Peer Review Practices of L2 Doctoral Students in the Natural Sciences
Peer Review Practices of L2 Doctoral Students in the Natural Sciences

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My support team

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Abstract

The aim of this dissertation is to contribute to the picture of second language (L2) writing in higher education by describing how a group of L2 doctoral students in the natural sciences uses online peer review (PR) in a research writing course. Writing research articles in English is a required part of doctoral studies for most programs in the natural sciences in Sweden. However, genre specific writing instruction for doctoral students is extremely limited. A potential source of help can be peers who are involved in the same writing tasks. Research on the uses of peer review for university-level L2 writers has been conducted for over three decades, and the practice has been shown to help L2 writers with improvement of their texts, with identification of writing strategies, with insight into the rhetorical practices of academic writing, and with development of confidence and agency. Less researched, however, are the ways L2 peers might use review at the graduate level, how the practice might mediate genre learning, and how the practice may be used differently in a non-native English speaking setting compared with English dominant settings.

Participants in the studies were doctoral students working at the Swedish University of Agricultural Sciences who took part in an elective research writing course. The goal of the course was for writers to complete a research article. Two groups of 15 students from different years used online peer review on the five sections of a traditional research paper. Half the participants were Swedish and the other half came from other non-native English speaking countries. The peer review comments given and received were analyzed and classified for 11 participants in order to find the focus of the comments. To better understand the perception of students’ use of the PR activity, pre and post course interviews were conducted and inductively analyzed. Furthermore, three students’ revisions were analyzed in detail to explore the ways they used the review comments. Learning was understood to occur as instances of languaging and noticing.

Findings from the combined studies suggest that when giving review, participants’ adopted roles influence what they notice, analyze and language. Roles constrained and mediated participants’ learning, and steered the reviewers’ focus. The reviewers focused most on the lexical and syntactic precision of peers’ texts, but also on the organization, cohesion, voice, stance and research knowledge. Correctness comments were minimal.

When receiving review, participants used the intent of the comments approximately 40 percent of the time, but this usage reflected only a small portion of the writers’ revision activities that occurred in response to review. Other activities included composing, re-writing, investigating, interviewing outsiders, and re-ordering the texts. Writers valued the organizational comments most highly, and used the precision comments most extensively. Review comments about research knowledge were used even when given by those from different disciplines. Voice and correctness comments were less appreciated.

Participants were strategic about peer review, both in their roles as reviewers and receivers. Unlike some past findings, participants did not appear to have troubles working with peers with different L1s and educational cultures, nor did they become confused with peers’ incautious comments. Findings from these combined studies indicate that peer review can be a potentially powerful tool for doctoral students to familiarize themselves with discipline-specific discourse, perhaps even more so in non-native English speaking work environments.
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1 Introduction

The perfect storm. When we hear that expression there are perhaps few people who have visions of graduate students staring desolately at empty computer screens. However, doctoral students who are researching for the first time, writing for publication for the first time, and trying to write in a foreign language might express their circumstances as the perfect storm. The career of a researcher in the natural sciences is welded to the individual’s ability to not only conduct research that others in her field find worthwhile, but to communicate that research according to institutional and disciplinary writing conventions (Cotterall, 2011; Montgomery, 2013). Doctoral students who must publish in academic journals are writing high stakes texts, texts that can sink their careers. Understandably, these texts are associated with anxiety (Wellington, 2010), and such writers do not typically need to be convinced that it is in their interest to learn how to write in English. Still, students are seldom aware of the written conventions and practices of their disciplines (K. Hyland, 2013), and learning to write this kind of text requires a subtle collection of skills that is not immediately transparent to the novice writer. For example, to succeed the doctoral student must become familiar with the debates and assumptions of her or his discipline in order to write with credibility (Lea and Street 98), which must then be demonstrated by authoritative writing about the epistemologies and unspoken agendas of their disciplines (Tardy, 2005). They must develop an authoritative persona in their writing (Cotterall, 2011; L.-J. Li & Ge, 2009). For doctoral students who learned English as a foreign language, this can mean that they must alter their academic writing identities from their voice they use in their mother tongue (L1) to that which is expected of their second language (L2) (Hirvela & Belcher, 2001). This development of academic literacy is a long-term process (Fenton-Smith & Humphreys, 2015).

Research writers are expected to comply with the genre expectations of their discourse communities, but the majority of doctoral students have had little experience with such genres (Torrance, Thomas, & Robinson, 1992). Explicit instruction can lead graduate students to a better understanding of discourse expectations (Diane D Belcher & Hirvela, 2005); however, subject teachers often assume that disciplinary writing is a matter of common sense (Lea & Street, 1998; K. Hyland 2013), and as a result, literacy requirements and understanding of academic genres are often not explicitly taught.

This problem has not gone unnoticed by research universities and the field of Second Language Writing (SLW). Research has begun focusing more on the challenges of L2 graduate writing, looking for ways for universities to most
effectively use their resources to provide assistance to this growing population of students. One common practice in higher education in some countries is the provision of generic writing courses identified as English for Academic Purposes (EAP). These courses focus on the most common rhetorical, syntactic and lexical expectations of academic English. A recent study that supports the use of EAP courses for L2 graduate students found that in a specially designed writing course, participants were shown to improve their abilities to structure their texts, to use more precise and nuanced academic vocabulary, and to improve their grammatical accuracy (Neomy Storch & Tapper, 2009). Other studies have shown EAP courses to be less beneficial for L2 graduate students because of the limited focus on discipline-specific genres (Faigley & Hansen, 1985; K. Hyland & Hyland, 2006). One study showed that these conclusions about the limited benefits were shared by faculty members in engineering and business, who claimed that general writing classes did not serve the larger task of discipline-specific writing (Zhu, 2004). Limited benefit was also the conclusion of L2 writers of discipline-specific texts who did not either think their EAP instructors could give them the feedback they needed (Ilona Leki, 2006b). EAP classes are an attempt to address some of the difficulties that L2 doctoral students have in writing in English, and the existence of such courses demonstrates that universities are aware of this problem.

More recently universities have begun approaching the problem in a more systematic way, trying to catalogue the academic benefits of different learning approaches. One example is a study by Fenton-Smith and Humphreys (2015) who conducted a nation-wide survey of Australia’s language learning specialists in tertiary institutions in order to identify best practices for supporting L2 graduate students with their writing. Findings identified some key components of quality writing support. These included discipline specificity of the initiatives, individualization of instruction, and engagement by the academics in the disciplines for team teaching (Fenton-Smith & Humphreys, 2015). These findings are supported by earlier studies (Harris & Ashton, 2011; Stratilas, 2011).

What is noticeable about these findings is the importance of discipline specificity. Mediation of genre specific knowledge requires that novices participate in their disciplinary circles, preferably in the forms of mentorships with their supervisors (Tardy, 2005). The most helpful practice that has been identified in connection to this participation in disciplinary literacy is for doctoral students to receive feedback on their texts (Caffarella & Barnett, 2000). Feedback is defined here as information that is provided to a writer concerning his or her performance or understanding (Hattie & Timperley, 2007). Feedback is critical to graduate literacy development (Ilona Leki, 2006b), and also for L2 writers’ lexical and syntactic development (D. Ferris, 2003). Even in the previously mentioned study
where an EAP course was found to benefit L2 graduate student writing, the researchers pointed out explicitly that the students’ gains were likely a result of instructors’ targeted feedback on student texts (Neomy Storch & Tapper, 2009), in other words, a consequence of the writers’ performances. Feedback matters for L2 graduate students’ writing.

Although research shows that feedback is critical, research also shows that doctoral students often have limited opportunities to get this help from their supervisors since the focus of the negotiated project is often on publication. According to a study by Cotterall (2011), students can be reluctant to request the kind of writing help from their supervisors that would lead to learning about writing as a practice, and supervisors may not embrace their pedagogical role as writing guides. Another writing researcher points out that supervisors who are second language (L2) English users themselves often use hit-or-miss strategies in their own writing (Diane D Belcher, 2007), which does not bode well for L2 graduate students looking for writing help in English. Another problem connected to supervisory feedback is the nature of the interactions, where supervisors respond primarily to the most obvious negative and positive features of the text, resulting in a situation where the occluded text features are often unattended to. Such occluded features must be taught explicitly (K. Hyland, 2003), a situation that is less likely to occur if writing assessment happens on an ad hoc basis (Pecorari, 2006).

If the type of feedback is one serious problem, lack of feedback is another. Research has shown that in general, content instructors do not typically comment on language use in writing assignments (N Storch & Tapper, 2000). Dissertation supervisors have assumptions that differ widely from one another regarding scholarly autonomy and regarding the amount of help they should provide to students writing their dissertations (Johnson, Lee, & Green, 2000). In fact, in many communities students are expected to learn the communicative discourse practices of their discipline on their own (Lee, Aitchison, Boud, & Lee, 2009). One study found that those doctoral students who have the additional constraint of writing a dissertation in an L2 tend to not ask for more help from their major professors than was volunteered (Ilona Leki, 2006a), and in a study where such L2 graduate writers did seek more help with their writing, they still received less help than NES students, even though advisors seemed not to notice the difference (Dong, 1998).

If feedback has been shown to be one of the most important components of learning a new written discourse in an L2, but availability of feedback is limited, it may be constructive to turn to other sources of feedback. Research has shown that L2 academic discourse socialization is not limited to mediation via institutional experts, but can also be mediated by social networks (Zappa-Hollman & Duff,
A social network available to many doctoral students is the doctoral students’ peer groups who are within similar disciplines and who are writing their own texts with similar genres. A pedagogical activity that can enhance activity among L2 writers’ social networks is peer review (PR).

The ways in which L2 peer review may serve the purposes of doctoral students gaining discourse awareness is a question of importance. Although a great deal of research has been conducted on L2PR, surprisingly little has been conducted on L2 graduate-level students. According to a somewhat dated conclusion by Leki (2006b), there is little research that distinguishes between the feedback practices of the L2 graduate student and that of the L2 undergraduate.

The possibility that peer review could help L2 doctoral students to more effectively enter their discourse communities is the focus of this research. This dissertation will attempt to bring more clarity to the picture of the PR of advanced users of English who are learning the discourse of their future professions. This dissertation explores the possibility that peer review may be able to mediate discourse constructs for the L2 participants of a research writing course that is comprised of students with different L1s and different research backgrounds. It partly answers the call for expanded research on L2 writing that is tied to FL writing populations, and also helps clarify the picture of feedback in settings that extend beyond L2 writers on NES campuses participating in feedback in writing courses or writing labs (Manchón, 2009).

1.1 AIMS

The larger aim of the work is to contribute to the picture of L2 writing education by describing a local form of language knowledge and teaching (Cumming, 2010). Specifically, the research will explore the ways a group of L2 doctoral students in the natural sciences uses online peer review, and further, to explore if and perhaps how the students’ use of peer review (PR) mediates their learning of the genre of the research article. Research questions include the following:

- What is the focus of these doctoral students’ review comments?
- What do the doctoral students say that do when they give review?
- What do the doctoral students say that they do when they receive review?
- What do participants’ revised texts in combination with their description of PR activities and personal histories indicate about the way the receivers use peer review?
- How do the doctoral students’ practices as found the combined studies suggest learning of the research article genre?
These questions will be addressed in the four different studies that make up this dissertation.

1.2 THE LOCAL PROBLEM
A substantial amount of research concerning Peer Review (PR) has been conducted in academic environments where English is the language of use in the surrounding community. However, non-native English speakers around the world must publish their studies in English, and these individuals are often educated in doctoral programs that are housed in NNES environments. To contextualize the nature of the problem associated with learning written discourse practices in NNES environments, I will describe here the setting of the current study. This description is not an attempt to describe what is “typical” of NNES doctoral settings around the world, but the description can serve as a contrast to the assumptions often used as starting points for other PR studies.

1.2.1 Sweden Demographics and Higher education
Sweden is a country of 9.8 million people. Whereas Sweden was once a relatively homogeneous population that, immigration has changed that considerably. Currently, over 20 percent of Sweden’s population is considered to be of “foreign background” according to the national agency responsible for statistics (SCB), meaning people who were either born outside of Sweden or who have two foreign-born parents. Since Sweden has no census regarding inhabitants’ mother-tongues, this figure of 20 foreign background is one kind of rough estimate of those who have a first language other than Swedish. Of children whose parents are both foreign born, it is estimated that 20-25 percent of them have a language other than Swedish as their first language (Parkvall, 2015). The last two decades have changed the linguistic landscape in Sweden from a country where Swedish was typically the mother tongue of the country’s inhabitants to a country that now has approximately 200 languages in use as mother tongues (Parkvall, 2015).

As all countries, Sweden has its own history concerning use of English. For many decades, Sweden as a nation has had a reputation of having a population proficient in English and was considered to have an advantage with English already in the 1970s and 1980s when other EU countries struggled with English (Oakes, 2005). Sweden Instruction at universities in Sweden today is commonly conducted in English at the advanced levels. A national survey from 2009 found that two-thirds of the Master’s programs in Sweden were taught in English and about 28 percent of the research and teaching staff at Swedish institutions of higher education have foreign backgrounds, in other words, those who either come from other countries or have two parents who are non-Swedish (SHEA, 2015). Textbooks used are
commonly written in English, even when the language of instruction is Swedish (Bolton & Kuteeva, 2012).

Even more entrenched in English are the natural sciences at Swedish universities, which account for 10 percent of the undergraduate and masters programs in tertiary institutions as counted by FTEs (SHEA, 2015). In a recent survey at Stockholm University, 75 percent of the science students who were surveyed reported that English was frequently used for lectures, 64 percent of them reported frequent use of English in seminars, and 65 percent of them reported frequent use of English for labs and workshops. These figures in the sciences are significantly higher than what was reported by students in the social sciences and humanities. Even higher figures were found for Master’s programs in the sciences, where 79 percent of the science students reported high use of English, again, much higher than in the other faculties. Of importance to the current research is that already at the Master's level, 92 percent of the students reported that the reading materials were mostly in English (Bolton & Kuteeva, 2012).

As concerns students’ self-reported abilities to express themselves in English, 26 percent of the Master’s science students felt that they could communicate about science more proficiently in English than their L1. Of the science faculty, 44 percent reported that they were more capable of expressing themselves in English when it pertained to their subject area (Bolton & Kuteeva, 2012). These figures for undergraduate and Master’s programs in the sciences are important in the contextualization of doctoral students’ work in English when they are in the natural sciences. It reflects not only the background that the Swedish doctoral students would have been exposed to earlier in their education, but also the language setting that the international doctoral students enter.

Finally, a look at the figures for doctoral education in Sweden portrays an enclave of English use in more recent years. According to figures provided by the Swedish Higher Education Authority 2015 status report (SHEA, 2015), there have been between 18,000 to 20,000 doctoral students studying in Sweden over the past 10 years in any given year, and approximately a third of all doctoral students in this period come from other countries. About a quarter of the total number of doctoral students in Sweden work in disciplines within the natural or agricultural sciences, of which percent write their dissertations in English (Bolton & Kuteeva, 2012). These figures draw a picture of doctoral studies in the natural sciences in Sweden. A combination of Swedish and international students typically study and work to become researchers over a four to five year period of time, reading and writing in English.
1.2.2 Local Context
For 15 years I have worked as a writing tutor at Umeå University, representing the Department of Language Studies and the Office of Student Services. I worked with doctoral students in 17 departments. What follows is a narrative description of my understandings of doctoral conditions in the natural sciences as based on my years working in Umeå’s doctoral programs. Doctoral students in these departments were assumed to know how to write when they entered their studies; however, unlike universities in North America, writing classes at the university level are not provided. Furthermore, although the doctoral students in the sciences had exposure to scientific English through reading in coursework in their undergraduate studies and through international journals in their particular fields, few had written anything in English since high school.

In the current study, only half the participants had a background from the Swedish education system. The other participants came from African and other European countries, each student having a different background regarding his or her education in writing, in the genres of scientific writing, and in English. What these non-Swedish doctoral students share is their non-Swedishness, which is perceived of as a constraint according to the national union for doctoral students. Courses, documents, employment information and instructional opportunities are more limited for non-Swedish doctoral students (Skarsgård, 2015), a situation that is seen as limiting their access to academic services.

Doctoral students in Sweden are not immersed in English in the surrounding community in the ways they would be if they studied in a country where English was a primary language. Doctoral students do not either typically have easy access to native English speakers who can model professional English for them at the university. On the other hand, because it is common in departments of natural sciences to employ non-Swedish faculty, post-doctoral researchers and doctoral students, English is often the Lingua Franca of graduate seminars and lectures. The typical work environment for Swedish doctoral students is to communicate in English when there are non-Swedish speakers present, and to use Swedish sprinkled with English when communicating with Swedish speakers. For the international doctoral students, they typically speak English among themselves and with Swedes. Scattered throughout these multilingual work spaces is typically a small number of native English speakers who doctoral students might turn to for help with their English. However, such individuals are rarely language experts or writing instructors, and there is little incentive for these individuals to assist graduate students with English difficulties.

Finding help with English writing is a challenge at most universities in Sweden compared with services available at Australian and North American universities.
A common place for a graduate student to go for help with English writing would seem to be departments of English. It should be emphasized, however, that in Sweden a department of English is a department of foreign language. The primary focus of English departments at universities in Sweden is the study of literature written in English, English linguistics, and in some instances didactics and cultural studies. According to the national registry of university courses, there were only ten writing courses for fall 2015 in Sweden that focus on general academic writing or research writing in English, and only two of these were specific to natural sciences.

1.2.3 Doctoral studies at SLU

The doctoral students who comprise the current studies work within the Swedish University of Agricultural Sciences (SLU), a university ranked as the best Swedish institute of higher education for doctoral education in natural sciences according to a respected organization that bases its ranking on 27 indicators (Urank, 2014). In the 2016 Times Higher Education rankings of small universities, SLU was ranked sixth in the world (Minsky, 2016). SLU is categorized as a research institute of natural sciences along with 14 others in Sweden. According to its own figures in its International Prospectus for 2015/2016, SLU has 715 PhD students, 965 teachers and researchers, and 272 professors. SLU’s webpage states that 70 percent of the university’s activities are connected to conducting research ("International Prospectus 2015-2016," 2015).

The language policy document for SLU is based on the national policy document for language use in Sweden. SLU has as major goals to work in an international climate, where research and doctoral studies are tightly connected to international research institutes and universities. A critical goal is to maintain doctoral studies that are attractive to international candidates. According to SLU’s language policy, students are to be provided with both language support and writing support in their education (Språkpolicy för SLU, 2010). Developing competence writing in English is emphasized for doctoral students. The summary document about doctoral education at SLU explicitly states that one of the six primary learning objectives for doctoral students is to write reports and research articles (SLU, 2015).

Despite these policy documents and webpage descriptions, SLU’s writing support for texts written in English is limited. The only general research writing course for writing in English is the one represented in this dissertation, which takes in 15 doctoral students per year. The other source of such help is a language support lab opened in the library of one of the campuses in the autumn of 2015. According to the website, there are three 50-minute slots a week that are available students to
receive help (Studieservice, 2015). Currently, three SLU students may receive help per week at the writing support lab.

In summary, doctoral students in the natural sciences must publish their research in English in order to complete their PhDs and to succeed in their careers as researchers. Research has shown that learning the genre of the research article is particularly difficult because of the lack of literacy mentoring doctoral students receive. Writing a research article in an L2 is an extra burden for doctoral students, and those who do their doctoral work in NNES societies have a different set of constraints compared with those in NES societies.
This chapter will describe research that informs the questions and interpretations of the studies in this dissertation. The first section describes the disciplines that have influenced the focus of peer review studies in second language writing research, the second section will look at the research about reviewers' activities, and the third section will look at receivers' activities.

2.1 Peer Review in Various Educational Communities

Peer review in this dissertation is a term that is used to describe studies that investigate peer feedback, peer critique and in some instances, peer assessment, the last mentioned being included when the emphasis includes students' efforts to help improve a peer's text in a formative task. Peer review can be seen as a practice that is part of a larger pedagogical category of “peer learning.” Peer learning is understood to be qualitatively different from what occurs between a teacher and a student.

According to a review of studies on peer learning that covers 25 years, peer review is considered common in the pedagogical practices of a wide variety of disciplines, including engineering, geography, computing, psychology and business (Topping, 2005). The starting assumption of PR as a pedagogical tool is that collaborative activity will enhance learning more than will working alone (Ohta, 2000; Neomy Storch, 2002; Swain, 2000). PR is an activity that allows the reviewer and the receiver to mutually scaffold one another’s writing (M. De Guerrero & O. S. Villamil, 2000; Donato & McCormick, 1994)(K. Topping, 1998). The potential for scaffolding in PR activities is considered to be high even in instances where both participants in the PR are novices (Antón & DiCamilla, 1998; Villamil & De Guerrero, 1998).

The next section explores some of the research traditions that have informed our understanding of PR as a pedagogical activity for second language writers.

2.1.1 PR in Composition and Rhetoric studies

A significant amount of early research on writing instruction and peer review in academic English comes from the discipline of Composition and Rhetoric (C&R), a discipline whose beginnings are marked at America's literacy crisis in the later 1800’s. In response to students' insufficient training in writing in secondary schools, composition classes were mandated in US universities. The writing classes emphasized exposition, argumentation, and logic, and aimed to develop general writing skills (Bazerman, 2005). The connected research tradition that investigated the instruction and the writer activities established itself in the 1980’s,
the primary work being conducted by researchers in English education programs. The research aimed at developing an empirical basis for pedagogical practices in writing instruction.

Instructional practices in C&R in North American universities have been strongly informed by a process writing pedagogy since the middle of the 20th century, a pedagogy based upon procedures that professional writers use (Pritchard & Honeycutt, 2006). Early instructional practice (1963-82) was built around the idea that teachers’ roles were to facilitate the process of writing rather than provide direct instruction (Hillocks, 1984). The pedagogy is broken into steps of prewriting, writing and rewriting. According to common practice, response groups meet to give verbal feedback to one another between prewriting and writing, and between writing and rewriting (Pritchard & Honeycutt, 2006). Because of this early use in North America of process writing in elementary schools, PR was a common educational practice in North American elementary and secondary schools before tertiary institutions adopted it as a practice (Nystrand, 1984).

The importance of peer review in process writing was given a further boost as a result of Flower and Hayes’ development of a cognitive model of writing processes (Flower & Hayes, 1981) which perceived composing as a form of problem-solving. This shift to a more cognitive focus would ultimately change university-level composition instruction in North America (Raimes, 1991), where praxis became more recursive than in earlier writing models, requiring students to write multiple drafts. The motivation for multiple drafts as informed by feedback is that the writer’s recursive activities move her toward a clearer understanding of what she intends to say.

The role of the reviewer is to analyze the writer’s text and to offer explanations for suggested changes (Flower, Hayes, Carey, Schriver, & Stratman, 1986) which will give impetus to the writer both to learn what she is trying to say, and to reformulate her work to best approximate what she is trying to say (K. Hyland, 2003). Peer review in this tradition has been seen as a critical step in revision (K. Hyland & F. Hyland 2006), which is particularly evident in tertiary education in North America (Pritchard & Honeycutt, 2006). University students engaged in L1PR benefit by becoming more aware of text organization and appropriateness of language, enhancing their critical reading skills, developing understanding of their own writing processes, improving their revision skills, and building their confidence as writers (Nystrand & Brandt, 1989).

The history of composition instruction in North America is important in the larger narrative of peer review research. Early research findings and foci that dominate discussions about PR are tightly connected to review practices as found in North
American freshman composition classes (Cho, Schunn, & Charney, 2006). This influence is seen in the literature reviews of L2PR research, where key figures in L1 composition and L1 PR are typically cited as starting points by L2PR researchers (Cho et al., 2006; G. L. Nelson & Murphy, 1992; Paulus, 1999; Zhang, 1995). PR studies in this tradition explore the kinds of comments students give and what students do with comments that they receive. Common strands of research foci include the ways peers comment compared with instructors, finding that peers comment more as typical readers (Smith, 1997). Studies show ways that the students benefit by reflecting upon and critiquing peers' texts (Smyth, 2004) and how they transfer skills they had learned during the activity of reviewing others' texts to the review of their own texts (Bruffee, 1984; Hooper, 1992). Research explores how writers are affected by the knowledge that a wider audience would be reading the texts, finding that writers are more careful with their writing than when they write only for their instructors (Kerr, Park, & Domazlicky, 1995). Research also explores students' attitudes about PR, finding that they are mostly positive about the activity (L. Li & Steckelberg, 2005; Jianguo Liu, Pysarchik, & Taylor, 2002), though some research finds that students are more positive about PR when it is anonymous (dLu & Bol, 2007).

The understanding that peers’ ideas can instigate new ideas for the writer is a fundamental construct that underpins PR in all areas of PR inquiry, and is an idea that was generated early in the L1 Composition and Rhetoric tradition. Peers are able to detect incongruities (Sommers, 1980), to show the writer when there is a misconstraint between what the writer is trying to mean, and to illuminate what the reader understands (Nystrand, 1989). Peers’ ideas are valuable, particularly when students have been trained in PR (Nystrand, 1984).

### 2.1.2 PR in Disciplinary Communities

Texts differ among discourse communities and differ among social functions within communities. Academic writing is considered to be specific to a discipline, reflecting a way of thinking that includes a discipline's ontological perspective, its epistemological assumptions, its methodological practices, its taxonomies that reflect their manner of classifying the world, the ways in which information is interpreted and reported, and the manner in which collective literature is synthesized.

Students must not only understand the discipline conceptually, but they must understand it rhetorically (K. Hyland 2013). A researcher participating in a community of practice must make a multitude of decisions when constructing the text, decisions that reflect the specific requirements of the discipline. The specificity of features as they relate to a discourse community is described as
situatedness of literacy (Prior, 2006). The broadening recognition of situated literacies influenced some writing instructional communities and writing researchers to look toward a more sociocultural framework rather than fully embracing a cognitive writing focus (Silva & Leki, 2004). The cognitive writing focus does not strongly profile genre in its model (Flower & Hayes, 1981), but views it as a constraint (Nystrand, 2006).

Responses to a more sociocultural perspective of writing instruction has taken a number of forms. L1 writing instruction developed Writing Across the Curriculum (WAC) pedagogies and Writing in the Disciplines (WID) pedagogies. L2 writing instruction developed English for Specific Purposes (ESP). These pedagogies actively instruct discourse communities’ written artifacts (Prior, 2006), referred to here as genre. Advocates of such pedagogy maintain that illumination of genres can even serve to transform a writer’s thinking. So rather than genre simply becoming a target, genre becomes a heuristic tool that shapes the ways the writer understands the writing task (Bazerman, 2005; Klein, 1999). The potential for genre pedagogy to help graduate students is particularly meaningful, since these students are writing high stakes texts under limited timeframes (K. Hyland, 2007).

Research conducted in connection with WAC, WID and ESP includes investigation of text types within in the sciences, which in academia is tightly linked to scientific writing in the professions (Russell, 1997a). Such explorations of scientific texts include historical research where scholars explore critical texts, for example those written by Darwin (Campbell, 1986), Gallileo (Pera, Shea, & Montuschi, 1994) and Newton (Bazerman, 1988). Modern versions of critical texts are explored by genre scholars and published in such journals as English for Special Purposes and English for Academic Purposes. Such explorations of what is distinct in disciplines’ texts serve the purposes of writing pedagogy, where writing instructors illuminate discipline-specific text features as identified in the genre investigations. This model is considered to be particularly helpful in SLW pedagogy, partly because disciplinary writing is seen to be more challenging for L2 writers who may not have had sufficient exposure to genre-specific texts written in English (Hyland 2013).

The role of PR differs in genre pedagogy as compared with writing process pedagogy. In genre pedagogy, PR focuses partly on the nearness to the genre that the existent text has come. From a practical standpoint, a model of the genre has been studied, discussed, analyzed, and defined. The writers construct their texts in awareness of the genre features, then turn them over for review. A reviewer is essentially part of the social context, a participant in the community who also has a relationship with the genre (K. Hyland, 2003). The reviewer can potentially help the writer with the structure of the text, as recognized in familiar move sequences.
They can comment upon language variation that may not conform to the reviewer’s view of formality, stance or distance. These are some of the primary expectations of what we might find in PR activities.

The PR studies that are most relevant in connection to genre pedagogy for the current group of students is PR within science education, and its more professionalized branch, English as used for scientific purposes (EScP).

Writing in science education holds a double role as both mediator of disciplinary knowledge and also mediator of appropriate forms of disciplinary conversation (Hyland 2013). Peer review as used in science education is used in a similar way, that is, to enhance students’ understanding of key constructs, and to instruct students on a critical literacy practice within the professions (Blair, Cline, & Bowen, 2007; Jianguo Liu et al., 2002). Using PR to develop students’ understanding of key constructs within sciences is premised on languaging. Students gain understanding of key concepts and patterns when they put language to thoughts, deepening their own understanding of constructs when they explain and elaborate such constructs to others (Amy, 2003; King, 2002; Pelaez, 2002; Slavin, 1996) and when they produce multiple drafts (Trautmann, 2009). Findings on use of PR in this tradition suggest that it motivates science students (Hiltz & Wellman, 1997; Sullivan, Brown, & Nielson, 1998) and encourages reflection, particularly when the reviewer’s understanding of a construct conflicts with the writer’s ideas (Pelaez, 2002).

Another pedagogical use of composing and PR in science education is connected to science’s particular forms of critical thinking as associated with disciplinary enculturation (Jianguo Liu et al., 2002; Topping, 2005). Expectations include students’ intellectual commitment to a position in a discipline-appropriate form of writing which is then opened to scrutiny via peer review. This activity reflects the usage of writing and PR within the profession of scientific research (Blair et al., 2007; Kern, Saraiva, & dos Santos Pacheco, 2003; Koprowski, 1997; Jianguo Liu et al., 2002; Trautmann et al., 2003).

In the professional world of science researchers, writing and PR is used as a heuristic tool for the individual to develop scientific knowledge, to co-construct knowledge, to assure quality, and to mentor others into professional science. These activities were explored in work by Latour and Woolgar (1986) who detailed the writing practices of researchers in a scientific lab from a pragmatic perspective. Their research followed the chains of text creation and literacy activities of the workers, tracing the ways scientists use literacy practices in the construction of claims and knowledge building. This writing included scribbled notes in the lab, memos to one another, labels and messages. Such informal literacy practices
advanced the science to more formal lab reports, drafts, revisions and eventually research articles. This collaborative, continuous writing and peer checking was the primary form of constructing knowledge (Woolgar & Latour, 1986).

In the pedagogy that focuses on the critical literacy practice of PR, instructors ask students to focus upon the tasks required by professional research review, including the soundness of the actual science, the significance of the objectives, the rigor of the hypothesis, the appropriateness of the methods, and other factors of relevance to the actual research being conducted. In other words, students participate in peer review in order to experience a critical literacy from their future profession (Blair et al., 2007; Cathey, 2007; Kern et al., 2003; Jianguo Liu et al., 2002).

Writing instruction as connected with the sciences focuses on discourse features of scientific writing as connected to critical thinking in the sciences. When combined with needs of second language writers, components of such instruction include practice in oral communication, reading, writing in the sciences in English. Language skills are seen as critical to the L2 science student who relies on such skills in order to develop their scientific knowledge. Particular to writing, such instruction focuses on the language needed to evaluate, describe, summarize, analyze and report the scientific content (G.-Z. Liu, Chiu, Lin, & Barrett, 2014).

2.1.3 Peer Review in Second Language Writing
Second language writing (SLW) is an interdisciplinary field that for over 40 years has combined research traditions drawn from applied linguistics, behaviorist psychology, and composition studies. The theories of these disciplines have affected the research foci and the pedagogical practices that developed (Silva & Leki, 2004). Over the decades, the field has broadened to explore the many ways that learners, cultures, languages, texts, practices, proficiencies and pedagogies affect people’s writing in an additional language (D. D. Belcher, 2009; Cumming, 2010). Because of the great diversity of writers, texts and forms of literacy, research has come to emphasize what is unique as much as what is the same (Sasaki, 2012). As a result, there is still little consensus about what its most fundamental issues are (Matsuda, 2013), and there is substantial pushback in the question of a meta-theory (Cumming, 2010).

Peer review practices were introduced to second language writing pedagogy from L1 pedagogy in the 1980s (Zamel, 1982). The L2 writing pedagogy community was slow to embrace writing process methods, including PR, because at that time the pedagogical focus was primarily still on linguistic form (Chauldron, 84). Almost 15 years later, L2PR still seemed to be on the margins, as established researchers described the practice as seemingly controversial (G. M. Jacobs, Curtis, Braine, &
Huang, 1998), stating that PR was not likely effective with L2 writers in the ways that it was effective for L1 writers (G. L. Nelson & Carson, 1998). Despite these research findings, PR as a practice in ESL writing instruction was commonplace already 25 years ago (Paulus, 99).

Eventually, peer review came to be seen as a means to provide feedback for L2 writers’ multiple drafts, where the writer could better understand the effect of her text on the reader. The language development benefits of collaborative learning were emphasized, as was improved reader awareness, and enhanced learner autonomy (Carson & Nelson 1996; Mendonca & Johnson, 1994; Min, 2006; Paulus, 1999; Tang, 1999; Tsui & Ng, 2000; Villamil & Guerrero, 1996; Tang, 1999). Research investigations expanded to consider the effects of PR on the text, on the writer and on the reviewer.

Peer review research is embedded in research traditions about second language writing. One tradition derives from Structuralism, where texts are judged by their formal properties such as syntactical complexity, grammatical accuracy, and formal conventions. Structuralism held a dominant position in SLW research, as evidenced by the many studies informed by contrastive analysis and error analysis, both of which are informed by a structuralist tradition and both of which are apparent in L2 writing research today (Silva & Leki, 2004). Instructional practice informed by Structuralism emphasizes commentary from the instructor, since feedback has long been perceived as a means to enhance linguistic correctness and rhetorical appropriateness (Bitchener, 2008; Bitchener, Young, & Cameron, 2005; Ellis, Sheen, Murakami, & Takashima, 2008; D. R. Ferris, 2004b; Polio, 2012; Shintani & Ellis, 2013; Truscott, 1996). L2 student writers have been found to want this form of feedback from instructors (D. R. Ferris, 2004a).

The effects of feedback on linguistic correctness and rhetorical appropriateness has held such a dominant place in SLW discussions (Ferris, 2006; Truscott, 2009), that peer feedback has often been contextualized within this debate, the resulting question being whether student feedback could act as an adequate substitute for instructor feedback. Instructors were often skeptical concerning the use of PR for purposes of improving the linguistic correctness of L2 writers’ texts (G. Jacobs & Zhang, 1989).

Another tradition of SLW focuses more on the writer. This tradition is seen often in work within a cognitive paradigm of the writing process which had its beginnings in L1 writing research and which strongly influenced SLW research and instructional practice (Grabe, 2012; K. Hyland, 2011). The writing process model was often used as a starting point to explore variables that affect the L2 students’ writing; however, there were limitations of the L1 based writing model when
applied to L2 writers (D. Belcher, 1995; Diane Dewhurst Belcher & Braine, 1995; Cumming, 2001; K. Hyland, 2011). Studies began to look at the unique ways that writing develops for L2 users. Questions concern the ways their L2 limits their fluency in the writing, ways they transfer knowledge from their L1 writing traditions, how they develop their writing over time, ways their practices influence the quality of their texts, and ways that peer feedback can influence their writing practices and text quality. Such research has informed our understanding of how writing processes differ for the L2 writer.

Pedagogical traditions vary widely in L2 teaching praxis that is based on the cognitive models of writing, but even within these varied traditions, PR is a common practice. Teacher and peer response is considered critical in order to move the writer through another round of revision, though this feedback does not typically focus on the language the writer needs to accomplish the writing task (K. Hyland, 2011). Studies investigate a wide range of questions, for example the effect of PR on students of different language levels (Kamimura, 2006), the effect of discussing task procedures as an aspect of L2PR (De Guerrero & Villamil, 1994; Villamil & De Guerrero, 1996), the effects of the review process on participants depending upon the tool used (Jun Liu & Sadler, 2003), and the ways participants’ writing process competence develops as a result of mutual scaffolding (Donato & McCormick, 1994; Hu & Lam, 2010; Villamil & De Guerrero, 1996).

Another PR research focus that emphasizes the writer concerns emotions and identity of participant of L2 PR. Studies support the idea that PR encourages writers’ autonomy and active engagement (F. Hyland, 2000; Mendonca & Johnson, 1994) (Villamil & De Guerrero, 1998; M. Yang, Badger, & Yu, 2006). PR has been found to generate positive attitudes about writing (Min, 2005) and has been mostly reported to be collaborative (Villamil & De Guerrero, 1998). PR has also been found to foster self-awareness of students’ strengths and weaknesses (Tsui & Ng, 2000).

The third focus of writing research and SLW instruction is on the reader, described commonly as concerns of the discourse community. One strong area of research on SLW and the reader is genre research. Genre research looks at the communicative purpose of the type of text, its value in various contexts, and the ways writers’ can learn the genre (K. Hyland, 2011).

The traditions of research within SLW are broad, as are the instructional practices in SLW classrooms. Instructional practices have changed over the years, which has also altered the focus of peer review as a pedagogical practice. These broadening instructional approaches to SLW have mostly moved away from correctness and toward genre analysis, rhetorical practice and development of
disciplinary argument (D. Belcher, 2009), which in turn impacts the purpose of PR. The breadth of the field and diversity of populations can make it difficult to draw conclusions about PR in SLW. At its most basic, research continues to focus upon the effect of PR on writers’ revisions, the attitudes students have about PR, and how students interact under review (Kamimura, 2006). The question of whether PR can be effectively used in SLW must necessarily be followed by the question, effective for what?

2.1.4 Concluding Thoughts
Peer review practices in various disciplines are closely tied to the objectives of those communities. Rather than PR being seen as a generic pedagogical activity where assumptions translate across disciplinary borders, PR must be scrutinized as a particular practice which is entrenched in the activities of particular groups.

Peer review is not only colored by the objectives of the professional or academic community that practices PR, but it is colored by the individuals who are using the activity. The differences can be great, for example, between L1 writers practicing PR in composition classes and L2 writers practicing PR in composition classes. Though the objectives of the instructors may be the same for both groups as connected to PR, the use of PR by the L2 students differs.

2.2 Giving Peer Review in L2 Writing
In this dissertation PR is defined as information provided by a peer concerning the text writer’s performance or understanding (Hattie & Timperley, 2007). One of the aims is to investigate the relation between PR and learning the RA genre. The basic premise of learning genre through critically reading a peer’s text is that the peer’s text will scaffold the reviewer’s learning (Chauldron, 84). Though more research has focused on the receiver of peer review, both in the fields of L1 and L2 research, students have described the importance of giving review for their own learning, an observation that arose in one of the earliest studies of peer review by Partridge in 1981, as reported by Zhang (1995).

2.2.1 Focus of Comments
Peer review (PR) has been used in SLW for over 40 years (Zamel, 1982). Early research identified that L2 reviewers focused on surface language concerns such as grammar, mechanics, punctuation and spelling, (Iona Leki, 1990; G. L. Nelson & Murphy, 1992). Students focused on finding mistakes in one another’s texts rather than the content or the writing process (G. L. Nelson & Carson, 1998). However, numerous studies have since found that L2 reviewers focus on a wide range of text issues.
Numerous studies have shown that populations of L2 university student reviewers focus on the content of the texts, for example the writers’ ideas (Lockhart & Ng, 1995; Suzuki, 2008) the support arguments, and the detail (Kamimura, 2006). The ways in which reviewers focus upon the content was further explored in Lockhart and Ng’s (2001) study, where they found the content focus to be affected by the stance of the reviewer. PR dyads discussed content extensively in the four stances identified, but which content they discussed became a central difference. Some student reviewers focused on prescribed content that reviewers assumed was required, some reviewers focused on content they personally found interesting, some focused on whether the writer’s intended content matched the text, and some focused on co-constructing content. Though the focus of the research was on stances of reviewers, a peripheral yet vital finding is the ways in which the content is explored (Caulk, 1994).

Research has also explored the differences between L1 and L2 reviewers, one study reporting that the L2 reviewers attended to content twice as much as they did surface issues, while the L1 reviewers attended to surface issues twice as much as they did to content issues (Anderson, Bergman, Bradley, Gustafsson, & Matzke, 2010). This research challenged the notion that L2 reviewers focus more on surface level issues than L1 reviewers.

One area that L2 reviewers tend to not look at is larger organizational and rhetorical issues (Crookes, 1994; Hu & Lam, 2010; Villamil & De Guerrero, 1998) (Zhu, 2001), even though such comments likely provide the most help to L2 writers (Chaudron, 1984). Neglect of rhetorical focus is explained by Leki (1990) as a consequence of L2 students’ cultural expectations that they bring to a text which makes it more difficult for them to detect such problems. Another explanation for the lack of organizational focus is that less experienced L2 university writers were found in one study to perceive the form of texts in a non-static, immutable form, which led the reviewers to comment in a prescriptive way (Mangelsdorf & Schlumberger, 1992).

Not all research has shown L2s to be negligent regarding organization. Nelson and Murphy (1993) found that low–intermediate ESL reviewers gave similar comments to trained raters concerning problems with organization and development. In a study of German EFL university students, Caulk found that reviewers did focus on organizational issues and rhetorical form, but they tended to look at smaller units of text than what the instructor looked at (Caulk, 1994). Min (2005) also found that reviewers focused upon organization at the paragraph level after they had been given training.
Peer review activities within pedagogical practices often refer to students in dialogue about a text, what can be called an interactive mode. Early investigations of PR feedback at the university level were conducted on groups who use face to face (FtoF) encounters, where students typically prepare by reading through a peer’s text and possibly make marks on it, and then come together to discuss the text. This practice is noticeable in the early L2PR studies, as they explored how FtoF feedback allowed for negotiated meaning (Mendonca & Johnson, 1994; Tang, 1999) and opportunities to scaffold one another’s learning (Carson & Nelson, 1996; M. De Guerrero & O. S. Villamil, 2000). FtoF communication was sometimes judged as problematic for L2 populations due to discomfort surrounding hurt feelings (Tang, 1999), students choosing silence over suggesting critique in order to maintain group harmony (G. L. Nelson & Carson, 1998), and students acting aggressively (Allaei & Connor, 1990).

With the expansion of technological opportunities in education, some teachers began using computer-mediated (CM) alternatives to the FtoF mode of peer review. Researchers took interest in the ways computer mediation affected PR, finding that the different communicative tools influenced the PR activity (Ching-Fen Chang, 2012). Computer-mediated review has been found to lessen participants’ anxiety about giving critique face-to-face (Bradley, 2014; Ching-Fen Chang, 2012; Ho & Savignon, 2007), and remove anxiety about working in unpredictable discussion groups (Jun Liu & Sadler, 2003). Research found that L2 students’ negotiations improved as did their tendencies to cooperate (Chen, 2014). Students remained more focused, and stayed on task longer in the online condition (DiGiovanni & Nagaswami, 2001), and some studies found that students were more motivated and positive about PR that was conducted online (Jun Liu & Sadler, 2003; Sullivan et al., 1998).

The nature of the comments reviewers give online appear to be influenced by the aspects of distance and interactivity. Interactivity in the online condition includes studies that use the written synchronous mode, like chat forums, and also include oral synchronous mode, like skype or Adobe Connect. The interactions are distant but require or allow for fast response. In such environments students have been found to provide more comments on average in the same span of time allotted to the in-class groups (Braine, 1997; Jun Liu & Sadler, 2003), though they may also talk more about non-essential topics than in other modes (Ching-Fen Chang, 2012). One study showed that synchronous written PR resulted in revision-oriented comments as compared to FtoF condition, but the comments were of lower quality than in the F-to-F condition due to the reviewers’ lack of time in the
Recent studies found that in the online, synchronous mode, review comments on text development and organization dominated (Jones, Garralda, Li, & Lock, 2006; Liang, 2010) while another study found that revision-oriented comments were strong in the synchronous mode, noting that it was the potential for negotiations that encourage this (Ching-Fen Chang, 2012).

Compared with FtoF review, asynchronous computer mediated PR provides distance and more time for response, which lessens reviewers’ stress (DiGiovanni & Nagaswami, 2001). At the same time, it constrains interactivity, which may enhance on-task interactions in comparison to the synchronous mode (Ching-Fen Chang, 2012). One study that explored PR in this environment found that reviewers focused on larger text sections and on new ideas (Tuzi, 2004), and another found that L2 reviewers paid attention to content twice as often as they focused on language-related issues (Anderson et al., 2010). Another study found that students focused on both global and local issues in the online, asynchronous environment (Ching-F Chang, 2009).

In one study of L2 graduate students in engineering, research found that 80 percent of the reviewers’ comments were at the global level. In their own estimations, students described how asynchronous PR necessitated elaboration regarding reformulations and explanations, since there was little chance for the writer to ask follow up questions (Bradley, 2014). In a study that explored PR with a wiki, reviewers focused on content rather than linguistic accuracy in their collaborative learning. The researcher suggested that the tool itself promoted that focus (Kessler, 2009). The idea that a tool influences reviewers’ commenting is a conclusion that would be supported by the premise of tools carrying their own cultures, where people’s activities are influenced by the groups’ understanding of the tool (Thorne, 2003).

Comparisons among computer mediated conditions can be complicated because of the many factors that influence the groups’ use of the tools. An example of this is seen in two studies on asynchronous PR where students were found to give a great many surface-level comments (Ching-Fen Chang, 2012; Jun Liu & Sadler, 2003). These findings contrast with other studies on asynchronous PR where reviewers focus comparatively more on global issues, assumedly because of the extra time they have to consider their peers’ texts. On closer scrutiny it becomes apparent that the high number of surface comments in these two studies were connected with some of the editing functions in Word, which can account for the many changes at the sentence level in the asynchronous mode. Online PR can be
influenced by issues of modality, interactivity, distance, and the programs/tools used (ex wiki or Word). A summary of 20 years of research on L2 CMPR concluded that students participate more and participate more equally in technologically enhanced PR. They control the discourse better, negotiate more, and critique one another more. They remain on task more, write more, and feel less anxious. In the asynchronous mode, comments tend to be more precise and detailed (Chen, 2014).

2.2.3 Reviewers’ Influence on the Commenting

Peer review is about people being involved in an activity. Part of what will happen in the PR is connected to who those people are. This section addresses the research that describes how review differs in connection to the individuals who give them. The section looks first at the effects of the reviewers’ perceptions of themselves and others, the roles they are found to take, the homogeneity of the groups, and the participants’ familiarity with the PR practice.

Findings in L2PR studies are influenced by a multitude of factors, two of which are related to L2 abilities or perceptions of L2 abilities. In a study of two groups of Japanese university students using PR under like conditions, Kamimura (2006) found that the students with more advanced English produced fewer comments, but the comments were more global and attended to the overall structure of the text. Students with weaker English focused more on smaller sections of the texts. Students’ negative perceptions of their language abilities can deter them from giving critical comments (Liou & Peng, 2009), while students’ perceptions of their peers’ language abilities also influence the nature of the comments participants give. For example, some L2 reviewers appear to perceive others’ texts as problem-filled (G. L. Nelson & Carson, 1998; Villamil & De Guerrero, 1996), which leads these reviewers to give more prescriptive comments that focus upon correction (Mangelsdorf & Schlumberger, 1992). In another study with Chinese graduate students, those reviewers who were concerned about the L2 proficiency of their peers gave fewer revision-oriented comments and fewer valid suggestions (Hu & Lam, 2010).

Another more individual factor that influences the kind of review that is performed is the role that the reviewer adopts. Research has shown that students take on different roles and stances when they give comments. These roles influence what they comment upon and the way they comment (Lockhart & Ng, 1995). Two L2PR studies investigated roles that students adopted when they worked with peers who shared the same L1. Lockhart and Ng (1995) found that although all reviewers cooperated well with the writers, the reviewers took on roles that were classified as authoritative, interpretive, probing and collaborative. These stances were found to connect with particular forms of commenting. For example, those who had probing and collaborative stances provided information rather than opinions,
whereas those adopting authoritative and interpretive stances tended to give evaluative comments that attempted to alert writers to problems. In another study that explored interactions of their EFL students in face-to-face PR, Villamil and DeGuerrero (1996) found that the reviewers mostly adopted collaborative stances in their work together. They partly attributed this to the peers being able to use their L1 in the PR and that the students came from the same culture.

Other studies explored stances in groups where participants came from diverse cultures and L1’s. In an early study, Mangelsdorf and Schlumberger (1992) found that their ESL freshman composition reviewers acted in roles that could be described as prescriptive, collaborative and interpretive. They found that those reviewers who tried to see the text through the writer's eyes (collaborative) had better success in their own writing. Most of their participants, however, adopted a prescriptive stance, where they focused on the formal features of texts. Another ESL study categorized the interactions among peer review groups as interactive and cooperative, or non-interactive and defensive, again, categories that influenced the focus (G. L. Nelson & Murphy, 1993).

Stance is not described as a kind of immutable quality, but rather can be influenced by training and awareness. In a study of EFL English majors in Taiwan, Min (2008) found that that students’ pre-training reviewer stances were primarily prescriptive, as shown by their excessive focus on grammar correction. After extensive training, however, students adopted more collaborative stances which led to exchanges where they focused more on ideas. From the interviews, Min concluded that the roles of the reviewer should be versatile since different situations require different kinds of review (Min, 2008).

Qualities of individuals who are involved in the PR activity affect the nature of the PR activity. Somewhat different but perhaps obvious, it seems that the PR activity is affected by the composition of the group. One aspect of group composition that seems to affect the students’ commenting activities is the cultural diversity/homogeneity of the group. According to some research on the effect of culture on PR effectiveness, feedback can be affected by students’ cultural backgrounds (Carson & Nelson, 1996; F. Hyland, 2000; G. L. Nelson & Carson, 1998), but many of the conclusions about particular cultural stereotypes have been contested through later findings (Hu, 2005; Hu & Lam, 2010; Tsui & Ng, 2000; M. Yang et al., 2006).

Nevertheless, studies have supported the contention that a groups’ success at reviewing can be positively influenced by that group’s cultural homogeneity (Hu & Lam, 2010; Levine, Oded, Connor, & Asons, 2002; Lockhart & Ng, 1995; Villamil & De Guerrero, 1996). For example, one study compared the review and PR
negotiations of an Israeli EFL writing group to that of a multicultural ESL group in the US, both class constructions otherwise being made as similar as possible. Results showed that the culturally heterogeneous group gave more contentious comments and were less cooperative than the EFL group. The homogeneous group was more concise and less negative in their commenting, and when giving critique they were more specific and relevant (Levine et al., 2002).

Similarly, a study of Puerto Rican EFL peer reviewers showed how a homogeneous group worked cooperatively and enthusiastically even while focusing on text deficiencies (Villamil & De Guerrero, 1996). The researchers suggested that the success of the collaborations was likely a consequence of the shared cultural perception of such group work. In another study that examined PR dyads from the same culture, researchers described the ease at which participants communicated, even when the reviewers took very different stances (Lockhart & Ng, 1995). Finally, in a study of Chinese graduate students, researchers found the PR activity to be successful by almost all standards commonly investigated (Hu & Lam, 2010). The authors of all these studies suggest that the success of L2 PR was likely facilitated by the students’ similar cultural understandings, a dynamic which allowed for a different kind of commenting.

What may be difficult to tease apart in the above-mentioned studies is what part of the success was ease of similar cultural backgrounds, and what part was ease of using their L1s. In those studies where students could use their L1 to communicate about the L2 writing, interactions were made easy concerning the common functions required in PR such as requests for information, clarification, and argumentation (Hu & Lam, 2010; Kamimura, 2006; Levine et al., 2002; Suzuki, 2008; Villamil & De Guerrero, 1996; M. Yang et al., 2006). Such groups seem to rely a great deal on their L1’s as noted in study of the Puerto Rican students where 95 percent of the interactions of the review groups took place in Spanish, including problem solving, retrieving words in L2, developing ideas, and discussing pragmatics of the task. Researchers point out that participants’ use of their L1 served as a powerful tool in controlling the PR task (Villamil & De Guerrero, 1996). Similarly, in Kamimura’s (2006) study of Japanese EFL students, all PR was given in students’ L1, even though they were given the option to discuss PR in English. In this study, use of their L1 increased the number of negotiations over all.

The advantages of working in one’s L1 is emphasized when placed in comparison to studies where PR is conducted in the participants’ L2s. These studies show how participant differences in language competency can create problems for effective PR. One study explored a PR group where NNES students were blended with NES students, creating not only a mixture of L1’s, but a mixture where some students have a strong advantage of using their L1 to negotiate review that concerns texts of
that L1 (Zhu, 2001). Here the L2s were disadvantaged and the comments they gave reflect that. The L2 reviewers rarely initiated new topics, they elicited less information, and often “dropped” their point due to interruptions. Further, L2 reviewers gave no evaluative comments and almost no local feedback (Zhu, 2001). This form of L2PR showed how language abilities affect group dynamics, resulting in fewer comments provided by the L2 users and a different kind of commenting.

Some of the difficulties that accompany PR in groups with mixed L1s have been shown to be creatively solved when participants are given the choice of providing feedback in writing or orally. For example, in the Levine (2002) study, she found that Israeli EFL students who shared the same cultural and language backgrounds chose to negotiate their comments orally, assumedly because this was efficient and effective since they could use Hebrew. In comparison, the ESL group who were given the same possibilities for commenting, instead chose to give their feedback more in the written mode. Students chose the mode where they were best able to comment, in this case, the L2 commenters choosing to write rather than discuss (Levine et al., 2002). This idea is supported by Zhu’s (2001) findings where L2 reviewers gave fewer comments in the FtoF environment, but when given the chance to write their comments, their commenting was comparable to native speakers. These findings draw our attention both to the differences among groups as connected to their group characteristics, and to the ways that different forms of PR can more or less effectively work for such groups.

A factor that has been found to be meaningful to the success of the PR activity is participants’ previous experience with PR. Students who are inexperienced with PR can be anxious about their responsibilities as reviewers, as was shown in a study focusing on graduate engineering students in Sweden whose academic background did not sufficiently expose them to PR, in the students’ opinions (Bradley, 2014). Research suggests that students who are inexperienced in PR tend to give corrective comments and comments that are often summative and evaluative (Lockhart & Ng, 1995), while those with PR experience respond more to the message (Min, 2008). Familiarity with PR practices is not only connected with past educational experiences, however. Inexperience can be helped with training, as has been shown in a number of PR studies that show how training affects the kinds of comments that reviewers give.

In an early ESL study by Stanley, coached students provided more comments than un-coached students, and a wider variety of comments (Stanley, 1992). In a study on undergraduate and graduate ESL students, Berg found that those students who had training in PR made more revisions that were at a meaning-level than those who were untrained. Interestingly, this distinction was found to be so for students irrespective of their L2 language proficiency (Berg, 1999).
In one study that covered three years of PR training on various groups, Hu (2005) found that the PR of the untrained participants in her first group was, in the researcher’s words, “unsuccessful” as measured by students’ surface level focus, inappropriate comments, and students’ negative attitudes. Subsequent years, 13 research-informed training activities were added to the course, resulting in improved quality and quantity of review comments. Furthermore, students in the trained groups had very positive opinions about using PR (Hu, 2005). This is perhaps the most detailed example of change that is made possible by training. In another study, researchers trained students to participate in PR using a combination of instructional activities that had been developed and described in earlier research. (Liou and Peng, 2009). Again, conclusions were that students gave more global comments and revision-oriented comments after the training.

In contrast with more extensive training are practices where students are simply provided a rubric to fill in as reviewers. Such practices were investigated by Hyland who found that this kind of teacher-directed PR can undermine scaffolding that may otherwise occur when reviewers and writers are allowed more self-autonomy (F. Hyland, 2000).

There are a type of studies that may provide nuance to this picture of training being a necessary component for review to be effective. One study found that graduate students experienced in PR gave comments that differed little from inexperienced graduate students’ comments Hu & Lam’s study (2010). The finding suggests that L2 students at the graduate level may bring with them experience that prepares them for PR even if they have not be trained explicitly in PR. Other work suggests that graduate students maintain a different climate surrounding PR, one that is described as heavy-handed (Cho et al., 2006). This finding would support the idea that a pre-existing praxis regarding PR is in operation.

2.2.4 Benefits to the Reviewer

Though PR research has focused most often on the learning of the receivers of review, some studies have also explored the ways reviewers benefit from the practice. Early studies on L1 reviewers showed that reviewing their peers’ texts provided practice in critical analysis that they then applied to their own texts (Nystrand, 1989). This benefit has been found in numerous studies on L2 reviewers (Jianguo Liu et al., 2002; Min, 2005; Zhu & Mitchell, 2012). Essentially, by critically reading other students’ writing, reviewers get exposure to ideas and practices that can inform their own writing. Carefully reading allows students to see the problems and strengths of their own texts, and learn new ways to present data (Liu 2002). Furthermore, students report that they learn new vocabulary, phrases and other kinds of sentence structure (W.-C. Lin & Yang, 2011).
Reviewers have also been found to benefit emotionally from the practice. Early research showed that L2 PR develops students’ confidence and motivation for their own writing (Chaudron, 84). In particular, students who were less-advanced reviewers were found to gain confidence in their own abilities as they had more exposure to other students’ texts (Min, 2005). Students also report that their peers’ texts are inspirational for their own writing (W.-C. Lin & Yang, 2011).

2.2.5 Summary
It is difficult to predict the kind of commenting students will do when we only consider one variable, for example, competency in L2. Rather, commenting is likely affected by combinations of variables that include characteristics and competencies of the reviewer, the configurations and characteristics of the dyad or group, and the constraints and affordances of the tool used for commenting and the mode of commenting. Based on many of these findings, it is reasonable to anticipate that the L2 doctoral students in the current research will be familiar with the practice of PR, that the mixed L1’s and educational cultures may be problematic, and that reviewing in an L2 may limit the amount of commenting that they do about text organization. Their mixed L1’s may be less problematic since they are working in a low-pressure environment that is familiar to them, and they can take their time reviewing. Research suggests that they likely will give sufficiently detailed comments in the knowledge that the set-up of the activity does not facilitate follow-up questions.

2.3 RECEIVING PEER REVIEW
Peer review has been explored over the decades primarily for its value as a tool to improve L1 students’ texts. Explorations involve numerous learner populations, languages, cultures, genres and professional groups. Conclusions are not easy to draw about L2PR since comparisons among studies are a challenge.

2.3.1 Participant Attitudes
One area of exploration regarding PR is receivers’ attitudes about the activity. Early studies found that student groups did not have high opinions about PR, but rather wanted commentary specifically from their instructors (G. L. Nelson & Carson, 1998; Saito, 1994; Zhang, 1995). One study showed that students claimed to put peer review after a friend or even after a grammar book (Leki, 90). A number of studies specifically asked whether the participants would prefer teacher or peer feedback (Chaudron, 1984; Connor & Asenavage, 1994; Hu & Lam, 2010; Iona Leki, 1990; G. L. Nelson & Carson, 1998; Tsui & Ng, 2000; M. Yang et al., 2006; Zhang, 1995) which is not entirely helpful information since use of one does not rule out use of the other. It can also be seen as an unbalanced comparison.
A great many studies have reported that students have positive attitudes toward receiving PR, even among studies that compare PR and teacher feedback (Hu, 2005; Hu & Lam, 2010; F. Hyland, 2000; G. M. Jacobs et al., 1998; Kamimura, 2006; Mangelsdorf & Schlumberger, 1992; Mendonca & Johnson, 1994; Saito, 1994; Tsui & Ng, 2000; M. Yang et al., 2006). Findings show that students claim to appreciate the process, they try to incorporate their peers’ comments, and they feel it is motivating to have a peer read their texts.

In another variation, one study where participants worked FtoF in steady groups over time, student attitudes about PR were inconsistent (Tang, 1999). Their perceptions of the PR activity changed back and forth over the duration of the course, though this did not seem to be connected with any kind of discomfort in the groups. Attitudes toward PR can also be affected by the situation participants find themselves in. For example, in one study, doctoral students who participated in multiple rounds of PR described strong feelings surrounding the reception of review comments, describing it as scary and frustrating. (Caffarella & Barnett, 2000). These emotions were strong across time and throughout multiple rounds of feedback. The researchers speculated that the investment in the doctoral students’ texts was so high, the importance of success in writing so extreme, that doctoral students were emotionally more sensitive to critique.

### 2.3.2 Amounts of Commentary Used

One area of PR that many researchers have explored is the amount of PR that is used by writers. Some of the early studies of L2 PR were connected to composition studies in North America. An early study on ESL freshman who participated in group face-to-face PR found that only five percent of the revisions in the students’ papers could be attributed to the review they received from their peers (Connor & Asenavage, 1994). In another study where ESL writers worked instead in dyads, Paulus (1999) found that 32 percent of the changes that students made on the peer reviewed drafts could be attributed to PR. Yet another ESL study showed that 53 percent of the revisions made were associated with PR, and these were considered to be thoughtfully adopted (Mendonca & Johnson, 1994). The difference between writers informing their revisions five percent of the time with PR or 53 percent of the time with PR is clearly a substantial difference.

Another kind of research measures percentages of received PR comments that are used by writers. One North American study of L2PR in freshman composition, researchers found that students used 41 percent of the revision-oriented peer comments when they were given face to face (FtoF), and 27 percent when they were given in computer-mediated review (Jun Liu & Sadler, 2003). In a group of Chinese EFL undergraduates who came from different disciplines, one study found that writers used 61 percent of the possible PR comments that were concerned with
global issues, and 71 percent of the PR comments on surface issues (M. Yang et al., 2006). In another study of Chinese EFL students, this time graduate level, research found that 76 percent of the valid PR comments were adopted by the writers (Hu & Lam, 2010). Of the FtoF review provided EFL students in Puerto Rico, 74 percent of the peer comments were used (Villamil & De Guerrero, 1998). In a study in Spain on EFL students, Rollinson found that 65 percent of the comments that were given were used by writers (Rollinson 98 as reported in Rollinson 2005). In an EFL study in Japan, highly proficient Japanese college writers were found to use about 94 percent of the L2PR comments provided, while less proficient L2 writers used 98 percent of the PR comments provided, a result explained by the more frequent errors made by the less proficient L2 writers (Kamimura, 2006).

Studies count use of comments differently, and they define use of uptake differently. Populations of participants are dissimilar, as are modes of feedback. Comparison among studies and possible conclusions are complicated because of the differences. Complicating matters further, variation in PR uptake occurs not only among studies, but also among students within studies. For example, in Paulus’ (1999) ESL study, one participant was found to use 22 percent of his peers’ comments, while another used 86 percent of her peer comments. Similarly, in a case study of EFL students in Hong Kong, one student used only 20 percent of the feedback and another used 78 percent (Tsui & Ng, 2000).

The question of how much review is used is a question requiring nuance. In connection to this question is that which focuses on the kinds of comments student writers use and the effect such revisions have on the revised text.

2.3.3 Improvements to Texts
One kind of investigation regarding uptake of peer review explores the amounts of revisions which would be considered “successful.” Numerous studies show that PR leads to improvements in text quality (Hu & Lam, 2010; G. M. Jacobs et al., 1998; Kamimura, 2006; Min, 2006; Villamil & De Guerrero, 1998; M. Yang et al., 2006). In one study, students adopted fewer comments from their peers than they did their teacher, however those peer comments that they adopted resulted in more successful revisions (M. Yang et al., 2006). One study investigating errors marked by peer reviewers and the types of changes made by the writers found that 76 percent of the revisions resulted in improvements (G. M. Jacobs et al., 1998).

Such studies suggest that writers are able to assess the review they receive and make decisions about how to apply the feedback that they judge to be good. The kinds of revisions that are judged by researchers as “good” can differ among studies. Studies defining text improvement according to more global features
(Berg, 1999; Hu & Lam, 2010; Min, 2006) have drawn positive conclusions concerning text improvement. For example, Min’s (2006) study examined differences in text revisions that occurred before and after PR training. According to the outside raters used in Min’s study, re-ordering within texts and consolidating ideas are actions that dramatically improved the texts, implying that global revisions deliver a higher impact regarding perceived improvement. This investigation reinforced ideas earlier developed by Faigley and Witte (1981) that claim text improvement results from meaning-level changes.

This introduces the more specific question of the types of revisions that the writers have been found to make, and how such revisions improve the texts. Since meaning-level changes have been considered to improve text quality more, these kinds of revisions are often prioritized in research. In turn, classifying the types of revisions writers make can nuance the question of the amounts of revisions the writers make. For example, in the study that reported so little use of PR comments among ESL freshmen, Connor and Asenavage (1994) found that those who made more revisions in response to PR were those who made meaning-level changes, while those who used few PR comments made mostly correction revisions. In the other ESL study where students made more use of PR, Paulus (99) showed that 63 percent of the peer-influenced revisions that her group made were meaning-level changes. Those students making revisions were focusing more on global changes.

It is perhaps not unusual that students use these comments more, since student writers have also been reported to prefer peer feedback that focuses on the content of their texts, such as comments that clarify and develop ideas (Mangelsdorf & Schlumberger, 1992; M. Yang et al., 2006), and that focus on organization (Min, 2008; M. Yang et al., 2006), and they dislike PR comments about grammar, words or sentence-level problems, as they found such comments to be ineffective (G. L. Nelson & Carson, 1998).

Some studies explore both the kinds of revisions most commonly made and identify those that resulted in most text improvement. In one such PR study of L2 business graduate students, researchers found that the writers made most effective post-PR changes in the area of argumentation and made the least progress after receiving review in the areas of text organization (Crossman & Kite, 2012). Text organization was also found to be the least attended to kind of PR comment in the study EFL study of Puerto Rican undergraduates (Villamil and De Guerrero 98).

As mentioned in the earlier section, the EFL writers used considerably more peer comments in their revisions (Hu & Lam, 2010; Kamimura, 2006; Rollinson, 2005; Villamil & De Guerrero, 1998; M. Yang et al., 2006) compared with the earlier studies of the ESL writers who worked in NES university environments (Connor &
Asanevage, 1994; Paulus, 1999). In research that reported on the kinds of revisions the EFL writers made, the pattern differs from the ESL uptake patterns. For example, Min’s (2006) study conducted with EFL college students in Taiwan found that revisions were most frequent at the sentence level (32 percent), followed by the paragraph level (20 percent) and word level (20 percent) (Min, 2005). Though these revisions do not reflect the kind of surface issues of mechanics and punctuation, they do not either emphasize content, argumentation and text structure. In the EFL study from China where undergraduates came from multiple disciplines, writers used more surface level comments for revision than global comments (M. Yang et al., 2006). In yet another example, the study on Japanese undergraduates who were English majors showed that writers’ revisions mainly emphasized word choice and form (Suzuki, 2008). Numbers of revisions connected to review comments would naturally be higher if writers were more focused on surface-level comments, so this comparison may shed light on the differences found between the ESL and the EFL studies where comment uptake was much higher in the latter.

Connected with text quality as related to revision are studies that explore problems that writers have in differentiating valid from invalid peer feedback (Iona Leki, 1990; Jun Liu & Sadler, 2003; Tsui & Ng, 2000). Investigations often explore false repairs, in other words, comments that writers should not have adopted but did. Where investigated, researchers find the amount is low. Numerous studies have shown that students adopt a very small percentage of incorrect comments and are, in fact, selective of the kinds of comments that they attend to in their revisions (Berg, 1999; Hu & Lam, 2010; Mendonca & Johnson, 1994; Villamil & De Guerrero, 1998). One study concluded that patterns of use are highly influenced by the seriousness with which the receiver attends to the feedback (Hu & Lam, 2010), and is enhanced with practice and instruction (Villamil & de Guerrero, 2006).

2.3.4 Factors Influencing Use of PR

The activity of being a receiver of feedback begins when an idea is communicated to a writer. Writers listen to or read an idea presented to them about their text, and then something happens. Sometimes they use a lot of comments; other times not. Sometimes they use only certain types of comments or comments from certain people. There are many factors that seem to influence what writers do with received peer review. This section will review some of the factors that research has illuminated as important in the studies of L2 writers’ use of PR.
Modality of the Review

Some factors that influence a writer’s use of PR can be classified as environmental factors, those that are outside the writer’s immediate control. Instructors work within the praxes of their professional cultures, choosing pedagogical formats that have impact on the learners’ opportunities to use the PR. There are a number of environmental factors that have been shown to influence the ways that PR receivers work with the feedback that they receive.

Findings show that mode of review can influence the amount of revisions that writers to make in connection to review, where more interaction results in more review uptake (Tsui & Ng, 2000). This conclusion is supported by students’ descriptions in Chang’s (2012) study where students perceived synchronous CMPR to provide the more help to their writing as compared with asynchronous PR. Some research also indicates that the modality of review influences the types of revisions. A study of online, synchronous chat for review found that student writers made mostly discourse-related revisions and global revisions (Liang, 2010). This may be because interactive feedback is perceived as being particularly helpful for writers to better understand the readers’ needs (Mendonca & Johnson 94; Ferris & Hedgecock, 1998). Somewhat in contradiction to this, other studies show that oral feedback results in writers focusing too strongly on surface level issues such as punctuation and grammar (Hedgecock & Lefkowitz, 1992; Paulus, 1999; Tuzi, 2004).

Some studies showed that participants took written, online PR more seriously, noting that they were more inclined to re-read and re-work their texts (DiGiovanni & Nagaswami, 2001; Tuzi, 2004) compared with oral feedback. So although interactive PR may facilitate discussions about readers’ needs, it may also encourage the more easy-to-address surface issues, the latter being less influential to text improvement.

Who Provides the Review

One aspect of PR reception that has interested researchers is how the identity of the reviewer might influence the uptake of the review. Some findings show that receivers use both teacher and peer commentary effectively but differently, which has been interpreted as differences in the reviewers’ distance to the receivers (Chaudron, 84). According to this reasoning, students look to their peers’ comments for issues that are not easily categorized as right or wrong, but rather, issues that an L2 peer can potentially scaffold. Scaffolding peer comments have also been found to provide support for writers’ self-initiated revisions in other parts of the text (M. Yang et al., 2006). Writers seem to use instructor feedback more for surface level, while they use peer comments for meaning-changing
revisions, additions, clarifications (Paulus, 1999; Tuzi, 2004; M. Yang et al., 2006). Such a division of revision activities led some researchers to claim that PR and teacher feedback should be perceived of as complimentary (Hu, 2005). Students are more inclined to use peer feedback when it is a supplement to instructor feedback (Hu & Lam, 2010).

A writers’ willingness to more seriously consider comments given by teachers may be influenced by their cultural backgrounds. A series of studies suggested that students from particular cultural backgrounds tended to place their faith in those of authority, such as their teachers, and were in turn skeptical of advice from peers (Nelson & Murphy, 1993; Carson & Nelson, 1994; Nelson & Carson, 1998). These findings are, however, now at odds with more recent studies that look at such student groups from within their own educational systems. These studies conducted from the inside of such cultures have found that peer review works well (Hu, 2005; Hu & Lam, 2010; Tsui & Ng, 2000; M. Yang et al., 2006).

Student writers’ judgment of reviewers’ competency affects their use of PR. Research shows that students notice the level of reviewer competency (Strijbos, Narciss, & Dünnebier, 2010), and such judgments have been found to influence the ways receivers judge the feedback (Cho et al., 2006; Liou & Peng, 2009; Tsui & Ng, 2000). Some writers have also been found to be wary of review that comes from students who have different educational cultures and whose pedagogical norms differ from their own (G. Nelson & Carson, 2006; Villamil & de Guerrero, 2006), suggesting that PR among participants who come from more homogeneous linguistic and cultural backgrounds is more cooperative and thus, more effective.

Despite these findings, there are also examples in research where the identity of the reviewers did not seem to impact review uptake (Hu & Lam, 2010). One study found that students were open to PR comments even when the receivers had reservations concerning the reviewers’ linguistic knowledge (M. Yang et al., 2006). In these exceptions, students shared the same L1 and the same culture, they were trained in PR, and they interacted in FtoF conditions in pairs. It may be that the combination of these other factors impacted writers’ perceptions of the reviewers so that the writers were more willing to consider their PR comments. Nevertheless, when conditions are less optimal than found in these three PR studies, it seems that writers’ perceptions of reviewers’ identities influence the types of revisions writers make (Atwater, Waldman, Atwater, & Cartier, 2000; Cho et al., 2006; Rucker & Thomson, 2003).

**Tone of the Comment**

Another factor that seems to influence writers’ willingness to consider peer comments is the tone of the comments. Studies where students participate in FtoF
review have found that positive interactions that are characterized by comraderie and concern for the other's feelings provide a conducive environment for receivers to consider the content of the comment (Lockhart & Ng, 1995; G. L. Nelson & Murphy, 1992; Villamil & De Guerrero, 1996).

In a study that investigated the manner of commenting in written feedback, Min (2008) found that comments were more likely to be adopted when convincing but politely delivered arguments were used (Min, 2008). However, comments that are primarily positive, but with relatively little content have been found to be counter-productive (G. L. Nelson & Carson, 1998). Positive yet empty commenting is understood to be unhelpful in feedback across diverse tasks and populations (Hattie & Timperley, 2007).

Genre of the text

Another environmental factor that may influence the nature of revisions made in response to PR is the difficulty of the genre under use. Studies have explored the cognitive burden associated with various rhetorical patterns and found that narratives create less of a burden to the writer in comparison to argumentation. (Villamil & DeGuerrero, 1998) The text types influenced the kinds of comments adopted, where writers attended to grammar and content in the narratives and to vocabulary in the argumentative texts. In another study that compared PR uptake in connection to book reviews as compared with research papers, student writers were shown to incorporate more comments to the text that was less demanding, namely, the book review (Liang, 2010). The familiarity of the texts seem to allow for different kinds of revision possibilities.

Reviewers' Experience and Training

Some findings suggest that those who have had more extensive PR experience are better able to utilize peer comments, (Connor & Asenavage, 1994), while other findings show that students’ inexperience with PR did not seem to affect the amount of suggestions they took (Hu & Lam, 2010). This difference was discussed in the section of giving review. Most studies investigate students who have had little exposure to PR but who are then trained in how to receive and use PR. Early research by Stanley showed that student writers who had been coached in PR made more revisions in response to peer comments than did students who were not coached (Stanley, 1992). In Min’s work where the EFL students were trained extensively in PR practices, writers revised their texts using 39 percent of the feedback before they went through training, but used 77 percent of the feedback given to them after they had gone through training in PR (Min, 2006).
Other studies focus instead on the quality of the revisions as connected with training. Berg’s study investigated whether revision types and writing quality were affected by participants receiving training in PR. She compared the quality of revisions among students who had received PR training and those who had not, finding that training allowed for more writing improvement on revised drafts for students of all L2 levels (Berg, 1999). In another study, students who had been trained in giving online review comments became more selective about the kinds of comments that they would then adopt as writers (Liou & Peng, 2009). This selectivity is connected to the knowledge writers need in order to assess peers’ suggestions (Connor & Asenavage, 1994; Hu, 2005).

Improvement in revising as associated with training is thought to result not only from participants’ better judgment, but also a result of the seriousness with which they take the PR activity (Hu, 2005). One study showed that training in PR encourages writers to more seriously consider comments that result in meaning-level revisions (Berg, 1999) rather than focus on surface level revisions. Min’s (2006) study came to similar conclusions, that the training resulted in higher quality texts as a result of the types of revisions writers made. Student revisions were primarily at the word level before they received training in PR, and there was a strong focus on error correction. However, after they received training in PR, writers used comments to revise at the sentence and paragraph level (Min 2006).

Training in PR is seen to impact students’ revisions significantly (Liou & Peng, 2009). However, it appears that the type of training is important for students to learn how to use PR comments, as some studies that used less explicit training methods did not find strong results concerning improved revision (Connor & Asenavage, 1994; Tang, 1999). Furthermore, training that is comprised simply of worksheets that encourage particular foci have actually been found to be more detrimental to participants in PR than helpful (F. Hyland, 2000).

**Language Skills, Academic Experience, and Attitude**

Another factor explored in connection with writers’ use of PR comments is the receiver’s abilities with the L2. Some findings show that more advanced language learners are able to be more selective about the comments they incorporate to their texts, evaluating each comment on its own merit (Mendonca & Johnson, 1994). Other findings suggest that students’ language proficiency is not an obstacle (Kamimura, 2006), but in this particular study student writers negotiated the PR in their first language.

Another individual factor that may influence a writer’s propensity to use PR comments is the amount of academic experience the writer has had. One investigation found that students who are less experienced in writing or in
academia in general will often feel that their peers are not qualified to give them helpful feedback (Liou & Peng, 2009). This kind of defensive attitude is particularly problematic in FtoF review where the interactions can become negative which then lead to the writer rejecting the peers’ comments (G. L. Nelson & Murphy, 1993). In contrast, a positive attitude influences writers to process comments in an effortful, mindful manner, leading to higher levels of adoption and more effective adoption (Poulos & Mahony, 2008; Strijbos et al., 2010). Not all studies have found that attitude influences review uptake. A study conducted on graduate students in China found that participants with positive and negative attitudes adopted the same amounts of review (Hu & Lam 2010). Clearly the relationship between positive attitude and willingness to use comments is not so simple.

2.3.5 Benefits to Receivers
A question asked in the current research is the ways in which PR may illuminate the RA genre for the participants. One area of research that partially addresses the influence of PR on student participants is that which explores benefits to the receivers. Research in this field rarely establishes as its goal to look for possible benefits the PR activity has, but in the exploration of other questions the researchers find such benefits.

Early studies showed how some L2 writers could not recognize when PR comments were valid or invalid (Iona Leki, 1990; G. L. Nelson & Murphy, 1992); however, many studies conducted since have shown that that L2 writers benefit from PR precisely because of the practice they receive in assessing comments. Assessment with PR is more active than with teacher feedback since students are less likely to simply adopt a peer’s comment (Berg, 1999; F. Hyland, 2000; Tsui & Ng, 2000). A study that investigated this focus in particular was that by Villamil and de Guerrero (1996) where they concluded that participants in the FtoF PR were required to justify, restate, clarify and react to peer comments, all activities that led to the writers’ own writing development. These conclusions were further supported by research that found receivers became more aware of their strengths and weaknesses as writers because of the need to justify their own actions (Tang, 1999; Tuzi, 2004). In other words, evaluating PR can lead to enhanced self-regulatory skills (Berg, 1999; Villamil & De Guerrero, 1998; Villamil & de Guerrero, 2006), which is found to enhance students’ writing competency (Berg, 1999).

Training in peer feedback influences writers’ abilities to assess peers’ suggestions (Connor & Asenavage, 1994), and is seen to impact students’ revisions significantly (Liou & Peng, 2009). In particular, it is the selection of review comments that is influenced by training, as participants are shown to use more judgment and to take PR more seriously with training (Hu, 2005).
Creating effective texts requires that the writer have an awareness of the needs of her reader (Sasaki, 2000). A benefit identified by research of receiving peer review is that it provides the writer with a sense of audience (Jun Liu & Sadler, 2003; Villamil & de Guerrero, 2006), a sense that is less apparent to the students when writing for an instructor (Hu, 2005; Tsui & Ng, 2000; Villamil & De Guerrero, 1998). This developed sense of audience awareness is provided by peers because they tend to respond more like “real” readers (Crookes, 1994) which allows the writers to better understand readers’ expectations (Lockhart & Ng, 1995). This benefit is also recognized by the PR receivers themselves, as noted in a study where students discuss the value of better understanding the needs of the reader (Mendonca & Johnson, 1994).

A less profiled benefit connected to receiving peer feedback is the emotional benefits such as feelings of self-efficacy and self-confidence. Research shows that PR gives writers a feeling of ownership of their texts because they can negotiate with the reader and then make their own decisions (Levine et al., 2002; Tsui & Ng, 2000). PR leads to writer autonomy (Villamil & De Guerrero, 1998; M. Yang et al., 2006) and has been shown to raise writers’ self-confidence and comfort in their writing and revising, irrespective of students’ proficiency (Tang, 1999). These feelings contribute to self-regulation by focusing the writer’s attention back onto the task of revision (Hattie & Timperley, 2007). These benefits of self-autonomy are connected more strongly to PR than to teacher feedback (M. Yang et al., 2006). It is important to note that not all studies have found emotional benefits connected to receiving PR. In a study on doctoral students who received multiple rounds of PR on high stakes texts, some receivers felt fear and frustration in connection to receiving PR, even after multiple rounds of PR (Caffarella & Barnett, 2000).

2.3.6 Summary
This section has focused on research about the reception of L2PR, particularly on areas that have relevance to the current set of investigations in this dissertation. The key points in this section note that student writers seem to use instructor feedback for different purposes than peer feedback, often in complementary ways. Amounts of feedback used are difficult to generalize since studies measure differently and reflect widely different populations, settings and tasks. PR is understood to improve texts, most improvement coming from meaning-level changes. False repairs are low, as writers appear to be selective about what they adopt. Factors influencing uptake include the identity or perceived identity of the reviewer, the detail and form of the comment, the tone of the review, the genre of the text, and the experience and/or training of the receiver. Modality of the review activity appears to affect comment uptake to a varying extent depending upon
other mediating factors. Benefits to the receiver include an enhanced skill in assessing comments, better self-regulation in writing, and stronger awareness of readers’ needs.
3 METHODS OF INVESTIGATION

This chapter describes the methods used to find research participants and collect data. Because the research in this dissertation reflects two different groups from different years, all recruitment and data collection occurred twice. The analysis used for each of the four studies is described in the relevant chapters since analysis was specific to each study.

3.1 DESCRIPTION OF WRITING COURSE

This research was conducted in connection with an annual course offered by the Swedish University for Agricultural Sciences (SLU) for its doctoral students who have already conducted a study but not yet written the results. The goals of the course are to provide participants with genre knowledge of research articles, to instruct them on writing strategies, to introduce them to online tools that can help them with word searches, revision and editing; to investigate their individual trouble-spots with English, and to give them multiple rounds of feedback on each of the five required texts. The course is an elective that is graded on a pass/fail basis, the pass being granted to participants who complete 90 percent of the required activities. It is a popular course that individuals take in order to get help with their research writing, and has been provided for five years in a blended learning environment. I co-teach the course once per year with the director of SLU’s doctoral studies for the Umeå campus.

The course runs over 16 weeks and consists of 10 lectures that we give in double sessions. Each double lecture unit focuses upon a different section of research articles and is taught in the following order: Results, Methods, Discussion, Introduction, Abstract. In addition to the campus meetings, the course has an online platform that serves as a repository for resources for English language and writing advice, an administrative site, a communication hub, a dropbox for students’ texts and instructors’ feedback, and a forum for text exchange for peer review. The pedagogical purpose of the peer review is to create a wider audience for the writers than the two instructors, to provide opportunities to carefully read five of their peers’ texts with a critical eye, to reinforce course constructs, to motivate the reviewers to re-visit issues that they notice in others’ texts, to raise their awareness of the reader, and to discourage the perception that writing is a one-draft activity.

After each lecture session, participants write an assigned section of the article and then post it in an online forum that is open for current course participants only. Through the chronological placement of the texts in the forum, participants become responsible to review the text that was chronologically uploaded immediately before they uploaded their own text, the result being that participants
review one person’s text, while having their own text reviewed by the next person uploading his/her text to the forum. With fifteen participants per class, and five review instances, it is not common that any given individual reviews the same person’s text more than once or is reviewed by the same person more than once. Students review one another’s texts using Microsoft Word’s review function, writing marginal comments, making internal text changes, and writing notes to the writer at the beginning or end of the text.

Writers load their Word document to the forum where a peer retrieves it, marks it in Word, and returns it then to the text writer’s thread in the forum within 36 hours. All texts and reviews are accessible to the participants of the course, though we do not encourage them to look at others’ texts and/or review. After a writer’s first draft is returned to the PR forum, the writer revises her text and turns it into the content specialist for feedback. When he has returned the second draft in its reviewed form, the writer revises it again and turns the third draft into me, where I review it and return it to the writer. The interactions between the instructors and writers are not accessible to other writers in the way the PR is accessible.

In order for the PR forum to function, there are very precise policies surrounding the ways in which participants deliver and receive texts. These detailed directions make it clear to the participants that it is their own activity, that it has been very tightly organized, and that any given individual’s administrative mistake can derail the mechanism for text distribution. The procedure gives the impression that the PR activity is professional and that it belongs to them as scientific writers rather than it being an assignment. Furthermore, students who do not participate in any given round of PR do not receive comments from a peer, so it is assumed that the reason people participate is at least partly because they value the review activity, whether as giver, receiver or both. In addition, the order of the rewrites and dates to submit second and third drafts are carefully planned to keep participants on a tight schedule. The participants have responded well to this. In the five years the course has run, neither instructor has ever been contacted by a student who is reluctant or resistant to PR. Though we have not explicitly stated that students must participate in order to get credit, they all do participate on average four of five times.

Students are not given explicit instruction regarding the nature of the review they should give beyond being reminded that the comments should be helpful to the receiver and directed at improving the text. They are also encouraged to be polite and professional. Over the years the participants have not initiated discussions about what to do in the peer review, though there are ample opportunities to have such discussions. As instructors, we initially motivated this decision to not train students in PR because of the limited amount of time we have with them, and also
because of our assumptions that this is a practice that they already have had experience with. When I became interested in exploring the ways participants did use PR, it became necessary to not train them, since their choices about PR are objects of the studies. Similar reasoning is used in Hu & Lam’s research on L2 graduate students’ PR practices (2010).

Although participants are not given explicit instructions regarding the focus of PR, the text writing and peer review do follow lectures that address the common rhetorical expectations connected to the given text section. The lectures also cover common linguistic difficulties and scientific potholes that often thwart the novice RA writer. Most students attend these lectures, so it seems reasonable that the constructs covered in the lectures would inform some of the peer review, and may act as a type of review instruction. In addition, readings are assigned that connect to each lecture. The readings come primarily from two sources: Successful Scientific Writing (Matthews, 2008), and How to Write and Publish a Scientific Paper (Day, 2011). Students are also given links to Purdue’s Online Writing Lab (“Online Writing Lab at Purdue,”) for numerous sentence-level difficulties to reinforce lecture material.

In all, there are many constructs presented in the lectures, and many presented in the recommended literature; however, students are not explicitly told to focus on any of the issues introduced in class or in the literature when they give PR. Rather, the instructions given regarding the PR activity are to give comments that will be helpful to the writer. The instructors provide no suggestions about the number of comments to be given, the language of commenting, nor the method of delivery (for example, internal commenting or marginal commenting). The students receive no grade as connected to the quality of their review comments.

### 3.2 Data Collection

#### 3.2.1 Recruitment of participants

Recruitment of participants occurred in three efforts per course. One effort was to recruit participants to be interviewed before and after the course. The second effort, one month after the course, was to recruit participants willing to have their text revisions and review comments (both given and received) used for data in the comment analysis and revision studies. The third effort was to obtain permission from students who had given review comments to the main participants so that I could include their comments in the analysis of the main participants. These efforts are detailed below.

Participants registered for the course were contacted via email one month before the start date and asked if they were interested in participating in a research project.
where they would be interviewed before and after the course (Appendix A). The letter explained that I was conducting a study that explored some of the instructional components of the course. The pre-course interviews would be about the students’ writing histories, language learning and their experiences with writing instruction and feedback. In the post-course interviews we would discuss their experiences with some of the methods used in the writing course. Students did not know me beyond the information that I was one of the two instructors leading the writing course. As an incentive to participate, I offered participants an extra session to review their writing practices and suggest future strategies that could help their writing. The email was written in an informal tone so that participants could easily ignore the request if they were uninterested. This tone was chosen so the participants would hopefully feel under no obligation to participate.

Individuals who responded to the request were sent additional information describing in more detail the way in which the interviews would proceed and the ways the interviews would be used (Appendix B). Students were told that the interviews would inform future course design, which it does, and that the data would be used in research about the effectiveness of some of the instructional methods used in the course. They were made aware that they would be given the opportunity to review the transcripts to remove comments that they did not want considered, that they would be consulted about their interviews as they were used in the studies, and that they could withdraw from the study at any time.

Nine participants responded to the request to be interviewed. Three participants were only able to do pre-course interviews due to pregnancy or changes in employment, so there were a total of six participants who did both pre and post course interviews. Participants were drawn from two different academic years. Interviews were conducted in Swedish (3) or English (3), reflecting the students’ requests. One student had a Slavic L1, two had Romance L1’s, and the others had Swedish as a first language. Half the group was female, half male, and all but one student used exclusively quantitative research designs. Participants came from different departments and disciplines.

3.2.2 Pre-course interviews
Meeting places were chosen by the participants for the pre-course interviews. The procedures for the interviews were informed by two pilot interviews conducted earlier, where two volunteer doctoral students in the humanities were interviewed in Swedish on these same topics. I conducted one pilot interview with a series of open-ended questions, and the second interview was conducted as a conversation. The transcriptions of these interviews showed that the conversation provided a far richer mode of information-gathering for the topics I was interested in. The list of
questions seemed to affect the one participant’s ability to disclose. As a result, I
decided upon a conversation-like interview. As a conversation aid, I created a
simple mind map that had the following phrases on it: learning to write, learning
foreign languages, writing in English, writing about science. I put this on the table
between us, facing the participant. Throughout the interviews when there were
moments of silence, the participants often glanced at the paper, seemingly to
remind themselves of what the main topics of the conversation were.

In the pre-course interviews I often began topics with a general question, then
listened and responded as I would in an informal conversation, the goal being to
learn as much as I could about the particular topic. When the participant seemed
to run out of ideas to share about a topic, I would point to another keyword on the
paper and ask if they could tell me about the new subject. The nature of the topics
meant that the participants had to summarize parts of their histories as they could
remember. Those participants who used their L1 told stories in different ways than
those who told stories in their L2’s. When transcribed, the Swedish speakers’ texts
were twice the length as the L2 interview participants for the same amount of time.
However, both kinds of interviews seemed pleasurable to the participants, and all
mentioned that they had not thought about the subjects before.

3.2.3 Post-course Interviews
Post course interviews differed considerably from pre-course interviews.
Participants had come to know me from the hours spent with me in class, through
the numerous administrative letters I sent out, through emails, and through the
feedback I gave them on five texts. They had also participated in pre-course
interviews with me. The interviews took place two to six weeks after the final
assignments were returned to the participant.

Post-course interviews also differed from pre-course interviews because they were
not informal conversations, but rather talk-around-the-text conversations,
modeled on the description by Lillis (T. Lillis, 2008). Here the participant was
asked to look at annotated summaries of the comment types they tended to give
and receive in peer review under the 16-weeks. They were also provided with the
original texts and their revised texts where the commentary was printed and
available for easy reference. Papers were strewn around the table like a work desk,
and the participant would sit near beside me with his or her head bent over the
papers, scrutinizing past work. In the interviews I would point to a couple
examples of a comment type, for example, a participant may have received many
correctness comments. I then asked if they had any thoughts about that type of
comment. Participants were encouraged to discuss any aspect of the review
activity, the documents serving to catalyze the discussions. The interviews were
conversational in nature, and I would typify 5 of 6 as relaxed. My goal was to avoid
interview-directed questioning as much as possible other than to prompt the student to talk about his or her impressions, reflections, recollections and opinions about any aspect of his or her experiences with peer review. Students were given free rein to talk about what mattered to them so long as peer review was the topic. It was assumed that students would talk about what was significant to them, what they remembered, and perhaps, what they had opinions about.

Participants were not prepared to talk about anything in particular in the post-course interviews. When they arrived they saw many of their texts on the table in printed form. Comments were highlighted with markers. Since they had not thought about their PR ahead of time, there were often periods of silence during the interviews where the participants scrutinized texts and the review comments they gave and received, trying to collect their thoughts. I tried to not interrupt these silences. Nervous fillers and apologies about time delays were allowed whatever amount of time necessary until the participant returned to the task. Students speaking in English were not given any help with recall of needed words, but rather were given time to struggle until they found a way to express themselves or changed subject. These decisions were based on the principle that the subjects that students brought up voluntarily would be the subjects that were meaningful to them and therefore the topics should be student-initiated. Because I was their former instructor, it seemed necessary to avoid forms of teacher-student interactions, such as the interviewer/teacher providing missing words. As a result, interviews that took place in English had longer and more frequent pauses, and interviews in Swedish were denser with participant talk. I took notes throughout the interviews of my impressions of the participants’ experience in the interview to later help with interpretation of the transcripts. Students discussed comments they gave, comments they received, and comments they used and did not use.

3.2.4 Transcribing
The interviews were digitally recorded, transcribed in full by the author, and uploaded to NVivo for analysis. The Swedish audio files were translated to English as they were transcribed, the exception being emotional expressions or the uniquely Swedish expressions that were left in Swedish. The decision to translate the transcripts from Swedish before the analysis of the data was based on a pilot study where I translated from Swedish to English at various parts of the analytical and writing process. From this pilot study, I concluded that early translation allowed for the most transparent and comparable inductive analysis.

Transcribing was approached from an interpretive perspective, the premise of analysis being that any given interview reflected a time and place-specific production of narratives. Therefore, I was careful to note unintentional, interactive prompts I made or leading sounds. Furthermore, I paid close attention to
utterances that were particularly relevant to my research topic. When I heard these, I listened for peripheral information which might be connected to these topic segments, such as attitudinal performance indicators. I also paid extra attention to the topics that sounded important to the participant, whether the emphasis became apparent because of repetition, information placement, performance indicators, or meta-cognitive statements that flagged certain topics. These more salient expressions were placed in bold script and were annotated as more salient.

Notes taken during the interview were cross-referenced with the transcriptions and added to the print-outs for future reference. The notes were mostly used to remind me of the atmosphere of the interview at various times.

3.2.5 Recruitment of Participants for the Text Analysis
At the completion of each course, after the content instructor had registered the credits, all students (n=30) were sent an email where the nature of the research project was described and where they were asked if they would consider having the peer review comments that they gave and received analyzed for the purpose of a study about peer review (Appendix C). Those who responded to the email were sent two copies of a consent letter via regular post that detailed the conditions of participation (attachment D), plus a postage paid return envelope. Those students who returned a copy of the signed consent form comprise the main 11 participants whose received and given comments are analyzed in study two.

Though the 11 gave permission for me to use all comments they wrote and received, it became clear that I would also need the consent of those individuals who wrote the comments on the 11 participants’ texts. Individuals who had given comments to these 11 key participants were later contacted asked if they would consider allowing me to use only the comments that they gave that were connected to the key participants. These 13 were provided with examples of the comments that they had given (individually) and shown how the comments would be used in the study if they chose to allow that (Appendix E). All contacted individuals agreed to the request to have the comments that they gave to the main participants included in the study.

The 11 participants were recruited from two of the courses run between 2008-2012, where there were 30 students in total. Of the 11 study participants, 5 participated in one year, and 6 from a different year. Participants use a wide array of research methodologies and represent a range of disciplines, including fisheries, wildlife biology, landscape ecology, forest harvesting technology, geographical analysis, soils, natural resource economics, and plant physiology. The group’s L1’s include seven researchers with Swedish, two with Romance languages, one with a Slavic
language, and one who is a multilingual with English being the primary language used since secondary school. There were five women and six men. As mentioned above, also included in the data were comments that were given to the 11 participants by 13 additional students. These reviewers also came from diverse cultures, first languages and disciplines within the natural sciences. Only one of these 13 was a bilingual user of English.

The table below shows the sources of data used in the studies. Data used for study 1 is instead described in detail in the actual chapter.

*Table 1 Overview of Data Material*

<table>
<thead>
<tr>
<th>Source</th>
<th>Study 1</th>
<th>Study 2</th>
<th>Study 3</th>
<th>Study 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>PR comments given by 11 main participants, and their received comments (as given by main participants and 13 additional students)</td>
<td>x</td>
<td></td>
<td></td>
<td>Received comments of selected texts of 3 students</td>
</tr>
<tr>
<td>Post-interviews of 6 participants-descriptions about giving review</td>
<td></td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post-interviews of 6 participants-descriptions about receiving review</td>
<td></td>
<td></td>
<td>x</td>
<td>3 of 6 students’ transcripts used</td>
</tr>
<tr>
<td>Pre interviews of 3 participants</td>
<td></td>
<td></td>
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<td>x</td>
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<tr>
<td>Three participants’ second drafts of selected # of texts</td>
<td></td>
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<td></td>
<td>x</td>
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</tbody>
</table>
3.3 Theories Used in the Analysis of Data

The aim of this research is to explore how individuals in the natural sciences use peer review and the ways in which their activities suggest learning of the RA genre. The analysis of the data is informed by key constructs from Sociocultural Theory (SCT) as put forth by Vygotsky and modified by more recent educational theorists. These constructs can help locate the kinds of activities that reflect learning.

Another theoretical base for the current work is Genre Theory. Where SCT helps identify the ways that the participants may be learning, Genre Theory helps identify what they need to learn. The question posed in the research includes the type of writing these participants need to learn. To define that type, it is important to specifically locate the genre. The way in which the genre is located is informed by Genre Theory. This section will first describe constructs from SCT, and then Genre Theory.

3.3.1 SocioCultural Theory

The current study of peer review and the course upon which the study is based have been motivated by Vygotsky, a developmental psychologist whose psycholinguistic theory addresses the ways humans learn. According to Vygotsky, neurobiology cannot explain the most vital forms of human cognitive activity. Instead, the development of mental functions depends on the interaction of internal and external processes, in other words, the relationship between the individual and society (Vygotsky, 1978). The activity that connects the internal and external processes is called mediation (Vygotsky, 1978).

Mediation

Lantolf and Thorne (2006) have described Vygotsky’s ideas about mediation as they relate to language. They emphasize Vygotsky’s claim that people’s cognitive skills develop as a result of interaction with cultural, linguistic and historically formed settings. These interactions are mediated symbolically, the foremost symbolic system being language (Lantolf & Thorne, 2006). People use language to reorganize their perceptions and to create connection between otherwise separate phenomena. With language, people solve problems associated with such things as remembering, comparing, attending, choosing and evaluating (Vygotsky, 1978). Language holds special status in people’s development, as it is used to construct actions and ideas that are critical to a cultural community (Lantolf & Thorne, 2006).

The idea of mediation as a primary form of cognitive development entails a series of steps that humans go through in their internalization of new habits and
knowledge. A simple definition of mediation is the mental processes and constructs that move among people through use of tools (Lantolf & Thorne, 2006). With mediation, an individual is exposed to an external activity or idea which is reconstructed in that individual’s mind. The activity then begins to occur for the individual in her own mind, an operationalization that is called internalizing. As Vygotsky described it, the interpersonal process has become an intrapersonal process, a phenomenon that typically relies on a series of mediating events (Vygotsky, 1978).

The construct of mediation is critical to the argument for using PR as a means for learning. Four other ideas inspired or described by Vygotsky are also relevant to the analysis of PR activities: the Zone of Proximal Development, languaging, tools and constructed identity.

**Zone of Proximal Development**

A subtle aspect of mediation concerns the nature of interactions that may enhance participants’ learning. Some interactions result in mediation, and others do not. Mediation of constructs may fail to occur in situations where the provided information is not currently of relevance to the reviewer or writer. Understanding, learning and perception can occur when the learner is on the cusp of readiness regarding a particular kind of information. In the terminology of sociocultural theory, this readiness is referred to as the learner’s Zone of Proximal Development (ZPD). ZPD is often defined as the distance between what a learner can potentially achieve by herself and what she can achieve with the help of an “expert” who provides appropriate mediating artifacts (Vygotsky, 1978).

When a learner is exposed to constructs that she is on the cusp of learning, we describe the interaction from the “expert” as scaffolding the learning. The expert’s actions provide other regulation for the learner who eventually self-regulates. Initially, Vygotsky described such scaffolding as connected to parent/child and teacher/child relationships. However, researchers now perceive mediation within the ZPD to include student to student mediation (Antón & DiCamilla, 1998; Iju & Kellogg, 2007; Neomy Storch, 2002; Villamil & De Guerrero, 1996; Villamil & De Guerrero, 1998) language learners and tutors (Aljaafreh & Lantolf, 1994) and doctoral students and supervisors in regards to apprenticeship into the discourse community (Braine, 2002; Cheung, 2010). With ZPD, the nature of the interaction is primarily affected by the participants’ knowledge about the item being discussed.

At any given moment, learners are in the process of internalizing a variety of new concepts. The extent to which the learner “knows” something may be at a low level of “barely knowing” that relies heavily on scaffolding from the expert, to “really knowing,” an entirely internalized knowing which reflects a learning process which
already took place (Aljaafreh & Lantolf, 1994). The ZPD framework has been described as ideal, since it includes the participants acting in roles as expert and novice, their goals, motives and histories, and the resources available to them (Aljaafreh & Lantolf, 1994). The framework also allows us to consider both the learning that has already occurred, and the learning that is developing through the scaffolding of others (Vygotsky, 1978). Hyland and Hyland (2006) point out that other researchers use the idea of scaffolding, but refer to it differently. Ohta (2001) uses the term assisted performance, Long (1996) uses the term negotiated interaction, and Lave and Wenger (1991) use the term guided participation.

In peer review research, some analyses are based upon the ZPD as connected to mutual scaffolding. Here, rather than one individual being identified as the “expert” who is scaffolding learning for another person within his Zone of Proximal Development, both participants are seen as scaffolding the learning of the other participant. Both the reviewer and the writer are seen to benefit from PR as a result of mutual scaffolding (DeGuerrero & Villamil, 2000; Anton & DiCamilla, 1998; Lundstrom & Baker, 2008). Writing development is considered to occur through peer review because of students’ different areas of competence which allows for mediation of new constructs (Min, 2005).

At a practical level, in the current studies, this scaffolding occurs through reading. Participants are exposed to one another’s ideas when they read peers’ texts and when they read peers’ review comments. The texts and comments may serve to reinforce knowledge that the reader has already mostly learned, or they may serve to re-introduce ideas that are barely known.

**Languaging**

In the survey of literature on PR that I conducted, the focus of most research is directed at the learning that occurs via exposure to a peer’s ideas, whether that be by reading or listening. However, another potential form of mediation is putting words to thoughts, whether in speaking or writing. The activity of putting words to thoughts is referred to in current Vygotskian circles as languaging (Swain, 2000, 2006; G. Wigglesworth & Storch, 2012) a construct that implies more than language use for the purpose of communication with others. Languaging is fundamental to learning mental habits and constructs about every aspect of our lives, including the mediation of new languages or the creation of texts. Languaging can be seen as particularly important for mediating new constructs in an L2 or a specialized discipline, as the language user must take initiative by
producing something\(^1\). What is produced is then an artifact, a piece of evidence for the “producer” which indicates what she can do or what she understands. The artifact also serves as evidence of what might be missing in the writer’s or reviewer’s understanding, and such evidence can then be used as a starting point for a new investigation. In other words, language production serves as a form of “forced noticing.” According to this theory of learning, writing practice is in and of itself a way to force learners to attend to what they do not know, and in the case of L2 writers, to test hypotheses of how the target language works.

The construct of *languaging* partly redefines the activity of writing. With writing, a person creates information as she writes rather than “reporting” what she already knows. Putting words to thoughts is the critical element of transforming thought. It allows the writer/reviewer a deeper or new understanding of complex ideas, and creates cornerstones for problem solving. We learn what we know and do not know in the process of writing it. Researchers and instructors often refer to this as the heuristic value of writing, a fundamental idea within the Writing-To-Learn framework (Klein, 1999). Early research identified the powers of languaging with writing, as noted in Britton’s description of “shaping at the point of utterance” (Britton, 1992), a shaping that was identified as a key construct in the eventual formulation of Flower and Hayes’ cognitive model of the writing process (Emig, 1977). Languaging is also similar to Bereiter and Scardemelia’s distinction between writing that is depicted as knowledge telling or that is depicted as knowledge transforming (Bereiter & Scardamalia, 1987). With L2 writers, there is the heuristic value tied to the ideas they are transcribing, and also the heuristic value of languaging in the L2. From the perspective of the peer reviewer, languaging a comment forces the reviewer to put words to thoughts. This is described in peer learning throughout time as learning through teaching, otherwise described as the heuristic value of explaining a concept to another person (Topping, 2005). In summary, intentional languaging is seen in this thesis as an indicator of mediation.

*Tools Matter*

Another idea that Vygotsky developed in his description of learning is that of tools, a word that is used broadly. Activities and object serve as tools when they assist in the mediation of new constructs. Language is considered the most powerful tool of mediation and is the tool that Vygotsky focused upon most in his descriptions of mediating cultural artifacts (Prior, 2006). The various functions made possible

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\(^1\) In this dissertation, the term new construct refers to the discourse features that are considered important to the RA genre in the natural sciences.
through language use can be further explored as tools. For example, one can define the actions of questioning, reformulating, expanding, and defining as tools of mediation for the writer and reviewer. Another form of tools is the mode of communication, for example whether participants are writing or talking, whether they are using an L1 or L2, whether their communication occurs via a computer or face-to-face. These functions and modes are seen as tools in SCT, where each is comprised of affordances and constraints that influence the ease or difficulty of mediation.

The importance of tools in relation to PR is noticeable in research. Investigations explore the impact of oral PR (Carson & Nelson, 1996; Mendonca & Johnson, 1994; Tang, 1999); negotiations held in L1 or L2 or a combination (Levine et al., 2002); and PR activities that are constrained by teacher review tools (F. Hyland, 2000), or helped by them (Levine et al., 2002). Tools can reflect the manners of mediation, for example whether learners can use their mother tongues, and whether they are familiar with strategies to discuss review. Tools include questions of computer mediation, including issues of synchronized and non-synchronized communication, the familiarity users have with computer tools, the ease of commenting depending upon the tools, and the constraints of certain computer tools in relation to second language use.

**Construct identity and Self-regulation**

One area of SCT studies focuses on the effect that identity has on the actions of language learners. Although Vygotsky did not address learner identity directly, researchers have interpreted his work to include issues of identity. Language use in an L2 is a human being attempting to participate in culture as mediated through a new symbolic system (Pavlenko & Lantolf, 2000). To manage this, individuals make choices, are driven by personal motivations, and are affected by emotions and histories. This learner identity is considered to be connected to self-regulation and strategies. Examples of L2 writer strategies include writing in the L1 and translating compared with writing directly in the L2 (Cohen & Brooks-Carson, 2001), transfer of strategies from L1 writing to L2 (Cumming, 1989), composition strategies of weak compared with strong L2 writers (Bereiter & Scardamalia, 1987; Raimes, 1985), and strategies of time distribution across stages in the writing process depending on language proficiency (Roca de Larios, Manchón, Murphy, & Marín, 2008).

In the current investigation, learner identity and self-regulation can provide an additional lens through which to view participants’ practices and to analyze their descriptions of PR use. According to Lantolf and Thorne (2006), a pedagogical activity is different to each individual depending upon the person’s history, goals
and abilities. But in keeping with the understanding of mediation, it is also understood that these same individuals’ learning strategies will likely be affected by the instructional activity (Donato & McCormick, 1994), in this case, strategies learned via the activity of peer review.

**Application of Constructs**

The constructs described here will be used to analyze the data in this dissertation in the effort to understand which of the participants’ activities in PR may lend themselves to learning. The data in each of the studies is first analyzed through an inductive process which does not include the application of these constructs, after which the constructs are applied to the results to discuss the learning events.

### 3.3.2 Genre Theory

From a genre perspective, language is understood to reflect human use, and the form of the language cannot be studied in isolation or out of time (Lantolf & Thorne, 2006). The respective disciplines and research teams of the doctoral students are the settings that contextualize the written practices of any given participant. These settings can be understood as activity systems whose activities are similar to and different from one another. To fulfill aspects of their research goals, the members of these activity systems are engaged in communicating their work to their peers and the larger community of science. When the researchers’ scientific activities shift to a primarily communicative focus, we refer to these groups as discourse communities. Discourse communities are understood to be comprised of shared knowledge, values and goals (Prior, 1991), as well as shared assumptions, conventions and communication forums (Porter, 1986). According to the definition by Swales (1990), a discourse community has at least one form of genre to serve its purposes, a specific lexis, and a sufficient number of users who have competence in the genre and lexis to maintain them.

Discourse communities are linked to activity systems as a result of recurring situations that are based on societal exigencies. In the case of the sciences, the societal exigency is to communicate scientific knowledge. That knowledge is described as “a set of temporary descriptions and explanations that best fits the existing evidence and current understanding of the real world within the limitations of people’s sensory and intellectual abilities” (Yore, Florence, Pearson, & Weaver, 2006). The recurring responses, in this case being the need to describe and explain existing evidence, take on a particular form over time, forms that become traditions, and traditions that ultimately constrain the choices of subsequent users of the form. The texts are perceived to be inseparable from the historical and current activities of the community and from the setting (Russell, 1997a). In the case of various research communities, the genre of the RA is molded
by the choices made by earlier generations of scientists who reported their findings. The challenges facing today’s scientific writer are assumed to be similar enough to those challenges faced by her predecessors, which is why the semantic and rhetorical cache can still be viewed as valuable to the modern day user of the historically created genre (Miller, 1984). As described in terms of Activity Theory, today’s tools—in this case the RA genre—reflect other people’s experiences who earlier attempted to solve similar problems (Kaptelinin, 2006).

Applying this set of ideas to the challenge that doctoral students have, the participants in the current studies are learning to communicate their scientific knowledge according to the practices of their respective discourse communities. Since it is any given participant’s community that practices the conventions of its genre (Miller, 1984; J. Swales, 1990), a doctoral student must focus on the practices reflected in journals of the relevant DC, as these are the artifacts of the DC. On a broader scale, the RA genre as a more general entity will, according to Russel, reflect “typified ways of purposefully interacting in and among some activity system(s)” (Russell, 1997b). In other words, though the RA genres of various disciplines differ because of the differences in their activity systems, they share like aspects of an RA genre that is representative of the linked community of scientific research systems.

This framework of genre theory influences my interpretations of the review comments and the participants’ descriptions of their use of PR. Features of the RA genre are assumed to be different among the disciplines, even though shared principles exist. Furthermore, the RA genre is in the process of evolving, so writers and reviewers may interpret the relative stability of features differently. Because of the disciplinary differences and the genre’s evolving nature, the analysis of data will not attempt to establish whether comments and responses to comments are right or wrong. Finally, genre is understood to be tied to the activities in the scientific research, so student references to activities in the research and the ways these activities are represented in the text are important indicators of genre awareness.

3.3.3 Combining Theories
A primary aim of the current research is to better understand how doctoral writers use PR to mediate their learning of the genre of the research article. This genre represents the historical activities of generations of other researchers who in their time attempted to write about what they did and why it mattered. Since the text form represents both a general RA genre of scientific research and also the specific RA genres as connected to their respective disciplinary activity systems, a pressing question concerns the way in which PR might allow for mediation of RA constructs,
a mediation that can illuminate the forms and functions of RA’s that are otherwise hidden to many novice writers.

The premise is that NNES novice research writers will better learn the principles and forms of the genre of research articles (RA) through the following activities: reading a peer’s texts, commenting upon the peer’s text, receiving comments from a peer, and revising the text that was reviewed. The construct of mediation suggests that the implicit principles that inform a particular researcher’s RA can be made more explicit to her when she is exposed to manifestations of these principles when reading a peer's text or review comment. In that activity, the researcher can notice how the principle was used, measuring it against previous knowledge, making decisions about the usage, and then mediating her understanding through languaging, either in the form of a comment or in revision. Because the participants’ levels of understanding the genre are closer than what they would be with their supervisors or expert researchers, the peers’ review can be more informative (Chauldron, 84).

In practice, when a writer or reviewer notices a peer’s alternative use of a construct or form, the student’s internalized and partially learned discourse and language constructs are activated. According to the processes described in sociocultural theory, the student compares, substantiates and decides upon the best solution to the problem that was raised, her past idea of the construct being challenged by the peer's idea of the construct. This cognitive negotiation serves to further mediate discourse constructs. Finally, when the student transcribes her thoughts about the contentious construct into words in her actual review comment or in her revision, she is forced to organize and control her thoughts surrounding that construct. The reading, noticing, comparing and languaging provide opportunities for the participants to negotiate meaning about the genre features specific to their discourse communities.

These theoretical principles described above were used in this dissertation both in the decisions of which data to collect and use, and also in the decisions concerning the manner of analysis and interpretation.
4 DESCRIPTION OF THE RESEARCH ARTICLE GENRE

In order to explore the ways the participants use PR to mediate the learning of the genre of the research article (RA), there must be a description of this genre. The aim of this chapter is to come to a working definition of the RA genre within the natural sciences. This working definition will be used to inform the investigation of peer review by providing genre features considered to be associated with the RA in the natural sciences. This investigation was conducted because there was no specific source that could be used to define the RA genre.

4.1 METHOD OF INVESTIGATION

This analysis focuses on the general functions being performed in the RA. These functions were located at the level of moves within the texts. The analysis draws on expert sources to define principles of scientific writing. The description of the RA in this chapter will be based on the averaging of move structures and the averaging of communicative principles that result in particular linguistic forms.

The remainder of this chapter is a description of the features of RA’s. Salient features were determined by calculating multiple mention in artifacts that are considered to have status with research writers in the natural sciences. The principles that influence the forms were considered as scales of attributes rather than absolutes. For example, formality of voice is considered important in scientific RA’s; however, the degree of formality differs among discourse communities. For the purposes of this research, it will be sufficient to establish that formality is a key negotiated principle within the RA genre. Once the principles and the moves are defined, it will then be possible to see where participants focus on these aspects of the RA genre.

4.1.1 SOURCES

To develop a composite description, I relied on a variety of sources. A historical stance was investigated through consultation of two studies of the research article in the natural sciences: Communicating Science: The scientific article from the 17th century to the present (Gross, Harmon, & Reidy, 2002), and Shaping Written Knowledge: The genre and activity of the Experimental Article in Science (Bazerman, 1988).

For a more current description, I surveyed artifacts that had stature in the scientific community such as editors of academic journals, writing and science teachers, genre researchers, grammarians, and professional organizations (Rogers, 2007). I examined author guidelines from primary journals of the participants’ identified discourse communities and the style guides referenced in those journals. I also
examined the cited style guides noted in the author guidelines from the dominant journals. For example, at the end of the writers’ guidelines for Conservation Biology ("Author Guidelines," 2016) the editors note that the guidelines were developed from Day’s textbook How to Write and Publish a Scientific Paper (Day, 2011), from the Council of Science Editors Scientific style and format, (Editors, 1994), and from University of Chicago’s manual of style Chicago (The Chicago Manual of Style, 1993). In summary, the writers’ guidelines of the model texts spawned the list of style guides that I then included.

Two academic journals that focus on genre were surveyed for studies associated with analysis of RAs: English for Academic Purposes and English for Specific Purposes. I surveyed the last five years of articles, looking for genre research that focused on RA’s. When I identified such research, the focus of the research was noted. For example, if the study investigated move structure or lexical features or use of syntax in the RA. This resulted in 18 research articles. I then scanned the bibliographies of the studies that were particularly relevant to the definition of RA’s in the natural sciences to see how extensive the research base was for the area of focus. For example, a study about order in the results section may have been the first of its kind, or it may be the most recent of 25 such articles. Such surveys not only alerted me to trends of investigation concerning RA’s, but they also helped define what may be contested in the definition of the scientific RA. Such contested features will be the indicators for the negotiations of discourse practices that reviewers and writers have in the peer review.

To capture the RA practices that are considered important for graduate students in the sciences to know when writing in English, I surveyed the current text books commonly used for graduate level scientific writing courses. To determine which text books these were, I looked at the university graduate course descriptions for the faculty of sciences in six prestigious research schools taught in English settings. I then examined the syllabi for research writing courses from the faculties of natural sciences. The collected data from these sources were used to inform the current description of the scientific RA. For a summary of sources used, see Appendix F.

When the description of the RA was complete, three well-published research writers in SLU reviewed the composite description for feedback. Clarifications were made based on their review, and in places their comments are added. I believe these comments are valuable from an emic perspective, as they reflect the beliefs of practiced supervisors and researchers who advise doctoral students about the genre of the RA at SLU.
4.1.2 Analysis and Categorization

The initial list of features was derived from the student text books about scientific writing. I used spreadsheets to compile lists of features that were addressed in the sources, initially creating over two hundred categories. As I categorized advice from new sources, essentially filling in columns that represented oft-repeated advice, some features became more salient and some more nuanced. These additions suggested patterns that helped me create sub-lists. The sub-lists were organized according to rhetorical functions, for example, *ease of reading, cohesion advice, brevity*. Once a category had reached saturation, I stopped calculating for that particular feature. Saturation was determined if five sources raised the same concern within 10 surveyed sources. The exception to this was when a surveyed source specifically noted that the feature-in-question was a “false concern,” in which case I held that category open for further classification.

The spreadsheet allowed for better understanding of the frequency of occurrences of features, showing the agreed-upon concerns in scientific RA’s. However, explanations for these concerns were not necessarily provided in many sources. Writers’ guidelines could state “prefer the active voice in all sections” but not say why. Where it was possible, I added explanations for such advice when these explanations were provided by the historical sources and the text books.

Where this chapter reports research findings from other genre studies, standard citational practices are used. However, when text books, author guidelines, style sheets or syllabi simply state a rule (“prefer the active voice”) I have not provided citations. Instead, it is understood that any feature suggested in this chapter is supported by 50 percent of the first ten sources surveyed.

The organization of the features as described in the remainder of this chapter is influenced by two underlying premises. First, the RA is seen as a form of argument, a tool of persuasion, where each section of the RA serves as a special platform to argue the importance of the research. Though RAs are traditionally considered a form of reporting rather than argumentation (Yore et al., 2006), a substantial amount of evidence contradicts the image of RA’s being a record of facts (Bazerman, 1988). Therefore, the description of text sections explores the general moves within each section and then explores the methods of argumentation. The description also focuses upon stated principles of scientific writing as described in text books and style guides. Such organization reflects commonly accepted classification of text features, so I used these categories as much as possible.
4.2 Rhetorical Features of the RA

Organization is a tool for argumentation and cohesion, where the reader’s text expectations provide an established forum for both. These expectations are largely determined by common rhetorical practices of dividing and ordering the text, practices that act as a form of meta-discourse. Expectation of order is powerful concerning scientific RAs, where readers expect the framework of the Introduction, Materials and Methods, Results and Discussion (IMRD). This rhetorical division was formalized for biomedical RAs in the 1970’s under the Vancouver Conventions, the purpose being to make RAs more accessible, accurate and clear for the reader. The American National Standards Institute recommended this organizational pattern in 1972 (Day, 2011), and it is now the most common structure of RAs in theoretical and applied sciences (Pérez-Llantada, 2012). The standards led to a uniformity of RA’s as seen by analysis that shows how RA’s in the 1950’s were not as uniform as were the 1980’s. This is seen in comparisons of theoretical sections and subsections (Bazerman, 1988).

The order of IMRD assists uniformity, conciseness, and easy comprehension (Day, 2011). Each section reflects a major rhetorical activity, with the introduction being theoretical, the methods being methodological, the results section being empirical, and the discussion being interpretive (Paradis & Zimmerman, 2002). The uniform sequence of the genre not only facilitates reading, but creates a kind of gratification in the reader, where the subsequent move is anticipated at the completion of the previous move (Miller, 1984). IMRD uniformity has led to uniformity of other RA features. For example, between 1976-95, the manner of giving complete references, the use of numbered figures and the use of subtitles was consistent in published scientific RA’s, which was not the case earlier (Bazerman, 1988).

A critical activity in genre analysis is defining the organization and sequence of the genre’s texts (Basturkmen, 2009) which includes the rhetorical moves and steps. Genre studies investigate how disciplines and sub-disciplines differ, the IMRD structure often used as the model for comparison. For example, one study analyzed 433 RA’s from 39 disciplines to identify the ways in which a large corpus of RA’s compares to the IMRD structure (L. Lin & Evans, 2012). In another study of RA structure, 13 studies were identified to have focused on moves within IMRD (Kanoksilapatham, 2005). Commonly, research investigates moves and steps within sections of the RA’s of a particular discipline (Stoller & Robinson, 2013), or compares moves and steps between sub-disciplines (Samraj, 2002).

Each section of the IMRD is used for a different form of argumentation. Early in the communications among scientists, nature was seen to speak for itself, and a scientific report was seen as just that, a detailed report (Gross et al., 2002).
Description was sufficient if the scientist was trustworthy and/or had witnesses to attest for his observations. What was earlier a science of observations became over time a science of causes, where experiments were expected to lead to theory. Methodology changed that instead strove after quantitative data, data that could be measured and compared, that could lead to systematization and eventually to theorization. These changes in scientific investigations created a more powerful need for argumentation in the written communications (Gross et al., 2007).

As understood in scientific inquiry, knowledge claims can be supported or falsified, but they are not absolute. Instead, it is the scientific community and sometimes the public who will critically assess these claims (Yore et al., 2006). Claims published in the scientific RA’s can be seen as public arguments, and that which becomes theory is the agreed upon collection of the strongest arguments. The ultimate goal of argumentation is for the researcher to have her knowledge claim accepted into the discourse (Pérez-Llantada, 2012).

What follows is a description of the main sections of the IMRD structure, descriptions that will provide this study with the general functions writers are expected to accomplish. For each section, there is also a description of the ways in which the rhetorical expectations are used to argue scientific claims. General expectations provide a map of the RA from which discourse practices in disciplines deviate.

4.2.1 Title

The title, the subtitles, and the abstract work together to guide the reader through the RA and serve to inform readers about whether the research is relevant to them. Titles reflect the general subject of the research in 95 percent of RAs (Gross et al., 2002). Titles are expected to be concise, informative, and not overly technical. Writers should avoid use of numbers, abbreviations, punctuation, and use of active voice (Paradis & Zimmerman, 2002). They should be specific enough to describe the contents of the paper and to facilitate computer searches, but not so technical that only specialists will understand (CU).

Most readers will decide to read a paper solely based on the title (Paradis & Zimmerman, 2002). The title will be read by thousands of people while only a few will read the paper (Day, 2011; Montgomery, 2003; Paradis & Zimmerman, 2002). The title serves a marketing purpose where the research writer can influence the number of readers based on the type of title. One expert from SLU confirmed the importance of catching the readers’ attention in the title, noting that experience had taught him to create titles that invoke controversy so that readers would be more likely to attend to the research. According to one study on RA titles and impact factors, such subtleties are not broached in the instructional texts for writing in the sciences (Paiva, Lima, & Paiva, 2012).
This difference between textbook sources and practitioners was apparent again regarding specificity in titles where the guidebooks warned against any vagueness in the titles (Day, 2011; Montgomery, 2003; Paradis & Zimmerman, 2002) but an expert researcher at SLU suggested that specificity in a title was not helpful if it implied that the results were only relevant to a particular area. He claimed that researchers instead write titles that vaguely suggest wider relevance for the findings, a strategy that is supported by a study that specifically analyzed title features of RAs with high impact factors. Among other findings, the study concluded that geographical mentions associated with relevance of findings was a disadvantage (Paiva et al., 2012). Other features that were associated with high impact factors were titles that were short and that clearly featured the main results (Paiva et al., 2012).

4.2.2 Abstracts

Genre analysts perceive abstracts to be a genre in and of itself. Abstracts give the readers what they need quickly (Berkenkotter & Huckin, 1995), helping the reader decide whether the article is worth reading (Gillaerts & Van de Velde, 2010) (Paradis & Zimmerman, 2002). An informative abstract is a miniature of the RA and seems most common, whereas a descriptive abstract features the knowledge claims and summarize the methods used (Gross et al., 2002). The preferred type is specific to the journal (Paradis & Zimmerman, 2002) and/or the professional society. For example, the Ecological Society of America explicitly states that abstracts should justify the purpose of the research and highlight key conclusions. An expert informant from SLU pointed out that the type of abstract is commonly determined by the word count requirements. Low word counts necessitate removal of methods descriptions.

The move structure varies according to the type of abstract expected (K. Hyland & Tse, 2005; Samraj, 2005). Though descriptive abstracts provide the reader with the expected order, both types help the reader navigate the text. Abstracts are often published separately from the study in bibliographical resources to allow other researchers to scan the literature. In this role, the abstracts must be seen as stand-alone texts that provide sufficient information using vocabulary to allow for bibliographic searches (Paradis & Zimmerman, 2002).

In most of the surveyed texts, abstracts serve as a marketing device for the RA (K. Hyland & Tse, 2005), and are considered the most important part of the manuscript for the purposes of attracting readers (Gillaerts & Van de Velde, 2010) (Pérez-Llantada, 2013). For this reason, abstracts should be short, they should highlight important results, and they should use non-technical, non-verbose
language so that potential readers are not discouraged from reading the text. One SLU expert pointed out that advice about non-technical language is contrary to her experience. She notes instead that readers should be expected to be familiar with the technical jargon of the field. Some journals warn writers to avoid personal phraseology, a kind of interactional discourse that is typically absent in scientific abstracts (K. Hyland, 2004). Discourse communities wishing to be perceived as belonging to the hard sciences have removed such attitudinal markers from their abstracts over the past 30 years (Gillaerts & Van de Velde, 2010).

An expert informant from SLU pointed out that requirements for abstracts for high impact journals within the same discipline can differ greatly, which was confirmed in samples surveyed. Furthermore, differences are apparent between traditional and online publications, where the latter demonstrate a clearer direction toward self-marketing. Introductions

4.2.3 Introductions
The purpose of the introduction is to provide the rationale and objectives of the research. It connects the research to the discipline’s foundational work within the discipline while also showing its originality. The introduction is a section that is consistently present in RAs (L. Lin & Evans, 2012), and has been studied in detail for over 20 years, beginning with a landmark genre analysis study where Swales defined the purpose of introductions as creating a research space Swales (J. Swales, 1990). Three primary moves comprise the introduction, each move consisting of steps that have been shown to be more varied than initially reported in Swales’ original work (Samraj, 2002). His model is used as a sort of boilerplate to show how any given discourse community enacts the moves within its introductions, most commonly using his original model rather than his updated model.

The first move described in the CARS model is to establish the research territory by showing the area is important and by introducing the relevant literature (J. Swales, 1990; J. M. Swales, Feak, Committee, & Council, 2004); however, the amounts and types of relevant literature differ among discourse communities (Samraj, 2005). One of the most used guidebooks advises writers to provide enough background information to allow the reader to judge the results without having to search earlier published studies (Day, 2011). Essential background information should be included but not lengthy reviews.

The second move is to establish a niche by either indicating a gap in the earlier research that points out what is missing, what is irregular, or what is forgotten in the consensual knowledge (J. Swales, 1990). Some guidelines for science writers do not include this step but rather advise writers to specify the problem,
summarize relevant research, and point out how the current research will contribute to what is known (Paradis & Zimmerman, 2002). The third move is to occupy the niche through stating the aim of the current research (J. Swales, 1990). Other differences among discourse communities include additional listing of hypotheses, announcing principal findings, announcing the value of the current research and outlining the structure of the RA (J. Swales, 2004).

According to one historical analysis that analyzed scientific RA’s between 1976-1995, 85 percent of the introductions conformed to Swales’ description of required rhetorical moves (Gross et al., 2002). A cross-cultural study comparing 20 Chinese introductions to English language RA introductions showed that despite many differences, they had the same three moves as noted by Swales (Loi, 2010). Numerous genre analysis studies found Swales’ model to accurately describe introductions as seen in a survey of 28 RA texts from 7 academic journals in Agricultural sciences where over 90 percent of the introductions were found to follow Swales’ model (Del Saz Rubio, 2011). Though the moves are mostly uniform, differences in steps within moves exist among discourse communities. Even within sub-disciplines, differences in steps are apparent, a reflection of the type of problem being investigated (Samraj, 2002, 2005).

**Argumentation in Introductions**

The overall purpose of the introduction is to argue for the current study by connecting it to previous research, or to argue the lack of research in the area. The introduction must also show its originality and its connection to the primary activities of the discourse community (Paradis & Zimmerman, 2002). The writer must capture the reader’s attention and demonstrate the importance of the subject. A key element of argumentation in the introductions is the use of citations. Through the 19th century, citations were used more as a form of informal recognition of predecessors’ work, rather than explicitly supporting the current research. Eventually, citations developed into a method to link current work to a body of research and theory (Bazerman, 1988). Through citation webs, researchers gain strength by being tied to legitimate, critical social processes. Citations demonstrate membership in the discourse group, where it can be sufficient to refer to a particular name or construct to symbolically attach one’s own work to the entire community (J. M. Swales et al., 2004). One SLU expert pointed out that calling forth the “right” references is a form of legitimizing one’s own research and to demonstrate knowledge in the natural sciences.

Citations now tend to be embedded throughout the articles, so each stage of argumentation is supported by references to earlier literature (Bazerman, 1988). Citation density has increased dramatically over time. According to one survey,
citations in scientific articles average one to two citations per 100 words (Gross et al., 2002). The newness of citations matters as well in scientific RAs, particular when compared with other disciplines (Pecorari, 2009). One SLU expert pointed out that this can be explained by the speed of research in natural sciences compared with physics or chemistry, where the latter would rely more on foundational research in citations.

Citations in introductions act as building blocks to create the story that will support the writer’s own claim. Citations are used to show where an idea came from, to support the topic of study, and to show research that has a similar focus. Each reference used can more tightly situate the researcher’s work and protect the significance of the current question. Those who may need less protection, such as high status researchers, rely less on this form of citation and can better afford to criticize other research (Bazerman, 1988). One SLU expert noted that novice researchers typically cite so many sources because they are unsure of the key players in the field, so they instead reference everything. This contention was supported by a study that showed how expert writers use citations differently than novices, the former strategically building support for their claims through synthesis of sources, whereas the novices use sources in isolation and unconnected to their own work (Mansourizadeh & Ahmad, 2011). Another SLU expert pointed out that researchers will typically cite work of people who will likely be reviewing their work. He noted that experienced researchers know who comprises their reviewer base, which is a critical part of the “citation game.”

4.2.4 Material and Methods
In materials and methods, the research design is described and defended (Day, 2011; Paradis & Zimmerman, 2002). According to a large survey of RA’s, the M&M section stands alone 85 percent of the time (L. Lin & Evans, 2012). A clear description of the experimental design, the sampling procedures, and the statistical procedures (Paradis & Zimmerman, 2002) is provided with enough detail so the readers can assess the appropriateness of the research design (Day, 2011) (Matthews, 2008). Condensed methods used by chemists and molecular biologists differ from extended methods more commonly used in the natural sciences (J. M. Swales et al., 2004). One SLU expert pointed out that methods descriptions are often insufficient regarding reproducibility, but the reason can be that they are protecting their practices. In M&M, writers address any relevant ethical considerations, for example, consent of human participants and treatment of experimental animals.

The M&M section is typically chronological, but also thematically arranged where related methods are described together (Day, 2011) as labeled by sub-headings
(Cargill, 2009; Paradis & Zimmerman, 2002), and flagged with time references (J. M. Swales, Feak, & Hixson, 2000). Subheadings in the M&M section should match subheadings in the Results section (Day, 2011), advice emphasized by members of the expert group from SLU, who further point out the order as connected to the hypothesis.

Guidelines for M&M focus on the principles of conciseness, clarity, and accuracy (Poly M). Details of the materials used in the process require exactitude which is often emphasized in author instructions. In some discourses, such detail is to be provided in strong sentences and paragraphs, others in tables and lists, and others in the appendix (Paradis & Zimmerman, 2002). If a complicated protocol is involved, writers are encouraged to include diagrams or flowcharts to explain the method.

The above described features support the argumentative component of the M&M section. Reproducibility of experiments has been a fundamental tenet of scientific RA’s harkening back to the late 1800’s when Louis Pasteur had to defend his work by explaining it in precise detail so that others could reproduce his work (Day, 2011). As a result of the speed of scientific developments, M&M’s became progressively more detailed throughout the following century (Gross et al., 2002). Consequently, scientists carefully describe their methods.

Detail is also required so readers can ascertain how the problem solving has been designed empirically. Somewhat contrary to popular belief, the scientific method is not comprised of a universal set of steps. Rather, the researcher must often make a case for the methods chosen (Yore et al., 2006), as evidenced by the instructional materials for graduate students that focus on phraseology of justification for this section (Matthews, 2008; J. M. Swales et al., 2004; Wallwork, 2011) and by warnings regarding dangling participles of purpose that occur most frequently in M&M (Day, 2011; Montgomery, 2003; J. M. Swales et al., 2004). Detail is also needed for the reader to check the results against the methodology (Paradis & Zimmerman, 2002) to assure the results could be ascertained by the stated methods. The amount and type of detail can convince the readers to accept the researcher’s experience of discovery by allowing the knowledgeable reader to imagine the activities that took place (Gross et al., 2002). The methods section must create the impression that any competent researcher would have likely conducted the study in a similar ways, and therefore, passive voice is typically considered appropriate (Day, 2011). Another reason readers attend to M&M is to assure the reader that the research was done with exactitude, to convince the reader of the quality of the research (Bazerman, 1988).
For all the above-mentioned purposes, clarity and accuracy of detail is vital (Paradis & Zimmerman, 2002). According to Bazerman, researchers choose detail with the same caution that a fiction writer chooses detail. Type and amounts of detail differ among disciplines, noted one SLU expert. As an example, he noted that ecologists focus more on ideas than methodology. As a result, ecologists’ methods sections are considered “dodgy” by other standards. In contrast, specialized disciplines within the natural sciences like plant physiology or soil science tend to be very methods focused, and subsequently highlight methods in their manuscript story. He tellingly described how he remains “highly aware of the importance of getting this part of the story just right for the different target audiences.”

A recent study of 433 RA’s found that current changes to the organizational structure in the RA affected the detail in the methods. They suggested that Methods were taking less space and significance in RA’s compared with Results and Discussions, and were consequently less detailed. Some of the evidence for this claim was the ways that Methods were more often relegated to the end of the RA, how the section could be in a smaller font, and it could be compressed with Results or even with Results and Discussion (L. Lin & Evans, 2012). Expert researchers who provided feedback on the current chapter also pointed out the changing practice of relegating sections of the methods to less visible locations such as moving it to online supplementary information.

4.2.5 Results
The results section of the RA is the empirical section. Though often the shortest, it is considered to be the core of the paper (Day, 2011; Paradis & Zimmerman, 2002). Readers will often jump from the abstract to the results, ignoring the other sections unless they become relevant after the readers process the results (Pérez-Llantada, 2012). One SLU expert noted that most of her colleagues jump directly from the title to the tables and figures in the results in order to judge if the article is worth looking at. A brief reminder of what has been done is followed by a cycle of simple statements of key results that are often followed by reference to tables and figures. Results should focus on data that has been selected to be representative (Day, 2011) (J. M. Swales et al., 2004), whereas repetitive determinations should be represented as tables or graphs to make comprehension easier (Paradis & Zimmerman, 2002) (Day, 2011) (UMN).

Data must not inadvertently be interpreted (Paradis & Zimmerman, 2002) or may be seen as compromised, though such separation is not as obvious as writers’ guidelines may imply (J. M. Swales et al., 2004). Some style guides instead recommend interpretation only in instances where it is necessary for
understanding subsequent data. An SLU researcher pointed out that separating interpretation from results is very difficult for new researchers.

The form of the represented data is a topic of concern in scientific writing. If data can be more efficiently and clearly represented in figures, they should be. Journals encourage writers to use tables, charts, graphs and figures, particularly when presenting high-quality data. Tables are more often used for data associated with statistical tests, whereas the key results one uses to tell the story will go in figures. Figures should be able to stand on their own, and should not be duplicated in the text. Visuals should allow for easy understanding of the message and should not be made complicated or too busy with excess data (Montgomery, 2003). Figures should adhere to visual conventions to allow for ease of reading, for example, no invented units. To emphasize these conventions, journals provide detailed instructions. Journals warn writers to not use visuals when they are unnecessary, and discourage writers from creating tables for data points that could reasonably be added into the text.

Numerous guidebooks contend that all aspects of the RA lead toward or away from the Results section. Information housed in the results has highest value, and what is placed in this section will typically retain value longer than what is found in the other sections (Bazerman, 1988). Argumentation in Results is performed less with text than in other sections, as readers should be able to clearly see results without the researchers’ interpretations. Mathematics is a prominent form of argumentation, allowing for comparison of one’s own data sets to past data sets, to theoretical calculations, or to data obtained by another method. Establishing a scientific fact is often a process of quantifying, and those observations that cannot be measured have lesser status as “facts” (Gross et al., 2002). Therefore, the key message of the modern scientific RA often lies in numerical generalizations and statistical analyses found in the results (Bazerman, 1988). Sources advise writers to use tables for matrices of data, illustrations for improved comprehension, and graphics for complex concepts and for clarifying relationships. Graphs, figures and equations in the modern scientific RA reflect a communication style that now relies on the visual as much as the verbal, providing a different set of tools to argue with.

One recent study concluded that the average number of equations per RA was 35 (Gross et al., 2002). Visual representations are common in modern day RA’s, with more than half containing numbered tables (five per article on average) and more than half having numbered graphs (five per article average). Tables and figures take up on average 26 percent of the space in scientific RAs, and over 72 percent of the articles surveyed used at least 1 graph (Gross et al., 2002). One expert reader
pointed out that this increase is largely due to the ease at which researchers can produce figures with new technology.

Writers are cautioned to not overwhelm their readers by providing too much detail. Writers are expected to condense their data sets into meaningful representations. For example, through splitting data types into a separate visual space in the RA, researchers can visualize trends and comparisons, and they can connect their assertions to visual evidence. Such decisions point to the interpretation that takes place in presenting results. Still, the appearance of the results in graphs, charts or tables is that the data are raw and seem to speak for themselves. Data as represented in figures may be more powerful because of the experience it provides the reader. Readers often ignore the researcher’s interpretations that are found in the discussion, choosing instead to interpret the results themselves. The graph is used as a heuristic tool for the reader, where its interpretation can lead to discoveries (Gross et al., 2002; Paradis & Zimmerman, 2002). Interacting with a graph that the writer created can lead to the conclusions that the writer hoped for.

Another visual form used as argument in RAs is illustrations and models, often used previously to show mechanical explanations. Photos and renderings serve as a form of argumentation, often accompanied by text that explains which aspect of the visual that the reader should attend to. These visuals are used primarily to support the researcher’s claim, both by establishing facts and explaining them (Gross et al., 2002).

4.2.6 Discussion
In the discussion, writers evaluate their results and describe their significance (Paradis & Zimmerman, 2002). After a brief reminder of background information, the most important results are highlighted and connected to the research question/hypothesis Swales (J. M. Swales et al., 2004). Results and interpretations are compared and contrasted with established findings and theories (Basturkmen, 2012) Also discussed are principles of interpretation, relationships among results, and the generalizations shown by results. Problematic results should be clarified (Day, 2011; Paradis & Zimmerman, 2002). Results and discussions sections are combined in some discourse communities, sometimes due to influence of online publishing.

Moves show variation among discourse communities, such as the presence of theoretical implications, the practical applications, and the research that could further develop questions illuminated in the research. Noting the limitations of the research varies significantly among discourse practices, appearing, for example, in Biology RA’s 6 percent of the time, and Environmental Science papers 69 percent of the time (Peacock, 2011). One SLU researcher noted that in his field
stating the limitations was seen as giving the reviewers free ammunition against your own work. In some fields, writers leave the reader with a succinct “take-home” lesson that emphasizes what is most relevant. Basturkmen’s (2012) survey of RA’s confirm the above steps, sub-steps and sequencing of discussions.

**Argumentation in the discussion**

Discussions are considered to be the interpretive section of the RA, being both more theoretical and more abstract than other sections (J. Swales, 1990). According to Day (2009), many papers are rejected because of poor discussions, even those that have interesting and worthwhile results. New knowledge claims are made in Discussions, and writers work to persuade readers to accept them (Basturkmen, 2009).

Original claims are related back to the aims of the research as stated in the introduction and shown in the results. These arguments are partly attended to by the order that information is presented, where the writer recreate the same order in all three sections to show that the questions have been answered and that the results support the conclusions. This strategy was used by Newton after he received strong criticism over his work. Newton’s response to the criticism was to reorder his Discussion section so that each particular claim was reinforced by tying each section of the discussion as tightly as possible to his empirical results (Bazerman, 1988). Essentially, Newton left no wiggle room for the reader to misinterpret which conclusion was supported by which evidence. This style of ordering a result plus its commentary, one result at a time in a cyclical way, is an argumentative device used in the discussion section in scientific RAs (Basturkmen, 2009; Hopkins & Dudley-Evans, 1988; J. Swales, 1990) (Kanoksilapatham, 2005).

Interpretation is another argumentative task of the Discussion which can be crucial if results are otherwise hard to explain (Parkinson, 2011) or if multiple interpretations are possible. Writers carefully choose their language when they try to convince the reader that their own interpretations of the results are valid (K. Hyland, 1998; Koutsantoni, 2006). Such argumentation typically requires use of epistemic modality as it is connected with belief, knowledge and opinion. With epistemic modality, writers’ express their assumptions and confidence about the meaningfulness, accuracy and significance of the propositions and interpretations being made (A. Yang, Zheng, & Ge, 2015). Meta-discourse is also used to show what claims might mean, for example, “the reason for this,” “as can be expected,” and “consequently.” Such phrases connect reasons to results and causes to effects Perez (Pérez-Llantada, 2012). Effective use of these tools requires that writers
anticipate disagreements with their propositions or anticipate potential misunderstandings. In this respect, epistemic modality and metadiscourse are used to anticipate dissenting opinions and to gather support for one’s own propositions.

Researchers also argue the significance their claims in context of the discipline’s theories (Basturkmen, 2009; Gross et al., 2002). Connecting a claim to theory requires inference, where writers use specialized terminology, a specialized register, and references to earlier noted visuals and mathematical arguments (Gross et al., 2002). Showing that one’s claims are uniquely important to the community is often a kind of straightforward promotion which typically relies on boosting. Lexical and syntactic strategies make one’s own work stand out, for example through use of adverbs and modals that indicate certainty, and adjectival and adverbial intensifiers that attempt to gather more support for propositions (Pérez-Llantada, 2012). Writers are careful to not overstate their claims by using overly strong verbs, and are also sound distant when they make claims (Cargill, 2009; Matthews, 2008; J. M. Swales et al., 2004; Wallwork, 2011). For example, “it-clause” constructions allow for highlighting results while still sounding neutral, as seen in an example like “It is significant that these results differ from earlier results.”

Appearance of objectivity and the voice of a team player matters, even when scientists are boosting their claims. They must not sound as though they are hacking away at earlier knowledge building and instead use neutral language in reference to others’ research. Both criticism and boosting are tempered in order to not invite criticism and controversy. Practices include citing work that supports one’s own findings, showing research that uses similar arguments, and comparing own findings to other sources to show similarities and dissimilarities (Mansourizadeh & Ahmad, 2011). Researchers often couch their claims in understatement, otherwise known as hedging. With hedging, researchers intentionally sound less certain than they might so that the results are suggested to the community rather than shoved upon them. With hedging one can more safely suggest possibilities, politely criticize, show trends and keep a safe distance from conclusions. With hedging, a writer can sound doubtful, but still sound authoritative, and can appear to subordinate themselves to scientific knowledge (Bazerman, 1988).

Hedging is linguistically similar to boosting, for example, using “it-clauses” to create distance between themselves and their claims (K. Hyland & Tse, 2005). An epistemic lexical device such as “it is commonly believed” is attached to a proposition, or and epistemic modality marker is used, where a writer notes something “may be prevalent” or something “could be noticed” in the data (Pérez-
Llantada, 2012). Hedging can counterbalance the use of passive voice which can make conclusions sound overly certain. Typically, the more a text relies on passive for objectivity, the more hedging is needed to not overstate a claim. (Gross et al., 2002). Hedging is an important argumentative strategy in RA texts that is used more extensively by experienced researchers than novices (Parkinson, 2011), and has quadrupled in use since the 19th century.

4.3 PRINCIPLES OF SCIENTIFIC WRITING

According to the combined sources used in this exploration of the RA genre, the fundamental principles of research writing within the natural sciences are accuracy, precision, clarity and brevity. These principles go without definition in most documents. Accuracy in most texts refers to writers claiming nothing that is false, describing activities and knowledge correctly, and sufficiently representing facts. With precision, writers should come as close as possible to the exact meaning, leaving no ambiguity, no possible alternative meanings. Clarity requires texts that are transparent and familiar in form for the intended audience, creating no unnecessary barriers to understanding. Finally, brevity reminds the writer to not use more of the readers’ time than necessary. Writers of research in the sciences must attempt to hold themselves to these principles while arguing for the importance of their work. The ways in which the principles become visible in RA genres is explored in the remainder of the chapter.

4.3.1 Linguistic Features of the RA: Balancing Precision, Clarity and Brevity

Lexicon

The principles that are most emphasized regarding lexical choice in RA writing are precision, brevity and clarity. Words must carry the intended meaning, be unambiguous, be understandable to the readership, and be brief. The principles push against one another, and disciplines prioritize these principles differently regarding lexicon. All text books scrutinized for this chapter gave warnings about vagueness in expression, alerting writers to not use synonyms. The rule is to find the most accurate, most precise word, and stick with it (Matthews, 2008; Paradis & Zimmerman, 2002; Rogers, 2007; Wallwork, 2011). When two or more similar terms are used throughout a text, writers are warned to be consistent with usage and to clarify distinctions for the readers (Day, 2011; Rogers, 2007). When two equally precise words mean the same, the more simple word should be chosen. (Matthews, 2008; Paradis & Zimmerman, 2002; Wallwork, 2011).
Scientific writing allows for word forms that provide the writer some latitude in the use of English, forms that are arguably less acceptable in other genres, such as noun clusters, where nouns are fused so they modify one another. An example of noun cluster is *anomalous stability constant order and monoamine oxidase inhibitor insensitive agent*. Noun clusters have increased in density and in theoretical importance over time, and they have quadrupled in occurrence in the 20th century (Gross et al., 2002); however, they are identified as problematic in numerous sources because they can be difficult to decode and they restrict the texts to small, specialized reader groups (Cargill, 2009; Matthews, 2008; Paradis & Zimmerman, 2002) (Rogers, 2007; J. Swales, 1990). Additionally, the modifiers can be misinterpreted when they are not sufficiently connected by syntactic cues that show relationships among concepts (Day, 2011; Matthews, 2008) resulting in lack of clarity for even specialized readers.

Writers avoid restating fused noun strings or extended noun phrases by creating initialisms that represent a construct important in the text, for example, the way I replaced “peer review” with PR. Disciplines have their own abbreviations for common constructs that act in the same manner. This form has increased six-fold from the early 20th century to mid-century (Gross et al., 2002). Initialisms are defined early in the text and replaced with the shortened form that is there after used. Clarity commonly suffers with lexical density, so writers are advised to keep abbreviations to a minimum (Day, 2011; Matthews, 2008). Some even claim such lexical devices function as a gatekeeping mechanism, where semantic interpretation can be too difficult for the lay person (Pérez-Llantada, 2012). In a study that analyzed 12 scientific journals over 145 years of publications, the lexical density was found to increase every decade between 1930 and 1990, making the texts increasingly more difficult to comprehend for the non-specialist. Niche publishing exacerbates lexical density, as journals compete for readership by becoming specialized (Gross et al., 2002).

In contrast, style guides and journals surveyed advise writers to choose words and expressions that provide more clarity for a wider readership. Writers are warned to avoid jargon, to avoid euphemisms and new coinages, to be cautious with foreign words and abbreviations, and to define acronyms. Writers are encouraged to use traditional vocabulary and to not change a word’s grammatical form if it makes the sentence more wordy. Such guidelines often note that precision must not be at the expense of clarity and simplicity.
Sentences

The challenges in constructing sentences in scientific RA’s result from the principles of precision and brevity compromising clarity. Brevity was less important historically, where we see sentence length averaging about 60 words per sentence in the 17th century and about 30 in the 20th (Bazerman, 1988). Today, the style sheets set sentence limits at approximately 20 words per sentence. Decrease in clausal density is also emphasized. Clausal density has remained consistent over the last hundred years at a bit over two per sentence (Gross et al., 2002). Sentences use fewer clauses by instead using complex noun phrases in the subject position, making the syntax more efficient (Bazerman, 1988). Clauses were previously used to develop relationships for precision, whereas that job currently is held by noun constructions. However, this new kind of sentence leads to comprehension problems for many readers.

Syntactical constraints of English make preciseness difficult to accomplish without compromising clarity. In scientific texts, nouns and verbs must often be so heavily modified that the basic S-V-O structure is hard to recognize for the reader. For example, multiple prepositional phrases are commonly used to modify the nouns, but placing them between the subject and verb compromises the clarity of the sentence. Writers are thus encouraged to remove any modifier that is not essential, and to carefully place modifiers as to not create ridiculous-sounding sentences. RA texts often suffer from misplaced modifiers and dangling participles due to the difficulties imposed by precision.

Syntactical constraints also make “distant-sounding-ness” hard to master when a writer also tries to be clear. To sound distant and theoretical, writers often choose passive voice. However, the syntax is marked, and in combination with large separations of key elements (resulting from modification), the reader is quickly confused. It is largely this reasoning that motivates editors’ recommendations to adhere to active voice when possible, preserving the familiarity of the S-V-O form. Passive in combination with heavily modified nouns and verbs is too hard on the reader. Similarly, writers are warned against other forms of complicated or marked syntax, such as negative constructions, parenthetical phrases and use of dummy subjects.

Sources are emphatic regarding the importance of clear and simple syntax. Writers are encouraged to keep the activity of the sentence in the verb and to choose the strongest, simplest verb forms possible. Phrasal verbs are discouraged, since one-word verbs typically exist as good replacements. Semantic units should be tightly bound wherever possible. For example, writers are cautioned about using non-
restrictive clauses where a restrictive clause can better bind the modifiers to the antecedent. In efforts to maintain clarity, some sources even encourage writers to ignore prescriptive rules like not splitting infinitives if the sentence can be made clearer by splitting them.

4.3.2 Cohesion

Clarity is a principle that is emphasized in all the documents I surveyed. The key feature of clarity that is emphasized is cohesion among ideas. The following will focus on cohesion features that were emphasized in the texts for scientific writing.

Common metadiscourse used in RAs include transitions, frame markers, endophoric markers, evidentials, and code glosses (K. Hyland & Tse, 2005), relying heavily on source referencing (Del Saz Rubio, 2011; K. Hyland & Tse, 2005). The books written by journal editors emphasize use of simple cohesion devices, for example, choose “if” rather than “in the event that,” and choose “after” rather than “subsequent to.” Other lexical cohesion devices are the key words and consistent terminology that act as lexical glue in RA’s (Day, 2011; Matthews, 2008; Paradis & Zimmerman, 2002).

Cohesion is enhanced by particular sentence structure, showing relationships among ideas by placement and anaphoric determiners. Pronouns and determiners such as this/these, that/those are used to refer to previous concepts, allowing the writer to break long sentences without losing text flow. Nominalization also acts to cohere texts, where a verb that appears in one sentence or clause is then altered to a noun for the next sentence or clause so it can stand in the subject position. This repositioning allows the subsequent sentence to read from old to new information flow, which is the pattern suggested in all text books I surveyed that address scientific research writing.

Some of the stylistic regularities found in RA texts work to cohere the text for the reader. The referencing system follow conventions that allow for minimal interference with reading (Gross et al., 2002). Citations are listed in the end of the research article, which allows for better flow of text where information within parentheses is kept to a minimum. Naming of researchers in the sentences is less common within scientific RA’s, a practice that allows the subject positions to be filled with research items and activities rather than with people who performed the activities. The availability of the subject position also creates opportunities for better text cohesion when the writer relies on old to new information.
Capturing the appropriate voice matters in international scientific publishing (Diane D Belcher, 2007; T. M. Lillis & Curry, 2010) and L2 researchers have the additional challenge of creating a credible voice for themselves in a foreign language. Creating a researcher voice requires attention to a multitude of features that are used to maintain the relationship between the writer and the reader (Matsuda & Tardy, 2007). To persuade readers of the importance and validity of their research, writers must sound credible to the members of the scientific community. Bazerman describes this readership as knowledgeable and potentially skeptical of knowledge claims being made (Bazerman, 1988). Therefore, writers make efforts to create relationships of trust with their readers. A trustworthy voice sounds like can differ among disciplines (Lave & Wenger, 1991), so a writer of a given discipline must anticipate the responses of their particular readership. Seniority within a research field can also influence voice, where a highly ranked researcher has wider choices in how to express herself.

Impersonality is encouraged in the sources surveyed, where the scientist steps back to allow the science to step forward. Partly as a result of this, RA texts are often described as impersonal and detached. Sources encourage writers to avoid of colloquialisms and local or spoken expressions. Another tool used to perform non-presence is passive voice where researchers appear to simply report objective facts (Gross et al 164), making the science more prominent. The subject position that is opened when the actor disappears is filled with abstractions and objects of research. Bazerman (1988) found that 70-80 percent of sentences in RAs use objects or abstractions in the subject position of sentences. Historically, passive increased (25 percent) throughout the 19th century and into the 20th, but interestingly, it then begins to drop (10 percent) in the last quarter of the 20th century. All researchers from SLU reacted to this issue of passive voice, noting that it is discouraged in their fields because it makes the texts boring and difficult.

Dummy subjects are used for impersonality, such as “it is often considered” and “there were numerous instances when.” Such constructions also allow for easier formation of nominalizations, making the texts sound more theoretical. The use of dummy subjects has remained relatively steady in the 20th century. (Gross et al., 2002). Impersonality is benefited by non-integral citations as they emphasize findings and de-emphasize the researchers. This citation form is used more in the hard sciences than social sciences (Hyland, 99), as seen in a study comparing botany and agricultural economics, where the natural scientists used non-integral citations, and the economists used integral-naming citations. (Thompson & Tribble, 2001)
Another aspect of voice relates to the kind of relationship with the reader that is implied by the writer's voice. Scientific communities rely on a form of team rules when constructing new knowledge, rules that make the reader feel included and feel that they are respected (Bazerman, 1988). This extends to the ways scientists talk with one another. The writer is not to sound haughty or superior to the reader (Day, 2011), and should not be perceived as telling others how to think. Metadisoursal features that point out the obvious should be avoided. Bias-free and gender neutral language is expected. Since the reader is considered to be knowledgeable, the writer must be careful to no overwrite, or it may be seen as an underestimation of the readers’ abilities or a sign that the writer does not know what the team already knows. A formalized discourse practice that acknowledges what the group already knows is the use of passive when the writer has used standardized procedures (Pérez-Llantada, 2012).

Writing should not draw attention to the individuality of the researchers. Interactional phrases, self-mention, marked expressions, and literary devices should all be avoided. Verbosity is not only problematic from the principle of brevity, but is seen as untrustworthy. Using as few words as possible to say as much as possible is the norm, which means meaningless phrases, redundancies, and unnecessary instructions are to be avoided. For example, Science gives the writers examples of phrases to avoid, such as not using "in spite of the fact that" but rather, “although.”

In brief, understanding of a particular genre is a matter of understanding the stance and attitude that is appropriate within one's community (Bazerman, 1988). Writers must be cautious to not alienate their readers by formulating their ideas in a manner that is inconsistent with their distinct community, particularly surrounding the claims they are making (A. Yang et al., 2015).

4.4 CONCLUDING REMARKS
The purpose of this chapter was to establish a description of the RA so that it is possible to assess the ways in which peer reviewers do or do not attend to genre requirements when using the PR activity. Although genre is constantly changing and although the RA differs from community to community, genres do provide a kind of order in what is otherwise a constantly changing symbolic world (Bazerman, 1988). Genres exist in order for people to achieve goals, providing guidance for what you can say, when you can say it, and how you can say it (J. Swales, 1990). So although the genre of the RA differs among the scientific discourse communities, I believe the description in this chapter provides a set of features of the RA that are recognized as salient from multiple perspectives.
For ease of reference, a summary of the key principles described in this section are provided in the appendix (Appendix G). The summary might help the reader remember the key ideas presented in this chapter.
In the introduction of this dissertation, I described the difficulties that doctoral students encounter when, as novice research writers, they are at the stage in research where they must write what they have done, what they have found, what it is that mattered. In the current group of participants, they are provided in class with a great deal of information about the text that they are expected to write, far more information than they can apply to their own writing. The students write a section of their research, beginning with the results they found. They know already what they found, and they know what the more important findings are. They need to now explain this in a language they are not entirely at home with, in a form that is new to them. They write the text and electronically send it away to a peer review forum, relieved, maybe anxious. Directly after that, they retrieve the same kind of text that they just wrote themselves. A person similar to them has also just submitted a results text and this person is looking for help. The writer’s job is now to read another results section, and tell the writer how that text can be made better. What will this reviewer focus upon? This is the question asked in this investigation.

As described in the theoretical section, an underlying premise of giving PR is that the reviewer will learn as a result of giving review. The reviewer is exposed to a text that represents a sort of parallel struggle to the struggle he just underwent himself. The writing of his own text is likely fresh in his mind when he reviews his peer’s text. What he comments upon is seen in this dissertation as a record of what he places his focus upon. There are many different foci possible, since there are so many aspects of a research text that a reviewer might attend to. In this first investigation, I explore the kinds of comments that participants gave one another when they acted as reviewers. The kinds of comments that they gave will be interpreted as the issues that are most salient for the reviewers. This stage of the larger research investigation explores the following questions:

What do L2 doctoral students in the natural sciences comment upon in computer-mediated peer review sessions?

How do students' PR comments reflect their focus of written discourse traditions of their RA’s?
5.1 METHODS

5.1.1 Compiling PR comments
The sample of data reflects the proportion of texts that were available as limited by participants' fieldwork schedules, the main texts being Methods, Discussions and Introductions, which are the second, third and fourth texts written. Students reviewed their peers' texts by using the Microsoft Word's commenting function, the tools for marking text internally (highlighting, overstriking, bold) and by writing notes before and after the text. Some also used the outlining tool to show ways they would re-organize the text. For purposes of data analysis, participants’ reviewed texts were downloaded from the forum along with any review comments written into the actual forum about a given text. These texts were then uploaded to NVivo where all coding and analysis was performed. In total, 73 texts representing 1457 comments as given by 24 reviewers were used reflecting the following text sections: 8 Results sections, 20 Methods sections, 20 Introductions, 18 Discussions, and 7 Abstracts.

5.1.2 Developing the Taxonomy
Although taxonomies exist that could have been applied to the participants' comments (Faigley & Witte, 1981; K. Hyland, 2013; Jun Liu & Sadler, 2003), the purpose of the current research is to describe the peer review activities of this particular group of participants. In order to not miss activities that may be specific to this group, an inductive approach to the data was more appropriate. A thematic analysis was used which allows for an analysis of patterned comments that is both inductive yet informed by external theory (Braun & Clarke, 2006). The categories are tightly linked to the data, yet are influenced by the research questions. This form of analysis also allowed me to notice what was otherwise unanticipated.

Approximately 400 comments representing 18 texts were analyzed in a first round of classification using open coding. Comments were identified at the ideational unit, not at a grammatical boundary. A given comment within one review bubble could, for example, have 3 or 4 pieces of advice. The initial coding resulted in 42 categories which were then collapsed to five categories through conceptual analysis, as can be seen in Appendix H. For examples of the kinds of comments that comprise the subcategories and categories, see Appendix I.

To check the clarity of the five categories, two coders were first given a written description of the categories and then given the opportunity to ask any questions about the classification. The coders included a Swedish linguist with 20 years of experience teaching English writing skills at the university level, and an experienced NES science researcher who is employed at the Swedish Agricultural University and who writes and edits scientific RA's in English. After the Q/A
session, they silently coded comments of three texts. They were first observed as they determined the ideational boundaries and then classified the resultant comments into five categories. I made notations as they performed the classification and audiotaped the follow-up sessions where they pointed out difficulties in the classification. This data was used to refine descriptions of the categories (see J in the appendix). The coders’ comments resulted in 83 percent agreement between the linguist and myself, and 84 percent agreement between the researcher in the natural sciences and myself. I later sent the finalized written descriptions of the classification scheme to another linguist and two university-level composition instructors who coded a new set of texts but had no opportunity to ask questions. This coding resulted in 85-91 percent agreement. Difficulties in the coding are described in Appendix K.

5.2 DESCRIPTION OF CATEGORIES
The following is a general description of the categories used to classify the review comments.

5.2.1 Coherence and Order
The category Coherence and Order reflects concerns about the clarity of message as affected by the writer's choice of what information should be included, what information should be combined, the order of information, and the writer's use of rhetorical devices, meta-discourse, and cohesion devices. Coherence used here follows the description found in Bamberg's work (Bamberg, 1983) where the focus is on the semantic relationships that create an understandable message. Implicit in coherence is a combination of the expectations of the reader, the goal of the writer, and the nature of the text. Review comments concerned with combining include those that focus on cohesion within a sentence, among sentences, within a paragraph, and among paragraphs. Comments concerned with the order of information can be at the level of a sentence, paragraph or text unit. In practice, review comments may focus on rhetorical practices such as topic sentences, old to new information, and commonly understood order of ideas within a text section. For example, a paragraph may break the rule of deductive order or not fulfill an implied promise from a topic sentence. A C&O review comment may claim that the text did not provide enough cues or actually mis-cued subsequent information. Also included are comments noting that the text does not conform to reader expectations of the IMRD format such as a Methods section that is non-chronological or a Results section with no apparent order to the results. Order may also be concerned with idea placement as regards impact.
5.2.2 Precision of Scientific Expression
The category Precision of Scientific Expression is the broadest category, encompassing comments that reflect requests for greater specificity, accuracy, and disciplinary appropriateness at the word, phrase or clausal level. Such comments address the ways that English lexicon and syntax are used to most transparently represent scientific activities to a particular discourse community. Lexical comments may focus on the accuracy or specificity of a word or a phrase as used within scientific discourse, encouraging consistency of terminology and discipline-specific jargon. Comments also discouraged usage of non-disciplinary jargon, euphemisms, new coinages, ambiguous words and heavy use of initialisms. Precision comments also focused on syntax, where modifying adverbs, phrases and relative clauses may make an idea unclear or misleading. The reviewer might warn about inconsistent use of key words, ambiguous noun clusters, and confusing stacked modifiers, none of which are incorrect, but all of which can cloud the meaning intended in the text.

5.2.3 Research Knowledge
Comments classified as Research Knowledge explicitly focus upon the research activities, the knowledge required as reflected in the positioning of the research and the use of evidence. Research Knowledge (RK) comments reflect what is considered common to the practitioners of the particular disciplinary community, including ideas, generalizations, theories, methods, agreed upon facts and phenomena, and ways in which to conduct research (Pérez-Llantada, 2012). Comments that are labeled RK are identified by asking whether the comment questions the basic tasks of implicit in scientific inquiry within the natural sciences. These include the following: asking questions, defining problems, developing and using models, planning and carrying out investigations, analyzing and interpreting data, using mathematics and computational thinking, constructing explanations, and designing solutions. These kinds of comments are what researchers would likely associate with the term "peer review."

5.2.4 Voice and Stance
The category of Voice and Stance reflects comments where reviewers focus on the persona the writer appears to be taking in the text and/or the strength of claims the writer makes. Voice refers to comments about the authorial role that the writer of the text has taken, including issues of anonymity, register, assertiveness, and use of engagement features (ex. directives and questions). Voice comments may note that the writer sounds too antagonistic, too brash or too literary. Comments include admonitions to sound more formal, less formal, more authoritative or less foreign. The actual PR comment can be to point out the existence of perceived
Stylistic rules, encouragement to break such rules or to follow them. A writer might be encouraged to be more present in the text or more invisible.

*Stance* emphasizes the ways that writers encode their opinions and assessments in the research texts they write. Stance can be epistemic—for example the degree of reliability of knowledge—or attitudinal (ref). Peer commentary about stance takes notice of the conventions of the disciplinary community concerning authority and strength of claims. Peer comments may point to the appropriateness of strength of language as matched to the status of knowledge, for example usage of hedging, boosting, and attitudinal markers, and also as matched by the experience of the researcher.

**5.2.5 Correctness of English**

The category called *Correctness of English* refers to the lexico-grammatical conventions of English, conventions which would be understood and valued by a reader even if he or she had no knowledge of the genre of RA's in the natural sciences. The category encompasses the same items as discussed by Faigley and Witte (1981) as surface errors in their taxonomy of revisions. Students' references to spelling, mechanics, punctuation, grammar, and choice and usage of everyday vocabulary fall within this category. Examples of features of correctness that students were directly taught in lectures include common problems with punctuation, misplaced, dangling participles, subject/verb agreement, and ambiguous pronoun references. *Correctness* also included comments about word usage when the words were not specific to the sciences and research. *Correctness* was the one category where I was able to identify review comments as being right or wrong.

**5.3 Coding and Analysis of Review Comments**

The 1457 review comments were then coded. In the cases where one of the main participants reviewed another of the main participants, the comments of that text were only counted once rather than being counted both as received and given comments. The total number of comments that could have been coded was higher than the 1457, but comments were left uncoded if they were ambiguous and could not be classified into one of the 5 categories with certainty. When possible, the nature of ambiguous comments was identified through analysis of the context of the comment. One to two percent of the participants' comments were considered ambiguous, examples of which can be found in the appendix (attachment J).

A few other decisions about coding should be mentioned. *Correctness* comments that focused on minor changes such as spelling errors or appropriate prepositions in phrasal verbs were only coded once per text in the rare instance where a reviewer
was eager, for example, to point out repeatedly that a writer could not spell a particular word correctly. Corrections of typing mistakes were not coded, and neither were comments of a task management, coaching or of a social nature. Examples of comment types can be seen in the Appendix I as well as descriptions of difficulties encountered with the categorizing Appendix K.

After the classifying the review comments of 73 texts into the five categories, a second round of open coding was conducted on the data within each of the 5 major categories. This investigation allowed for a more nuanced description of the main categories, and provided more details about the discourse focus of the reviewers’ commenting. The most salient subcategories of this analysis are discussed in the findings. In the final reporting of the research, comments written in Swedish were translated to English, and comments with details that might identify the writer or reviewer were changed. Such details were primarily of a study-specific nature, where the focus of the study could allow for identification of the participant.

5.4 FINDINGS
The results of the classification of the review comments can be seen in figure 1, which reflects the comments given in 73 texts (1457 comments). The distribution is as follows: Precision = 31.1 percent (454); Coherence and Order = 23.6 percent (344); Voice and Stance = 16.7 percent (243); Correctness = 15.5 percent (226); Research Knowledge = 13.1 percent (191) (range 191-454). When broken down to reflect comments per text (CPT), the classification suggests that student reviewers gave on average 6.2 comments per text (CPT) in Precision; 4.7 CPT in Coherence and Order; 3.3 CPT in Voice and Stance; 3 CPT in Correctness; and 2.8 CPT in Research Knowledge. The total number of comments per text (n=19) is similar to the number (n=17) found in a similar pedagogical activity with engineering graduate students in Chalmers who conducted PR using Word and posting online (Bradley, 2014). To better understand the nature of the participants’ commenting, the following section explores the commonly given comments within each of these classifications.
5.4.1 Precision Comments

*Precision of Scientific Expression* was the most frequent comment type given by these student reviewers, a category that reflects a reading scenario where the reviewer has presumably halted his reading because a particular word, phrase or formulation did not create a clear enough picture for the reader to continue without ambiguity.

The most common *Precision* problems that reviewers pointed out were inaccurate and imprecise words, where reviewers request a change or provide a replacement. Examples include, *What exactly is clear? Try to find a better word.* Another example is the following: *To be picky, you didn’t create anything.* In these examples, reviewers point to the loaded nature of commonly used words in English when such words are used in the research context. The comments reflect the description of the RA where words must be chosen with utmost care. Reviewers also target specialized discourse words or formulation of discourse phrases by providing either a replacement or providing a rule. In the example *Could you say EM fungal respiration?* the reviewer rewrites a phrase into a noun cluster, creating a single conceptual entity and leaving less doubt about which concept modifies respiration. Discourse-related words and constructs that were given special attention were key words and critical constructs that the reviewer interpreted to be ambiguous, poorly described or inconsistently used. *Use the same word the whole*
This type of comments was referenced in the RA chapter where writers are warned to not complicate readers’ experience with lexical ambiguity. Reviewers’ concern with lexical precision accounted for nearly half the comments in this category.

The second most common type of Precision comment focused on the form of the sentence or clause as it related to precision of message, for example, warnings about confusing orders of prepositional phrases, unclear messages resulting from ambiguously placed modifiers, and vagueness resulting from the order of ideas in the sentences. These issues of precision connected to sentence structure were described in detail in chapter four that detailed the RA genre. In one example, the student reviewer underlines the confusing phrase and then provides these two competing interpretations. Is it recently that it stagnated after this half century of increase in general productivity? Or do you mean that while general productivity increased during this last half century this wasn’t the case for harvesting operations? Finally, a common Precision comment dealt with sentence structure that created ambiguity due to excess words that create overly complicated constructions. Often the reviewer would provide a simplified reformulation such as sounds like the fixture only works when held. Is that how it is? These comments reflect the warnings in the RA chapter for writers to choose simple words when possible, to use as few words as possible, to be cautious with lexical density, and to prefer the S-V-O structure.

5.4.2 Coherence and Order
Coherence and Order comments were the second most common kind of comments given by reviewers. The comments noticeably fell into three categories as defined by the size of the text unit that the reviewer commented upon. The most common type of C&O comments were given at the text level, for example, the overall organization of a discussions text. Reviewers gave advice on how to restructure texts, not uncommonly creating outlines of the entire text or summarizing the key points of organization. This focus reflects the description from chapter four about locating information according to reader expectations as informed by the moves within the IMRD. For example, in the following comment we see how the reviewer first showed the writer the current structure before recommending a change:

When I look at the paragraphs quickly, I find the following topics for each paragraph: 1 Scientific debate about the role of forest on soil composition; 2 same

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In this dissertation I will use italics to represent participants’ written comments, and I will use italics plus quotation marks to represent interview comments. Bold within a comment means emphasis from the perspective of the participant.
as 1; 3 Potential beneficial impact of trees; 4 ground plants; 5 soil composition plus objective 1; 6 objective 2; 7 GAP and aim of study. So, it takes some time before you get to your own topic and 1&2 could probably be less, and joined to 1.

This reviewer divided the text as it was written into topics and moves in the way she understood the writer’s organizational strategy. Her own judgment of the rhetorical effectiveness of the order is different than the writer’s and she uses the move sequence and a reference to over-writing to motivate alternative possibilities of a rewrite.

Reviewers often recommended moving substantial amounts of the text, moves that implied a complete re-ordering. For example, *I think this section can be improved if you rearrange it so that it ends with the discussion about your study.* In other instances the reviewer simply described her experience reading the text section but gave no advice on how to reorder. *I had a problem understanding what you had done until I reached the end of the document and could put things together.*

*C&O* comments concerning unity were apparent at the text level, as well, where reviewers told writers to address gaps between paragraphs. *Here I really would like to see some kind of slick connection. I was forced to stop and wonder what this paragraph had to do with the previous one.* This kind of comment links to chapter four’s details on cohesion where transitions, frame markers and code glosses are expected. Another form of cohesion comment at the text level were requests to rework sub-headings to more accurately reflect the content, for example: *You are describing behaviors of several species other than roe deer here. I suggest that you change the title of the subheading.* Such comments reflect the advice given about RA texts to use lexicon as cohesion devices, and labeling sections to not mislead the reader.

Coherence and Order at the paragraph level was another focus of reviewers’ comments. Reviewers suggested changes in the internal order of the paragraph, for example *Maybe move this to the end of the paragraph? Then you have the two similar sentences together.* Such suggestions were often precise. Reviewers also showed interest in the integrity of paragraphs, pointing out information that did not belong, as seen in this comment: *In this paragraph, you talk about one study, but other references appear which confuse me.* Limiting text to only essential information was a principle noted in chapter four. Another maneuver reviewers suggested was to combine paragraphs for better coherence. *Why don't you join this to the previous paragraph, where you talk about "reasons" and have the "results" in the next?* Such comments are considered to also to reflect general rhetorical expectations of academic texts and cannot be seen as specific to scientific texts.
Reviewers spent a proportionately large number of comments focusing on issues of cohesion between sentences, sometimes by pointing out disjointedness (*The connection of the two sentences is not clear.*) while other times providing advice about how the sentences should be more explicitly linked (*It could be nice if you could start this sentence in a way that linked to the previous one. Is this one of the negative consequences you were talking about?). They occasionally provided the word or phrase that seemed needed, for example *Or in contrast*, or *something that links to the previous sentence and indicates contradiction*. Finally, reviewers focused on coherence and order of information within sentences. One aspect of this was to identify sentences that had too many unrelated ideas in them. Such sentences were described as cumbersome, impossible to grasp, heavy, complicated and too long. Reviewers often determined precise boundaries between the ideas, and even provided needed connecting devices between the new sentences they had created. Arguably, sentence cohesion is not a key indicator of the RA genre, but the focus of these review comments was weighted toward cohesion and the simplification of the sentences, which is the direction that writers are expected to move in their efforts to cohere and clarify in the RA genre. Finally, internal sentence order for the sake of improved clarity was also seen where reviewers reordered information to reflect old-to-new information. *Most often I had problem with a good flow. I think this could be improved by flipping over the sentences.*

In summary, the C&O comments were partly a reflection of the principles that would be expected of academic texts in general. But the C&O comments often encouraged text changes about cohesion and order that reflected issues specific to the scientific RA, such as the expectations connected to moves, the lexical strategies used to cohere text, the encouragement toward brevity and simplicity, and the explicit labeling of text sections.

### 5.4.3 Voice and Stance
We can see in figure A, *Voice and Stance* comments were the third most common type given. Within this category, the most common comments reviewers gave were encouragement of a more formal register, for example, reminding writers to avoid contractions and conversational phrases. Such comments reflect advice about the RA concerning an objective-sounding voice. There were also formality comments that could be perceived as more contested since they prioritized formality over readability. Examples of such review actions were systematic removal of definite articles, removal of prepositional phrases to instead create noun clusters, and the replacing of coordinating conjunctions with synonymous multi-syllabic connectors. An example of how movement toward formality can compromise readability is demonstrated where the initial introductory phrase *Regardless of*
what ecosystem is studied was changed by the reviewer to Regardless of ecosystems studied. The changed form as advised by the reviewer makes the text harder to grasp on a first reading. In another example, the introductory phrase The importance of large carnivores was changed to Large carnivore importance. Such changes formalize the texts, making them sound more theoretical. The advice to nominalize in order to theorize is captured in the sources writing about RA features as found in chapter four.

Conversely, other reviewers rejected an overly formal style and removed what could be perceived to be pretentious constructions and replaced them with simpler words or constructions. For example, access is therefore of importance for was changed to access is therefore important for. Reviewers added definite articles, resulting in less theoretical-sounding prose, for example, ways to analyze diets is changed to ways to analyze the diet. In another example, a reviewer attempts a clearer, more common style when he overstrikes each site consisted of a clearcut and offers instead was placed in a clear cut? Was within a clearcut? Such comments can both reflect the reviewer’s efforts to not alienate the reader through sounding superior, and also to not complicate the readers’ experience through marked constructions.

Strength of voice was another noticeable trend in review comments, with the reviewer often leaning toward hedged conclusions and less visible narrators, perhaps in keeping with a more traditional RA style, or perhaps in recognition of junior status of doctoral writers. In an example of a reviewer changing language that sounded too certain, we see the original text if this is true changed by the reviewer to if this holds. This kind of comment reflects the advice from the RA description for writers to project the appropriate degree of epistemic commitment. In another example, the reviewer removes the researcher from his visible position in the methods section, changing the original phrase from where we have data to where data is available. This change reflects repeated RA advice to remove oneself from common research procedures. Unfortunately, as seen in the example, such removal can also result in unwanted changes in meaning.

Conversely, some reviewers seemed to make efforts to make the narrators more visible, even writing the researcher into the text. We see an initial text the model results may hold...changed by the reviewer to we think our model results are still valid because. This reflects RA advice to use the active voice when possible. In similar efforts, reviewers promoted strength of voice by encouraging the writer to use less passive, less present continuous, and less present perfect, and also to remove words and phrases that hedged observations. But again, these changes seemed to occasionally result in unwanted changes in meaning, as the conviction
in voice could actually be seen to be a stronger claim than what the writer intended. Nevertheless, the comments reflect the RA description concerning the importance of writers promoting their claims.

One final tendency of review comments in this category focused on the way that the writing sounded foreign. An example of such a comment in reference to a description of a step in the methodology, the reviewer exclaims, *This you cannot keep this as it is!* and notes the ways in which it sounds Swenglish. Such comments were often quite bold in the way they were written. The advice reflects the advice in the RA chapter to choose traditional vocabulary and avoid foreign-sounding or colloquial expressions.

5.4.4 Correctness Comments
As we see in Figure A, Correctness comments were given only more frequently than Research Knowledge. The types of comments that the students gave most about Correctness were of four types: lexicon, grammar, usage and punctuation. Lexicon-related comments most commonly reflected perceived problems with idiomatic expressions, verbs, and prepositions. Here it is important to point out that in contrast to Precision comments, these Correctness comments focus on lexical issues that would be considered within the realm of L2 vocabulary issues or within a non-science oriented, copy-editing realm. Commonly, student reviewers would either try to provide the word or phrase they thought would be better, or they repeated what sounded odd, for example, *lengthmeasured doesn't sound right.* Reviewers’ grammar-oriented comments mostly pertained to word order, perceived incorrect use of adjectives and adverbs, overuse and misplacement of commas, and subject/verb correspondence. Here rather than reformulating the sentences, reviewers would commonly explain what they thought was wrong in the sentence, for example *plural instead? or reference problem? or remember S-V-O!* Usage comments most commonly related to incorrect verb forms, and punctuation comments focused primarily on overuse or misplacement of commas.

5.4.5 Research Knowledge
In figure A we notice that Research Knowledge is the category with the fewest comments, 2.8 comments per text. These comments tended to be specific in their request for change and more extensively explained as compared with other comments. The comments reflected expertise that was more obvious than what was seen in the other categories. Most commonly, reviewers identified missing information as connected to the research activities, for example details about methodological procedures: *how did you do it, counting everything from a car? And using GPS to determine the distance to things?* Reviewers offered information that they suspected was missing from the texts, for example, *and then the average weight was estimated?* The also asked for information about
software, statistical procedures, and mechanical details. Such comments reflect the descriptions of RAs where writers are told to give sufficient detail, particularly in the methods section, since detail is vital to credibility.

Another form of missing information reviewers identified was explanations and justifications, for example asking the writer why a particular field site or methodology had been chosen over a competing option. Reviewers also requested further development of analysis, as seen in the example *Perhaps the effects of soil types and tree species could be further discussed* and here also in the comment *you might want to discuss why growth reduction was lower*. There were requests for explanations about the stated problem area, for example *You should also write more about why this is important—wastefulness of both natural and human resources with the catching of small fish*, and also requests to justify the relevance of the research, such as *I would add a sentence about the bad effect of MeHg on health and biodiversity so we understand the dilemma*. These comments fall within the lengthy description of argumentation within the scientific RA, where writers must motivate why their work matters and matters to whom, and they must anticipate the ways their research may be challenged by others and cut such challenges off.

Reviewers questioned the analysis of the data, for example the inclusion of questionable variables such as, *Since hunting is not allowed during the mating period, I wonder if it really is relevant to include hunters here..?* or exclusion of a variable such as *Here you have a possible learning effect (that was not included in the analysis)*. They noted contradictory reasoning, for example, *I thought that you didn't need to predict the prior distribution because it was "what we already know before we observe any new data,"* and again in the comment, *If the above given information is not accurate, why refer to it?* Other kinds of reasoning comments that reviewers noticed included arguing from weak premises (*Isn't it questionable to motivate research on that species with references to continuous forestry*?), questioning the nature of relationships (*I understand that it can stagnate, but why does it decline?*), questioning the sufficiency of evidence (*did you observe or study the vegetation in your areas? And did this confirm this explanation?*) and questioning the conclusions (*If it is not fully known why can't it be lower as well as greater?*). These review comments fell into the category of research review rather than reflecting more of a kind of peer review that illuminated the RA genre. In my estimation, such comments focused on the thinking behind the science.

Finally, reviewers focused on information that was of questionable value. Most commonly, it was the relevancy of a detail or a description that was questioned.
Reviewers asked *Does this information add something to the method section?* and *Why are you talking about wood at all?* Other such comments included those that pointed out unnecessary repetitions of details (*you already refer to a study that explains this model*), floating facts that seemed incorrectly attached, and information that is directed at the wrong audience (*This is important for the lab, but not the reader*). Noticeable in this category of comment was the detailed nature of the comments. Such comments reflected argumentative strategies as described in the RA chapter where writers are to only use the detail necessary to argue their claims. Extra detail will only cloud the vital information.

5.5 **CLOSING COMMENTS**

This has been an exploration into the kinds of comments that participants gave one another in the peer review activity. The taxonomy developed in this study will be used to inform parts of the other studies, and the findings of this study will be taken into consideration when I analyze the other studies. The findings will also inform the discussion in the end of the dissertation in an attempt to answer the question how reviewers seem to use PR and how their use of PR reflects features of the RA genre.
6 STUDY 2: PARTICIPANT DESCRIPTIONS OF REVIEWING PRACTICES

In study one of this dissertation, data in the form of written review comments were explored and categorized, the aim being to discover what participants commented upon when they reviewed their peers’ texts, and in what way it reflected the features of the RA genre. Classifying their comments led to some understanding of what the participants chose to comment upon, of what they noticed, and also what they did not comment upon in any meaningful amounts. As a first step, the classification of comments provided a general picture of their review activities. These proportions of comments that the participants gave do not necessarily show what was meaningful to the reviewers from their own perspective of learning. We cannot either know which types of comments required reflection or exertion, or which kinds of comments left an impact on the reviewers. For example, we cannot know how much effort is expended or significance attributed to the action of a reviewer giving a comment about precision compared with a comment about rhetorical cohesion.

The current study focuses on what the reviewers find meaningful about giving peer review. By examining what participants say about giving review, we may be able to learn more about the peer review process as it is experienced by the reviewer. This emic perspective can inform our understanding of the affordances and constraints of the PR activity for this group of L2 graduate students working in the natural sciences. This research is exploratory in nature, with an aim of providing an inductively developed thematic description of students’ perceptions of and experiences with giving peer review. As with other instances of situated qualitative interviews, the results were considered as reflections of the participants’ interpretations of the PR event, interpretations that were affected by the interview event itself (Atkinson, 2010). Furthermore, the perspectives of the participants are not understood to be fixed, but rather, suggestive of their experiences. Though interviews have limitations, they are still an effective way to capture an insider’s perspective about his or her review activities.

In this study, I explore the descriptions and explanations participants give about their review practices. The specific question asked the following:

- What do the doctoral students say that do when they give review?

6.1 DESCRIPTION OF METHODS

The data corpus used in the current study is comprised of six participants’ interviews that took place two to six weeks after completion of the courses. Two participants came from one class, four from the other. All six were interviewed before the course, as well, and they were aware they would be interviewed again
after the completion of the course. The manner of interviewing and transcribing was described in chapter three.

6.1.1 Analysis of Post-Course Interviews
Emergent analysis of the interview data followed the Grounded Theory analysis as described by Charmaz (2006) and supplemented by the method described by Braun and Clarke (2006). The complete transcripts translated into English for each interview were located in NVivo, which is the tool I used to perform the inductive analysis. The data set used for this study included the interview comments that pertained to giving peer review. To explore the data set, a data item (a participant’s description about giving PR) was first fragmented into extracts that each suggested a single idea. The ideas were identified based mostly upon the action being expressed: such units could comprise a word, an utterance, a phrase or an incident. Establishing units in this manner worked better than other forms of initial coding because it made it possible to compare fluent language users with those interviewed in their L2. In this close reading, I tried to remain as open as possible to what might be present in the transcripts, asking what actions were suggested by the data. Key words were attached to the fragments, and these fragments were then compared to other fragments to cluster ideas into initial codes.

Following this, initial codes were examined for the most salient and/or prevalent representations of the participants’ PR descriptions, resulting in a clustering of initial codes into focused codes across the entire data set (all 6 interviews comments about giving PR). These focused codes were further developed and refined by comparing the fragmented transcripts to the focused codes. To do this, relevant sections of the interviews were replayed repeatedly to capture participants’ emphases and hesitations, and extra weight was given to self-initiated comments that interrupted the flow of the conversation or changed the subject. Furthermore, the transcripts were analyzed multiple times using different perspectives. Examples of perspectives include the subjects that the participants chose to discuss, the subjects they profiled or subordinated to other subjects, the context of the subject initiation—for example whether the participant was looking at a document when bringing up a subject or whether he/she brought it up spontaneously—and the ways participants emphasized time and process in their descriptions of their review activities. In three cases, participants were contacted for follow-up in order to obtain their explanations and clarifications about statements important to the focused coding.
Also helpful to my analysis when refining focused categories was a set of investigative questions that are drawn from Charmaz (2006) and modified to fit the current research:

- What social processes are being represented?
- What cognitive processes are being represented?
- Whose point of view is profiled in participants’ descriptions?
- How do the commenting processes emerge, and what actions are profiled?
- What control do participants describe owning in the process?
- What meanings are attributed to PR? What do participants find interesting and/or problematic about PR?
- What motivations, justifications and excuses do participants use to explain their actions?

Through this analysis, the data were re-sorted multiple times in an attempt to account for the participants’ descriptions of their review practices. The focus of the analysis was not limited to what seemed similar among participants, but included what seemed different. Definition of a theme was based on prevalence of comments in combination with the relevance to the research question. Prevalence was given more weight when a theme was addressed by numerous participants, and when participants addressed the issue spontaneously, non-sequentially and extensively.

The categories that developed represent situationally grounded themes that were meaningful to the understanding of the participants’ PR experiences. I made all efforts to not force data into pre-established categories, but what I noticed in the transcripts was a reflection of the main questions that I was asking in the research, my professional history and my knowledge of the field. The focused coded categories that were refined at this end stage is what I refer to in the rest of the document as themes. Below is a summary of the key steps taken to conduct this study:

- Interview
- Transcription
- Sort relevant data about reviewing
- Fragment data to ideational units + keyword
- Key words clustered to initial codes
- Initial codes clustered to focused coding
- Transcripts and audio files compared to focused coding
- Re-Analysis from multiple perspectives and using heuristic questions
6.2 FINDINGS
The classification developed in study one showed that participants focused on precision of the language, the coherence and order of the text, the voice and stance, research knowledge, and correctness. The comments they made reflect the rhetorical, linguistic and stylistic concerns of the RA genre as described in chapter four. The current exploration uses participant descriptions to better understand what was meaningful to them about PR. What follows are themes that evolved from participants’ descriptions of what they notice in others’ texts, why they think they notice such things, what they comment upon, and how they decide to make comments. Originally, I anticipated that the participants would discuss their review activities by using the category labels that I had provided when showing them their commenting patterns. However, this was not the case. Instead, participants talked about their commenting experientially, describing reviewing episodes. The themes of participants’ experiences are discussed in the following order: what the reviewers focus upon, what they find difficult, and how they perceive their role as reviewer. Please note that participants’ quotes are written in italics, and where they have emphasized something, it is in bold.

6.2.1 What they Focus Upon
This first description reflects the beliefs and opinions that the reviewers had that essentially answered the question what do you think you comment upon? This question was not directly asked to the participants, but rather, discussions about the activity in general led participants to talk about this during the interview.

6.2.1.1 It’s wrong!
A category that half the participants commonly described as noticing was incorrectness, though they did not explicitly label their actions as such. Rather, participants described an experience where a particular kind of commenting was easy, automatic, unavoidable. “Yes, commas I see. Commas which are not in the right place I think pop up and are easy for me, and... yeah, things which are really obvious..I usually see that.” Such review comments were not only automatic to the reviewer, but they were given with certainty. “You just comment when you think something. If someone has written something wrong, then it’s easy to comment. Then you know, no, this isn't the way you write it.” The focus of such comments was almost exclusively connected to English correctness, and giving such comments was described as though they were compelled, simply could not restrain themselves. “Like you read it and it comes up, and you see it. You see that that's not right. And then you have to say something.” Interestingly, only half the students mentioned this kind of text focus, and the others seemed to not have this category in mind when they looked at peer’s texts.
6.2.1.2 Sounds strange!

Another commenting experience that participants described was reading through the text, processing the ideas, when suddenly they would become confused. The descriptions of this moment were depicted in terms of how the text sounded. “It was more about how the sentences sound. Like sometimes they sound off, and I don’t know what it is. But it is not about prepositions or these small things but more about what do they mean with this (emphasis in voice)?” This sounds strange. Reviewers responded by pointing out that they got lost, but they did not try to fix the text bit. The reviewer recognizes something is not right, but is not sure how to identify the problem. In their descriptions of these experiences, the reviewers contend that it is the text that is the problem, not their own ability to interpret the text. We see this in the following comment. “Even if I’m not good in my own English writing, sometimes I can see others’ mistakes. Oh, that sounds really bad.” The reviewers’ judgments about their comments of this type were confident, as though their ability to “hear” a text could be relied on. “If I think that it’s an inappropriate way of saying it, then I will say so.” Unlike the previous category, participants describe this kind of text problem as being irritating, perhaps because there is no easy fix.

6.2.1.3 I have this problem, too

Peer reviewers described their commenting as often being connected to their own learning. Here, the reviewer has a pressing thought about personal challenges, so the pressing thought takes space in the noticing and commenting. In this category the reviewers search for problems in the text that they personally grapple with in their own writing, struggles that the writer may or may not have. The reviewer’s focus on problems he has himself is heard in this description. “I probably do many mistakes in this category as well, so that is why I focus on it.” Another informant described a personal preoccupation that he could not ignore in others’ texts, a description that went on at length accompanied with strong feelings. “I think it is very important to make definitions. You see people use words a lot of times that have a common definition and they use it outside the common definition without redefining them. I think definitions are important! I mean that is the basis of communication. You have to agree what the word means before you use it. If you use it with a different meaning then you have to be very clear about that. This is something that I’ve been thinking about.” For this student, peer review gave him the opportunity to explore many words that others used inappropriately, so lexical precision is what he looked for and commented upon in others’ texts.
6.2.1.4 Key constructs from class
As would be hoped for by writing instructors, student reviewers described how they used their commenting to practice knowledge presented in class, essentially carrying course constructs into the review process. An example of this experience is heard in the following comment where a student explained that “I have to think about what it is I’ve learned and how it functions with this construction... that kind of thing.” Though they were not explicitly instructed to focus on constructs that were covered in the lectures or in the text book, most reviewers expressed that this was what they should attend to. According to some student reviewers, monitoring peers’ texts for introduced course constructs was a fundamental part of peer review. However, such focus did not always seem entirely valued by the reviewers themselves. Here an informant notes how she commented on class lessons like “lots of small things that you get hung up on from the lectures, like keeping your lists for the end of the sentence and you shouldn’t separate the verb and the object.” She went on to describe how constructs from the course got “stuck in my head,” making her focus on them too much. Such descriptions tended to sound dutiful in contrast to the previous theme of I have this problem, too, where the reviewer has chosen an introduced construct for his own writing improvement, and therefore searches for the use or misuse of the construct in others’ writing.

6.2.1.5 Giving to others
Another theme described by reviewers pertained to being helpful to the writer. “Yeah, I thought it (PR) was good. Just to look at others’ papers and think about how you can help them. Or try to help them.” Such descriptions of reviewing implied that the reviewer focused less on text improvement and self-improvement, and more on what the reviewer assumed the writer may need as a learner. The reviewers were concerned not only with what the writer might need to know, but also with the way the message needed to be delivered. "You don’t want to be harsh, but at the same time help, to try to get it at the right level." Such descriptions show that these review comments are based on the reviewers’ pedagogical assumptions, in this case, that the writer will better absorb advice given with the right tone and at the appropriate level. In another comment the reviewer is concerned about the writer’s feelings, but values the writer’s learning over the potential sore feelings when he says "you want to be ....constructive or... nice...but still help if you think it’s going to help...try to suggest something." The focus on the writer’s learning is further emphasized by reviewer’s concerns over being incompetent to appropriately respond to a writer’s text. Reviewers explain that

3 This attitude may have been influenced by my double role as interviewer and instructor; however, there were numerous occasions where the oral descriptions about construct-focus were triggered by the text comments they were analyzing during the interview.
they are responsible to help the writer in some way, so they admit to sometimes commenting upon trivial aspects of a “too difficult” text in order to give feedback.

6.2.2 Difficult to give
Student reviewers described certain kinds of comments as being particularly difficult to give to writers, whether requiring more effort or time. They were not specifically asked to discuss what was an easier or harder kind of comment to give, yet participants consistently identified particular kinds of comments as being hard.

6.2.2.1 Organization and Coherence
The most often mentioned and most discussed difficult comment type was the monitoring of the structure of a text. This focus was seen to take extra effort, and was an aspect of review that was not automatic but rather required an active decision on the part of the reviewer. “Maybe you don’t think so much about the structure. You have to focus a little bit more if you want to get those things about the structure.” Unlike noticing sentence-level or lexical difficulties in a text, noticing structural difficulties was described as a growing confusion after the reader already processed a substantial amount of text. “I remember thinking there were gaps in it, that it didn’t hold together.” Identifying the nature of the structural problem was described as time consuming relative to other types of review actions since it required re-reading large amounts of text and determining the purpose of the sections. The kind of cognitive overload that is understood to limit an L2 reader was apparent in some of the participants’ descriptions of reviewing organization. “When I read papers, it’s quite difficult to keep the whole story in my mind. The working memory and you know. When I’m at the end I sort of forgot what was at the beginning. That’s really hard.”

6.2.2.2 Unfamiliar disciplines
Another commonly mentioned difficulty was following texts that reflected research from unfamiliar disciplines. Student participants prefaced interview comments about having to review texts from other disciplines by admitting that they understood the limitations of the class configurations, but nevertheless bemoaning the “foreign” texts. They noted that participating in peer review with those who had different research fields was still preferable to no review, even though it was not something they would be expected to do in the future as “real” reviewers. Despite such goodwill comments, the reviewers expressed frustration over having to read unfamiliar texts. Students described other discipline’s texts as though they were foreign places, locations in which it was hard to find their bearings. One student mimicked being physically lost when she said “Where should I start? Where am I?”
In connection to texts written from other fields, the reviewers described the specialized terms and expressions as unfamiliar, which was particularly problematic when the reviewers perceived the words as seeming to be used incorrectly. “Often times jargon, words and phrases don't sound right to me, but maybe I can't point out what it should be, or I'm not 100 percent sure how it should be.” Reading and commenting upon research papers in other disciplines was risky compared with commenting upon papers near to one's own field, as the reviewers may be perceived as ignorant if they ask what may be obvious to another researcher. In reaction to this, some reviewers searched hard with such papers to find something to comment upon since, as described above, all the participants exclaimed that they felt they owed the writer some kind of commentary.

6.2.3 Reviewer Role and the Decision to Comment

In the previous section where participants’ descriptions of their review experiences were explored, we see what reviewers believe they attend to and what they feel is difficult to attend to. What they claim to focus on also hints at beliefs about roles, in other words, what kind of reviewer one should be. Having been given minimal instructions regarding their responsibilities, reviewers had to decide independently what role they had as reviewer. The roles that the students took as reviewers seemed to influence the choices they made about commenting, which in turn likely influenced the general focus of their comments. Below are the descriptions of reviewer roles that became obvious from the interviews.

6.2.3.1 I’m your average L2 science reader

A role that students seemed to be most comfortable with was that of a peer or colleague with the same limitations as the writer of the text. “I am NOT a teacher and I’m only going to be a colleague. I think that is the main role you have when you give feedback, a colleague who gives feedback.” These reviewers highlighted their status of being educated scientists and of being second language readers. They had confidence that they were well enough educated to follow most texts, and that their English competency was comparable with other L2 readers. As typical L2 science readers, they could judge when someone’s writing had become too convoluted. If the reviewer was confused, the writer had not done his or her job. As one participant explained, "Most of the time when I have to read it three or four times to understand the sentence, then I just interpret it that it needs to be rewritten. If I am the average reader and it took me four times to read this sentence, then it is not an easy sentence." Rather than see themselves as peer reviewers with limitations, they see themselves as typical readers, an audience that needs attended to. "If it is unclear to me, maybe most of your readers will (also) be non-native." This was the predominant role that the informants projected. There was an optimism that the receiver of the feedback would take what was
worthwhile and ignore what was not helpful. In one interview, the student even pointed out that it was insignificant that she was not the most adept of the L2 reviewers. “I hope to help them as much as I can. But I was not feeling like oh I am not a good person to ask.”

6.2.3.2 Commenting is for experts
A more difficult self-designated role for students to navigate was that of “expert.” Sometimes, participants claimed that the best reviewer should be the one to comment, or at least that the reviewer should clearly have more expertise than the writer regarding a text issue if they were going to comment. The type of text issue seemed to affect whether reviewers temporarily adopted this role. Those who were periodically predisposed toward the expert role were reluctant to venture into the areas of expertise that the instructors held, namely, scientific knowledge and academic English. “I don’t do what Göran does, because that I think is really hard to know, like what a good design of a study is or those things. So that stuff I don’t poke around in much.” Here the student points out explicitly that she is not looking at what the content instructor looks at. Similarly, one reviewer who had very strong English skills was asked why he never commented on others’ English even though he was so knowledgeable. He pointed out what was obvious to him. “Well I figured you would go through the language, so I didn’t see a point of me adding to it.” Unlike those who more consistently maintained the role of average L2 Science reader and who felt they should comment on what they thought they knew, the part time experts would instead avoid text problems that they thought others would attend to.

6.2.3.3 I’m not the bad guy
Another role reviewers described was that of the nice reviewer, a troublesome status that seemed to require calculated decisions regarding the ratio of helpfulness to hurtfulness of any given comment. “So, you want to be ....constructive or... nice...but still help if you think its going to help to suggest something.” Here, there are a confusing set of competing demands where constructive is not the same as nice, yet the goal is still to arrive at helpful. A helpful comment might be “not nice,” and it is the job of the nice reviewer to accurately judge whether the amount of help will sufficiently offset the amount of hurt. This moment in the PR process was described as emotionally tiring for a number of the reviewers, as they seemed to be forever calculating the numbers of “negative” comments that they gave and constantly estimating whether it was worth giving yet another comment. “It felt at the beginning, like, I was very detailed and particular and picked on everything. It felt like my ambition is so strict.” When asked what made this participant start making fewer comments the
reviewer replied “Mmm, I don't know. I just felt like I was getting to be the bad guy.”

6.3 CLOSING COMMENTS
This exploration provided insight about participants’ activities and thoughts as peer reviewers from their own perspectives. The findings showed what they believe they focus on, what is difficult for them to provide, and the ways their roles influence their commenting. These findings will be further explored in the discussion section in combination with the other chapters’ findings.
7 STUDY 3: PARTICIPANT DESCRIPTIONS ABOUT RECEIVING PEER REVIEW

In this dissertation so far, I explored the kinds of comments that participants seem to give and the ways that participants describe their reviewing activities. The analysis has also explored the ways that the review comments focus upon the genre of the RA. These investigations provided insight to what the L2 doctoral students in this writing course do when they act as reviewers in PR.

Research in L2 PR has more commonly investigated the activities of the receiver of peer review as suggested by their revisions, since text improvement was a dominant goal of early PR praxis. As detailed in the literature review section, writers attend to review comments in a range of ways depending upon such things as the types of comments given, the ways the comments are expressed, the mediational tool used, the language used, the configurations of review groups, the homo or heterogeneity of the class, the level of language competence, the familiarity with PR, the level of anonymity of the activity, the purpose of the text, and the nature of the genre.

The current investigation will explore what the writers believe they do with the review that they receive on their research texts, and their attitudes about the practice of PR as a tool in a writing course. The group of participants in this dissertation have skills, knowledge and maturity that participants in many earlier PR studies did not have, so the question of what the participants think that they do with the PR commentary seems important to our understanding of their PR use. The findings can inform our understanding of the affordances and constraints of the PR activity from the perspective of the receiver of review. Similar to study two, the findings are perceived of as reflections of the writers’ interpretations of their PR participation. It is understood that the interview event impacts what is told and in what way, and that the interviews are suggestive of participants’ experiences.

This exploration poses the following questions:

- How do the participants describe the PR comments they received?
- How do participants explain the patterns of acceptance and/or rejection of comments types that they received from peers?
- What do their descriptions tell us about mediation of genre through the tool of PR?

The findings to such questions can be valuable. By exploring what these participants value and do not value in review comments, we can better understand
the writers’ actions in the PR activity and also better understand the way they interact with the genre of the RA.

7.1 METHOD

7.1.1 Interview elements specific to this study
During the post-course interviews, the protocol of which is described in chapter three, participants were asked questions about giving commentary to other students (reflected in study two) and asked about receiving comments from other students. The current study focuses on the data sample from the post-course interviews that reflect issues of receiving comments. The method of data collection is similar to Hyland’s (2000) study where she investigated L2 writers’ beliefs and expectations about feedback. As part of the post-course interviews, writers were presented with the patterns of review comments that they received from their peers for each text section that they wrote. For example, a writer may have received many comments about text structure on each section that she wrote, or she may have received structure comments on only a couple texts that she wrote. When a pattern was pointed out to the writer, she might respond to the pattern by explaining her thoughts on it, or she may say nothing.

The participant was then shown patterns of what kinds of comments she seemed to use, and what kinds she seemed to not use. The participant was asked to look over the reviewed texts to reflect upon the reviewers’ comments and upon her subsequent choices to revise or not. For example, the writer may have adopted most of the suggested structure changes, none of the suggested structure changes, or only suggested structure changes in a particular text. When such patterns of comment adoption were pointed out to the writer, she might or might not have something to say about them.

As mentioned earlier in the thesis, participants did not know that the focus of the interviews would be about peer review, only that they would be asked about something in the course. Therefore, the patterns shown to participants were simplified analyses of what they used and did not seem to use, and they were given a few examples of their actions rather than a complete summation of their actions. I made this choice so they did not feel overwhelmed with all the comments and revisions. However, all texts with review comments and the revised texts were available for the participant to look through at the time of the interview in case he or she wanted to scrutinize the texts for something. These were in printed form for ease of skimming. Participants had no difficulties explaining why they accepted and rejected particular types of comments, though some writers described their
reactions in a strong and spontaneous manner, while others’ reactions were more measured and pensive.

7.1.2 Analysis of Transcripts
The analysis of the interview transcripts adhered to the method of analysis described in study two with some small alterations. Briefly, emergent analysis of the interview data followed the Grounded Theory analysis (Charmaz, 2006) and supplemented by a method that allows for directed focus (Braun & Clarke, 2006). The data set included the interview comments that pertained to receiving peer review. Exploration of the data set proceeded in the same manner as study two, where the relevant sections of a participant’s interview were fragmented into units comprised of discrete ideas, actions being the focal point of the unit. Key words were attached to the fragments, which were then compared to other fragments to cluster ideas into initial codes.

Initial codes were examined for the most salient and/or prevalent representations of the participants’ descriptions of receiving comments, which resulted in focused codes across the entire data set. The focused codes were refined by comparing them to the fragmented transcripts and through repeated listening of the interviews. Self-initiated comments were marked as highly relevant, particularly those that interrupted the flow of the conversation or changed the subject.

Similar to study two, transcripts were analyzed from multiple perspectives, for example, through narrative, summative commentary, emotional reactions, and identity projection. Questions used to inform the analysis in study two were also used in the current analysis. Definition of a theme was based on prevalence of comments in combination with the relevance to the research questions. Prevalence was given more weight when a theme was addressed by numerous participants, and when participants addressed the issue spontaneously, non-sequentially and extensively. Principles used in study two were adhered to in the current study regarding the formation of grounded themes. The focused coded categories that were refined at this end stage is what I refer to in the rest of the document as themes.

7.2 Findings Concerning Participants’ Descriptions of Received Comments
The following section reports on participants’ descriptions of their experiences of PR. The findings are not presented here in an organizational pattern that reflects the research questions, but rather the findings are organized according to the themes that developed in the analysis. The explorations that led to the themes are informed by the research questions.
7.2.1 Positive feelings

This first section discusses the themes that evolved regarding review comments that the writers had positive reactions to. Participants described the comments that they received in terms of what was valuable, what was memorable, and what was easiest to use.

7.2.1.1 Seeing what I cannot see

Comments described as the most valuable were those classified in study two as *Coherence and Order* (C&O). The primary reason cited for this preference was that the comments showed them what they could not see on their own.

Most commonly, participants identified the construction of a research storyline as being the area they struggle with most in their writing, a writing problem that results in jumps, gaps and extraneous material in the text. This struggle with storyline may be why writers valued C&O comments so highly. One writer described his struggles with text coherence, blaming his composing strategies for the many flow hindrances in his texts. He was very adept himself at recognizing other writers’ problems with text flow, so it was curious that he claimed to rely so heavily on those review comments for his own writing. “I would say I go along with those (C&O) comments. I should also say that I have a pretty bad writing process when I do write. ...So it can often be that the story isn't that great. I try to really write out an outline for the article ahead of time but it ends up being anyway that I write one sentence at a time.” This writer is aware of his L2 writing habits and the resulting weaknesses in the text. Though he could spot problems in the narrative structure in others’ texts, he struggled with those same issues as a writer and reviser of his own texts. He relied on reviewers to point out where his text story failed.

Another aspect of the text coherence was the problem of gaps in the text. Participants claimed that reviewers could often find holes in the text that left the reader stranded, an ability that writers appreciated. A writer described this as the reviewer being able to see what I can’t see. Reviewers could not only find and fill gaps in the story that the writer took for granted, but they could locate extraneous information that misled the reader. One proficient English language writer regularly received comments about the abundance of peripheral information that he had in his texts. “This is an area that I am kind of wrestling with, being clear about what the background is, and what I intend to do, and showing why I intend to do it...the reasoning behind how I came to the conclusion that this needs to be done. And then the frustration of having to put it in a very short mode.” He relied
upon the reviewers to point out the “extra” information that they did not need, since he could not anticipate that himself.

Another appreciated type of comment within C&O concerned re-ordering of ideas. Writers claimed that they often could not anticipate what information was prerequisite to the understanding of other ideas, a situation that reflects writers who have been entrenched in their own disciplines for so long. Writers described how a peer’s organizational comment could catalyze a complete change in the structure of a section due to the writer’s new understanding of the readers’ needs. The emphasis receivers placed on comments about cohesion and about the order of their text reflects features of the RA genre regarding move structure within sections and the ways texts are expected to cohere at the text, paragraph and sentence level. The writers job is to facilitate comprehension of the RA via the lexical and syntactic tools commonly used to cohere text in scientific writing.

Though C&O comments were identified as the most valuable kind of review, they were also identified as being the most difficult type of review comments to judge. Students explained that feedback comments that focus on structure “are harder.... they take more time to judge whether I agree or not.” Writers explain that such review comments are challenging to interpret since the identified problems can be hidden to the text writer. One writer described how she could mistakenly skim through C&O comments and not get much out of them. However, when she slowed down and carefully analyzed the comments “then you come up with so many things! Like I understand what they are saying here, that this doesn't match that. Maybe these are the most important comments, like the ones you can get the most out of.”

Student writers also explained that these valued comments were not easy for the reviewer to give. As reviewers themselves, the writers described how a reviewer could, if he wanted to, simply patch together the meaning of a text, guessing and suspecting meaning, while not looking for ways to make the text more clear. In other words, writers are aware that it is easier for a reviewer to not make the effort to improve the structure of the text. Furthermore, participants noted that the activity of making structural comments can be time consuming for the reviewer, as he must locate where in the text he became confused. Without such location markers, the writer cannot find where the reader became lost.

7.2.1.2 Things I should have known

One theme that developed concerning comments writers received was information that the writers felt they should have known before. Comments would lodge in their memories due to a surprise element, a small shock that they had somehow missed this point before. One type of surprise comment was about words that had
alternative meanings within the sciences. “Yeah, for me I have no clue. For example, series, that I am not supposed to use that word. For me, saying series was just a way to not say package. I found that series sounds better than package, (laughs). I guess I said something else than what I wanted to say.” As described in chapter four, lexical precision in the RA is critical, and as L2 writers, the participants seemed to have troubles differentiating usage of a word when used in laymen’s discourse compared with scientific discourse. They knew words in one semantic field, but were unaware that the words held special status in their new community. This issue reflects the description in chapter four concerning lexical precision, where the writer must choose the word that carries the intended meaning, that is least ambiguous, and that the reader will understand. Review comments on disciplinary lexicon gave writers a jolt because they felt they should have had awareness of the words before. Value that the receivers placed on such comments reflects their understanding of how important lexical precision is in the RA.

Memorable comments were not only about lexicon the writer felt she should have known, but also included comments that addressed practices or knowledge about the particular field the writers were in, in other words, research knowledge. We hear one student’s description of helpful review regarding scientific practices: “What I remember most was 2 times 2 factorial design, I mean, a statistical thing she commented on. I had felt really unsure about that. I mean, that was the thing I really grabbed onto that she wrote. Just that particular comment I remember really, really clearly.” Here the reviewer provided information that would be classified as research knowledge, and the receiver embraced the information directly, having struggled with the particular issue before.

7.2.1.3 Things I should have spotted
Another kind of appreciated comment that writers described were lexical and sentence-level issues that the writer could likely have noticed in another person’s text as being problematic, but that they did not see in their own texts. Writers described such review comments as “simple things that jump out at other people.” These comments did not usually provide new knowledge about content, but rather an “oops!” kind of experience, something that the writer felt he should have noticed, for example unclear wording. “I know that someone commented on something being ambiguous and I was like, oh wow, why didn't I see that?” Another kind of blind spot was overuse of expressions or grammatical structures, as though the writer had an irritating habit that an outsider could notice. “I see that I use that form too much. That felt right that I should take away a number of them and rewrite them.”
Another kind of eye opener comment was more closely linked to readability at the sentence level. Writers had difficulty judging the readability of their texts and were often surprised to read that their sentences were overly complex and wordy. Reviewers would write comments like hard sentence! or too many ideas all together! One of the most adept writers of English in the student group pointed out that he adopted almost all the comments he received about simplifying his sentences. Another writer explained that she broke up all sentences that were marked by student readers as being too complicated. She had troubles noticing when her complex sentences were a burden to L2 readers.

7.2.1.4 Easy to Take
Unlike the other categories of comments that writers appreciated and remembered which were determined by the nature of the content, another category enthusiastically discussed referred to the way the reviewer commented, in particular, reformulation. Student writers claimed to be grateful when peers rewrote sentences, even if the writers did not eventually adopt the rewrite. One participant expressed this by saying a good reviewer is one who “doesn’t just write unclear sentence. He will make it clearer.” Writers praised the ways in which these kinds of reviewers provided rewrites, as seen in this example: “I remember that they (the reformulations) were good and that she had done it in a good way. She’d write, here is another way you could write it, and I’d think, yeah, that would be good. Another writer described a reviewer with awe. What is really nice from him is that he gives alternatives. I don’t like this sentence. Would you like it better this way? That is really nice.” Some writers explained that they felt a bit ashamed that they did not provide the same service to others since they were so appreciative when others provided reformulations.

7.2.2 Types of Comments that Get Rejected
Though participants were not directly asked about the kinds of comments they did not appreciate or use, they often commented strongly about the types of comments they rejected. The following themes comprise this class of more negative feelings about receiving PR.

7.2.2.1 I Already Decided That
One form of rejected review comment that the participants discussed was the type that addressed issues the writer had already grappled with. “Sometimes I had already thought about it and I already had a clear idea. Then I just didn’t accept the changes.” Such review comments could address any aspect of the text; however, most common of this kind of rejected comment were those that addressed the scientific knowledge and reasoning. One writer described how it was easy to ignore a series of comments about the referencing of sources “because I had tried to find the researchers, but I couldn’t. So that was easy.” The ease of
interpreting such review comments was particularly evident as we hear in one writer’s description: “I think it was quick because it’s things you've been thinking about yourself. And then it’s quite...it’s fast.” Another participant echoed the sentiments, noting that she could “distinguish quite easily if they were not accurate or helpful.” Though these review comments were rejected, writers did not express negative feelings about them.

Another form of rejected PR was comments about text organization when the writer had already thought the structure through carefully. Organization comments were quickly dismissed by those writers who had very particular ideas of how they wanted to tell their story. “I think...I don’t agree with these comments. Sometimes you write the story and you like it how it is! I don’t consider these comments very important, if I like it how it is. I can consider them if I am a little unsure. But if not, No!” Because there is room for variety in respect to ordering text, order can be considered a personal choice. When a writer has made an active choice about order that she feels content with, the provision of a corrective comment is less valued. Another writer shared similar sentiments stating “I had a good estimate of my structure. I can sort of evaluate myself.” In some cases, the rejection of organization comments seemed to reflect genre differences between reviewer and writer. One writer who used qualitative methodology ignored most all storyline suggestions, pointing out the rhetorical differences among writing styles. “Of course I can see that I don't have any subheadings (laughs). But if that is a good thing or not I am not sure. I generally don't like subheadings. I think it confuses things a lot, pretty much ruins the flow of the text.”

7.2.2.2 Wrong Reviewer

Although student writers only met their peers a few times, a number of them claimed to be able to assess the other students’ abilities as reviewers. It may be that they had surveyed the work of the reviewer on earlier postings in the peer review forum to make such conclusions, or noticed them in the lectures. Such writers asserted that they would often reject comments that came from less competent reviewers, focusing in particular on the English competency of the reviewer. For example, one strong writer who had a liberal arts background in addition to her scientific background explained that the reviewers often had overly limited academic vocabulary in English. Another writer came to understand early in the course that few of the reviewers were better than she was at English, so she began to ignore correction comments. Writers described how they dismissed comments about voice and stance if they suspected the reviewer had weak English: “Is it formal or informal, well, it’s rather obvious what it is referring to, right? So then unless someone a lot more capable in English would comment on it then I wouldn't give it much notice.”
Writers also judged their peers’ abilities in other areas when the writers were trying to decide about review comments. “Well I think that Sue is clever and I can trust that what she writes is relevant. So, maybe that is also important, that I judge her comments differently because I think she is ambitious and smart. That can be a difference.” This writer said she attended to some reviewers’ comments more seriously than others. We see another writer describing the weight he gives to comments depending upon their source. “Some people understand things a lot more easily than others. And that also makes them a lot more able to give more rewarding, constructive criticism. It takes a level of understanding to give constructive criticism.” This writer was not referring to problems of understanding as connected to differences in discipline, but rather, problems of understanding connected to the reviewers’ general capacity to comprehend the text. If one happens to get a less competent peer as a reviewer, it will require a more thorough sorting of review comments. As one participant noted “Well, if you (they) don’t understand it, what is the point of commenting?”

7.2.2.3 Too Trivial

Another type of rejected comment can be described as the trivial comment, those which were more ignored than rejected. Such review comments were not described as incorrect, but student writers often noted that they would have spotted such issues on their own in later versions. Participants referred to such issues as "small things" which included diagram labels, formatting, spelling, stylistics and mechanics. These comments on small details were described as being the easiest type of comment to judge, but were described with irritation, since writers felt they should probably consider these smaller comments. Here a writer responds to comments about her use of definite articles where the reviewer keeps removing them.

“If I am talking about something general, okay, but then if I measured something and this is the distance to the tree or to the closest ...I don’t need to. And I was thinking about them (the suggested changes). Some of them were ok, but some others didn’t need to be general if they were particular. Yeah. Mmmm, then I kept some.”

There is irritation in the voice of this participant in the audiofile. The reviewer is going against the writer’s use of definite articles and essentially forcing the writer to attend to what is perceived to be an issue of little consequence. There is also an admission that the writer chose to think about the suggestions, eventually adopting some of them. Such comments are judged as too small to value, but still must be considered
7.2.2.4 Not Enough Detail
A third factor that influenced the rejection of review comments was the way in which the comment was delivered. Receivers claimed to reject comments if they lacked an explanation that would allow them to accurately assess the suggestions. The complaints of insufficient information were more bitter than some other kinds of complaints about review, seemingly to reflect the writer’s frustration that the reviewer might indeed be right, but that the reviewer was too cryptic. “Yeah, like this, do you really need that? I mean, I don’t consider it because it’s not well explained. Why shouldn’t I need that? If they gave me a reason not to consider it. Is it not flowing well with the rest of the text? Or why?” Writers reflect on their partial understanding of review comments, but often want more rationale. I mean, “I guess you get the logic of what they are thinking. (But) it’s not very well explained.” The emphasis of such comments is often on the lack of explanation connected to the feedback.

7.2.3 Unexpected Findings

7.2.3.1 Trawling for Help
Some writers’ actions in using review were unanticipated, one being a situation where writers strategically use PR to obtain specific help that the reviewer is not notified about. One form of this was to use PR to confirm their own suspicions about their partly completed texts. One writer described how she turned in texts knowing “I’m not so happy about this part.” With this, the writer described how she could save time if she had another individual helping with the problem solving. An extension of this strategy was the writer who described how he intentionally did not make a few, chosen changes that had been suggested to him by a peer. He then submitted the unchanged text to the content specialist. “He gave me the same comments, like this is a bit rough. You need a transition! It is not clear! So it was kind of funny. Like, okay, it’s really not clear.” In other words, the writer temporarily shelved the peers’ comments and revisited them only after she got a second opinion.

In a variation on this strategy, one writer seemed to use PR to confirm that she had made the right decision about her text. She explained how she typically submitted texts that were carefully crafted for order. When she received feedback, she would look quickly through the text comments to reconfirm that the reviewer did not comment on the structure of her text. “Oh, there was almost no comment about the structure, so it was okay!”
7.2.3.2 Building Identity by Rejecting PR
Sometimes, scientific knowledge comments that the writer judged to be incorrect were described as the most memorable comments, but not because they confused the writer. Instead, the reviewer would comment upon a research practice, a text practice, or a lexical choice that happened to be specific to the writer’s discipline, and the writer would reject the comment with enthusiasm. The strong reaction and rejection to such review comments seemed to come from the writers’ developing knowledge of their individual disciplines and their associated identities with the disciplines. Such strong reactions seemed to indicate an earlier uncertainty concerning the same idea, which perhaps explains the strong reaction to the reviewer comment.

7.2.4 Final words
This section of the research explored participants’ ideas about receiving PR. The themes described here were inductively arrived at as a result of conversations, not interview questions. Because the conversations were unpredictable and driven by ideas the participants presented, the themes tell us what mattered to the students, but they do not fully answer the research questions. The themes do, however, show what participants appreciate about comment types and what they found less helpful with comment types. The themes also revealed some unanticipated activities that the receivers involved themselves in. These findings will be further explored in the larger context of the dissertation in the discussion section.
The overall purpose of this thesis is to better understand how L2 doctoral students in the natural sciences use peer review (PR), and to notice the ways in which they use PR to become more familiar with the RA genre. Where study three focused on the ways a group of six participants described their use of review comments, the current study looks at the individual. The focus will be on what can be learned about receiving review by analyzing the complexities of an individual’s actions. Here I explore the actions and attitudes of the writer after s/he has received PR comments. Research conducted about writers’ revisions subsequent to peer review explore numerous foci, but a similarity among feedback/revision studies is some assumption that a connection likely exists between feedback comment and the receiver’s subsequent text action. The content of the feedback comment is assumed to alert the receiver to that text issue. The expectation is that the receiver will consider that text issue with the reviewer’s interpretation in mind, and from that point, make a decision that is manifested in the text revision or lack of revision (although lack of revision can also reflect a lack of action altogether).

For example, if the reviewer focuses on the scientific precision of a word, it is reasonable to assume the receiver will look at the scientific precision of that word, whereas if the reviewer focuses on the correctness of a word, the receiver will look at the correctness of the word. What writers focus upon and negotiate in connection to PR comments is considered to be indication of attention and possible learning. The patterns of text comments students seem to adopt or to react to may tell us something about the ways the student writers engage with feedback. From a Vygotskian framework of learning, a receiver’s text change can serve as an indication that some form of mediation has occurred from reviewer to writer.

Because a primary goal of the PR in the writing course is to raise awareness of the RA genre, the current exploration will also attend to the patterns of receivers’ activities as connected to the RA genre. From a pedagogical perspective, the reception of review comments that reflect issues of the RA genre would indicate attention to such discourse features. Ideally, the receiver of the review will revise her text based on the comments that reflect issues that have earlier been identified as reflecting principles that inform the RA. Such response would not necessarily indicate the level of engagement, but could indicate the focus of engagement. To better understand the level of engagement, I rely on the participants’ explanations, opinions and described feelings as they talk-around-the-texts that they revised in response to peer review. Adding also to the details of the receiver’s use of PR will be the individual’s own description of his/her history as a language learner, as an
L1 and L2 writer, and as a science writer. Though the descriptions do not directly inform us about their use of PR, such descriptions might serve to contextualize the participants’ writing and revising activities. The combination of data sources can inform the descriptions of the individuals’ use of peer review. This study addresses the following research questions:

What do participants’ revised texts in combination with their description of PR activities and their personal histories indicate about the way the receivers use peer review?

How do the doctoral students’ practices as found the combined studies suggest learning of the research article genre?

8.1 METHODS
As described in the thesis’ introduction, course participants from two different years reviewed a new writer’s text for each of five rounds of review, and had their own five texts reviewed by different participants for each round of review. The peer review was the first of three rounds of review that students’ texts would undergo in the writing course for each text. The second round of review was given by the content specialist, who may be the reader that the participants had in mind when they revised after receiving peer comments. For any given text section (intro, methods, etc), the individual would review someone other than the person who she was being reviewed by. Few students knew others from the class, and when a person did, it was unlikely that he/she would have had review contact with the familiar person more than once. All participants were writing papers that concerned the research they were currently engaged with where they were the primary investigators.

8.1.1 Analysis of Received Comments
The text analysis step of this investigation represents a product-oriented analysis of revisions, where writers’ responses to review comments were categorized, and where other revisions and additions the writer makes were analyzed, in other words, those revisions that appear to not be directly connected to the review. In this text, the word revision will refer to changes the writer makes to his or her text. The word review comment and text change will refer to the actions of the reviewer.

Sample Selection
I selected 3 of the 6 participants who had been interviewed before and after the course, Roger, Irene, and Louise. The selection criteria was based primarily on variety. All 3 individuals chosen have different L1’s and educational cultures, they all come from unlike disciplines, and they reflect different English language
competencies according to my own assessment. Also different is the amount of comments they received on their texts since I wanted to see how receivers might differ when they receive many comments compared with few comments. My interest is not primarily to compare the cases to one another, but rather to explore what three different individuals do with PR when what they have in common is their goal of learning to write scientific research articles in the natural sciences. As described by Stake (1995), such a collective, instrumental case study is a way to investigate a phenomenon, where a better understanding of a number of cases can contribute to theorizing (Stake, 1995), in this case, the theorizing about reception and use of review.

Exploration of Revisions

To understand the ways the writers used received comments, I conducted a multi-step analysis that entailed various ways to scrutinize the differences between a writer’s peer reviewed draft and the writer’s revised draft. In short, I compared the comments they received with the ways they revised. If the received comment addressed lexical precision, I looked at the revision to see if the writer attended to lexical precision at that point. If the writer did something other than what was suggested, I classified the nature of that action. A detailed description of this process is here described.

In order to have approximately the same numbers of comments to work with per writer, I selected three texts for Roger and Irene, and four texts for Louise, since she received fewer comments on a number of texts. The documents that I analyzed included a writer’s first draft as reviewed by another student and placed in the PR forum, the writer’s second draft as submitted to the content instructor after having made revisions, the computer-compressed version of the review and revision documents, and the detailed list of mark-ups that comprises all the receiver’s changes to the reviewed text.

To perform the analysis, review comments were first classified, using the original classification of the review comment from study one as much as possible. This illuminated to some degree the kinds of comments that the writer tended to receive, though the identity of the reviewer was also an important factor in the type of comments, as was the text type. The writer’s revision as connected to the peer comment was then scrutinized in order to assure that his interpretation of the review comment matched my own interpretation of the review comment. For review comments that could be seen as ambiguous and where the writer interpreted them differently, the review comment was reclassified to reflect the writer’s interpretation. This reclassification was important in order to see the ways the writer responded to the comments.
The writer's use of the review comments was then sub-classified into three categories: “No” representing the receiver's non-action in relation to the review comment, “accepts reviewer change,” and “third-action”. Third-action means that the writers' revisions seem to have been catalyzed by the review comment, but do not reflect the type of advice given in the comment as defined in investigation two. These third-action revisions were then analyzed to see what kinds of revisions the writer tends to make when he responds to the problem, but responds in his own way.

After review comments and their related revisions were coded, I performed a separate analysis where I looked at the writer's revisions that seemed peripherally connected to review comments given somewhere else in the text. In still another analysis, I looked at revisions that seemed entirely unconnected to the PR. In these instances, the writer expanded, deleted or changed the text in what appeared to be inspired by something other than a review comment. Such revisions seemed important to capture since a larger question in the dissertation concerns the effects peer review might have on participants. In this analysis, the writer's text changes in the mark-up list were analyzed to see if they were connected to a review mark or comment. When judged as unconnected, they were classified as self-initiated changes and then sub-classified by type of self-initiated change.

When review comments and participants' revisions were ambiguous to me because of science I did not understand, I sent my questions to one of three expert informants from SLU who represent three different disciplines. The explanations these experts provided were valuable to the classification and explanation of revisions.

There were a couple decisions that I had to make regarding text changes. Some review comments became irrelevant to the analysis because of writers' choices to entirely re-work sections of their texts, essentially deleting the review comments. When a writer's reworking of a text made certain review comments obsolete, these initial comments were not included in the numerical analysis as represented in the table. Also uncounted were writers' editing changes that reflect the required “clean-up” after a larger change. For example, when the writer is told to revise a chart and the writer does that, the revision counts as one change rather than 15 small changes that it took to revise the chart.

In some instances, reviewers changed writers' texts rather than write a review comment. Such text changes were coded according to the type of change suggested in the reformulation, and were then compared to the writer's revised text and to the computer-compressed text that compares the two texts. The writer's actions and non-actions were coded in Nvivo and/or on the mark-up list using the same
categories and sub-categories. For example, if a reviewer changed a verb in a claim into a weaker modal which the writer then changed back to the stronger modal, the receiver’s action was coded as “Voice and Stance- No.” In this case, the reviewer made a text change about the strength of voice which the writer rejected. Revisions connected to internal PR text changes were not coded if the writer’s actions were unclear, and repeated actions were not repeatedly coded, for example a repeated correction of a particular word. These repetitions were, however, noted in the written analysis.

To manage the data, I used Nvivo to create nodes for the five primary categories, and I used a subset of nodes to classify receiver actions within the major categories. For the analysis of revisions that seemed connected to peripheral comments and the analysis of self-initiated changes, I used Word-generated printouts that reflected all text changes that the writer made to the revised texts. For a summary of research activities for the revision analysis, please see Appendix L. The findings of the analysis of revisions will be described case by case. Therefore, I will next describe the analysis of the interviews before moving to the findings.

Analysis of Interviews

The aim of this section of the study is to identify, explore and understand the purported beliefs and attitudes that the L2 doctoral students have about receiving peer review. The findings of this part of the study emanated from pre and post-course interviews. The descriptions of the interviews are in chapter three. The rationale for using the post-course interviews was to better understand the ways the writers perceived their own actions in response to review comments. In a supplementary investigation I used the pre-course interviews to provide a general narrative of each individual’s self-description as L2 writer.

Analysis of Post-Course Interviews

Printed transcripts of the post-course interviews for the two L2 users were reread, and writers’ remarks about receiving comments were highlighted. With these highlighted transcripts in hand, I re-played the audiotapes, listening for performance indicators that would provide clues about the interviewees’ attitudes and feelings as connected to what they said. These performance indicators also provided narrative boundaries between ideas, which I was able to use to create stanzas, and which allowed me to better interpret what was said. I coded the stanzas of the interviews that sounded particularly passionate, disinterested, satisfied, ambivalent or frustrated. For the participant interviewed in her L1, I predominantly used the audio file rather than the translated transcript for the analysis, transcribing comments in Swedish that were particularly relevant to the
study. The resulting coded stanzas were then read in parallel with the completed text analysis sections in order to ascertain any motivations for the writers’ revision actions.

**Analysis of Pre-Course Interviews**

The digital recordings of the pre-course interviews were loaded to Nvivo and transcribed. Analysis of the interviews followed a thematic narrative analysis as describe by Riessman, where the focus of the narratives is on what was told and supplemented with data of participants’ ways of telling (Riessman, 2008). The interview data was interpreted in connection with themes that I judged to be meaningful while still respecting the narrative turns of the participant’s stories. The focus of the analysis served to illuminate how an individual’s self-narrative can inform his or her use of peer review commentary. After writing the descriptions of the participants’ biographies, I sent the texts to the respective participants for feedback. I had between three and five email exchanges with each participant to finalize the texts so they would reflect the participants’ self-narratives.

**8.2 FINDINGS**

The findings presented here are not organized in a manner where each research question as presented above has a respective section in the findings. Rather, the findings are presented case by case, and each case is organized in a manner that allows the actions of the writer to be profiled. Each case description begins with a brief biographical sketch that reflects a composite of the pre-course interview. Each sketch introduces the writer and can provide hints about the decisions the writer made in the revision process.

After this, a table summary is provided of the individual’s revisions or other actions according the type of review comment. A given participant’s summary table first shows the percentage of the writer’s received PR per comment type based on all the individual’s reviewed texts in the course as calculated in study one. These figures are provided as an additional data source in order to provide a richer picture of the individual’s PR situation. In the second row of each participant’s table are the averages of received comment types for the 11 study participants based on the same classification scheme. This row is provided to give some indication of the kinds of comments the writer has received relative to what the group received. However, since there are few rounds of review and large variation among reviewers, the averages cannot do more than give a general picture of what the writer received.
The other figures in each table represent the way the participant responded to the various types of review comments, and also shows the kinds of self-initiated changes the individual made. The figures in the table will serve as a reference for the subsequent descriptions of what was found in the revisions. A description follows of the kinds of revisions the writer made that appear connected to the PR comments. Revisions that appear to be self-initiated are also shown for the second and third case study. In the narrative section of the case analysis, the findings from the revision analysis will be described, and examples from the writer’s texts will be provided to illuminate the findings. When interview comments appear to lend better understanding to the revision activities, they are added.

8.2.1 Roger
Roger began foreign language instruction in third grade, describing language learning as tough but fun. He preferred German over English, noting that his English teachers negatively affected his attitudes about English. As an undergraduate, he became more interested in English, choosing to study more than was required for his degree. He described himself as a confident language learner. As a young adult, he took opportunities on three occasions to work in countries where English was the dominant language. These extended experiences with English gave him the confidence to participate in a graduate exchange in Finland where instruction was in English, and to write his Master’s thesis in English. He explained that writing the thesis in English gave him a competitive advantage for PhD programs.

Roger discussed grammar and text types when he described writing instruction in elementary and secondary school. He referred to rules, formats, strictness, final exams and conforming to stylistic requirements. The words grammar and form came up repeatedly in these early descriptions of composition. At university, in contrast, he had no direct writing instruction, but he did learn to write lab reports in his L1. He thinks most people learn to write scientific texts by themselves. His first experience with scientific writing in English was at the Master’s level where he received “basically no constructive feedback” from his supervisor, which he surmised may have been due to his supervisor’s poor English. Aside from the current class, he had never had direct instruction in scientific writing.

It was first when he began his doctorate in Sweden that he began receiving feedback about his scientific writing. When he describes his English research writing, he focuses upon the amount of grammar mistakes he makes, but also upon the difficulty of expressing himself in a simple way. He believes he expresses himself in an overly complicated manner. He is hesitant to ask for help from NES colleagues because they are so busy, but would like to have more help with his
grammar, someone to point out his mistakes. He gets linguistic feedback from his supervisor, but he seems skeptical about many of her comments since she is a non-native English speaker.

He does not believe it would be easier for him to write his research in his L1 because he only uses English for his work. He does not know the terminology in his L1. He mostly thinks through his texts in English, however when he becomes fatigued he begins to translate rather than compose directly in English. This, he says, is problematic since the word order between his L1 and English is so different. The rhetorical structure is also difficult when writing in English, not because it is different, but because he cannot keep all the ideas together in his head in English, so he cannot ascertain the best order of ideas. He describes how his physical memory of composing is stronger in his L1, so he can quickly fix the order.

<table>
<thead>
<tr>
<th></th>
<th>Correctness</th>
<th>Precision</th>
<th>Science knowledge</th>
<th>Cohesion &amp; Order</th>
<th>Voice &amp; stance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proportion of comments received on average per text</td>
<td>7%</td>
<td>25%</td>
<td>10%</td>
<td>32%</td>
<td>25%</td>
</tr>
<tr>
<td>Proportion of comments received for 11 participants</td>
<td>16%</td>
<td>31%</td>
<td>13%</td>
<td>24%</td>
<td>17%</td>
</tr>
<tr>
<td>No visible action</td>
<td>-</td>
<td>6</td>
<td>6</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Accepts advice</td>
<td>9</td>
<td>13</td>
<td>6</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>3rd action</td>
<td>1</td>
<td>11</td>
<td>6</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

### 8.2.1.1 Noticeable Habits

There were a couple revision habits that became immediately apparent, one being his attention to all types of review comment irrespective of the reviewer or text. Roger considered even small suggestions about grammar and also considered all scientific knowledge comments from those not in his field. In the interview he described how helpful it was to receive review comments, even though comments were not always correct. He noted that he found student comments consistently easier to understand and to utilize than comments provided by his professional supervisory committee.
Self-initiated comments are not reflected in his table because it was too difficult to distinguish among his extensive revisions that may have been inspired by a comment or may have been self-initiated. In fact, the table cannot really capture the extent of this writer’s revisions, since the way I chose to identify revisions was primarily connected with the review comment on a one-to-one basis. For any given review comment, this writer would typically make an average of 10 changes in the revision of the marked sentence. A simple suggested change in a connective word could result in entire restructuring of a sentence, and any restructuring seemed to lead to substitutions of general words with more precise vocabulary. These extensive revisions and rewrites are why it was too difficult to count his self-initiated revisions.

Though he seemed to consider all review comments, it appeared that Roger did not accept other people’s reformulations. This may be partly explained by his stated lack of trust of non-native speakers. Another explanation he volunteered was that this writing course was the first opportunity he had to express himself freely in his texts without the weight of having others rewrite his sentences. He described how the feeling of freedom to construct a text that was his own may have influenced him to reject others’ reformulations. Instead, he strategically used reviewers’ reformulations, taking the parts he liked, and then reconstructing the text. Here we see an example of this with sentence structure. His original text was as follows: *where the abundance of EM fungal biomarker*\textsubscript{18:2ω6,9} *will be lowest, thus the ratio will be lowest.*

The reviewer compressed the sentence and removed the ratio of numbers, resulting in the following: *where the abundance of EM fungal biomarker and thus the fungi:bacteria ratio will be lowest.* The writer liked the compressed text, but did not want the ratio of numbers to be removed. He also decided to add more detail in his hybrid revision: *where the abundance of ECM fungal PLFA biomarker 18:2ω6,9, and hence, the ratio fungi:bacteria will be lowest.*

It is not the expressed purpose of this analysis to judge the readability of the revisions, but rather to try to understand the way the review comments are used. In this instance, like many others, Roger cherry-picks from reviewers’ reformulations to inspire creative re-constructions.

**8.2.1.2 Expanding on Precision comments**

Compared with the average numbers of review comments received as classified by comment type (See table 2), Roger receives more precision comments than average. According to what is indicated by the text revisions, he acts on over 80% of the precision comments, responding to all requests for more clarity that are related to precision. The times when he does not accept a reviewer’s reformulation
or direct advice, he instead interprets the problem as suggested in the comment and develops his own text solution, as see in the comment-revision sequence below. The original sentence states the following: *As a result, NO3 leaching into groundwater, N2O emissions and N2 may occur.*

The reviewer does not describe the problem, but reformulates the sentence as follows: *If the retention capacity is low, NO3 may leak into the ground. There may also be emissions of N2O and N2.* In the reformulation, the reviewer clarifies the pre-existing condition: *As a result became If the retention capacity is low.* The reviewer's reformulation also clarifies the possible results of low retention capacity where she splits the results into two sentences and creates parallelism in the second sentence.

In response to this reformulation, Roger then revises his initial sentence as follows: *Leaching of NO3 into groundwater, nitrous oxide (N2O) emissions and ammonia (NH3) volatilization may occur because of poor N retention in N-saturated ecosystems.* One noticeable change in Roger's revision is that the rewrite now differentiates N2O emissions from NH3 volatilization, a difference that was unnoticed by the reviewer when she rewrote the sentence because it was unclear in the original. He then makes two other changes to the sentence that were not suggested by the reviewer. He uses the names of two of the chemical compounds rather than only the abbreviations, a technique that makes the text easier to understand. Secondly, the writer changes the order of information in the sentence, placing the pre-existing condition at the end of the sentence in the less rhetorically powerful position. This then emphasizes the three results that now open the sentence. In summary, Roger added missing information that enhances a distinction, added detail for easier understanding, and shifted rhetorical focus of the sentence, all this based on the reviewer's reformulation.

In another kind of exchange the reviewer shows confusion surrounding the following passage: *Capacity to retain N in N-limited boreal forests with dominance of EM fungi is higher than the retention capacity of an N-saturated ecosystems dominated by bacteria.*

The reviewer asks, *Does this depend on the amounts of N in the ground or on the characteristics of the bacteria and fungi? I don’t really get it.* Rather than a reformulation like the earlier examples, here the reviewer explains her confusion. She identifies that there is no differentiation between the mechanisms that could explain the phenomenon.

When Roger revises, he again addresses more than was suggested: *Hence, the ecosystems with dominance of ECM fungi in the microbial communities, such as boreal forests, have higher capacity to retain N compared to N-saturated*
ecosystems dominated by bacteria. Here he addressed the ambiguity by eliminating one of the potential explanatory mechanisms. But similar to the previous example, he does not stop there. He goes on to re-write the sentence in what seems like an attempt to make the syntax easier for the reader, which is what makes the sentence longer, less compressed. Similar to the earlier example, Roger attends not only to the precision problem noted by the reviewer, but finds additional ways to clarify the text in the process of revising. Such revision activities are supported by his attitudes as expressed in the interview. There he repeatedly emphasizes the importance of good text flow, connection of ideas, and simplicity of message.

8.2.1.3 Own ideas about Organization and Cohesion

Most comments that Roger receives, he accepts or is inspired by. One category where this is less so is the C&O comments, where he seems to ignore or not attend to 40 percent of them. On closer investigation, the rejected comments are those that suggest removal of text, for example the details of the nitrogen cycle or the amount of data placed in a table. Roger does not act on these requests, nor does he change the forms of information display, for example, moving numbers from the text to a figure. In the interview he mentions that some comments reviewers gave that were not accurate or helpful resulted from readers’ limited knowledge of his field. It may be that these ignored comments about removing information or changing form of data display were examples of readers’ limited disciplinary understanding.

Still, Roger attends to 60 percent of the C&O review comments, whether they were accepted outright or inspired change. Appreciated C&O comments include reviewers’ suggestions for alternative order of ideas, like when one reviewer suggested that the reader needs to be reminded first of the importance of nitrogen to plants before they are told about nitrogen deposition. Adopting such suggestions makes sense in light of his stated concern over not feeling confident about order of ideas when writing in English. At the sentence level, he accepted C&O comments that led to better cohesion and those that suggested expansion of information. In the following accepted comment we see requests for both types of suggestions: I would have rephrased this in a way that puts the word Microbes in the end of the sentence. And maybe explain some more about microbes. In the interview he emphasized the importance of review that pointed out unclear paragraph structure or overly complicated sentence structure, elaborating that such things are invisible to him but obvious to the readers.
In numerous instances, C&O comments inspired considerable changes, but not necessarily C&O changes. An example of this is in the aims of the study. His original statement was as follows: *In this study, we present estimates of gross N mineralization and estimate the general composition of microbial community to understand the links between microbes and N cycling (my emphasis).*

Here we can see that the phrase describing the purpose is at the end of the sentence. This is moved in the reviewer’s reformulation: *The aim of this study is to better understand the links between microbes and N cycling.* We therefore present estimates of gross $N_m$ and estimate the general composition of the microbial community. With this order, the reviewer presents the larger aim before the proposed focus of investigation, an order that is more commonly found in research articles and that allows for stronger emphasis on the study’s focus. The writer’s revision seems to show that he adopted the idea of starting with the words about an aim, but then goes on to scuttle the division between large aim and specific focus in the rewrite.

*The main aim of the present study is to contribute in the discussion on the effects of $N$ load on the composition of microbial community and gross $N$ mineralization and the ability of originally $N$-limited ecosystems to recover from previous high $N$-load.*

Here the details of the current research command the focus of the aims statement, as the writer describes the two complicated relationships under investigation. Upon reception of the C&O comment, the writer seems to have reconsidered the readership, as if the first aim statement was directed too much for the lay reader rather than the specialist. However, it should be noted that where he is trying to explain his research within the detail requirements of his discourse community, he seems to continually attend to the non-native reader of scientific texts. This focus on readership appears throughout his interview, where he says he is bothered by sentence construction that is more complicated than necessary.

As mentioned earlier, Roger’s self-initiated changes were not explicitly counted because he made so many changes that could have been either inspired by a comment or could have been an isolated inspiration. What does seem clear when looking at the types of changes that he makes is that he has his own ideas about structuring information, about the types and amounts of information needed, and about the emphasis. In fact, many review comments that were classified as precision or scientific knowledge were then attended to via restructuring, suggesting that Roger’s solutions to unclear messages were often solved through information placement. The interview reconfirms this strategy, as he describes in numerous places the difficulty that someone like him has in understanding others’
descriptions and explanations when they are in his L3. He refers to the limitations of memory and believes that the larger research picture is made possible for NNS only when the texts are structured obviously and written simply.

Summary

Roger is an ambitious writer and reviser who takes into consideration all types of peer commentary. He judges PR to be most always helpful, but this does not mean he uses the comments as the reviewer likely intended. Rather than responding to the issue addressed in any given comment, Roger seems to use comments as markers of failed communication. The nature of the failed communication seems to be mined in any given comment, the hints embedded in the reviewers’ attempts to reformulate or explain. Roger’s subsequent revision action can therefore veer widely from the initial review comment, and can often result in multiple changes that improve precision, cohesion, readability, and rhetorical emphasis.

8.2.2 Irene

Irene is bilingual, is highly advanced in English, and is in the process of actively learning a fourth language. In first grade she began to use her L2 as a classroom language. She feels that she does not speak any of her languages perfectly, particularly now that she has been away from her first languages for two years. “I speak strange now. I can feel there is something wrong.” She describes learning languages as relatively easy so long as she wants to learn.

Irene describes an educational background where writing was emphasized from the earliest grades. She remembers writing essays every Monday throughout elementary school and turning them in for feedback. Language Arts teachers had very high status, and strong literacy skills were emphasized. As a young writer, she had an easy time expressing herself, and still feels this is easy for her. Furthermore, the writing process she learned when she was young is similar to what she uses now. As part of her education, she learned syntax and grammar, fondly remembering tree diagrams. She feels that this background helped her a great deal with writing in her other languages, and that she can easily identify “when things don’t fit.”

At the university level she received no formal writing instruction, but rather, students simply had to rewrite what was sub-standard. She learned to write scientific texts in her L2 as an undergraduate by studying models on her own. In learning to write in English (L3) as a Master’s student, she again relied on imitation by “choosing good papers” that were similar to hers.

Languages sound different to her in text form, she thinks. For example, she describes Swedish as sounding choppy and concise, while English is a bit closer to
her L1 and L2, where multiple clauses are not frowned upon. Currently she feels that though writing in English can require more concentration, once she gets started then “it just comes.” She enjoys writing and says she is not afraid of it; however, she considers being a non-native speaker to be a certain disadvantage as a science writer.

Although she studied at the university level for five years in her L2, she feels that two years writing in English has damaged her writing in her L2. She says it can be very annoying to write in her mother tongues now, and that she even translates from English. She finds it very difficult to explain her research in her L1, L2 or in Swedish.

**Table 3: Distribution and Use of Irene’s Received Comments**

<table>
<thead>
<tr>
<th></th>
<th>Correctness</th>
<th>Precision</th>
<th>Science knowledge</th>
<th>Cohesion &amp; Order</th>
<th>Voice &amp; stance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proportion of comments received on average per text</td>
<td>12%</td>
<td>34%</td>
<td>4%</td>
<td>35%</td>
<td>16%</td>
</tr>
<tr>
<td>Proportion of comments received for 11 participants</td>
<td>16%</td>
<td>31%</td>
<td>13%</td>
<td>24%</td>
<td>17%</td>
</tr>
<tr>
<td>No visible action</td>
<td>4</td>
<td>14</td>
<td>1</td>
<td>10</td>
<td>12</td>
</tr>
<tr>
<td>Accepts advice</td>
<td>2</td>
<td>13</td>
<td>2</td>
<td>11</td>
<td>8</td>
</tr>
<tr>
<td>3rd action</td>
<td>-</td>
<td>4</td>
<td>7</td>
<td>6</td>
<td>-</td>
</tr>
<tr>
<td>Self-initiates</td>
<td>-</td>
<td>14</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

8.2.2.1 **PR comments that initiated little action**

Studying the table (3) that numerically reflects Irene’s revising, it seems that she ignores more review comments than she accepts. However all the categories except Correctness are attended to in her revisions even when she does not take the precise advice of the reviewer. She received few comments on correctness, and those she received about commas and grammar she rejected, accepting only spelling correction. In the interview she said such comments were unhelpful and that she would have found them later by herself.
8.2.2.2 Feedback on Semantics and Syntax - accept some, ignore some

Certain revisions seemed to take little space but happen throughout all the texts, for example those that focus on Precision. As noted in study one, reviewers’ focus on Precision was strong for the entire group (31 percent of all comments), and Irene received what was an above average amount. She ignored the advice provided in over half of the Precision review comments, in particular, warnings about noun clusters and comments concerning discipline-specific vocabulary, for example, verbs about movement and growth patterns. In the interview she pointed out that a person in her field would expect the kinds of terminology that the reviewers reacted to, so she just “jumped over” such comments. Interestingly, though she rejected requests to change noun clusters when they were simply marked, she accepted changes in some noun clusters when the reviewer reformulated them. The other kind of precision comment that she ignored related to the reviewers’ apparent confusion about the writer’s syntax, which they often labeled as imprecise. From the perspective of an L1 reader, none of the sentences she ignored in this category were incorrect or imprecise, but they were syntactically complex and formal.

The Precision comments that she accepted mostly fell into three categories: inconsistencies of key expressions; redundancies, where the reviewer found repetition that resulted in confusion; and vagueness, where the reviewer asks for more specificity, for example a request for a synonym for clear and for in the middle. One redundancy comment about a critical phrase resulted in an extensive set of changes. Irene removed the redundancy, replacing it with a key word. She then went on to make multiple changes throughout the texts where she used only this key word. The same occurred with a reviewer’s request for a more specific description of distances, a request that is arguably connected to multiple subsequent changes throughout the text. That she ignored some precision comments while accepting others is something she later describes in the interview. She mentions that most of the terminology comments that she rejected reflect words she already thought about and talked about with her co-authors. Those she had not thought about were negotiable. Overall she thought that precision comments were very helpful.

8.2.2.3 Mostly liking how she sounds

Most Voice and Stance review comments provided in Irene’s texts are ignored or rejected. Those rejections include a number of places where her language is described as too informal or as overly formal. In the interview she explains this contradiction as one where the goal of the writing is to “get to the point,” and in that process readers have strong opinions about how formal a person should sound when being direct. She admits that she thought extra about the comments that
marked her vocabulary as too “everyday.” In these instances she asked the content specialist his opinion, and also asked a native English speaker in her discipline, wondering if she sounded too informal. She was reassured that language should be easy for others to grasp. In a different kind of comment, a sentence is described as awkward when the sentence is very precise and correct, yet complex. In other places her use of lexicon is described at times as dramatic, and in another place as a bit weird, and a little bit too artistic often in reference to Latinate words. In her interview she laughs at these comments and dismisses them completely. In other words, the comments about sentence structure and lexicon that may reflect L1 or L2 transfer to her scientific English were dismissed. In contrast, comments about words that may make the text sound too common were double-checked with a content specialist or a native speaker.

Some S&V comments seemed smoothly accepted, for example when the reviewer strengthened the stance of a claim by changing a modal or by removing hedging. A type of comment she was more ambivalent about was the removal of her definite articles, sometimes accepting the increased formality, other times rejecting it.

8.2.2.4 Comments about Content leading to investigation
Research Knowledge (RK) comments represented a small percentage of Irene’s received comments, where two of nine were used as suggested and seven catalyzed a different kind of revision action. One type of the third-action changes is exemplified by an interaction where the reviewer questions the way Irene described the history of the research problem, noting it seemed illogical and problematic. In response, Irene writes the content instructor in her revision, asking him how to deal with missing historical texts in another language that are important to her argumentation. In other words, the reviewer found a hole in her argumentation that she had likely pushed away because of a missing text, and her response was to get specialized help. In another line of questioning, a reviewer wonders if it is really necessary to describe two competing theories. Again, Irene writes to the content instructor, telling him that she must explain the theories and detail the mechanisms that underlie them in order to create the basis for the reconciled theory. Here she seems to be asking for confirmation that she is right. Finally, a reviewer questions her addition of so much textbook science in the theoretical section, where she again takes up the problem with the content instructor, justifying her decision to add the basic explanations to help the non-specialist.

Though none of these review comments led to changes within the revised text, the writer kept the reviewer’s comments in the text that she sent to the subject specialist instructor. In these submissions to the content expert, she asked for
advice about the issues the peers had commented upon, writing notes to him that explained her attempts. *What to do? Am I right? Here is why I'm right.* She confesses to the content expert that she may have become *a little bit blind* to the text, a kind of admission that the peer may be right. Even though the peers do not have expertise in her field, she seems to consider them to have enough scientific standing to send her onward for expert advice in half the instances that RK commentary was given.

**8.2.2.5 Coherence and Order**

Coherence and Order review comments in Irene’s texts (35 percent) were more common than average (24 percent), and more than half resulted in little or seemingly no effect. Review comments she ignored concerned overwriting, where the reviewers said she was more explicit and repetitive than necessary. Also ignored were comments about her being overly explicit regarding relations among ideas. An example is when reviewers would remove her connective words and she would put them back in. The strong focus she placed on connecting ideas was discussed in numerous parts of her interviews, where she used the word “flow” again and again. As a writer who values textual cohesion, she was more likely to accept comments where reviewers attempted to join and re-arrange sentences and clauses for the sake of cohesion. Similarly she accepted suggestions to add subheadings for easier identification of topic changes. In other words, she rejected C&O sentence-level comments that took away connecting devices and accepted the C&O sentence-level comments that would cohere the text. In her interview comments she mentions that a goal she set for herself was to try to write more simply and clearly, suggesting shorter sentences were a solution. However, she also criticized her Swedish peers for their one-clause sentences that sounded too choppy.

Coherence and Order comments for Irene also include those that recommend more extensive re-ordering in text structure, many of which she accepted. For example, the reviewer of her Results section suggested she reconsider the order of her diagrams in multiple places, which she did, moving them around, altering the configuration of the charts in one section, and re-ordering and re-labeling charts in another section. In her Introduction text, one reviewer created an outline of the way he perceived she should re-structure her text to better emphasize the literature review section. Here Irene wrote a note to the content specialist asking about his opinion on the structure of her text. She compared her idea of the outline to the reviewer’s outline. In multiple places, a reviewer pointed out that Irene should profile her own study more by re-arranging so key findings were more visible. She asked the content specialist about this, as well. So although there were not a large
number of C&O review comments that she attends to, those she does attend to result in either significant text changes or negotiations with the content instructor.

The interviews created an enigmatic picture of Irene’s use of PR in connection to C&O. Her pre-course interview described a writer with a very confident writing process, where ordering a story came easily to her as she composed. This was reinforced in the post-course interview where she described how outlining was problematic for her, that she tends to ignore her own attempts at outlining, instead choosing to “write it as I write.” She describes the ordering of her texts as being logical and that she does not really need to think about it. She was also loyal to her own text order, stating confidently at a later point in the interview that she would not make a storyline change if she liked the text the way she had written it. A reviewer would have to give her a good reason for changing the text, and most of them did not do that, she said. She later mentioned that she could not recall receiving many comments about her organization, and that what she received was minor.

However, the text analysis shows that she did receive proportionately high numbers of such comments, and her responses to such comments were ambitious. To confuse this picture somewhat more, late in the interview she summarized her thoughts about receiving PR. There she thoughtfully surmised that the C&O comments were those than most made her think. A reviewer would ask if she really needed to keep a paragraph, and the question would make her reconsider the paragraph, even if she kept it at the end.

Summary

This is a description of a confident writer and a strong FL learner who has had a thorough educational background in language arts. Her vocabulary, sentence production and paragraph development are all strong. What she seems to gain most in the PR activity as a receiver is cues to help her re-consider her organization, awareness of places where readers may need a more simple style, and descriptions of potential problems in the actual science of her article. She described her experience with the PR activity as being positive, and that it mattered little that some comments were unhelpful. She mentioned spontaneously that she would prefer face to face review sessions so that she could better explain herself and that she could ask follow-up from reviewers who did not explain themselves well. This wish for F-to-F review seems understandable in light of her pattern of asking further questions to the content specialist, her co-writers, and the English speaker in her corridor. It makes sense that she would want to talk with the reader about revisions since most of the revisions she was willing to make were to make the text easier for the reader.
8.2.3 Louise

Louise described herself initially as being a poor language learner and having little interest in foreign languages. Despite this, she chose an upper secondary program in science where instruction was conducted in English, and she chose to study at the graduate level for a year abroad in an English speaking country. She reads fiction in English in her free time.

She describes herself as being a person who has always liked to write, but that she received little L1 or L2 writing instruction in her undergraduate and graduate programs. She has high standards for what texts should sound like in her mother tongue, and claims it is easy for her to hear when texts become incoherent. She says that working with texts in her L1 is fun, and that she is good at expressing herself so long as she knows what she wants to say.

Louise received what she described as a great deal of writing instruction during her year abroad. Writing in her L2 for so many months made her more aware of the complicated nature of creating a text in another language. She says she sees now that it is not just an activity of simple translation. She explains that composing sentences can be particularly confusing in English when it requires breaking a rule that is different in her mother tongue.

She is able to describe writing process strategies that she has for larger texts, and she uses some internet tools to facilitate her writing. She describes the act of writing in English as rewarding as long as she knows what she wants to say. She believes that it would be hard if she were expected to write her research in her L1 now because of her lack of vocabulary. She also believes that her writing in English has been detrimental to her L1 writing.
Table 4: Distribution and Use of Louise’s Received Comments

<table>
<thead>
<tr>
<th></th>
<th>Correctness</th>
<th>Precision</th>
<th>Science knowledge</th>
<th>Cohesion &amp; Order</th>
<th>Voice &amp; stance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proportion of comments</td>
<td>29%</td>
<td>21%</td>
<td>5%</td>
<td>29%</td>
<td>16%</td>
</tr>
<tr>
<td>received on average per</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>text</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proportion of comments</td>
<td>16%</td>
<td>31%</td>
<td>13%</td>
<td>24%</td>
<td>17%</td>
</tr>
<tr>
<td>received for 11</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>participants</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No visible action</td>
<td>6</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Accepts advice</td>
<td>2</td>
<td>7</td>
<td>3</td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td>3rd action</td>
<td>4</td>
<td>6</td>
<td>1</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Self-initiates</td>
<td>2</td>
<td>17</td>
<td>6</td>
<td>3</td>
<td>9</td>
</tr>
</tbody>
</table>

8.2.3.1 Receiving review and making revisions
Louise was one of the few participants in all the courses who had the misfortune of receiving relatively few comments on three of five texts, as seen in Table 4. It became clear in the post-course interview that she was aware of how little feedback she had received from three of the reviewers. In fact, the fifth missing text from the forum was where she had intentionally sought out a classmate on her own to review one of her texts so she could be more certain of the type of review she would get. The lack of comments is one of the reasons I chose to investigate her activities in revision.

8.2.3.2 General Tendencies
There are a few general tendencies in Louise’s revisions that are explored here. First, it is noticeable that she seems to accept few comments about correctness, seeming to disagree with over half of them. For example, the reviewer removes a semi-colon, and Louise replaces it, or the reviewer suggests the change of common vocabulary and Louise makes no change. Those correctness comments that she does react to, she mostly takes an action that was not suggested. For example, the reviewer suggests a comma between clauses and Louise instead turns one of the clauses into a phrase. She described in the interview that such feedback had been valuable to her in another stage of her academic career, that is, when she studied abroad. But at this stage in her writing, she felt that correctness comments were not helpful. She claimed that currently, those correctness comments that she agreed with were things that she would have spotted on her own in later drafts, and those she disagreed with were because she felt her English was stronger than most
others’ English. In the future she said she would specifically ask the reviewers to not look at her English.

In contrast to her general lack of attention to correction comments, Louise attended to 13 of the 15 precision comments and attended to 13 of 17 cohesion and organization (C&O) comments. In those instances, she either took the reviewers’ suggestions or altered the reviewers’ solutions to fit her purposes. In an example of such an interaction about precision, the reviewer asked about the verb used to describe the implantation of radio transceivers to the study object. Louise rejects the word the reviewer suggests and instead uses the verb *tagged* which provides less detail but is understood within the discipline. C&O comments that she accepted included both major revisions requiring movement of diagrams and text sections, but also suggestions that attempt to strengthen her text rhetorically. In the interview she states that it is the C&O comments that were particularly helpful to her, that such ideas were things she would not have seen herself. It was, in fact, in connection with her positive evaluation of C&O comments that she proclaimed that PR was so helpful to her.

It is notable that Louise accepted more than half of the Research Knowledge comments despite her reviewers having come from different disciplines. This is particularly interesting considering her own hesitation expressed in the interview regarding how difficult review is when you are not a member of the particular research community. She explicitly pointed out how hard it was for her to *get into* other people’s subjects, and that she fears she may as a reviewer focus only on language issues in texts from unfamiliar fields. A general conclusion is that she considered all comments but the correction comments, either by accepting the intention of the comment, or using them to initiate other changes.

8.2.3.3 Disproportionate response
Looking closely at the nature of Louise’s revisions, one pattern that becomes apparent is the way the reception of a simple suggestion, for example to instead use passive voice, seems often to result in a substantial content revision that alters the amount of detail that was in the noted sentence. The changes seem to reflect a situation where the writer looks at the sentence and considers the reviewer’s idea, but then notices something entirely different to revise, such as the amount of detail in the description or the order of information. Though she was not asked about this specifically, there is a description in the interview that might shed light on her substantial revisions. There Louise emphatically expresses her preference for written feedback, as compared with face-to-face. In her description of her time abroad, she had experienced many rounds of FtoF review about her writing, a form of review where she could always ask the reviewer to explain what was unclear to him, then she herself would explain the way the reviewer misunderstood her. She
dramatized “This is what I meant” and the reviewers says “ah,ha! That is what you meant.” She believed that the discussion of the misunderstanding decreased the actual impact of the text problem because the interaction would end her mental negotiation with the text. She had fixed the reader’s misunderstanding, so she was less likely to then to fix the text. In contrast, she described working with written feedback where she would sit alone, forced to try to understand what might have gone wrong for the reader to have misunderstood her. She judged this to be a better incentive for altering her own writing. Such a description provides a picture of the review comments acting as clues for the writer rather than acting as directions. Such clues seemed to result in substantial text alterations and additions for Louise and helped her better understand what to write.

In contrast to Louise’s substantial additions in the revisions, another pattern was her entire removal of text sections in response to review that addressed sentence complexity and overly detailed descriptions. In numerous instances, such text sections simply disappear from her revision. Louise did not discuss this specifically, but she does emphasize in numerous parts of the interview that her goal is to write a text that is easy to read. It may be, then, that the complexity or overly detailed nature of some parts of the text were judged to be too heavy of a burden and not necessary to the understanding of the research. She seesaw between the need for detail in order to be precise, with the need to be easily understood.

8.2.3.4 Self-initiated revisions
Noticeable also is the number of self-initiated revisions concerning precision, scientific knowledge and voice & stance. Looking at precision in particular, Louise has initiated even more precision revisions than the total number of precision review comments that she received. Proportionately, self-initiated revisions in both scientific knowledge and voice and stance were high, as well. Excepting correctness, it seems as though the writer extends as much effort searching for revision opportunities as she does responding to review comments.

This kind of revision is particularly noticeable in Louise’s text that has been reviewed in a very detailed way. We might anticipate that a text filled with review comments would elicit fewer self-initiated revisions since there is already so much to attend to. However, the heavily reviewed text also resulted in a high number of self-initiated revisions, particularly the adding of words and phrases to enhance precision. It was not always easy to determine when a revision was self-initiated or inspired by a comment. For example, in one place the reviewer questions an adjective that describes the lab, and in the subsequent draft, the writer had added a detailed description of the activities of the lab, and explained both the political
purposes and research purpose of the lab. Furthermore, between the review and the second draft, Louise added an entire detailed section that replaced a simple table. It is hard to know the amounts of her changes that were inspired by the reviewer’s questions. It is possible to say, though, that half again more was written between the two drafts.

8.2.3.5 Less Active Reviewers
In two texts Louise receives very few comments. In her Introduction, she receives one spelling comment which she ignores, two comments on commas which she reacts to by simply removing all commas in that sentence, and one question about the meaning of a specialized word that she then deletes. What is more interesting is that she later goes on to make many self-initiated revisions, even with such sparse review. For example, in the revised introduction, she makes 12 self-initiated revisions, four of them substantial, including a re-ordering of literature, deletions of others’ research conclusions, and additions to literature. Other self-initiated revisions included changing terms to enhance precision, and altering the strength of her claims.

In her Results text, a different reviewer also gives Louise few comments. Here the reviewer suggests that she profile her findings more via moving the figures and he makes rhetorical suggestions about how to better introduce the results. Louise attends to both these. The reviewer also highlights a couple of her descriptions which she then clarifies in the revision, even though he gave no comments about what to do with them. According to the data, practically any bit of help Louise receives, she uses in some form. In this text as in the others, she goes onto make twice the amount of self-initiated changes in the revised text than those resulting from the reviewer’s suggestions.

The third text that received few comments/text changes was Louise’s Abstract, a somewhat understandable situation considering the size of the text (232 words). Though she only directly attended to one of the four comments, she made changes in the abstract that strengthened the claim and connected the ideas. Reviewer comments about correctness led instead to further development of ideas. For example, a suggested change of a comma to a semi colon resulted in a re-mix of clauses, where ideas were clustered differently than the initial text. She initiated further changes in voice, precision and sentence order.

What is curious about these many revisions is that comments about correctness were seen by Louise to be meaningless. She described that her self-confidence with English and writing made her more likely to disregard correctness comments. However, it may be that those same “useless” comments serve to instigate more substantial changes of a different kind. In all, what seems to stand out in the
interviews is her confidence that it is good to get comments, that reviewers mostly try to be helpful, and that you can always get ideas from what people write.

Summary

In summary, PR for Louise gave her disappointingly few review comments. Nevertheless, her revised drafts are extensively re-written after PR, many of the revisions tied to comments provided by the reviewers. Review comments about correctness were not used and not appreciated, although such comments did seem to initiate unrelated revisions. Louise took seriously all other forms of review, attending to almost all comments about precision, cohesion and organization. Simple requests to change a word could result in extensive text additions about just that word. C&O comments were particularly appreciated, both at the larger text level and regarding persuasion. She also self-initiated extensive revisions in Precision, voice and stance, and research knowledge. In the interviews, Louise expressed hesitation about giving review to her peers about Research Knowledge since she was not in their fields, yet she used the RK comments provided by her peers. Louise’s description about the value of written PR over FtoF provided insight into the heuristic value of working on one’s own with the text rather than talking problems through.

8.2.4 Final Comments

This exploration used a variety of data sources to inform a picture of what activities the receivers performed when they received review comments on their texts. The findings included an overview summary table for each participant of the kinds of comments they received, and the ways they appeared to use those comments. Also included was a brief writer biography which can provide hints as to why they use the comments they use, and the way they use comments. Third, the picture was informed by text analysis of the received comments, the reviewed text, and the revised text in order to establish the kinds of changes writers made after receiving PR. Findings of this exploration will be discussed in the next section.
The purpose of the PR activity in the context of the writing course under investigation was to raise participants’ awareness of the genre requirements of the RA texts in their respective disciplines. Complications that could potentially thwart this goal are many when considering previously conducted research about PR. Participants in the current research do not share an L1 or an educational culture in most dyadic instances, they do not share the same disciplines, they have different levels of English competence, and they have not been instructed on how to conduct PR in the course. However, that which can potentially smooth the PR activity for this group is their mutual exposure to course constructs, their broad reading of RAs in English from the natural sciences, their common culture and knowledge as researchers/doctoral students in the natural sciences, their professional maturity, their familiarity with the computer program, and their choice to take a writing course when they could have instead used their time on something else.

In this discussion section, the findings from the studies will be synthesized in an attempt to find what participants do when they are asked to participate in peer review. The investigation is contextualized by Vygotsky’s description of ways knowledge and skills are mediated through interaction. Applying the constructs of mediation, the zone of proximal development, languaging, tools and constructed identity to the findings in the studies can help us better understand how participants’ collaborative efforts surrounding text improvement can enhance their understanding of the genre requirements of the scientific RA. The discussion will first explore the reviewers’ activities and then the receivers’ activities. Attention to genre features will then follow.

### 9.1 ACTIVITIES IN GENERAL AS REVIEWERS

This part of the discussion focuses upon the ways reviewers use the online peer review, and explores the ways their use of the activity mediates learning. What can we understand about their commenting or non-commenting, and what might the implications of those activities be on the participants’ learning? In the interviews where the six participants described their experiences with the PR activity, they described the reasons they searched for certain items in a text, what they stumbled upon and could not avoid in the text, and what they found hard about the activity. They described the person they thought they should be as a reviewer, and who they should not be. This discussion section will also be informed by study one where the review comments were classified by focus; however, the main findings of study one will be discussed in a later section. The following
section explores findings about participants when they are in the role of reviewer. It answers the research question of what the doctoral students say that they do when they give review. The section then discusses the implications of these activities on their own learning according to Sociocultural theory.

9.1.1 A Model of the Commenting Process

The themes in study two that were developed from interviews provide a starting point from which to create a chronological description of the participants’ commenting processes. The chronology accounts for the most salient ideas proposed by the full group of participants.

The act of giving peer review was described as a complex process, one that was driven by a combination of factors such as the roles the reviewer adopted, the competence that the reviewer perceived himself to have, and expectations the reviewer had concerning the PR activity. Participants’ own review paths seem to vary depending upon the text they reviewed, with certain text types seeming to be less challenging than others. The round of review also seemed to affect people’s review paths, as later review rounds became more uniform in number of comments. Below is a model that depicts the steps of giving review. The process happens many times under a reviewer’s reading of a given text, though not each comment makes it through all steps.

Read the text/falter/triage

Deciding to Comment

Read the text/falter/triage

Deciding the Form of the Comment

The first two steps in giving peer review seem to be the same for all participants. The reviewer reads for meaning and tries to follow the ideas. Next the reviewer falters somewhere in the text, stops, and re-reads to see where she became confused. She then performs a kind of triage, a sieving of text problems that is influenced by her beliefs and goals. The triage likely works as a way to lessen the amount of work that the reviewer has to do.

One principle for deciding what to examine was to judge whether a text problem was personally interesting to the reviewer, represented in the themes by I have this problem, too (6.3.1.3). Other research has also found that some reviewers will focus on issues that are personally interesting to them (Lockhart & Ng, 1995). If a reviewer holding this principle suspected a text problem was similar to one of his own issues, the problem would move to the next step of review. One such text issue that reviewers identified was course constructs that the reviewers had decided
were intriguing. I refer here to the reviewer who became fascinated with noun clusters and began scanning all texts that he reviewed for such occurrences, essentially becoming hyper-vigilant to what he had designated as important.

Another principle for deciding what to examine was to judge if the text problem was connected to a course construct (6.3.1.4), a value expressed a feeling of responsibility to the classroom activity. A reviewer may not himself find a particular course construct to be valuable, but still feel that he should consider it since he is a member of the writing class. Items that reviewers highlighted were contentious scientific terminology and discipline-specific infractions that were recently addressed by the content specialist. Participants also mention course constructs they judged as trivial, but that they felt they should attend to because it was part of the course. This tendency was reported by Hyland in her study of PR participants who felt obligated to comment upon text features identified as important by the teacher (F. Hyland, 2000). Numerous studies have shown that student reviewers focus their attention on issues that were raised by instructors (Berg, 1999; Hu, 2005; Liou & Peng, 2009; Stanley, 1992) so this does not seem unusual. In the current research, such text problems moved on in the review process for those who believed they needed to attend to course constructs.

Another principle that seems to influence the activity of triage for the reviewer is giving to others (6.3.1.5), where the reviewer wants to be helpful to the writer. This principle was also an incentive for some students as found in earlier studies (Lockhart & Ng, 1995; Mangelsdorf & Schlumberger, 1992; Min, 2005; G. L. Nelson & Murphy, 1993). It was not clear the amounts and extent to which the reviewers shifted their principles in their decision to respond to a text issue, but since all interviewed participants claimed to want to be helpful to the writers, it seems reasonable that this attitude must influence triage.

A principle reviewers used to sort away perceived text problems was the possibility that a text issue fell into another reader’s purview. This sorting away is represented in the theme of commenting is for experts (6.3.3.2). Some participants explained that rhetorical problems are the job of the writer, that scientific issues are the job of the content expert, and that English language problems are the job of the EAP instructor. In these instances, the reviewer notices the problem, generally identifies it, and then pushes it away, essentially lessening the instances of reviewing in the categories of coherence and order, scientific thinking, and correctness. When reviewers applied the principle of expertise, the related problem did not move on in the review process. This principle is associated with the anti-role that I called not-the-expert.
Automatic reactions can be described as a form of triage because from the perspective of the reviewer, there was little energy expended, just a quick reaction and then moving on. In the theme *It's Wrong!* (6.3.1.1) some reviewers described issues of grammar, punctuation, mechanics and more simple word choice where they acted as copy editors. Such forms of commenting were a concern in early PR research where studies found that L2 reviewers focused overly much on surface issues (Iona Leki, 1990; G. L. Nelson & Carson, 1998). Participants in the current study described how they quickly marked these infractions with little thought or hesitation. This could be considered a form of triage from the perspective of the reviewer, even though from the perspective of the receiver there has been an action taken on her text. Another form of partial triage was described in the theme *Sounds strange* (6.3.1.2), where parts of texts that sounded unidiomatic, foreign, unscientific, or simply convoluted were dismissed with a mark that noted the reviewer’s confusion and frustration. These text problems did not move on in the process for some reviewers.

In summary, triage sorts text problems to help the reviewer decide whether to take further action. Text problems that are not quickly pushed aside as reactions are judged primarily by two questions: is it interesting to me and/or is it my responsibility? The result of triage is that reviewers will ultimately examine different proportions of the writers’ texts and different types of text problems depending upon the reviewers’ beliefs about their perceptions of the purpose of peer review and the role adopted.

*Deciding to comment*

Problem types that passed triage are not yet guaranteed to be commented upon. Once beyond triage, a perceived text problem is more closely evaluated for whether the formulation of a comment will likely result in something positive. Similar to the step of triage, participants described a number of guidelines to determine whether a comment is worth making.

One principle is the value the reviewer places on being right. Some reviewers say they try to give no comments that might be incorrect or misleading, believing such comments may confuse the writer. In such a case, the reviewer may have decided in triage that it was his job to attend to a text problem but on closer scrutiny realize that he cannot give authoritative advice. Concern about being right is reflected in the theme of *Giving to others* (6.3.1.5), where reviewers emphasize the importance of being helpful, partly by being right. Concern for being right is also reflected in the theme *Commenting is for Experts* (6.3.3.2), and in the theme *Key Course Constructs* (6.3.1.4) where interviewees emphasize the importance of delivering
information that is right. That student reviewers worry over being right is a concern raised in other research, as well (Liou & Peng, 2009).

Reviewers who had high standards of being right and were uncertain about an issue would likely not comment, even when certain that the text had a problem. The review for that issue would end there. In contrast, some reviewers instead believed that they should give the writer comments even if the comments might be wrong, noting that it was better to give more information and let the writer judge. The principle of being “right” did not hinder commenting.

Deciding to comment was also affected by the reviewer’s perception of how important the feedback was. “Will this comment likely matter enough?” This concern was seen in the theme of Key Constructs from Class (6.3.1.4) where reviewers chose to not formulate comments that seemed too trivial. Disciplinary specificity also influenced the perception of importance as seen in Unfamiliar Disciplines (6.3.2.2). A reviewer who wants to be helpful and who knows that a particular text feature would be unacceptable in her own research discipline may ultimately decide to not comment if she suspects the comment is discipline-specific.

Empathy for the writer’s feelings could affect the choice to comment. Reviewers could labor over decisions to comment as connected to how the writer might feel on receiving the comment. “Oh, he has struggled with this sentence to make it nice and it is still not nice. He won’t like that I tell him it is not nice but ..” The reviewer imagines what the writer went through in his creation of the sentence, to calculates the failure of the sentence, and anticipates the writer’s emotional reaction to her bad news. The reviewers in study two who described such scenarios then judge whether their comments will have good enough impact to offset the frustration the writer will feel when receiving the comment. Their criteria for judging was often to use themselves as objects of comparison. “I wouldn’t consider it a problem for anybody telling me this, so I hope that (other) people don’t.” The complications surrounding commenting and not being hurtful was found in other L2 PR studies, as well (Bradley, 2014; Carson & Nelson, 1996). However, this kind of concern for others’ feelings regarding critical comments runs contrary to a study on graduate students’, where reviewers were found to be more harsh in their commenting than other groups of peer reviewers (Cho et al., 2006).

In summary, decisions to comment could be affected by the reviewer’s perception of the accuracy of the comment and her perception of the significance of the comment as judged by its potential meaningfulness and sometimes its helpfulness as weighed against hurtfulness.
Deciding the Form of the Comment

The manner of commenting was not an aspect of the comment analysis in study one, nor was it a theme that developed in study two. However, when comparing the written review comments (study one) with the interview data set from study two, it became apparent that form was a decision in the process of giving review. Since it was not systematically analyzed in either of those studies, I only mention here what participants described in the interviews that is also supported by the texts I analyzed. This description of the form of comments reflects observations I had after the original analyses of studies one and two.

Once reviewers decided to comment, they had to decide the form of the comment, which could include a minimalist mark, a correction, a reformulation, or an explanation. Minimalist marks were editing symbols, abbreviations (RW? = Right word?) or a highlighting of a word in the text. All reviewers used minimalist marks, but the extent to which they used them differed greatly. The type of problem in the text often seemed to drive the decision of how to comment, for example, a lexical question about another discipline was often questioned in this way as was a course construct. This can perhaps be understood as follows: reviewers who are unsure whether something is wrong might simply mark the item in a way to tell the writer “check this.” Similarly, reviewers who know that a writer has already been exposed to a construct via classwork might also simply mark the item to say “remember about clusters!”

Another form of commenting was to rewrite or reformulate in an attempt to improve the text. The motivations for responding to the text in this way were apparent from numerous themes. Some people who reformulated did so because they had similar problems and wanted to practice (6.3.1.3). Others mentioned reformulating when attending specifically to class constructs (6.3.1.4). Finally, those instances where reviewers re-worked outlines and text sections described how they wanted to be helpful (6.3.1.5).

Reformulating was described as being difficult, because it is both time consuming and requires finesse. As one student describes her experience, "I try to interpret and then try to figure out how I can write this in another way." The writer first puzzles over the intent of the sentence, decides what the writer must have meant, and then searches her internal bank of possibilities, holding the potential remedies up in comparison to the initial text. One reviewer described this time-consuming nature of reformulation. “Maybe when I find a not-sentence, I don’t know how to find the mistake, or how to rewrite it so that it sounds better to me. I think that’s the way I spend most time.” The reviewer felt it was her responsibility to do more than indicate that the sentence was not working, but the search for such
improvement is time consuming and not always judged by the reviewer to be successful. Another reviewer described reformulating as stress-inducing, explaining that how difficult it was to “change things that are already written,” as she found it disrespectful to break apart someone else’s text in order to reformulate, a sort of violation of the text. Such descriptions were found as well in Bradley’s (2014) study of graduate engineering students in Chalmers, where they spent a great deal of extra time trying to formulate comments for peers in order to be sensitive to the writers. In the current group, descriptions of efforts to reformulate sensitively contrast to the reviewers who describe being put off by a text formulation that they cannot understand and simply marking it.

In the third form of commenting, the reviewer analyses what is wrong in the text and provides an explanation of the gap between the writer’s construction and the reviewer’s view of the rule or practice. Such comments could refer back to something that one of the instructors said in class (remember what Göran said about not changing the keywords!) something from earlier schooling (I was taught to never put a comma before “and”) or even a personal tip (where? Here! This is how I remember the difference between where and were). One reviewer described this step when he explained that giving review "makes me think why did they do this? and try to understand them." The reviewer tries to understand why the writer constructed the text in a particular way. If he can understand how the writer has reasoned incorrectly, then he can explain where the writer went wrong. Explanations included reminders of course constructs (6.3.1.4), questions about the strength of voice or stance, inquiries into scientific procedures, and descriptions of ways that the writer’s words could be misinterpreted.

Another motivation that the reviewers described when deciding how to comment was related to reviewer’s perceptions of not wanting to be the bad guy (6.3.3.3). Nice reviewers do not simply change someone’s text but explain why it was changed. This finding is similar to that found by Zhu and Mitchell (2012) where the manner of expressing oneself was found to be connected to the stance that the reviewer took. In the current study, some reviewers took extra time to formulate their explanations in palatable language so the writer could more easily consider the comment without taking offense. Some reviewers described how they preferred using their L1 to review when possible because they could quickly formulate their comment, knowing more certainly that they were not being insensitive. This advantage of being able to comment in one’s L1 is implied in numerous studies (Hu & Lam, 2010; Kamimura, 2006; Levine et al., 2002; W.-C. Lin & Yang, 2011; Suzuki, 2008; Villamil & De Guerrero, 1996)
This section described the process that was discerned from the themes developed in study two. This chronology suggests that not all that is noticed is commented upon, that not all that is commented upon is thought about, and that behind any given comment can be a simple or a complicated set of steps depending upon a host of factors, including but not limited to the principles that motivate the reviewer, the perceived role of the reviewer, and the nature of the text that the reviewer receives to work on.

9.1.2 Intentionality of Review and the Influence of Role
The idea that reviewers primarily respond to noticed items in the text is not how review was described by participants in this study. According to the interview data in study two and the description of commenting (above), participants’ review activities were only partly driven by the text, seen primarily in the themes It’s Wrong (6.3.1.1) and Sounds Strange (6.3.1.2). In those two cases, reviewers did not seem to make active choices whether and how to comment. However, for the better part of review, commenting was driven by reviewer’s own needs, self-perceptions and interests; in other words, agency was strongly involved in their review. The reviewer decided whether a comment should be ignored, whether it was wise to make a comment, and what form of comment seemed best in any given instance.

Perhaps the most obviously intentional was when reviewers attended to their own problem areas in the peers’ texts, seeking out text features that allowed them to practice a problem that they identified as important to themselves (6.3.1.3). Attending to one’s own writing difficulties through review may partly explain why some individuals seem to find giving review more rewarding than receiving review. Rather than the text being the center of the review, the reviewer’s own learning is at the center, and any text can be a potential training ground. In focusing on her own problems, the reviewer practices spotting and attending to the weaknesses or preoccupations she claims are her own. This practice is supported by studies that show that a key benefit to reviewing others’ texts is the exposure students get to constructs that they are working on themselves (Jianguo Liu et al., 2002), benefits shown to be connected to questions of vocabulary, phraseology and sentence structure (W.-C. Lin & Yang, 2011).

Also intentional were comments that focused on course constructs, a focus initiated by the lectures or instructional materials. The reviewer who describes duty-bound commenting that derives from course constructs is not focusing on his own problem, but rather is focusing on what he thinks he ought to focus on as a student of the writing course, trusting that the constructs chosen by the instructors are the constructs that are valuable to the students’ eventual attainment of RA writing skills. A study by Hyland showed that some students resent such guided
focus (F. Hyland, 2000), which was also an attitude shown in some SLU interviews. These imposed constructs created a kind of ambivalence for some reviewers when they felt they were commenting on features that they did not always consider to be priorities. However, focus on course constructs was also discussed positively, participants noting that genre features previously hidden were now visible. Intentional focus on constructs was a central aspect of most interviews. Course constructs that commanded the focus of reviewers in other studies where students’ review was investigated included improvements in the variety of review comments (Stanley, 1992), the complexity of review (Berg, 1999), and the overall quality of review (Hu, 2005).

The third intentional category was where participants described their hopes to be helpful to the writer. This was the category where all interviewed students shared similar, strong reflections, expressing their ambitions to encourage learning. The implication was that the reviewer believed she could sometimes ascertain what the writer needed to learn, which was perhaps based on the reviewer’s own experiences or based on a pattern that the reviewer had inductively discovered in the text. This form of review required that the reader respond closely to the text rather than skipping to items of personal interest or searching for items connected to course instruction.

What reviewers intentions were regarding content were sometimes described as being connected to the participants’ principles. However, more than principles seemed to explain their decisions of what to do as reviewers. In the interviews with participants, I commonly initiated topics with the words “what” and “why.” *What do you do after you have read something that seems wrong? Why did you re-write these sentences?* Reviewers often answered these questions in ways I had not anticipated, that is, by explaining who they see themselves to be. Review practices were often connected to the way the reviewers saw themselves. Participants did not only focus on course constructs out of principle, but described doing it because they were dutiful reviewers. They did not focus on writers’ weaknesses just to provide help, but because they were helpful reviewers. Even stronger were roles the participants described which developed into themes, where decisions to comment widely were supported by participants’ roles as average L2 science reader (6.3.3.1), and decisions to not focus on language were defended by claiming to not be an expert (6.3.3.2) and decisions to comment more like others were motivated by not being a bad guy (6.3.3.3).

If we take one example of an activity within PR, it is perhaps more clear how roles influence decisions. As mentioned above, reviewers have strategies to limit their loads. There are numerous ways to do this, and the choices reviewers make were often described in connection to the reviewer roles they took. The non-expert
limited his work by ignoring issues that the teachers would attend to, and the nice guy limited the number of comments so as to not overwhelm the writer. The average science reader limited the work load in a different way, which was to comment on things without agonizing over them, leaving the judgment to the receiver. Other research on PR has found it helpful to explain students’ review practices as being a consequence of the roles the students adopt. Research describes how these roles influence both the content and the form of the comments students give (Lockhart & Ng, 1995), and that the roles also influence the reviewer’s own success in writing (Mangelsdorf & Schlumberger, 1992). Similar to the current findings, research has also found that these roles are flexible rather than stable, and can be influenced by training in review (Min, 2008).

In summary, commenting on peers’ texts was only occasionally driven by text issues. Reviewers entered the task wearing a particular reviewer mantle which served to focus their commenting activities. Commenting that was described as reactionary seemed unaffected by these roles. Participants’ descriptions of their commenting provided this research with another dimension of PR activity, one where agency and self-identity influenced the practices.

9.1.3 Learning and the Activities of Reviewers
One of the aims of this research was to explore how the participants’ practice of PR suggest learning of the RA. An aspect of this question concerns the particular activities of the participants and the ways those activities can constrain or enhance learning. This section focuses on reviewers’ activities as interpreted through the lens of Vygotskian constructs of learning. This exploration can illuminate the way the reviewers’ actions assist and hinder their negotiations with the discourse specificity of the RA genre.

Mediation through Noticing

As previously described, a critical concept within Vygotsky’s learning theory is the Zone of Proximal Development, a metaphorical place where mediation of new constructs can occur as a result of interaction. Interaction for the reviewer is reflected in the reviewer’s reading of the writer’s text. The reviewer is exposed to the ways other students use the discourse constructs. The constructs made available through the other students’ texts can potentially mediate the reviewer’s learning, particularly because the peers’ work may include examples of constructs that the reviewer is on the cusp of learning (Chaudron, 1984; W.-C. Lin & Yang, 2011; Lundstrom & Baker, 2009).

The text writers are not seen as “experts” for the “novice” reviewer, but rather are seen as partners in mutual scaffolding of the scientific constructs (M. C. M. De Guerrero & O. S. Villamil, 2000; Donato & McCormick, 1994; Hu, 2005). Some of
the features of the peer’s text will approximate the kinds of text negotiations that
the reviewer is grappling with in his own writing. In essence, the entire text is
available for the reviewer as a smorgasbord of discourse and language issues for
the reviewer to explore. From the available collection of examples, the reviewer
can potentially notice expressions, organizational features, discourse specific
words, and the like, all of which can reinforce ideas he is becoming aware of, or the
reviewer can have his assumptions challenged by these same items. This
explanation may lend clarity to the findings of reviewers learning more about
writing from giving review than receiving review (Lundstrom & Baker, 2009; Tsui
& Ng, 2000). Texts that the reviewer interacts with can serve as scaffolding for
his own learning. Reviewers’ choices of what to focus upon in PR allow a nearer fit
to where the reviewers find themselves; in other words, choice from a familiar text
written by a like peer provides constructs within the reviewer’s zone of proximal

It follows that participants’ choices of review practices can affect the breadth of
constructs they are exposed to and in turn the amount of analysis they perform
related to the feedback they provide. For example, those who read the texts with a
goal to help the writer practiced a more text-driven review. Because familiarity
with the discipline’s discourse, debates and assumptions is enhanced by increased
exposure to the texts (Lea & Street, 1998), this text-driven review arguably allows
for more learning than review practices that remove numerous types of text issues
during triage. Those reviewers who chose to leave certain types of comments to
the experts essentially self-limited their engagement with the available scientific
constructs. For example, one reviewer was forming an awareness of the problems
inherent in adding too many modifiers between the subject and verb. He had this
habit himself and explained that he was working to change it. Yet when he read
others’ texts, he pushed away anything that seemed connected to sentence
correctness, including the very issue of subject/verb separations that he had been
working on. Such issues were sorted away as an English problem, the job of the
ESP instructor. The opportunities to further mediate this construct was lost due
to his self-defined, non-expert status.

From a perspective of mediation, the reviewer activity of commenting
automatically on items that appear in the text can also be considered a less effective
use of the reviewer’s time, as such automatic commenting can be explained as
expressing knowledge that the reviewer already internalized. Some participants in
the current study described how they methodically commented upon what they
were already certain about. This kind of automatic commenting is common in L2
review activities where students have not had sufficient PR training (Min, 2008).
Such commenting uses the reviewers’ time without challenging their thinking. It
is also problematic if the reviewer comments automatically in place of commenting upon constructs that she is grappling with, an activity substitution which is entirely likely from numerous participant descriptions. They comment automatically on small features and then feel they have been too harsh. They then decide to not comment so much to avoid being the bad guy. According to Vygotsky’s description of mediated learning, the reviewers’ own learning can occur when they grapple with less familiar concepts rather than known concepts.

In summary, Vygotsky’s construct of ZPD supports the claim that a reviewer who does not limit his exposure to others’ text features will have wider opportunity to learn new constructs. In addition, reviewers who focus on new issues will benefit more than those who focus upon what they already know.

**Languaging**

The expression *languaging* has been used to collectively reflect a number of steps described by Vygotsky where an individual’s learning is mediated by others’ articulation of a concept which the individual then adopts as a form of private speech, manipulating it to fit her own understanding, and then eventually producing the new construct in words, essentially mediating the construct for others through her own languaging of the construct. People’s learning is understood to be tightly connected to the process of putting words to ideas. Therefore, reviewer practices that should aid the learning of new discourse constructs for the reviewer include those that encourage languaging of constructs that the reviewer is on the cusp of learning. In consideration of this, reformulation and explanation are activities that should enhance mediation for the reviewer.

In reformulation, the reviewer applies knowledge of discourse constructs to peers’ texts, attempting to create meaning in a form that she perceives is more accepted by the discourse community. This form of languaging for the reviewer allows her to hypothesize about language and new concepts while using others’ constructions to initiate her inquiry. An example of such reformulation was given in Roger’s text where the reviewer compressed a key sentence and removed the numbers in an attempt to shorten and simplify it ⁴. Similarly, explanation requires the reviewer to put words to the rules or practices that she assumes apply to the writer’s problematic text. Naming the constructs, which is common in explanation, can be seen as a mechanism to further mediate an idea, as the idea has been identified

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⁴ Original text: *where the abundance of EM fungal PLFA biomarker 18:w6,9 will be lowest, thus the ratio will be lowest*. Reviewer’s reformulation: *where the abundance of EM fungal biomarker and thus the fungi:bacteria ratio will be lowest*. 

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with words. Where reformulating is an application of the reviewer’s rules, explanation is an attempt to communicate the rule itself.

Language in the service of learning is a common practice in science education. Science education motivates the practice with the premise that students deepen their own understanding of constructs by explaining and elaborating key constructs to others (Amy, 2003; King, 2002; Slavin, 1996). Language in the service of learning is supported by other research that explores second language peer feedback, where one study demonstrated the importance of students explaining, clarifying and justifying their ideas about trouble sources (Villamil & De Guerrero, 1996), while another showed the importance of questioning, suggesting, paraphrasing and correcting (Mendonca & Johnson, 1994).

Considering this support for language as a mediator for new mental constructs, it is reasonable to suggest that those reviewers who reformulate and explain their ideas concerning key components of the RA genre will enhance their learning of those same components. As follows, reviewers who chose not to comment on issues that they described as difficult, such as organization and research knowledge, would likely have engaged in less interpreting, word searching, comparing, and composing than those who attempted to problem solve those trouble spots. If the assumption is applied that language benefits mediation of new constructs, it is problematic that reviewers do not articulate their ideas. Language can serve as a form of forced noticing that potentially lifts the unsettled item to a visible position in the reviewer’s thoughts. *I think you cannot use the word “significant” in this way,* writes the reviewer. By writing this review comment, this participant has produced an artifact of her hypothesis. Though she may not be certain about the use of the word “significant,” by languaging her concern she has placed the issue on her own table for future scrutiny.

**Role and Commenting**

In the analysis that explored why participants commented on what they did, the theme of roles as reviewer arose repeatedly. The influence of roles on learner strategies is not novel (Lei, 2008), and in L2 PR research in particular, roles have been shown to influence the form of commenting (De Guerrero & Villamil, 1994; Lockhart & Ng, 1995; Mangelsdorf & Schlumberger, 1992). In one study, researchers examined the feedback students provided in face-to-face review and found that reviewers adopted various stances, including an interpretive stance where they revised and reformulated the text according to their own interpretations; a prescriptive stance, where they focused on correction; and a collaborative stance, where they tried to understand the text from the writers’ views (Mangelsdorf & Shlumberger, 1992). These stances are similar to the roles
described by the participants of the current study, particularly the collaborative stance, which is similar to your average L2 science reader, and the interpretive stance, which is similar to the self-interested reviewer who looks for text features for his own best interest.

Another study produced similar findings, where those taking an authoritative stance focused on text issues connected to rules and directions; those taking an interpretive stance focused on suggestions that would help the readers; those taking a probing stance focused on what they did not understand; and those taking a collaborative stance focused on writing processes and strategies (Lockhart & Ng 95). In both these studies, students’ reviewer roles influenced the proportions of time the reviewers discussed types of text issues. Though the roles described in these studies differ from those in study two, such differences can be expected since the student populations and the writing tasks differed. That which is relevant is that participants do construct identities in connection to the task, and these identities allow them to better self-regulate during review.

Participants described some roles as more stable, such as the self-interested reviewer (6.3.1.3), the helpful reviewer (6.3.1.5), and the average L2 science reader (6.3.3.1). Other roles seemed more fleeting, appearing in connection with difficult decisions that the participant needed to make, such as not the bad guy (6.3.3.3), the good student (6.3.1.4), and the non-expert (6.3.3.2). These cameo roles came with built-in principles to help the reviewer decide whether and how to comment when the reviewer had a dilemma. Such shifts in an individual’s role have been found in earlier PR research (Lockhart and Ng, 95) and are considered to be particularly common among doctoral students, as doctoral education has been described as being as much connected to identity formation as knowledge construction (Johnson et al., 2000). Role for peer reviewers in the natural sciences may be particularly salient since giving review in their professions is a critical literacy practice (Blair et al., 2007; Cathey, 2007; Kern et al., 2003; Jianguo Liu et al., 2002).

In the current work, shifts in roles were associated with strong feelings of discomfort. Uncomfortable feelings have been shown to affect the kinds of critical comments that graduate students give their peers (Hu & Lam, 2010; Liou & Peng, 2009), and to affect whether students give critical comments (Carson & Nelson, 1996; G. L. Nelson & Carson, 1998). Data in the current interview transcripts showed that when reviewers felt uncomfortable about giving comments about other disciplines, some would shift out of the average L2 reader role, citing they are not experts, even though the principle of expertise was not what had driven their earlier review activities. Emotions that force a shift in roles can help explain
why participants did not stick with a particular role throughout a given review session.

The review model developed in this section suggests that a reviewer's perception of her role and her perception of the intention of the activity can affect the extent to which she notices, analyzes, chooses to comment, chooses the form of commenting, and articulates the comment. From the perspective of discourse learning, it seems reasonable that a reviewer's role adoption likely impacts the individual reviewer's learning. Some roles seem more conducive to learning than others. For example, the helpful reviewer (6.3.1.5) believed it was his responsibility to find text problems that the writer might be unaware of. The role demanded that the reviewer remain close to the text in order to find what may be problematic for the writer. Those reviewers had more exposure to a wider variety of constructs as found in their peers’ texts as compared with self-interested reviewers (6.3.1.3) and good student reviewers (6.3.1.4). All genre constructs in the writers’ text were available as noticeable items to the helpful reviewer.

Reviewer role also influenced the amount of languaging. As mentioned earlier, languaging often reflects information that is created while the writing takes place. Giving comments was identified by the participants as being the most influential aspect of the PR activity on their own learning. This value that sociocultural theory places on languaging gives further prominence to the role a reviewer chooses, since languaging appears to carry more value with certain roles. For example, the role of the good student reviewer (6.3.1.4) encouraged participants to describe and explain text issues that had been earlier introduced in class. Such reviewers commonly named the specific constructs in their comments, constructs that they had read about in the textbook or heard about from the lectures. In another example, helpful reviewers (6.3.1.5) were driven by the idea that they should provide sufficient, effective help for the writers, part of that being reformulation of sentences that they identified as problematic.

An arguably disadvantaged reviewer role in regards to languaging is that of the non-expert (6.3.3.2), who did not comment upon issues that fell under another reader’s area of expertise. This intentional avoidance of particular types of commenting limits exposure to scientific constructs within peer texts, and also limits the kinds of issues the reviewer attempts to language. Although the non-expert role was only a cameo role in the current study, it nevertheless inhibited certain forms of review that could have mediated new constructs for the reviewer.
In summary, roles expanded or limited that which the reviewer was exposed to and what the reviewer languaged, a conclusion supported by other research that found reviewers’ stances enhanced or constrained opportunities for learning (Lockhart & Ng, 1995; Mangelsdorf & Schlumberger, 1992).

One other observation about role and commenting seems important to mention in regards to learning. Roles seemed to influence reviewers’ attitudes regarding the hardiness of the receivers. For example, in situations when a reviewer struggled with a dilemma of whether to comment, the role of educated L2 science reviewer (6.3.3.1) encouraged commenting, whereas those who did not want to be the bad guy (6.3.3.3) were careful to not hurt the writers’ feelings. Although research supports the notion that the role of helper is conducive to learning (Lockhart & Ng, 1995; Neomy Storch, 2002), and that it is common for reviewers to feel uncomfortable giving critical feedback (Tang, 1999), my analysis of the interview data showed that needing to be nice can constrain the type and amount of comments a reviewer gives. The nice reviewer’s heightened awareness of the receiver’s feelings complicated the reviewer’s formulation of a comment, as he tried as best possible to create a graceful, tactful comment. The nice reviewer role discouraged directness, since directness was seen as insensitive. Consequently, these reviewers used a combination of humor, hedging, politeness phrases and even emoticons to modify their message. Review practices that result in disproportionate amounts of time mitigating hard feelings are difficult to motivate from the standpoint of the reviewer as learner.

9.2 Activities in General as Receivers
In my efforts to find how students’ use of PR mediates their learning of the RA genre, I asked two questions related to the receivers of review. The analysis of the post course interviews as found in study three informs the question of what doctoral students say that they do when they receive review. The findings from study four informs the question of what ways participants use peer review as seen in three individuals’ revised texts and their interviews. In this section I will first describe chronologically what receivers seem to do when they receive review, a description based on studies three and four. After this, I will look at a few other findings that seem important in the description of what L2 doctoral students do with PR.

9.2.1 Activities after Receiving Peer Review
In my analysis where I could more closely explore the text changes made by receivers, and could analyze the transcripts of the receivers’ explanations of what they thought they did, it was possible to cobble together a chronology of receivers’ activities. Similar to the description of giving review, participants did not
themselves describe their receiving in any kind of process or clear order. However, the participants described similar activities in the post-course interviews that provided details of what they did with review comments. This part of the Discussion section will use the findings from studies three and four to inform a description of what the participants do when they receive PR. In brief, the main steps include the following:

*Skim text, note comments (and look for baited hooks)*

*Re-read text, get an idea*

*Streamline or Triage*

*Dissect the Review Comment*

*Do I agree that this is a Problem?*

*Judge the Proposed Change*

*Skim text, note comments (and look for baited hooks)*

The first activity that receivers describe when they receive review is to read or skim the section of their texts that are referenced with peer comments.

Already at this stage, some writers shift their focus from a sequential reading to instead jump to places in their texts where they want to know what the reviewer’s opinion is regarding a particular text issue. The issue is sometimes a section the writer struggled with, sometimes a section that was overwritten, sometimes even a section that was left sloppily undone (7.2.3.1). This does not conform to general assumptions concerning use of PR, where writers are thought to submit their texts for peer review in a form that reflects their near-best efforts, where the texts are for the time-being in a completed state. In more extreme cases, writers submitted texts to the review forum that were disorganized in hopes the reviewer would organize them. In the writer’s trawling for help, the peer reviewer was unknowingly being used as a co-writer or a reviser rather than a reader-responder. Hoping for help from the reviewer, the writer would scan the text directly to see if the problem had been solved.

In another form of trawling, writers described how they sometimes had put particular effort into a section of their text that they wanted to have approved by an outside reader. In the words of one writer “I look at it all quickly because I am curious. I want to know what they think about it, to see if I had a good estimate of my structure.” On receiving PR, these writers quickly scan their texts to assure they received no critique regarding the issue they had wrestled with. This
skimming for confirmation was found in Hyland’s (2000) study of L2 university students’ use of feedback, where she describes how a participant intentionally used difficult, new words in expectation of feedback related to these attempts (8.2.3.3).

Re-read text, get an idea

In a more common form of receiving review, where writers do not trawl for help (or after writers finish their trawling), writers describe skimming their own text, noticing review comments, and then re-reading the section that was identified in the peer comment in order to hear or see what the reviewer has heard or seen. After this, there are two paths the writers seem to take: writing or triage.

In study four it became apparent that receiving PR was not primarily characterized by writers using comments for revision (8.2.3.4 & 8.2.1.1) Rather, receiving PR more commonly meant that a section of their text was highlighted by the reviewer as problematic, at which point the writers re-read their texts with a critical eye, reading what they wrote after time had passed from the last writing. With PR, the writer’s re-reading is supplemented by comments that re-direct the writer’s focus. Such re-direction seems to function as another form of heuristic, a way for the writer to see the text not only from her own, fresh view, but also from the reader’s view (8.2.3.3) Writers discovered what they needed to write in response to the reviewer’s highlighting, or even simply by re-reading the text, a phenomenon also described in other research (Klein, 1999; Sommers, 1980) and a phenomenon embedded in writing models (Bereiter & Scardamalia, 1987; Flower & Hayes, 1981). It is not strange then that reading review comments and re-reading one’s text results often in re-writing rather than local revising.

Streamline or Triage

For the participants in this investigation, the next step was to read the review comment and make a decision about how seriously to take the comment. One kind of comment was streamlined where the writer would take the comment seriously and attend to it. That kind of comment reflected a reviewer who seemed to need help understanding something in the text. In numerous places in studies three and four, writers described their concern for the needs of their readers, worries that the readers might be confused (7.2.1.1). The writer’s judgment could be based upon the tone of the comment or the content (8.2.1.2 & 8.2.2.2) According to the interviews, a tone indicating confusion was often directly attended to, for example, the responses in Sounds Strange (6.2.1.2), where reviewers often gave no content in their comment but expressed exasperation. These kinds of troubles are what is discussed in some PR literature as a misconstraint, where there is a mismatch between what the writer meant to say and what the reader understood (Nystrand, 1989). Because the writers are new to the genre and also writing in their L2, it
seems reasonable that they would be concerned about the comprehensibility of their texts.

Another type of review comments that were attended to directly were those concerning the flow of the story, in other words, issues of coherence and order. As seen in the description of the RA, order within text sections is critically important both for the readers’ comprehension and also the writers’ success in profiling their research well. All five sections of the RA have many organizational requirements attached to them which must then be combined with the particular story of any given researcher’s work and purposes. Writers in the SLU group had been made aware of these requirements in the lectures, so it is understandable that they would be vigilant to reviewers’ concerns about order.

In the interviews about receiving commentary, participants seemed to strongly believe that reviewers could illuminate certain issues that were otherwise hidden to the writers about their texts. In particular, reviewers could highlight what information was missing or over-abundant, what was ordered confusingly, and what cohered poorly. Problems in understanding due to story flow were often expressed by reviewers showing frustration and confusion, and writers noticed such PR comments (7.2.1.1). The participants claimed that the reader’s ability to identify text flow problems was extremely valuable, a finding that is supported by earlier research (Mangelsdorf & Schlumberger, 1992; Min, 2008; Tuzi, 2004; M. Yang et al., 2006). Seeing their texts with the reader’s eyes is crucial for writers in order to create effective texts (Sasaki, 2000).

Organization, missing information or overwriting reflect text problems that are difficult for the writer to identify alone. This review interaction can be understood better when we think about the “jobs” of the writer and reviewer. The writer reports on what she did in her research using a foreign language in a genre she is inexperienced with. She is quite certain about what she is trying to communicate, but cannot be certain of how much detail to provide, what the best order might be, the ways to use the moves of the text sections, and whether her choices have conformed sufficiently to rhetorical and scientific expectations. Her familiarity with the content makes it hard for her to identify a vague storyline. The reviewer’s job is first and foremost to comprehend the ideas of the text, finding meaning in a text that is in a foreign language and in another discipline’s terminology and possibly even different rhetorical conventions. The reader does not know the story ahead of time. The reader is doing a puzzle, and when the puzzle gets too difficult, he becomes confused and says so. The writer at this point looks back at her text and tries to find why she lost her reader, trying to see her text with the eyes of the reader at the point where he got lost.
Writers also described aspects of received review that negatively colored their analysis of the incoming comment. Confusion for a reader about the storyline of the text was not taken seriously when the concern seemed to stem from an unlike discipline. Writers were less willing to consider such changes if the confusion seemed to reflect the needs of an outside discipline or research paradigm. This lesser willingness to attend to problems pointed out by reviewers from other educational cultures has been found in other research, as well (G. Nelson & Carson, 2006; Villamil & de Guerrero, 2006). In one clear example of this, a participant who worked in an applied research field who wrote in a descriptive research form was unwilling to simplify the organization of his texts as was requested by the reviewer. He contended that people in his field would find such writing childish. Such a review comment was therefore not fast-tracked for this writer, since the reader’s needs reflected a kind of ignorance that the writer felt he should not have to attend to.

Writers conducted a kind of triage when it came to comments that were written by reviewers who the writers did not have faith in (8.2.2.5. The writer’s assigning of competence to reviewers can be seen in the interview transcripts where participants explained that some reviewers “just understand things a lot more easily than others while other reviewers shouldn’t comment when they don’t know what they are talking about.” A writer’s negative judgment of a reviewer affected the writer’s interpretation of the review comments (7.2.2.2). This phenomenon has been found in other PR research, as well (Liou & Peng, 2009; G. L. Nelson & Carson, 1998; Saito, 1994; Strijbos et al., 2010; Zhang, 1995). The participants’ descriptions were sometimes specific to skills that the reviewer lacked, but such descriptions also bled into wider attitudes of dismissal.

Although the writers described judging reviewers, and said their judgments affected their interpretation of review comments, in study four it was apparent that the three participants used such comments even when they had reservations about the reviewers. Though they said some reviewers should not comment on certain kinds of features, they nevertheless seemed to consider the comments. What may contextualize the complicated relationship between writers’ perceptions of reviewers, and writers’ utilization of the review comments is to re-introduce the idea of audience awareness. One of the fundamental ideas that most PR studies agree with is the benefit of PR for the sake of a writer’s developing awareness of the readership. Though a writer may react to a reviewer who seems unqualified to give particular comments, this writer is also trying to understand the ways his text does not work for readers. This is a reader. In other words, the relationship is likely complicated, which is shown in other studies as well. For example, in a large PR study using 85 graduate students, writers’ effective use of PR was not affected.
by their confidence or lack of confidence in any particular reviewer (Strijbos et al., 2010), and in another study on L2 graduate students, both receivers who did and did not trust their peers used similar amounts of comments (Hu & Lam, 2010). It may be, then, that writers think that their perceptions of a reviewer’s competence plays a larger role than is found in their text activities.

Dissect the Review Comment

The next step is for the writer to try to understand the review comment. This step of reception is important for participants in asynchronous review because they cannot interact with the reviewer (Tsui & Ng, 2000). Interview findings from study two indicated that reviewers marked texts with different forms of comments depending upon factors that included their certainty, their adopted role, and the importance they attributed to the issue (6.2.1.1 & 6.2.2.2). Types of commenting included marks, emoticons, internal text changes, reformulations, personal reactions, explanations, and personal notes in the beginning or end of texts. As might be expected, receivers had opinions concerning the form of the comments, and such opinions affected the way they used the comment. PR receivers described how they would have to re-read the comments to understand them, trying to interpret them in the context of their own writing. This is described in other research about online PR (DiGiovanni & Nagaswami, 2001). Writers described how some comments were too cryptic for the writers to adequately find ways to re-evaluate their own texts, and they were vocal about their need for more information (7.2.2.4). That peer comments that went unused because the comments were often too difficult to interpret for the writer was found in earlier studies (Min, 2005).

In connection with receivers’ complaints about cryptic review comments, it should be pointed out that the case studies showed that receivers did not always do what they said they did. For example, Irene claimed to not use comments on organization, but she did, and Louise claimed to ignore correctness, but in fact those comments initiated alternative revisions. In the same vein, the case study participants claimed to not know how to use indirect comments, but the revised texts showed participants did often use such comments. It was indeed the case that similar to Min’s (2005), writers occasionally dismissed unclear comments (likely represented in the category of “no visible action”) but they also regularly acted upon cryptic comments.

This is not surprising when contextualized by the observation from study four that in fact, participants’ use of most comments, irrespective of form and content-type, often entailed a form of detective work rather than direction-following. In the case of cryptic comments, reviewer marks were difficult for the receiver to interpret, but
the receiver’s response was to do something other than reject the cryptic comment completely (8.2.3.3 & 8.2.1.1). This is reminiscent of findings from Lockhart and Ng (95) who found that when the reviewer seeks clarification in a non-direct manner, the writer reflects on their own intentions. Similar findings are also discussed in research by Wigglesworth and Storch (2012) who explored what L2 writers do with different forms of instructors’ comments. They found that writers’ levels of engagement during the revision process was higher when they received editing comments as compared with reformulations or corrections. In summary, it may be that receivers’ activities in dissecting comments are more extensive than the interviews might lead us to believe.

*Do I Agree that this is a Problem?*

During the follow-up interviews, participants looked at patterns of received comments that they appeared to agree with or ignore, and they were asked for any thoughts they had about these decisions. In the analysis of revisions in the case studies these ideas were further scrutinized. From those findings it appears that review comments are used in four different ways.

In one scenario, the comment is rejected because the receiver does not agree that there is a problem. As identified in study three, such rejected comments included discipline-specific terminology, scientific knowledge that the writer was confident about, research issues that the writer had already grappled with and decided about (7.2.2.1), grammar and mechanics that the writer felt sure about (7.2.2.3), and text organization the writer had already motivated (7.2.2.1). This is a wide span of comment types that writers claimed to reject. This will be analyzed more in the section on genre mediation in the last section of the discussion chapter.

Comments that appeared to be ignored were sometimes saved for further contemplation. Study three’s analysis of interviews showed how seemingly ignored comments often act as a kind of low-volume chant for the writer, reminding him of a problem each time a particular text feature comes up. Participants in the post-course interviews described how they resurrected comments that appeared dead if multiple reviewers addressed the same issue in their texts (7.2.3.1). These comments were described as a kind of collectors’ item, where the PR raised the issue for the writer, and the writer put it in her pocket for possible future consideration. This is described in an early ESL feedback study in a Canadian university, where L2 student writers reported that they often made a mental note of teachers’ feedback about a third of the time rather than correct, revise or re-read (Saito, 1994). Another study showed similar findings where student writers often engaged in extended verbal negotiations regarding received feedback, but that this
engagement was only sometimes reflected in the writer’s eventual revisions (G. Wigglesworth & Storch, 2012).

Rejecting and saving comments were not the only responses standing behind seemingly ignored review. Participants also described how seemingly ignored comments acted as triggers for word searches, discussions with native English speakers, and consultations with supervisors or former instructors (8.2.2.4 & 8.2.3.5). The conclusion the writer sometimes drew from the investigation was that he had been right in what he initially wrote in his text. This results in what appears to be an ignored comment. In these cases, the peer comment served to initiate an investigation that then solidified a construct for the writer.

These three described actions are not discernable when we look at the classification of comments accepted/rejected. The comments simply look rejected. But writers who save comments and investigate comments are using PR to mediate their learning, even though we cannot see this by looking at their revisions. Revision means that a writer attended to a comment and possibly changed his mind, but non-revision can mean an active rejection of a comment, or it can mean a full investigation into a construct that resulted in rejection, or it can mean a temporary suspension of certainty when the comment gets stored in a mental folder of issues-under-negotiation. It is entirely possible that lack of action in response to a PR comment can mean that the writer does not know how to revise, which is a problem identified in early PR research (Sommers, 1980). However, nowhere in any of the interviews did writers mention this problem.

A fourth possibility is that the writer agrees with the comment as concerns the text problem, in which case, the writer may need to revise it on his own if the text was simply marked. If the reviewer provided a reconstruction or an explanation, the comment goes to the last major activity where the writer judges the reviewer’s proposed change.

*Judge the Proposed Change*

At this point in the reception of a review comment, the writer has skimmed her text, read the comment, re-read the text, decided the reviewer had competence with the particular issue, and judged that the identified problem was worth attending to. If the reviewer has offered a revision and/or explanation, the writer at this stage assesses the suggestions. As mentioned before, a common way to explore the effectiveness of PR is by calculating the adoption rate of review comments, whether it is the adoption of a reformulation or the altering of a text to conform to an explanation or suggestion. Considering the number of alternative paths a review comment could have taken, adopting a comment happened a surprisingly high percentage of the time (41 percent) according to the case studies.
The comments that the participants said they adopted were ideas or facts that the writers felt they should already have known, for example words they had earlier been unfamiliar with, overuse of favorite phrases, and difficult sentence constructions that confused the reader (7.2.1.3). They also claimed to use comments described as new information, such as rhetorical practices that strengthened their texts or scientific practices that their peer reviewer was more familiar with 7.2.1.2). This claim to use comments about new information is supported by findings in other research, as well (Tuzi, 2004).

An alternative to adopting the review comment is that the writer agrees with the reviewer that a problem exists, but in scrutinizing the reformulation or the explanation, the writer makes her own change, as reflected in the category of “third actions.” These kinds of revisions have been found to be far more common in texts reviewed by peers, as peer comments are more likely to mediate constructs within the peer writer’s ZPD (M. Yang et al., 2006). In the current findings, these actions constitute about a fourth of the writers’ responses to PR. The case studies suggested that such third-action revisions were often connected with the structure of the text, this being at the inter-sentence, paragraph and text levels. Third action revisions also included writers’ cherry-picking from reviewers’ reformulations. This buffet-style selection of reviewers’ reformulations reflects a kind of revision that runs somewhat counter to participants’ proclaimed love for reformulations. Reformulations were rarely used as given, but were instead used as clues about the problem. Writers then found their own solutions, occasionally pilfering from the reviewer’s solution.

This last step in the reception of review comments addresses an issue that is often explored in peer feedback studies, namely, what do receivers do with PR that may be misleading or even incorrect. The findings of studies three and four painted a picture of the receivers as not easily misled by unhelpful commentary. Though the writers claimed to be annoyed and sometimes distracted with reviewers’ occasionally poor editing comments, writers seemed to easily dismiss them (7.2.2.3), a finding supported by some research on peer review (Hedgcock & Lefkowitz, 1992; Paulus, 1999; M. Yang et al., 2006). Furthermore, review comments of a more substantial nature that were seen by the writers as wrong were described as benign. Writers either rejected the comments decisively, for example when they had already struggled with a particular construct (7.2.2.1), or they rejected comments hesitantly, leaving open the possibility that the particular issue at hand may be problematic and worth future investigation.

This is a different picture of receivers’ activities as compared with studies that look at more novice L2 writers, where writers often lost control over their own text changes in the presence of strong reviewers (Villamil & De Guerrero, 1996). In the
current studies, unhelpful comments did not seem to create a burden for the receivers of review. Writers described unhelpful peer review comments as being less bothersome than when a supervisor or instructor gave them such comments, a theme that is also discussed in Hyland’s research concerning L2 writers’ attitudes toward instructor feedback (F. Hyland, 2000). Unexpectedly, some of the participants even described the incorrect comments as helpful, as they provided some other kind of information to the writers.

9.2.2 Revisiting Participants’ Descriptions of Reception
The above description of receivers’ activities associated with PR captures much of what was found in studies three and four. There are also a few over-arching themes concerning PR reception that can inform the peer review field more generally.

Modifying our Assumptions of What Receivers Do

Peer review is commonly described in earlier research as being a form of dialogue between the reviewer and the writer (GUERRERO & Villamil, 1994). This can be inferred from the numerous peer review studies that explore the impact of the PR activity by comparing the comments the participant received with the comments the receiver used (Kamimura, 2006; Jianguo Liu et al., 2002; Paulus, 1999; Tsui & Ng, 2000; Villamil & De Guerrero, 1998) or studies that compare valid review comments given with those used by the writer (Hu & Lam, 2010; Min, 2006). This manner of measuring suggests that success in the PR activity is at least partly identifiable by measuring the extent to which the receiver addresses the reader’s concerns. The writer/receiver is considered to be in a kind of conversation with the reader/reviewer, responding to the review in a way that is connected to the ideas of the comments. However, the description of PR reception derived from studies three and four does not paint a picture of a dialogic activity to the extent that much research suggests.

Numerical proportions pulled from study four reflect a curious picture of the three participants’ responses to comments given. Of 220 review comments given, about 70 appeared to be ignored, 90 accepted, and 60 led to changes other than what was suggested by the reviewer. If we define the success of PR by measuring the comments writers accepted as compared with what they received, the PR activity does not seem very effective with only 40 percent of the comments adopted. In a study with comparable EFL populations at graduate level, Hu and Lam (2010) found students used 76 percent of PR comments, and in undergraduate EFL studies, figures of adoption were 61% in a Chinese group (M. Yang et al., 2006), 74 percent for a Puerto Rican group (Villamil & De Guerrero, 1998), and 94 percent in a Japanese group (Kamimura, 2006).
Receivers sometimes responded to review comments in a way that could be considered dialogical, but more often they used review comments as springboards to other writing tasks, they cherry-picked bits of reformulations, and they removed sections of their texts that contained too many PR comments. This description of writers’ apparent disregard of the dialogical nature of PR can be interpreted in a more positive way, however, if the focus is instead shifted to what the writers are doing after receiving peer review.

As seen from another perspective, an uncountable amount of self-initiated changes in study four occurred that seemed unconnected to review comments. Such self-initiated revisions are found in other studies as well. In findings by Paulus (1999) 52 percent of the revisions students made after receiving PR was introduced by the writers themselves, in Tuzi (2004), 42 percent; in Lee (1997), 40 percent; in Villamil and deGuerrero (1998), 39 percent; and in Mendonca and Johnson (1994) 37 percent. These high numbers of self-initiated changes could be inspired by writers re-reading their own texts, by writers not fully understanding a comment, by writers not fully agreeing with the reviewer’s identified problem, or by not agreeing with the proposed solution. Rather than seeing PR as primarily an activity of the writer responding to the ideas of the reviewer, PR should perhaps be seen as a form of motivation for continued writing and re-writing.

This perspective is supported in study four by the disproportionate response that writers often had to review comments. For example, Roger made extensive revisions and additions in response to all types of PR comments, inspired to make changes even in response to “incorrect” comments. Such was the case also for Louise when she received few comments and less helpful comments. In the interview, Louise contended that writing in English was not problematic for her so long as she knew what she was going to say. This same writer doubled her text output in three documents between the first and second draft, suggesting that working through a draft with PR inspired the writer to know what she needed to say. Comments inspired the doctoral students to write more, a conclusion that is similar to findings from other research on PR (Berg, 1999; Villamil & De Guerrero, 1998), particularly for those who are more proficient writers (Kamimura, 2006).

There is another way that the receivers’ activities can be interpreted that focuses more on what they are doing rather than what they are not doing. As mentioned, frequently there seemed to be an absent match-up between review comment and revision type. Another explanation for this is that writers had favorite strategies for fixing problems, and when their favorite strategy could potentially work, that is what they used. This interpretation is suggested by the participants’ text changes and their oral descriptions of their revising. The writer has a couple tools she uses to fix texts, and even if the reviewer hands her a screwdriver, she will try to fix it
with the hammer, since she knows she is good with a hammer. Here again we see the review comment as being utilized rather than used. The PR seemed to serve as a way for the writer to look at the given section of the text with new eyes, but the interpretation of the problem belonged to the writer, as did the choice of repair tools (8.2.1.1 & 8.2.2.5). The reviewers can be seen as having scaffolded the writers’ learning by enhancing the writers’ noticing, but the scaffolding only occasionally included the reviewers’ solutions.

In summary, though writers in the SLU group seemed to not respond in an expected dialogical manner with reviewers, they did use PR to inspire extensive revising, rewriting, and writing.

**Peer Reviewers as one of many helpers**

Receivers of review described in their interviews how they would turn to other individuals outside the class for advice, assistance and opinions as connected to a review comment. Outside helpers included office mates, native English speakers in the building, colleagues within their discipline or within their research practice, supervisors, co-authors, friends, partners, and other doctoral students outside of the class (8.2.2.4 & 8.2.31). In investigation four this action was particularly apparent in Irene, who turned to co-authors concerning specific lexicon, to native speakers about questions of register, and to the content specialist about issues concerning her literature review, her theory section and her outlines. When Louise received multiple rounds of sub-standard PR from classmates, she turned to a peer who she knew would ambitiously review one of her texts. This seeking out of other helpers can be seen as engagement in the review process. The reviewer points to a problem and the receiver acts. This description is supported by the early PR studies that showed how writers’ revisions were supplemented by feedback that they obtained outside of the class environment. In the study by Paulus (1999), 52% of the writers’ revisions came from sources outside the teacher and peers, while in the study by Connor and Asanevage (1994), 60% came from outside sources. In Hyland’s more intimate exploration of students’ use of PR, she found a number of students who relied on those from outside the ESL class, despite the teacher’s suggestion to not use such outsiders (F. Hyland, 2000).

Seeking help from multiple sources can be understood within the framework of *individual network of practice*, a construct described in detail by Zappa-Hollman and Duff (2015) in their case study of Mexican university students studying in Canada. Drawing on the ideas from Social Network Theory which contends that learning is primarily a product of negotiation and mediation, the concept of *individual network of practice* further defines the entity of the negotiations and mediations to be comprised of multiple nodes of social ties, even those that are
weak and distant. Zappa-Hollman and Duff differentiate the construct of *individual network of practice* from Lave and Wenger’s (1991) Communities of Practice in that the latter describes a more formalized set of relationships that are defined by mutual engagement. In contrast, an individual network of practice places the learner at the center of the many clusters he or she has developed in order to obtain affective and academic support (Zappa-Hollman & Duff, 2015).

Similar to the Mexican students who were able to accomplish course-specific literacy practices through informal interactions with networks of fellow novices (Zappa-Hollman & Duff, 2015), the participants in the current studies sought and received help from their social networks. Seen from this perspective, PR is one of many of the writers’ sources of negotiation to learn the discourse features of their RA genres. PR served to initiate questions that the writers may not otherwise have grappled with. That they attempted to get help on those questions from their individual network of practice is seen here as a positive aspect of the PR activity.

**PR as an Enhancer of the Writers’ Identities**

An earlier section of this thesis described the ways that participants’ review practices were influenced by roles they adopted during the PR activity (6.2.3). As reviewers, participants described the ways they actively adopted roles in order to conduct certain aspects of the review task. Roles used were not apparent in the same way when participants were in the role of receiver. Instead receivers described roles to buttress decisions already made (7.2.3.2). To understand this better, it is worth considering again how the role of receiver is unique.

Receiving peer review for graduate students has been found to be anxiety producing even after multiple rounds of reception (Caffarella & Barnett, 2000). In comparison to giving review, the receiver has exposed himself to critique, essentially handing over a text that reflects how he thinks, how he works, how he navigates a high stakes genre, and how he expresses himself in a foreign language.

In the current research, a defense used by the receiver appeared to be his or her writer identity. Writers described how review comments could strengthen their resolve to claim ownership over their texts. For example, writers defended their choices of syntax and lexicon with reference to their identities as member of particular L1 communities (8.8.8.3). In the case study of Irene, she described how she prided herself on her ability to create long, coherent sentences that she perceived as beautiful, even though she often revised them for the sake of L2 readers. She retained Latinate words that pleased her, noting that such words were good words. Rejecting some PR was a way to announce that her culturally-based English was as good as Swedes’ culturally-based English.
Another form of writer identity that seemed to be enhanced by PR was the participants’ disciplinary writing identities. Participants described their reception of review comments as moments where they were highly aware of the reviewer’s background. A very good reviewer could still give misleading advice because of her disciplinary background (7.2.2.1). Receiving critique from reviewers whose disciplines differed created a scenario where the receiver was forced to ask herself “is this what we do in my field?” This amplifying of a writer’s disciplinary identity as a result of negotiation with a peer has been highlighted in earlier research (Zappa-Hollman & Duff, 2015).

Another way that participants’ writer identities were strengthened with PR relates to their option of taking or leaving a peer’s suggestion. In the insecure condition of turning over one’s text to a peer and exposing weaknesses, a receiver nevertheless has the option of rejecting what he does not like (8.2.1.3). Because there are no retributions associated with rejecting a peer’s comments, a writer is in the position to safely judge comments, being the ultimate decider. Conclusions drawn from earlier studies reflect this situation, where receiving PR can enhance writers’ feelings of ownership over their texts (Levine et al., 2002; Tsui & Ng, 2000). The importance of this was made clear in the interviews with Roger, who claimed that his identity as a research writer was strengthened by PR because he could ultimately write his text as he pleased. Where writing his sentences to please his supervisor had clearly burdened him, writing freely in response to PR seemed to be a practice of his rights. Such a description is supported by an area of research described by Hyland (2000) concerning the appropriation of writers’ texts by those in positions of power. Hyland describes a body of feedback research that suggests that students’ cognitive growth and writing skills can be hindered when they respond to teachers’ feedback in ways to simply appease the teachers (Hyland, 2000). L2 writers feel more in control over decisions connected to peer comments than instructor comments (Mendonca & Johnson, 1994).

In summary, responding to PR gave participants opportunities to develop their writer identities in connection to their unique combination of languages, their disciplines, and their personal preferences. This observation was built upon limited data, but it may serve as a starting point for future research.
9.2.3 Learning and the Activities of Receivers

A primary goal of this dissertation was to better understand the way PR might facilitate the learning of the RA genre for the doctoral students. This section discusses findings from studies three and four from a perspective of learning. Receivers’ activities will be interpreted through Vygotsky’s constructs that were described in chapter three (3.3.1). Specifically, I focus on the ways the receivers’ actions assist and hinder their negotiations with the discourse specificity of the RA genre.

Mediation of constructs as receivers of review was evidenced in a number of ways. The form of mediation that is the most anticipated type is in the interactions where the receiver adopts the reviewer’s advice. For example, the reviewer tells the writer to not use synonyms for a key word, and the writer then replaces the synonym with a keyword. Such an action is considered here as evidence of mediation of that particular construct, the construct being, use key words and consistent terminology- avoid synonyms. If the writer then switches other synonyms back to keywords in the remainder of the text, this is further indication of mediation. The writer has internalized the rule and applied it to the rest of the text. When the receiver later says in an interview that comments about keywords are those she remembers, then it is even more convincing that mediation has taken place because she has put words to her rule. Another convincing form of evidence that constructs have been mediated is when the receiver of review uses the name of the problem that the reviewer has used. In the above example, a receiver would not simply describe that she stopped using a thesaurus, but instead would explain the change using the vocabulary of the rule that had been provided, saying something like “I stopped using synonyms when I had the right keyword.” In this scenario, the receiver was not only exposed to a type of problem that may occur in her text, but she was given the vocabulary with which to talk about that issue.

Some kinds of review comments are more difficult to connect with a receiver’s learning because of the nature of the comment. For example, with comment types that happen quite seldom, such as a receiver being provided with a new outline for the entire section, mediation was identified primarily through the interviews when the participant spontaneously talked about such review comments. Another difficult comment to establish as evidence of mediation was that where a reviewer’s comment was not adopted, but was a source of another kind of change. In these instances, the sentence or text section that was commented upon was indeed the text that the receiver re-worked. However, the type of response was not what was suggested by the reviewer. In these instances, what seems to be mediated was information that the reader was confused or that the text was failing the reader in some way. It is possible to see that the writer’s understanding of the text was
affected in some way by the review comment, but it was not possible to categorize what may have been mediated.

The next sections will describe some of the receivers’ activities that appeared to enhance or constrain mediation.

*Constraining Mediation through Poor Triage*

One constraint to mediation of constructs was an attitude that discouraged attention to all possible comments. Those receivers who claimed to pay more attention to particular reviewers assumedly paid less attention to others (7.2.2.2). Use of peer review given by students who writers distrust is an issue that has been explored in other research since it is seen to be problematic. Some research concludes that receivers ignore such review (Tsui & Ng, 2000), particularly if they are less experienced in academia or in writing (Liou & Peng, 2009). Other research has found that receivers use the review even when they distrust the reviewer (Hu & Lam, 2010; Strijbos et al., 2010), so the picture is not tidy.

Nevertheless, having a dismissive attitude concerning certain reviewers’ comments was probably not a good learning strategy. A receiver who chooses away reviewers will limit her exposure to comment types and miss comments that are potentially insightful. For example, a number of writers assumed that the peer who was less competent in English would likely not have helpful comments regarding other areas of review, such as discipline-specific vocabulary, organization, or scientific analysis (7.2.2.2). However, neither I nor the content specialist observed that the weaker English users are less astute in giving review, though they may have less varied language to express their review comments.

Another problem with discounting particular types of reviewers is that a firm understanding of the readership may also be hindered. Because English is the language used for L2 scientists around the world, L2 reviewers may actually provide a particular form of review that represents a part of the readership. If average L2 science readers repeatedly get lost at a particular paragraph, it should be worth the writer’s while to attend to that paragraph. Writing for the native English reader is arguably an easier task, since the reader brings more to the interaction and can decipher difficult text. In summary, if the goal is to learn to write as clearly and precisely as possible, then value can be found in the comments of the struggling reader who is actually providing a different kind of test for the text.
Enhancing Mediation with Mindful Processing

Some activities appear to enhance receivers’ learning, one of which is mindful processing. Mindful processing can be seen as a quality of the reception activities rather than a particular step in the reception. As described by Lantolf and Thorne (2006), learning results from people’s interactions with cultural, linguistic and historically formed settings. To expand their thoughts, people construct relationships between otherwise separate phenomena by comparing, evaluating, remembering and attending to new information. However, according to Sociocultural Theory, for this expansion of thoughts to occur, learner-initiated activity is required. For receivers of PR, mediation is affected by the concentrated efforts that they give to the activities of interpreting, comparing, second-guessing oneself, and following up on hunches.

The quality of mindful processing was primarily described by participants in terms of the time it took to understand review comments (7.2.1.1). Participants explained how they needed to slow down and carefully analyze review comments in order to “see” what was being suggested. This grappling is considered to be the most important element of mediation of new ideas via PR (Poulos & Mahony, 2008; Strijbos et al., 2010) and is associated with those who have more experience receiving PR (Min, 2005).

Mindful processing can be seen in the examples of what receivers do with half-formed comments (7.2.2.4). Though some reviewers claimed in their interviews to not use comments that had insufficient information, the revisions in study four showed how the three participants in the case study used them. PR provided hints to these writers about how the reader had understood the story of the research as told thus far. A simple mark from the reviewer could act as a pointer of failed communication that said this is not clear to me.

Receivers claimed to dislike indirect comments, a finding supported by other PR studies (Min, 2005; Tsui & Ng, 2000). Wanting to know why the reader needs the change is a plea for understanding how the text currently sounds to an outsider. One interpretation of their negative attitudes about indirect comments is that it takes more effort to try to understand what was being communicated. The writer who mindfully attended to such comments rather than dismiss them had to engage herself in the task at a higher level. This very engagement in the task of interpretation has been found to benefit students’ long term changes in their writing, to the degree that one study even suggested that indirect feedback was more beneficial to student writers since it forced them to apply themselves (N. S. G. Wigglesworth, 2010). This is a clear example of learner-initiated activity that results in mediation.
The importance of mindful processing to the process of learning seems particularly important in the act of receiving review and may help explain why review comments seemed often to act more like clues than directions. It is the detective who will benefit from such comments. The practice of mindful detective work seems to be at work as well regarding the reception of reformulation since reformulation was rarely accepted as given. Writers often changed their texts in response to reformulation, using what was provided as clues. This conclusion is supported by previous research that found that PR receivers more often used comments to initiate their own revisions of various kinds (M. Yang et al., 2006). The practice of seeming to only need clues regarding text problems is also supported by research findings where recipients of review who had strong writing skills were not helped more by comments that were more detailed, even though they claimed to prefer such detailed feedback (Gielen, Peeters, Dochy, Onghena, & Struyven, 2010; Strijbos et al., 2010).

In light of this interpretation, it is possible to say that receivers who were willing to perceive review comments as clues rather than directions were in better positions to mediate constructs. The receiver reads the comment and asks herself What can they mean by this? In asking this question, the receiver looks wider for possibilities than she would had she only absorbed the comment in its most obvious form or even dismissed a comment because of its insufficient explanation. This detective work was described clearly by Louise when she explained why she preferred written review over face-to-face (8.2.3.3). In written review, she was forced to explore why the reviewer may have become lost based on the clues given. She explained that if the review had been face-to-face, she could simply have asked the reviewer for more information, but once she heard their response the detective work would have been done, and the interaction may not have provided as good an answer as her own. I suggest here that these are examples of mindful processing, where the writer takes in outside information and transforms it to her own.

More opportunities for mediation

There were a couple activities that participants described that resulted in more opportunities for writers to interact with the review comments. One of these activities was their efforts to empathize with the L2 reader and to make text changes that would facilitate the readers’ experiences. Interviews showed that most writers were willing to alter their texts when they perceived that the reviewers’ comments reflected confusion (7.2.1.1). Furthermore, in study four, text changes showed that the three participants responded to any suggestion that their text was too hard. This willingness to change their texts for the sake of the reader was particularly evident when it concerned issues that writers were otherwise reluctant to alter. For example, in study four we see that Roger rejected
C&O comments unless such changes had been suggested by a reviewer who claimed to be confused. In contrast, he did not accept such suggestions if they concerned the reviewer’s ideas about normative expectations. Concern for the reader essentially encouraged writers to consider a wider set of review comments.

In light of this, it seems reasonable to suggest that writers’ empathy for the readers’ experiences will result in attention to more review comments. What form of mediation is occurring in the situation where the writer empathizes with the reader’s experience? What is arguably mediated is the reader’s experience of the writer’s text. In turn, a writer who analyzes and classifies the patterns of comments he receives concerning readers’ experience of his texts can then become aware of his own tendencies. An example of this is seen in the writer who described how he regularly received comments about over-writing (7.3.1), and in fact relied on readers to point out where they were confused. His insight about over-writing was made possible due to numerous readers who had informed him of their experience in reading his overwritten texts, and due to his willingness to care what they thought.

Other activities that likely extended the opportunities for writers’ learning were seen in studies three and four as connected to comments that appeared to be ignored, but sometimes reflected hidden activities where mediation was taking place.

Writers discussed how they collected comments they were unsure about. When another review comment addressed the same issue, the problem rose higher and higher in status until the writer decided the issue was noteworthy. This finding is apparent in a recent study where of numerous features studied as potential impacts on feedback uptake, one of the most important was receiving the same feedback from multiple peers (Leijen & Leontjeva, 2012). An idea is exposed to the learner, whereby he begins to pay more attention to that idea, comparing and evaluating it for its worth. If the learner judges the idea positively, he begins to internalize the idea. This is a clear description of mediation, where the writer’s knowledge of a particular construct moves from “barely knowing” to eventually “really knowing” as a result of the learner’s goals and her available resources (Aljaafreh & Lantolf, 1994). According to Vygotsky (1978), the interpersonal process becomes intrapersonal as a result of a series of mediating events.

Another receiver strategy for attending to potentially relevant comments was to actively investigate the issues addressed by the reviewer. Participants described how they sought second opinions from colleagues, native English speakers, other instructors, and even their supervisors. They searched artifacts for confirmation of their own text choice, for example searching model texts, corpus sites, style
manuals, and textbooks. The form of mediation that occurs as a result of these pro-active strategies is of the same type as described in the previous paragraph; however, here the receivers actions were not to only remember the ideas that the reviewer scaffolded, but to actively seek mediating events that will hasten the internalization. Such investigations were possibly the most student-directed, active form of mediation that occurred in these studies about the receivers. In conclusion, writers appeared to have more opportunities to learn if the empathized with the reader, if they tracked past comments that they were grappling with, and if they investigated comments they were unsure of.

Summary

Learning from the peer review activity seemed to take place for receivers when they processed the comments slowly and mindfully. Mediation was also enhanced when receivers empathized with the reader to understand where he became confused. Saving comments for future consideration benefited learning, as did investigating comments that were questionable. Perceiving review comments as clues rather than directions allowed for more active engagement with constructs. A practice that disadvantaged mediation was the rejection of a reviewer’s comments due to rejection of the reviewer.

9.3 Peer Review Activities and Genre Focus

This research explored the ways that PR might mediate the learning of the RA genre as indicated by attention to features of the RA. The primary goal of the PR activity in the course used in this study was for the participants to develop a clearer understanding of the genre of research articles. To locate the instances of genre specific commenting and writers’ use of such review comments, it was first necessary to define the features of the RA. Features were investigated through a survey of sources which resulted in the description in chapter four. The description was then used to identify students’ focus on the RA for all four studies. In this section of the discussion, the findings from the studies are summarized regarding issues of genre mediation. The findings are arranged according to the thematic categories that were inductively constructed in study one, since this arrangement is based on what they did do.

9.3.1 Coherence and Order

The studies that explored participants’ activities in the PR activity showed considerable evidence of the participants’ focus upon the organization of the text and awareness of the IMRD structure. As described in the investigation of the RA genre, organization is a tool for both cohesion and argumentation. The reader has expectations that pertain to the way the text is divided and ordered, and expectations of what will be found in each of the sections (Day, 2011; Paradis &
Zimmerman, 2002). These expectations are embodied in variations of the IMRD which lends the text its uniformity, conciseness and ease of comprehension. For the writer, the IMRD order supports the actual writing of the texts (J. Swales, 1990), it guides choices to show membership in one’s discourse community (Russell, 1997a), and it provides stable patterns the writer can use to argue her/his claims (Pérez-Llantada, 2012).

Beginning with the premise that rhetorical order of text moves can be learned, it is here argued that noticing, negotiating, hypothesizing and languaging alternative rhetorical patterns will mediate learning of variations of RA’s rhetorical structure. If languaging of alternative rhetorical forms is considered indication of these mentioned cognitive activities, then it is possible to say that participants’ use of PR mediates the learning of organizational patterns of the RA genre. This is clear when we look at the findings from the various explorations conducted in this dissertation.

Mediation of RA organization is apparent in the first study where the doctoral students’ given comments were classified. There it was shown that 24 percent of the comments were built on underlying expectations of text organization and cohesion as identified in chapter four. Within this 24 percent of the comments, reviewers focused primarily on the text level, giving advice on ways to restructure texts and creating outlines for their peers. They recommended major re-ordering to more tightly conform to rhetorical moves that would be expected by the readers. In a study of Japanese students of English, Kamimura (2006) found similar results, where about 35 percent of the comments of the more proficient group fell into the category of C&O (unity, order, division, coherence) while her less proficient group gave only about 10 percent of such comments. Participants in study one also pointed out missing information and unnecessary information that misled the reader, a finding similar to what Caulk (1994) found in her German undergraduates.

From the perspective of discourse familiarization, the focus on organization and emphasis is promising. Though the genre of research articles has what can be seen as a prescribed rhetorical order (IMRD), ordering information in anticipation of what a reader may need requires that writers make choices at every turn, even though the main structure is set. Writers need feedback from readers who are familiar with the RA moves in the IMRD form, even if the moves do vary among disciplines. Furthermore, according to Vygotskian learning theory, reviewers themselves benefit from focusing upon rhetorical strategies and organization of the texts. Practiced focus on rhetorical and organizational issues mediates these constructs for the reviewer, where the reviewer can then apply such knowledge to her own texts. This was demonstrated in Lundstrom and Baker’s study (2009) on
the benefits of L2 peer review that showed how students transferred knowledge about text organization and cohesion to their own writing.

Study one showed that the variability of moves within IMRD did not dissuade the reviewer from languaging alternatives to the writer’s order, and thereby questioning what seems most effective. In their attempts to improve their peers’ texts, reviewers used their content knowledge to understand the activities of the science being presented, and they used their rhetorical knowledge to understand the options available to the writer. The options presented by the reviewers reflected those options that the reviewer has noticed in RA texts. The following C&O comment illustrates this:

*I think I would have started the intro with --Nitrogen is a key nutrient that limits the growth of plants.--Then I would have explained about the Nitrogen deposition.*

In this typical C&O comment, the reviewer wants the writer to back the story up to the larger known construct about the effect of nitrogen on plants. After the larger picture is established, the more precise topic of nitrogen deposition can be introduced. How far to back up a story for the reader is a rhetorical choice the writer must make, and the decision is based on her understanding of the readers’ knowledge. In the above example, the reviewer wants a wider starting point than nitrogen deposition, and understands that RA introductions give the writer the choice of the starting point, as was described in chapter four (4.3.3).

Another aspect of order that was addressed in reviewers’ comments concerned the influence that text order and information placement has on what the reader notices. As described in chapter four, key information should be placed in rhetorically powerful positions, a strategy understood by the reviewer who wrote *Maybe you could think about presenting your result first rather than the previous findings.* Here the comment suggests that the reviewer is aware of the power of information placement in the Discussion section, and wants the writer to emphasize her own results before contextualizing them.

In summary, reviewers’ comments focused on both rhetorical order and emphasis as connected to RA features. Furthermore, the results from study one showed that reviewers noticed larger patterns that were problematic in texts, often re-ordering large chunks of the text for the writer. These suggestions required a keen understanding of the content of the texts and also a substantial amount of ambition to produce such comments. These findings contradict some research that finds that L2 reviewers focus little on global issues of text order (Crookes, 1994; Hu & Lam, 2010; W.-C. Lin & Yang, 2011; Villamil & De Guerrero, 1998; Zhu, 2001). For example, one study on Chinese graduate students who were trained in PR,
researchers found that out of 240 comments given in their PR sample, only 13 focused on organization (Hu & Lam, 2010). However, other research has found that L2 reviewers do focus on organization, particularly when participants have opportunities to negotiate back and forth with one another, whether FtoF or online in a synchronous condition (Ching-Fen Chang, 2012; Hedgcock & Lefkowitz, 1992; Jones et al., 2006; Kamimura, 2006; Liang, 2010). There are instances as well where reviewers were found to focus on issues of text order when using asynchronous PR (Tuzzi, 2004), a condition similar to that in this dissertation.

The reviewers in study one gave a high number of organizational comments in comparison to participants from other studies. This may be explained by some of the reviewers’ strong English, which may have influenced the overall number of such comments. Strong L2 skills is a factor that some researchers have found to influence the provision of comments on unity, coherence, order and logical division (Kamimura, 2006; Villamil & De Guerrero, 1996). One observation that speaks against this explanation in the current research is that the one bilingual reviewer gave hardly any C&O comments, even though English was one of her languages and she commented above average amounts.

It may be that the current group of students were able to comment more on C&O because of their heightened awareness of the IMRD requirements that were discussed in the lectures. This familiarity with the rhetorical expectations would likely give the reviewers an advantage in noticing problems in order and emphasis. Lack of familiarity of rhetorical forms is precisely the issue Leki (1990) identifies when explaining L2 writers’ lack of C&O focus. Whereas some PR groups may have different cultural traditions that can confuse writers about rhetorical expectations, the current group had a more unified view of the text.

Providing organizational comments was described by participants in study two as being exceptionally difficult to give, and very time consuming (6.3.2.1). Commenting on organization requires that the reviewer re-read the text to reassure himself that he indeed had not misread cues or misunderstood the organizational structure up to that point. They described how they had to compare alternative orders that could more closely reflect a reader’s anticipated order as seen in the moves connected to the IMRD form. The languaging was also described as more time consuming, which was confirmed in the scrutiny of the texts. Rather than using the review bubbles in the margin, organizational comments were typically placed at the beginning or end of the text in the main document where the reviewer could create alternative outlines. Reviewers pointed out that they had to decide to focus on such issues, because awareness of organization was not “automatic.” Reviewers described that focusing on organization was extra challenging because of having to follow the text in an L2.
Cohesion and Organizational comments were also addressed by receivers of review. They described organization and rhetorical decisions as being the most difficult part of creating a text. They claim to struggle with jumps, gaps, confusing order and extraneous information, explaining that they cannot see these things themselves (7.3.1.1). Writers described themselves as being dependent on reviewers to identify such problems. From an L2 perspective, this kind of feedback may be particularly valuable to the writer because of the limitations brought about by writing in an L2. This is confirmed in work by Chaudron (1984) who claimed that such comments are likely the most helpful kind that L2 writers can receive. As one participant described, the text is often constructed “one sentence at a time,” where the writer risks losing the storyline.

Participants also described the difficulty of interpreting C&O comments, how they must slow down and make special efforts to understand what is being suggested since the problems being discussed were earlier invisible to the writer. These descriptions of receiving C&O review comments and trying to find meaning in them fit the definition of scaffolding. The writer is primed to understand the ways in which his text might not work for the reader, but he cannot achieve this on his own. The writers describe this kind of help as “seeing what I cannot see.” As a result, comments were often inspirational for the writer, where participants claimed that the C&O comments could catalyze multiple revisions, even entire reorderings (7.3.1.1).

Two other findings about organizational comments arose in study three. Writers sometimes rejected C&O comments with enthusiasm when a writer claimed to already have thought about the order. A writer who has thought carefully about her text order and who receives a comment about a suggested change to the order will not seem to consider the change unless the suggestion is motivated by the reader’s confusion. An unanticipated finding connected to C&O comments concerned writers’ trawling for help, where they intentionally left particular issues unresolved, or where they worked particularly hard on an area in the text and used the reviewer to change or reconfirm the choices the writer made. This search for help was related to issues of text order in each of the descriptions. The writers either hoped for help from the reviewer to better organize the text, or they looked for confirmation that the organization they had chosen worked well for the reader.

Findings from study four showed that all three participants used C&O comments in similar ways. Though both Irene and Roger seemed to reject a high number of C&O comments (40%), the kinds of rejected comments were in both cases about removal of text that could have made the reading experience more difficult. Both Irene and Roger rejected any comment that made the texts more challenging. All three participants attended to comments about text order, where Roger and Louise
would make extensive changes, and Irene would seek out help from others in her field or rearrange directly. All three also accepted comments about text movement that would result in rhetorical strengthening of their own findings. Both Irene and Louise reworked graphs, diagrams and tables on the suggestions of reviewers. The extensiveness of the changes is not adequately measured by counting.

What may impact the writers when they do not use the suggested C&O comments is that they are already cognizant of the qualities of a well-ordered, cohesive text. The three participants described in their personal writing histories that they felt confident about their ability to write cohesive, well-ordered texts in their L1s. All considered themselves to be strong writers. Interestingly, all three described C&O comments as being the most important kind of comments they received, even Irene, who claimed in contradiction that she received few such comments. The reason the C&O comments were so important to these otherwise confident L1 writers was connected to the newness of the writing task and the constraint of writing in English. As Roger described it, he does not feel he has the “physical memory” to compose well in English as he does in his L1. It may be then, that the writers cannot find their own text sections that are unclear, but if pointed out, the writers can fix the problems.

Using C&O comments effectively in revisions has not been described in many studies that I have been able to find. In a study of graduate students in business who participated in PR after receiving training, researchers found that the writers texts improved in all areas that were investigated, but text organization was the least impacted of the measured changes (Crossman & Kite, 2012). Villamil and De Guerrero (1998) also found that organization was the least attended to type of revision that the student writers made in response to PR. In another study, the organizational comments received by Chinese graduate students were considered to be of high quality, but the findings showed that they only used the valid organizational comments 50 percent of the time (Hu & Lam, 2010).

In conclusion, the participants’ focus upon Coherence and Order was a strong in all the ways measured in the studies, which is a positive finding since this focus is critical for nearing the RA genre, and it is the kind of text change that results in more positive change than any other kind of revision (Faigley & Witte, 1981; Min, 2006)

9.3.2 Precision
Precision was described in chapter four as one of the fundamental principles of research articles in the sciences, where specificity of terminology in particular is seen as a cornerstone of research articles. Precision is particularly important in the Materials and Methods section of the RA (4.2.4), where clarity, accuracy and
conciseness are emphasized. The appropriate kinds and amounts of detail are critical, as is the choice of details in the figures. Precision serves an argumentative purpose of convincing the discourse community that the research was conducted with exactitude and care. In the Results section, precision is emphasized regarding visual conventions, the use of standard terminology, the appropriate amount of detail in data displays, and the reliance on equations and graphs when possible. Precision is also emphasized by use of one-clause sentences with standard syntax (4.2.5).

Precision comments were the most frequent kind of comment given by reviewers according to findings in study one. Over 30 percent of all comments given focused on Precision, meaning over six comments per text on average. Most common were comments about inaccurate and imprecise words, including specialized discourse words. Key words and critical constructs were also in focus. When focusing upon lexical precision, reviewers pointed out words that were too abstract and could be more specific, they questioned the use of synonyms, they noted alternative uses of words that represent research activities, they pointed out inconsistencies in key words, and they highlighted when the writer used the same word for two different concepts. These findings suggest that the reviewers’ focus on lexicon is strongly influenced by their concern with discourse requirements.

Precision also included focus on syntax, where reviewers disambiguated complicated sentences, particularly regarding modifiers. In addition, reviewers were concerned with ambiguity that arose from wordiness, and often reformulated such sentences. These kinds of review comments also reflect understanding of the RA genre. In chapter four’s description, unambiguous sentence structure is emphasized in order to avoid any misinterpretation. Warnings abounded in the style guides and exercises were provided in numerous writing texts to highlight the importance of not confusing restrictive with non-restrictive clauses, of recognizing dangling participles, and of being wary of misplaced modifiers (4.3.1).

It is difficult to compare the category of precision with previous studies because word-level attention is often classified as issues of L2 lexicon or usage problems, and comments on sentence construction typically are seen as questions of grammar or cohesion. Studies often refer to “meaning-level” and “revision-oriented” changes, which often include aspects of Precision, but they also include content changes and organizational changes. In the current studies, precision in lexicon and syntax are questions of discipline-specific praxis and science writing constraints. Therefore, this category cannot be compared with most other PR studies.
Giving precision comments was described in study two as challenging in instances where members of the class had widely differing disciplines. Participants described their anxiety over providing the wrong advice concerning word choice since they did not want to be seen as ignorant. Some reviewer ideas about precision were not expressed in the texts because the reviewers felt that they fell in the language teacher’s purview, but according to the interviews, most of the time reviewers commented on what seemed questionable to them.

Study three explored the ways the writers described using peer review. In the interviews they explained that some kinds of review comments jolted them into new realizations, namely comments that lifted ideas that they felt they should have known previously (7.3.1.2). These high-impact review comments focused in particular on technical terminology or specialized use of common words, in other words, issues of lexical precision. I believe it is worth pointing out again that this was an inductively developed category, making it that much more salient. Participants were not explicitly asked what surprised them about received comments, but rather, they spontaneously disclosed that these lexical precision comments impacted them.

In study four of participants’ actual use of peer review comments, writers adopted precision comments as given more than other types of comments. Precision comments that writers consistently attended to were those that were informed by scientific writing praxis, for example, comments about key word consistency, warnings about misuse of lay terms that had special meaning in science, and cautions about overly burdened sentences where critical information was essentially buried.

Arguably as important as the number of precision comments used was the observation that writers’ self-initiated revisions concerning precision superseded all types of revisions by a 3:1 ratio, in essence, outnumbering all other kinds of self-initiated revisions combined. For example, Louise self-initiated a high number of precision revisions, more than the total number of such comments that she received. It is not possible to know here whether these self-initiated precision comments would have occurred as likely without having followed PR.

Participants did not appear to accept a fourth of the precision comments that they received, many of which were discipline-specific precision comments. In describing the ignored comments, receivers pointed out that judging precision comments was easy. For example, Irene used precision comments when they addressed words she had not yet decided about previously, and she “jumped over” comments when she had already made active decisions about the noted issue. In other words, the precision review comments seemed to mostly help and to not
hinder the writer in revising for more lexical clarity or in revising more extensively. Both Roger and Louise used or attended to almost all the precision comments they received to create rewrites, often adding more detail, finding better words, and making changes to the syntactic divisions of the sentences. Such modifications comprised a third of the comments that otherwise were seen to be unused.

Though these figures regarding adoption of comments only represent three participants’ revising activities, the studies in this thesis suggest that the participants focused a significant amount of the review comments and revisions and rewrites on the precision of the research texts. This strong focus on Precision is perhaps one of the most important findings of the dissertation, as it shows the ways that PR centers participants’ focus on a key feature of the genre of research articles in the sciences.

9.3.3 Voice and Stance
Voice and Stance in chapter four is described in reference to principles about objectivity, argumentation and conciseness (4.3.3). A writer’s job is to convince the reader of the reliability and worth of the research conducted, but should not taunt fellow researchers or waste the reader’s time. Text sections where V&S are particularly salient are the introduction and the discussion sections (4.2.3), where a writer’s challenge is to promote her own work while still maintaining group membership. For example, to argue a case for one’s research, a writer must clearly claim the new findings and persuade the readers to accept them but at the same time, to keep an objective-sounding voice that appears to maintain an air of distance. Some of the tools used to promote one’s work include epistemic modality, meta-discourse, and phrases that infer relationships. Researchers also use boosting to promote their work, and tame these statements with hedging in order to appear objective and to not insult the work of discourse colleagues (4.2.6). The category that reflects these issues in the current work is that which is labeled Voice & Stance.

In study one, V&S made up about 17 percent of the comments that reviewers gave, meaning about three comments per text. Such comments primarily focused on two continua: formal to informal voice, and high to low visibility, this latter continuum often including issues of stance. These continua reflect two key rhetorical tasks implicit in research writing in the natural sciences, as summarized in chapter four, tasks that are hard to balance: one, to write in a way that assures you maintain group membership, and two, to argue that your work is important. The question of formality and informality relates to group membership, and is therefore partly dictated by the discourse community of the individual class participant. But issues of formality are also driven by the attitudes of the individual doctoral student regarding status and cultural traditions.
It is perhaps understandable that disagreements about formality flourished in the review comments. Particularly prevalent were PR comments about stance, where reviewers would in some cases encourage writers to be more self-effacing and humble, and other times encourage boldness. Again, the first kind of advice prioritized “fitting in,” while the other advice prioritized self-promotion. In all cases, these pieces of advice can arguably be connected to important features of the RA genre.

Oddly, this type of comment was hardly ever brought up spontaneously in interviews for studies two and three. In fact, in one interview I explicitly pointed out to a participant a series of V&S comments that he had ignored as a receiver. He stated that he would never in his life have ever noticed or understood the significance of those comments. The other kind of reaction that arose regarding V&S was irritation with those reviewers whose English was not strong enough to make such judgments.

The limited focus surrounding V&S comments was also reflected in the investigation concerning revisions. About 70 percent of the received V&S comments was either not acted upon or was responded to with a third action. In other words, adoption of V&S comments as given was around 30 percent, which is low compared with adoption of Precision and C&O comments. Of those 30 percent, one kind of comment receivers often did accept from reviewers was advice regarding understatements. Reviewers would comment upon the weak constructions surrounding writers’ own results, and would encourage writers to sound more convincing. Such review comments were commonly adopted, for example changing overly weak modals in connection to claims. That the participants may be influenced concerning stance may reflect their status as doctoral students where they are in a hybrid role, not really students and not quite independent researchers. Negotiations about stance could also reflect the participants’ different epistemologies, their L1’s, or their past instruction in how to make a claim.

Where writers would use stance comments about boosting, they rarely used voice comments regarding formality and scientific sounding-ness. The participants’ different impressions concerning formality of voice may reflect the changing nature of the RA, where in some discourse communities the journals emphasize readability over formality. This seemed to affect the participants in the case studies, where all three participants judged comments about formality in the context of text clarity, believing that clarity was negatively affected by formality. At the same time, they did not either want to risk sounding casual and unscientific, so formality comments were not ignored. Rather, comments about informality and not sounding sufficiently scientific led writers to seek second opinions.
Voice comments also focused on text constructions that sounded foreign to the reviewer, whether the foreign sounding-ness was connected to another discipline or to language choices made by a writer with a different L1. The review comments were typically those described by reviewers as “strange sounding” and were often marked in an offhand manner with seemingly little reflection. Receivers of strange sounding comments typically ignored them.

Finally, from findings in study four it appeared that though writers did not accept a high number of V&S review comments, they did self-initiate more V&S revisions compared with most other categories. It may be that review focus influences these revisions in an indirect way.

In summary, Voice and Stance comments were not a main focus of review, nor were they typically accepted by the writers. Participants did not spontaneously discuss issues of voice and stance as reviewers or as receivers in the interviews. Interestingly, though, self-initiated V&S revisions were high, which may or may not be connected to the actual review activity. It does seem safe to say that these kinds of comments are less salient in the PR activity as mediators of the RA genre. I speculate that where C&O comments and Precision comments seem to not be negatively affected by the diverse backgrounds of the participants, it may be that V&S comments are less useful when the group is comprised of such different L1’s, cultural backgrounds, English language levels, disciplines and educational histories.

9.3.4 Research Knowledge
Research Knowledge comments are not explicitly a reflection of the genre as much as a focus on the activities of research. However, the interface between the research activities and the genre of RAs are tightly interwoven and therefore difficult to neatly classify. For example, comments that request justifications for and explanations of steps in the methods may reflect a focus on an essential step in the method design, or may reflect focus on argumentation to buttress the credibility of the study, or may reflect efforts to better conform to principles of precision. To disentangle the comments that strictly reflect the science from those that reflect the languaging of the science is not a fruitful activity. This is a position taken by other research, as well. For example, research that explores how PR can mediate knowledge within the subject area often includes the norms and writing conventions of the particular community (K. Hyland, 2013; Manchón, 2009). In an example of a study where lines are blurred between content and genre mediation, PR was explored as a means to improve the quality of the toxicology reports. The major units of analysis that served as indicators of improvement were writers’ content-related revisions in response to peer commentary (Trautmann,
In like fashion, comments about the research knowledge are judged here to benefit the mediation of the RA genre.

Peer Review is a critical literacy practice in scientific research. It is therefore not surprising that the participants would review one another’s texts as though they were reviewing for a journal. In more familiar terms, the L2 reviewers are focusing on content, a focus that other studies have also shown. For example, Anderson et al (2010) found in a comparison of L1 and L2 student reviewers online, that the L2 participants commented on content twice as often as they did on language issues. L2 reviewers have been found to focus on writers’ ideas (Lockhart & Ng, 1995; Suzuki, 2008), the writers’ arguments (Kamimura, 2006), and discipline-specific content (Ching-F Chang, 2009; Hu & Lam, 2010).

The category of Research Knowledge was reflected by the lowest percentage of comments given (13 percent), which is similar amounts given by Hu and Lam’s (2010) graduate students. In the current research, comments on scientific knowledge were more detailed and more extensive than other comments (average words per comment: Research Knowledge=20, Cohesion and Organization = 20; Voice and Stance = 11; Precision = 8; Correctness = 7). About 40 percent of the RK comments were hybrid comments where the emphasis was on RK, but precision, C&O, or V&S were also strong influences. The other 60 percent of the total RK comments more specifically questioned the decisions made by the researcher regarding the science, including criticism of the methodology, the reasoning, the validity of base knowledge and what constitutes evidence. These are issues that reviewers would be expected to attend to in scientific review.

One unexpected kind of given RK review was that which focused on missing information. Identifying what was not in their peers’ texts requires careful attention to meaning, sufficient background knowledge in the sciences, and an understanding of the RA genre. It may be that reviewers from diverse fields would focus on what is missing since they do not share the same disciplinary assumptions of common knowledge.

In study two, reviewers described RK comments as being particularly difficult to give since their peers came from unlike disciplines. The reviewers suspected they were often wrong and they felt they could not orient themselves within the texts. Some reviewers said that they refused to give comments to those whose disciplines were too different from their own. They said they jumped over questions of research in the texts, and defended this by noting that the content specialist was to attend to such issues (6.3.2.2). Other reviewers justified giving RK comments by profiling their roles as average scientific readers. This role allowed them to
comment upon their peers’ texts as generalists because they did not feel they had to be experts (6.3.3.1).

Reviewers also remarked about the difficulty of reviewing texts from other disciplines due to the difference in language use, rhetorical expectations, narrative voice and even syntax. Such difficulties can be interpreted as positive indications of reviewers’ awareness of differences in the written discourse, not only differences in the actual science (6.3.2.2).

In study three, writers who discussed the reception of RK comments described them as memorable, especially those comments that spurred a change in the writer’s thinking (7.3.1.2). Those instances where a comment was considered unhelpful, it was described as either easily dismissed or as set aside for further investigation (7.3.2.1). What writers did not describe regarding RK comments was being confused or haphazardly changing that which the reviewer recommended. In other words, as a group, the writers felt that RK comments were helpful and when they were not, they were easily ignored.

In the case study investigation where writers’ revisions were more closely explored, it became apparent that RK comments were most always utilized by the receiver, but use did not often include the solutions that were given. That writers so often considered reviewers’ RK comments was unanticipated since the participants came from such different fields, since they described being hesitant to give such comments, and since their review practices did indeed show that they gave proportionately few RK comments. Even one of the most hesitant givers of research knowledge comments was a writer who used such review comments. In fact, all three participants acted upon scientific knowledge comments, one adding substantially more detail and changing vocabulary, another reworking the text sections to remove ambiguity connected to the science, and the third contacting the content expert to check on issues that were commented upon by peers.

One might think that the attitude that drove them to not comment on unfamiliar discipline’s research would also influence their decisions about accepting comments from reviewers in other fields. However, according to findings from study four, the three receivers used a large portion of RK comments, either by outright accepting them or taking third actions. How can we understand the receivers’ willingness to consider RK comments from peers who come from other disciplines when they themselves do not believe they are qualified to give such commentary to others?

One explanation can be that receivers of review can be helped by disciplinary non-experts when the feedback addresses the writers’ knowledge-in-development. A study by Liu (2002) found that most of the participants in their study felt that they
could be helped by those from different disciplines (Liu, 2002). This finding is supported by Trautmann (2009), who found that scientific writers are open to changing their minds about the scientific aspects of their texts as a result of PR. A PR study of L1 undergraduate psychology students came to similar conclusions where researchers found that PR that evaluated empirical issues were particularly effective, even though the students were disciplinary novices. The researchers explain that novice’s content feedback is often more helpful to students because there is less of a knowledge gap between novices as compared with novice and expert (Cho et al., 2006). This explanation is also used by Lockart and Ng (1994) where they explain that peer comments fall closer within the writer’s developmental level. Though the SLU reviewers are clearly not novices, so the comparison with the Cho study is not clean, the findings concerning SLU receivers being helped by non-disciplinary experts can be informed by the Cho study. It may be that the knowledge gap between the SLU peers is not so large as the participants themselves had anticipated, so when they receive the comments they are helped.

Another explanation for why receivers may be willing to consider review from non-experts is that the reviewers give RK comments with a great deal of caution. If the comments are more carefully considered when they are written, the quality of the comments may be high, which in turn could explain why the RK comments are more often considered. One other possible explanation for writers may be influenced by reviewers not in their disciplines comes from work by Latour and Woolgar (1986). In that research on scientific writing, they describe how scientists use multiple rounds of feedback and rewriting to come to clarity concerning their own scientific claims (Woolgar & Latour, 1986). So even when commentary may not reflect expert advice, it can be seen as a normal step in the information building that is provided by PR.

In conclusion, although only a portion of RK comments directly inform the question of genre mediation, this collection of studies does shed light on the ways that students from different disciplines can refine their ideas about their own studies with the help of general science peers. Participants gave few RK comments compared to some other categories, but those they gave were detailed. Receivers described the RK comments they received as useful or memorable, and they used them proportionately more than they used other types of comments.

9.3.5 Correctness
The category of correctness is not emphasized in the investigation that looks at features of the RA genre, but is an expected aspect of the texts that the doctoral students will eventually submit to journals. At a pragmatic level, a great number of the kinds of problems that fall under correctness are ones that a copy editor could fix, even if that person had no expertise in scientific writing. This distinction
was what served as a defining boundary for me when originally deciding whether a comment fell into the category of correctness. If a copy editor can fix it easily, it is not an issue for the participants to take their time with. Supporting my impressions was Hyland’s (2013) study that found faculty members who are in the position of judging L2 students’ writing give little attention to language accuracy outside the writing classrooms (Hyland, 2013). Because I was not focusing on correctness as a benefit of PR, my primary interest in correctness comments was to see whether the participants spend unnecessary amounts of time with this focus.

In the first study, correctness comments comprised 15 percent of the review comments that were given, which is about three comments per reviewed text. Correctness comments focused on basic lexicon, grammar, usage and punctuation. Aside for the replacement of simple words, correctness issues were typically only commented upon or marked, but not fixed by the reviewer. Simple words were commonly replaced. Research on training in PR suggests that those students who receive no explicit training in PR will comment on correctness by default (Iona Leki, 1990; W.-C. Lin & Yang, 2011; Mangelsdorf & Schlumberger, 1992; Min, 2005). One study using computer mediated review found that 91 percent of the comments given in the synchronous mode were surface issues (Ching-Fen Chang, 2012), which is obviously not similar to the SLU reviewers. Instead, the amounts of their correctness comments fell more in line with Kamimura’s (2010) study where students who received training to give PR gave about 15 percent correctness comments. Bradley’s (2014) study of L2 engineering graduate students also had similar amounts at about 20 percent surface level comments.

In the participants’ description of their reviewing in study two, two types of text issues elicited reactionary review: those features that seemed incorrect according to prescribed rules and those text features that sounded strange. Participants did not appear to intentionally look for items that were incorrect or strange-sounding, but rather, they spontaneously reacted as a sort of reflex. In the theme *It’s Wrong!* (6.3.1.1), reviewers described carrying old, reliable knowledge that is triggered by the text. Reviewers described how issues “popped up” in front of them and they felt they were compelled to comment. A reviewer would automatically comment because “you think something.” The word “easy” came up repeatedly surrounding these issues, the issues being correctness. This kind of text problem was described as only temporarily interrupting the reading experience.

In the third study, where participants described their feelings about comments given to them, correctness comments were dismissed as trivial, small things that the writer would have found at a later time (7.3.2.3). The comments were easy to judge, but were annoying to the receivers since they were a kind of distraction from the real revision. Participants said they mostly ignored correctness comments.
This was shown to be so for two of the three individuals in study four, where Irene rejected all correctness comments (8.3.2). Louise rejected half, often having to rework what a reviewer changed to return to her original. Those comments she did not full-out reject she instead revised in her own way (8.3.3). Both Irene and Louise said they would have found these issues at a later stage by themselves, and that they were not appropriate for this kind of review. Roger, however, attended to comments of all types in his revisions, including correctness comments. His interest in linguistic correctness came up repeatedly in his interviews, and his language-learner narrative from his early schooling focused strongly on issues of correctness. He also described how he wished he had received such comments from his supervisors both at the Master’s and doctoral level (8.3.1).

In summary, those participants who give correctness comments seem to spend little time on them, but rather seem compelled to automatically mark them. Receivers mostly find them annoying and claim that they are unhelpful. Of the three participants in the case study, one used the correctness comments and appreciated them, while one used some but was mostly angry about the wasted time assessing them. The third receiver did not use them.

9.3.6 Summary
A key question posed in this research was whether students seemed to use PR as an activity that could enhance their understanding of the RA genre in their respective disciplines. I believe that the findings strongly demonstrate that both reviewers and receivers of review actively negotiate constructs connected to the scientific RA as seen in the review comments given, the review comments used, the discussions about giving and receiving review, and in the revisions and rewrites of their texts.
This research explored what participants in the peer review activity did when they gave and received PR, what they said that did in the PR activity, and how their activities reflected learning of the RA genre. These questions were addressed in the relevant discussion sections. This final chapter briefly discusses how teaching practices can be informed by some of the findings, and it also points out a few limitations of the actual research. Finally, in the end is a list of the main findings of the research.

10.1 IMPLICATIONS FOR TEACHING

In this section, I discuss what I see are the implications of some of the findings. What I describe here are my own thoughts on some of the findings, so I have limited them to those issues I find most important. For each point I will briefly remind the reader of the particular finding before discussing what I believe to be implications of these findings.

**Training**

In most research communities involved in forms of second language writing, training of student reviewers and receivers is now considered standard practice. This was detailed in the literature review section for both reviewers (2.2.3) and receivers (2.3.4). A well supported starting assumption with L2PR groups is that without training, inexperienced reviewers and L2 writers will focus on surface features (Van Steendam, Rijlaarsdam, Sercu, & Van den Bergh, 2010). Participants in the current study had little experience with PR, they were all L2 writers and they were not given training in the current course. Nevertheless, only 15 percent of their comments focused on correctness, and most of these comments were ignored by the receivers.

This introduces an idea that catalyzed this research project some years ago. L2 writing groups comprised of graduate students carry with them ideas of PR from past educational experiences. I have always believed that students’ knowledge and skills should be considered and utilized to enhance pedagogical activities, and peer review is no different. The current group of L2 reviewers had exposure to professional review practices before they came to the writing class, even though they had not directly participated themselves. As a result, numerous types of comments that were highly valued by the participants in the PR activity were not the types of comments that I would have trained them to give, since I do not have the expertise for this.
The pedagogical implication of this observation is that instructors are more effective in their choices when aware of the knowledge that students carry when they arrive. When we cannot understand the kinds of knowledge they carry, since we do not always have the right academic background, we may need to step back and see what students already do well without instructional interventions. After observing closely what participants seem to do with PR when left to their own devices, I can now better provide certain types of training and modify the review activity in ways that likely will enhance their PR. These ideas are discussed below.

*Discuss the Impact of Roles*

Study two showed that participants adopted and altered their roles when they reviewed peers’ texts. Accompanying the roles were principles that steered the reviewers’ activities and consequently influenced the learning opportunities for the reviewer. Opportunities for learning included the amount of text the reviewer explored, the amount of languaging the reviewer did, the intensity of the focus the reviewer gave particular issues, and the amounts of time spent on less helpful practices such as automatic correction and polite comment construction.

In consideration of the influence reviewer roles had on participants’ commenting, I suggest that teachers should discuss the choices reviewers have regarding roles and the impact these roles have, both on the reviewers’ own learning and on the potential helpfulness of review they provide the writers. Such discussions can potentially lead to more intentional review practices where the students are aware of the constraints and affordances of the different roles. For example, a role that leaves content-related issues to the content expert will limit the amount of exposure the reviewer has to disciplinary constructs. As is shown in previous PR research, providing feedback in itself is a powerful form of mediation of writing constructs (Antón & DiCamilla, 1998; M. C. M. De Guerrero & O. S. Villamil, 2000; Lundstrom & Baker, 2009), so limiting the amounts of commenting on key text issues disadvantages the reviewer. Furthermore, the reviewer who leaves content-related issues to the expert deprives the writer of a potentially important round of review. Lessening the provision of commentary for the receiver had no benefit in the current studies. In fact, even when the review comments were occasionally wrong they were often used for other purposes. Furthermore, writers claimed to not be misled by comments that were wrong or unhelpful. In all, the role of not-the-expert appeared to be unhelpful to the reviewer and the writer, and discussing that would probably be valuable to participants. Instructors should try to identify the group’s ideas about roles as reviewers and discuss the advantages and disadvantages of such roles.
Help Participants Save Time

Reviewers demonstrated agency in their PR activities by making active decisions about what to comment upon and what to ignore. Although choices differed among reviewers regarding the types of problems to ignore, each participant interviewed discussed these choices. The choices were made to save time. Nevertheless, although reviewers were concerned with time, they often wasted it with certain review practices. Teachers could help participants identify the ways that participants do not use their time well, and help develop agreeable solutions to those time-wasters.

One ineffective use of time was the way reviewers tried to compose comments in the least offensive ways possible. Giving critical comments could exhaust some reviewers in their attempts to be nice. Other studies have also shown that reviewers can suffer anxiety about how to formulate comments in non-offensive ways (W.-C. Lin & Yang, 2011; G. Nelson & Carson, 2006). To encourage the students’ agency and time management, instructors should help participants to create practical solutions to the problem of creating critical comments in an L2. Many of the participants noted that they did not have the same problem critically commenting when using their L1, so what seems needed is the language of critique that the participants can agree upon ahead of time. Such classroom protocol was described earlier in research where students developed their own phraseology that they would use in PR (Tang, 1999).

Another way that reviewers used their time inefficiently was to try to resolve text problems for their peers which they did not have sufficient knowledge for. This practice reflects ideas that are strongly entrenched in PR praxis which is that to effectively comment on higher order concerns a reviewer must not only read critically in order to locate and identify the text problems, but that the reviewer should try to resolve the text problems (as described in (Van Steendam et al., 2010). Resolving the text problem may be a good use of time for the reviewer in categories like cohesion, order, and precision of syntax. But in issues of voice, and in issues of discipline-specific lexicon, it is probably better to point to the problem and ask a question rather than to try to resolve the problem. Trying to resolve the problem will be time consuming, and the receiver will likely reject the suggestion anyway. Reviewers can also be given the phraseology for these situations when they are not entirely certain about the advice they are giving. This could serve as a little apology that means I think this is a problem, but I have no suggestion. Automatic phrases to help reviewers with critical comments and with insufficient comments will save reviewers time. These ideas are not new, as they have been

Building in Activities

Studies three and four showed the many activities receivers were involved with after receiving PR: long revisions, extensive rewrites, investigations, consultations, etc. Each of these activities described by writers is arguably a good use of their time in their journey toward becoming writers of research articles. In my own previous understanding of students’ use of PR comments, I had not assumed the participants were still engaged in such an active stage of composition, idea exploration, and reorganization. Students did not themselves seem to understand how incomplete their submitted texts were, believing that they were turning in nearly complete texts. However, this was not so for the three case studies.

To encourage these more extensive revision activities, I would instead build in the time necessary for writers to conduct the needed investigations, revisions compositions, and reordering. It would have benefited the review activity to discuss more in detail the kinds of tools that would help them with these important steps that follow the reception of review, and to encourage writers to develop wider circles of reader/viewers for their texts. By discussing tools and practices that are associated with these more substantial revision activities, instructors will be encouraging such efforts.

Comment Focus and Instructional Practices

This pedagogical activity was intended to benefit participants’ understanding of the RA genre. There are a few ways that instructors might be able to better encourage this focus as connected to certain types of comments.

Review concerning organization was tightly focused on issues connected with the RA. Participants gave a high proportion of organizational and rhetorical comments, they used a high proportion, and they described how important such comments were to them. However, they also described how difficult it was to give such comments and to interpret such comments. To encourage commenting on organization, instructors should consider a response tool that is easy to use. Students in the current course spent a great deal of time recreating outlines in the beginnings and ends of the texts. Discussions on how to facilitate organizational comments could encourage participants to focus on organization, and could also lead to smarter praxis in how to share their ideas on organization. Having group discussions before beginning PR could lift this issue for the entire group and produce alternative ways to comment on organization.
Correctness comments that participants give during review were described as though participants felt compelled to give them, not that they intentionally gave them. Correctness comments were not shown to be of help to the reviewer and may actually take the place of more constructive comments. Four of six receivers of correctness comments were annoyed with them as time-wasters. These comments should probably be discouraged. It may be that the habit of commenting on correctness is more entrenched in L2 reviewers who would likely have participated in writing-to-learn activities earlier when practicing accuracy in English.

Focus on lexical and syntactic precision, a focus that arguably reflects the most important principle of scientific writing, was apparent throughout the PR activity. Precision comments were the most common kind that participants gave one another. Receivers used a large portion of these comments in a combination of adopting them directly, using them as guidance to find better solutions, using them to inspire further investigations, or using them to direct rewriting or continued composition. Receivers described such comments as helpful, and even when the review provided incorrect information, the receivers seemed to notice and not be bothered by the misinformation. Self-initiated precision revisions outnumbered all other kinds of self-initiated revisions.

Chapter four sources were unanimous in putting precision as the highest principle of RA writing. That the students focused on this principle in each aspect of their PR work is a tendency that should be encouraged through further instruction about precision through syntactic choices and through instruction of corpus use for lexical choices. Students entered the PR activity already understanding the value of this focus, so prioritizing this focus seems wise.

There was one type of commenting that did not fall easily into a particular comment category but rather arose from the participant interviews about giving review. In Sounds Strange! reviewers described reacting to text that was incomprehensible, weird-sounding or non-English. These comments were often left unclassified in the first study because they were typically ambiguous. However, interviewees’ descriptions of these reading experiences referred to the L2 writers’ odd text constructions where something written veered too far from standard English. These were often the instances when the participant writers were revealed as L2 writers. Whereas most text comments attended to in the PR were those that mimicked PR of doctoral students, of scientists, and of genre learners, those comments that were given as a reaction to strange-sounding-ness reveal the struggles of the L2 writer. An L1 writer would very unlikely write such sentences at the doctoral level. This theme was a poignant reminder of the L2 writers’ struggles.
L2 writers sometimes create sentences that have too many problems to be understood, a problem that may be exacerbated by the compromised style of scientific RAs, and further exacerbated by the writers’ novice status within their disciplines. If the reviewer then comes from another discipline and perhaps even another L1, it is easy to see how a reader and writer might struggle. Reviewers did not know what to do with such sentences, so they used odd marks to show their emotional reaction. Receivers could not interpret the marks and became annoyed. This situation may require that the instructors return to the tool kits for foreign language instruction and help individual writers analyze the patterns of errors that they make that are so problematic in combination with style requirements of scientific writing. In addition, conversations with students in anticipation of this problem would help, where it can be explicitly pointed out to them that such sentences will occasionally occur. Deciding upon phraseology to use in review will keep the comments more palatable.

**Tools**

As described earlier (3.3.1), tools are considered important to the mediation of new constructs for learners, where any given tool potentially constrains or encourages mediation. Characteristics of tools in the PR activity under study in this research included the semi-public nature of the forum, the asynchronous nature of communication, and the use of Word documents with Word’s commonly utilized functions for feedback. The tools mandated that the reviewers and writers would be communicating by writing and reading, that others could see what they wrote, that continued interaction would be easy to ignore, and that reviewers were mostly expected to comment by using the margin bubbles. Furthermore, the routine connected to the tool discouraged the development of dyadic review relationships over time.

According to most interviews, the combination of tools used in the course under investigation worked well for the participants. From a closer analysis of how they used the tools, it became apparent that the review activity was strongly affected by the configurations of the tools, a finding that I had not anticipated. In this section I want to briefly describe the ways the tools seemed to influence the activity so that I can then comment on pedagogical considerations.

The tools used had some clear benefits, one which was their simplicity. Participants were already familiar with editing and review functions in Word and could discuss features of the program using common vocabulary, for example, asking one another to use or not use Track Changes. The familiarity of Word included an unspoken praxis, where reviewers seemed reluctant to use the editing functions,
but would often write out in a marginal comment what could have been easily edited in the text. I suspect that this praxis discouraged surface-level review in the SLU group, where other groups have been shown to overuse this function.

Another benefit of the tool is that Word allowed Swedish reviewers to move back and forth between Swedish and English with ease in their review, which they did. Because the question of Swedish or English did not come up in the post-course interviews, the theme was not raised in study two’s findings. However, when I looked at the review comments comparing reviewers with mixed L1’s to those with the same L1’s, it is clear that the latter group used their L1’s extensively in the review comments. Motivation for using one’s L1 in peer review has been shown in many studies (Hu & Lam, 2010; Kamimura, 2006; Levine et al., 2002; W.-C. Lin & Yang, 2011; Suzuki, 2008; Villamil & De Guerrero, 1996). The Swedish students who reviewed Swedish writers’ texts switched languages throughout the review, a possibility that was facilitated by the use of Word. I would even suggest that the Swedish reviewers would have been hindered in FtoF communication with other Swedes as compared with what they could do in Word, as the code switching would have been extreme and likely awkward.

There were some unanticipated benefits that came with the tools. One was the benefit of a single-response tool for the reviewers, most of whom said that they did not want continued dialogue with the writers of the texts, even if a writer might want that. Intriguingly, participants could easily have had continued dialogue on their review threads, but they did not. This may have been influenced by the condition that each PR instance had its own thread. A reviewer on forum four, thread B was also involved in forum four, thread C where her own text had been reviewed. Likely because of this double-use of the forum for each participant, the forums were commonly seen as public drop boxes rather than meeting places. There was little communication that took place on the actual forum threads, but rather, communication took place in the Word documents that were loaded to the threads. As a result, follow-up questions that a writer might ask on the thread to his reviewer often went unanswered because the reviewer was no longer looking at that thread but instead concentrating on the thread where she loaded her own text. Those interviewed for the current research said that they appreciated not having to revisit their peers’ texts, but rather wanted to move on with their own work. Two of the four participants, however, wished that they could have had more dialogue with reviewers about their own texts.

In summary, the forums were used as electronic spaces to pass texts back and forth and to spy on other students’ texts and review comments. The nature of this limited communication could have impacted the ways writers used the review comments. For example, because there were not simple ways to elicit further help from the
text reviewers, the writers had a “make-do” attitude, where they took what was given and made the best of it. This may have been partly responsible for the finding in this research where the writers used the comments as clues rather than directions. To use comments as directions may have required clearer directions, and this clarity was not easy to obtain through one-off commenting.

What may also have influenced the writers’ use of peer review was the asynchronous, written mode of the PR. An obvious advantage is that reviewers had time they needed to conduct the steps of review that are described in the discussion section about giving review. Having that time likely affected the kinds of comments that the reviewers provided. Other research has shown this to be so, where reviewers in this environment commented more on organization (Tuzi, 2004).

The asynchronous mode allowed receivers to work through the comments in their chosen ways. These singular ways were highlighted in the discussion on receiving review, where review comments led to numerous kinds of receiver activities. One aspect of this was that the receivers were in control of the time immediately following the reception of a comment since they had easy access to a permanent record of the comments and no one was waiting to hear what they thought about those comments. This contrasts to the conditions of earlier research where receivers spent time in FtoF review justifying, clarifying and reacting to PR (Villamil & De Guerrero, 1996). In the SLU group, they would take what parts of the comments they chose, and move on with their writing. This was described by receivers as very empowering.

A benefit of having the PR activity in an open class forum was that participants could scrutinize the ways that their peers conducted review. Course web statistics of participant activities indicate that participants did look at other people’s review in the forum. In the interviews, participants confirmed that they looked at others’ review when they wanted to see what comprised a sufficient amount of commenting, what form the comments should appear, whether they could comment in Swedish, and whether it was common practice to reply to writers’ follow-up questions in the forum. This likely was a partial explanation for why review practices became more similar among participants for each subsequent round of review.

The open forum provided the participants with models of review which served as artifacts in and of themselves. Such modeling would have been constrained in a face-to-face mode or in synchronous computer mediation. Interestingly, no participant mentioned feelings of being scrutinized as a reviewer, even though their review was open to others and they themselves were scrutinizing others.
Research has found that the pressure of scrutiny can enhance students’ feelings of responsibility to the tasks (Sengupta, 2001) yet this issue was not taken up by participants.

This discussion about the importance of the tools in the PR activity comes as a kind of postscript to the research project. I suggest here that the constraints and affordances of the review tool and the established routines in this course had a strong influence on both the kind of review the students gave, and on the ways the writers used the review, a suggestion strongly supported by research (Ching-Fen Chang, 2012) This is a topic I did not investigate, but in retrospect, I should have. There is a strong movement to investigate the uses of online PR, in particular coming from researchers in Asia (Chen, 2014). It is likely that my own North American educational background limited my starting assumptions and inquiry into the PR practices of the students, leaving me with somewhat of a blind spot concerning the relevance of IT tools on the activities of the PR users. Students arrive with skills and assumptions connected to computer tools, and it seems imperative to be alert to these when we develop new ways to conduct PR.

In summary, the modality, tools and routines used in the PR activity likely affected the kinds of review participants provide and the ways that writers use peer review. Instructors should consider computer tools as potentially strong influences on the pedagogical activity, and not, as I did, a peripheral influence.

10.2 LIMITATIONS OF THE STUDIES

The method used in study one to describe the activities of reviewers assumes that the comment types are comparable in terms of the effort reviewers make when giving a comment. This counting taxonomy is somewhat misleading. Ferris (2003) has argued that in most student texts, only a few macro-structural changes are typically warranted, whereas many surface-level changes are warranted. That peer reviewers give more of the latter is not necessarily an indication that they focus more on surface-level changes, but that there are actually many more small revisions that require their own comments. What became more apparent as the research project progressed was that both C&O comments and Research Knowledge comments required extensive efforts. In retrospect, the description of PR activities would have benefitted from a categorization scheme that could better account for amounts of effort as connected to the types of comments given and acted upon.

In study four, all three participants were ambitious language learners and writers. Their experience with PR may not be typical for doctoral students having to write in English. The way they showed themselves to be ambitious is that they took the course when it was an elective, they managed to get into the course which in itself
takes substantial efforts, and they each chose at an earlier stage in their careers to study in countries where they would have to use English. Their use of PR comments is therefore most likely a description of ambitious students of writing.

Participating in peer review required students to be reviewers and receivers, and learning could occur in both roles. From a research perspective, it was more challenging to see the way learning takes place in receiving review because writers only sometimes respond to review in a form that is visible to the researcher. Other times they do other things, such as email a colleague about a website for words. Such activities are not apparent in the revisions. Though we might hope that their interviews could enlighten the situation, participants had more difficulties describing their activities as receivers than they did as reviewers. For example, their reasons behind not using peer comments were vague compared with their reasons for using peer comments. Some writers seemed to remember comments that they rejected if the comment had irritated them or surprised them, but for the most part, interview participants had difficulties drawing any generalizations from the comments they rejected. This was not as obvious a problem when the reviewers described what was hard to comment upon or what they did not comment upon. The information that did come to light about receivers’ uses of rejected comments was gleaned via serendipitous touches on topics. Otherwise, the participants had difficulties remembering or explaining what they rejected and why. Therefore, it is difficult to come to conclusions about commenting that serves little use, since this information is hard to obtain.

10.3 CONCLUSIONS
The beginning premise of this research is that L2 writers will have their own motives, goals and understandings connected to pedagogical activities which will influence the use of such activities. The pedagogical activity of peer review was explored in this dissertation. The aim was to contribute to the picture of L2 writing education by describing how a group of L2 doctoral students in the natural sciences used online peer review. A second aim was to explore if and perhaps how the students’ use of PR mediated their learning of the genre of the research article. The major findings have been explored in the Discussion chapter, and are therefore simply summarized here for the reader’s convenience. The points included in the summary are those findings that are most relevant to the two key aims and are divided as such.

What do the participants do when they use the peer review activity?
There are a few findings concerning the activities of the reviewers that can help us understand where their efforts are placed and where their learning may be occurring. A key finding is that participants mostly act with intentionality as
reviewers, and the ways they are intentional are influenced by roles they have adopted.

These roles influenced how broadly they explored peers’ texts, what they dismissed, what they took extra efforts with when comparing and analyzing, what they decided to language, and how they formulated their comments. Interpretations of these mental activities through a lens of Sociocultural theory suggests that the roles that better mediate learning are those that push reviewers to engage in noticing, analyzing, comparing, and languaging. Some roles affected more what the reviewers noticed, while another set of roles seemed to influence what they languaged. One role that gave reviewers wide exposure to discourse features was described by participants as the average L2 science reader. In this role the reviewer looked at the entire text, confident that she would notice what other science readers would also notice. A role that gave reviewers a narrower range of constructs to grapple with was that of a self-interested reviewer. In this role the reviewer searched for text issues that he was personally interested in.

In the roles that influenced the reviewer to reformulate and/or explain, a self-interested reviewer will attempt to reconstruct sentences that have similar problems to his own, which is positive. More languaging was influenced by the role of helpful reviewer, a role that mandated the reviewer not simply mark things as wrong, but explain why. In contrast, the role of nice guy limited the number of comments that would be language.

Roles also steered the reviewers’ attention in the text, so that some reviewers more actively negotiated with text features such as organization while others focused more on precision. The reviewers who took the anti-role of not-the-expert claimed that they dismissed problems about research knowledge, lexical precision, cohesion and sentence-level precision, leaving those to the teachers. Not all review activities were intentional. Incorrect and strange-sounding constructions elicited automatic commenting or marking that reviewers did not seem to hardly notice. This reactionary commenting did not likely lead to mediation of new constructs.

Receivers perceived review comments as clues about their own half-told or poorly proportioned research stories. They described the difficulties in writing such challenging texts in an L2, and emphasized seriousness with which they took these comments. Receivers claimed to attend to these comments directly, and in study four this was shown to be mostly so. The most important aspect of receiving such comments was to better understand the needs of the reader concerning unnecessary distractions in the text, order of information, and needs for more information. These things the writers could not see on their own and they believed the reader could show them. Another aspect of receiving comments that writers
appreciated was being surprised by ideas that they had earlier not thought about at all. In the interviews the participants were able to remember such comments months after having received them.

Around 40 percent of the given review comments were accepted in spirit, if not adopted in form. Adopting review comments reflected only a small amount of the activities that took place in response to the PR. Instead, upon receiving review, participants returned to composing, they re-wrote entire sections, they re-ordered text sections, they created new figures, they initiated investigations and they interviewed outsiders. Reviewers’ learning benefited by being open to many types of comments, by perceiving comments as clues rather than directions, and by being empathetic to the needs of the reader. In their revisions, the receivers cherry-picked parts of review comments and repeatedly used revision strategies that they favored rather than those suggested by the reviewer.

Receivers review also showed agency in how they used the PR activity, describing strategies to elicit types of help, to save time, to further explore their own thinking, and to collect more information. One pro-active strategy was to submit texts that contained known problems in hopes that the reviewer would resolve them, while another was to submit incomplete texts in hopes that the reviewer would have organizational advice.

Receivers claimed to judge the comments by who gave them, explaining that some reviewers should not give certain kinds of comments. Nevertheless, writers did consider most all kinds of comments from all reviewers, even if they did not eventually adopt them. Furthermore, writers were not confused about comments that suggested changes that would be inappropriate in their own discourse communities, such as specialized lexicon or rhetorical practices.

The case studies showed that writers’ use of PR could be connected to their descriptions of their writer histories and language learning histories. Each person used the comments in different ways, for example Roger who interpreted any kind of comments as a clue toward refining the clarity, Irene who used comments to simplify her text and to jump-start investigations that would often include outsiders, and Louise who used comments to inspire further composition.

*How do their activities mediate their learning of the genre of the scientific research article?*

Both reviewers and receivers focused on issues of text organization, argumentation, cohesion and precision. Text organization seemed the most valued
kind of comment to receive and the hardest to give, while precision comments were
given and used most frequently, and were most closely tied to the features
described in the sources about the RA genre. Receivers appreciated review about
lexical precision, and were often surprised with others’ astute recommendations,
feeling like they should have known such words earlier. Precision comments were
not only important for the actual words, phrases and expressions the receivers
learned, but were also important in seeming to establish a focus on lexical
precision. This was shown in study four where findings indicated that writers self-
initiated precision revisions more than all forms of self-initiated revisions
combined. These emphases seemed to benefit learning of the RA the most.

Review about research knowledge was given tentatively because of reviewers’
concern with the differences among disciplines. Reviewers claimed to develop
awareness about disciplinary discourse differences because of the self-imposed
pressure they felt to not mislead writers. Comments on research knowledge was
detailed and showed expertise, which may be why receivers attended to the RK
comments proportionately more than other comment types. Though comments
about voice were given by reviewers, the participants did not talk about them or
seem to value them. Voice comments were adopted erratically and at low rates.
Stance comments were given both concerning hedging and boosting, but receivers
mostly adopted the boosting comments. Correctness comments seemed unhelpful
to reviewers and mostly unhelpful to receivers. Comments that were incorrect
were ignored by receivers or used for other purposes than what was suggested.

10.3.1 Last Thoughts
The introduction of this dissertation described the difficulties that doctoral
students encounter when they work in NNES environments and must write their
dissertations in English with little help and less time. The group of students
highlighted in this text have their peculiarities as any study group will.
Nevertheless, the findings here can complement other studies that illuminate the
pedagogical tools that serve this population of second language writers. The
findings in these studies show that peer review among L2 doctoral students
provides rich experiences for those individuals who choose to engage, both as
reviewers and as receivers. Though the ways that participants seemed to use the
activity differed, the students mostly focused on features of the RA genre in their
roles as both reviewers and receivers. The disadvantages sometimes assumed to
be connected to L2 peer review that have concerned teachers in the past, for
example conflicts among participants or bad advice that misleads writers, were not
apparent in this group of students. For doctoral students who have limited means
to learn the discourse requirements of research articles, peer review seems to be a
good strategy to not only weather the perfect storm, but to do so in good company.
11 Bibliography


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Hello everyone,

I would like to ask if there are any participants in the upcoming writing course who would be willing to participate in a pre and post course interview in order to help us improve this course. I understand that people are very busy right now, and it may be that some people feel uncomfortable not knowing what will be expected. To try to address the second issue, I have written a description below of the project so you can better imagine whether it may be something for you.

The interviews are a part of a study which investigates doctoral students’ strategies in writing research and their attitudes about types of learning activities. The initial interview can take place under weeks 36 or 37 or 38. A follow-up interview will take place in January where I will ask questions about participants’ experiences with certain class activities used in our course and about participants’ strategies and actions during the course. All information will be confidential, and all efforts will be made to keep your identity anonymous (for example removing any references to details that reflect your study area).

The pre and post interview will be about an hour long each, and I will be the only person in the room aside from you. The questions are open-ended and will focus on your experiences as a writer in your first language, as a writer in English, on your background as a language learner, on your ideas about writing improvement, and on the help you currently get with your writing. You can talk in either English or Swedish (or a combination!). You can ask any questions to clarify misunderstandings and add information that you think is important. The interviews will be taped with a small recorder that will sit on the table in between us, but the discussion will be informal. After the course is over and you have received feedback on all your texts, I will schedule a follow-up interview with you. In that interview, I will ask you to talk about your experiences in the course relating to a couple activities. I will also ask you to describe how you worked on some of the texts.

If you are willing to participate in this pilot project, you need to reply to this email. I will send you a letter of consent that details my role and responsibilities in the transaction and details your rights as a participant. You will have to sign the paper as a way of saying you understand how the interview will be conducted and how the data will be used. When I receive that, I will contact you so we can arrange a time and place to meet. In addition to the satisfaction you will have knowing you helped build better courses for future research students, you will have the extra benefit of receiving feedback regarding your writing behaviors. As an extra incentive, I will offer you a session to review the summary of your writing practices and suggest personalized strategies that can be helpful to you.

Sincerely,

Karyn Sandström
APPENDIX B- FURTHER DESCRIPTION OF INTERVIEWS AND CONSENT FORM

The purpose of this investigation is to explore the activities, habits and beliefs of non-native English speaking (NNES) doctoral students who will be writing their research in English. Included is an investigation into the study participants’ opinions of and behaviors shown in a partly online academic writing course. The aim of the study is to map differences and similarities in second language (L2) writing strategies of NNES doctoral students and to assess commonly used teaching methods that have been relocated to an online learning platform. The intended benefit of this study is to collect profiles of NNES students’ strategies which seem to expedite writing skill acquisition when such writers work in non-native English speaking environments. Knowing what such writers do and think to solve their problems gives writing instructors a more informed starting point. Another intended benefit is to improve writing instruction for this population by determining whether teaching methods used in traditional writing courses can be effectively used online with this population of writers.

Participants in the investigation will first take part in a taped, pre-course interview where they will be asked about their habits regarding foreign language learning and writing, their academic and cultural backgrounds, their beliefs about writing, and their current academic writing environments. After the participants have completed the course, they will be interviewed again about their learning experiences they had under the course. The face-to-face interviews will take approximately an hour and can take place in Swedish or English.

Participants answers and results will be dealt with in such a way that no unauthorised person will have access to them. Information that can link the participants’ identity via their verbal responses or writing will be removed from any reporting of data. Such information includes discipline-specific references in their texts or names used by the participant. Participants will be given the opportunity to view the transcripts of their interviews and the write-up of any summarized data from course behaviors in order to comment and request changes. Participants have the right to withdraw from the study at any time.

Possible risks of participating in the study are minimal, but may include a person’s discomfort at having her/his work more carefully scrutinized. Participants should be aware that parts of the interview and/or text may be used in published research texts which may also make a person feel uncomfortable, even though the participant’s identity will not be known to the reader. A benefit to participating in the study is that participant’s work and habits will be investigated in relation to the course activities, so the participant will have the opportunity to access this information via a debriefing session. Here the participant will be able to learn more about his or her writing than would otherwise be available to other students.

If you are unsure about any of the information written here, or if there is missing information, please contact Karyn at 786 9616 or email her at karyn.sandstrom@engelska.umu.se.

I read this description and agree to participate in the study. (Please sign and note the date)
Hi everyone,

You might remember that I mentioned that I am working on a research project about how doctoral writers use class activities to improve their writing. The purpose of the research is to help writing instructors better understand the ways that advanced second language writers of specialized texts use peer review to improve their own texts. I am writing this note to ask if there are any people who participated in the class in autumn of xxxx who would consider allowing me to use their peer review comments and subsequent text changes for the research project. Below I will explain a bit about the project and what I need, and then you can consider whether you would be interested in participating.

First I can tell you a little about the project. In writing classes where students write in their non-native language, instructors are often reluctant to use any kind of peer review because they feel that second language users mostly “mess each other up.” The teachers often claim that the only worthwhile feedback is instructor feedback. My experience with doctoral students’ peer review at SLU has been profoundly different from the above-described scenario. My impressions over the years have been that doctoral students offer one another a wide variety of commentary and that much of it is very valuable. But it was only my impression, not something I knew to be so. This experience with SLU peer review was the incentive for me to actually begin looking at what people do in their peer review.

In the project I am currently working on, I basically classify the peer review comments from the class forum into categories that are meaningful to applied linguists. These categories are ones you would recognize, probably. The five categories of comments are those that reflect issues of correctness (grammar, mechanics), those that reflect scientific thinking, those that reflect order and cohesion, those that reflect precision in language, and those that reflect register, or the scientific “sound” of the language. The reporting of the comments is a matter of analyzing the proportions of comment types so that we can begin to understand what it is that advanced second language writers in the sciences decide to comment upon. For example, up until now in the study where I have looked at 9 people’s comments over 5 texts each, I have found that very few people comment upon correctness in English. This is a very different result than what is found for most second language peer reviewers. I also look at patterns according to text types. For example, people comment far more on cohesion in the discussion sections, but very little in the methods.

In another part of the project, I look at which type of comments student writers actually choose to adopt in their re-writes. Here I use the same categories. For example, of those comments given on correctness of English, how often do the writers of the texts use those correctness comments? So far I have found that people mostly use the comments they received that address order and cohesion. At the end of all this analysis, I hope to have a clearer picture of the ways the peer review activity is used in our course.
So what I am asking is whether you would feel comfortable allowing me to use the comments that you received on your texts from other students and to then see what you actually used or did not use in the texts you turned into Göran. The analysis of your comments and of your text changes will be added to a larger data set. If my research is published, the results will appear in an applied linguistics journal or a writing pedagogy journal. Your identity will be anonymous, of course, and no comments will be used as examples unless all potential identifying details are removed.

I don’t want anyone to feel awkward about this request. My role as course instructor can make this request seem odd, I realize, but my role goes hand in hand with my interest in the subject, creating a bit of a Catch 22. If you feel the least uncomfortable, all you need to do is delete this request and pretend you never received it. If you feel comfortable with the idea of me using your comments and analyzing the changes you made to your texts, please simply write back to me that you may be interested. At that time I will send you a more detailed description of the project so that you can decide if you want to participate. You will not need to send me any of your texts, since there is a record of what you did on the Moodle.

If you have any questions, do not hesitate to ask. Thanks for considering my request.

Sincerely,

12.3 APPENDIX D-CONSENT FORM TO ALLOW USE TEXTS AND COMMENTS GIVEN AND RECEIVED

karyn.sandstrom@engelska.umu.se phone: 0768032079 work phone: 786 9616

Consent Form
Under autumn term xxxx I participated in SLU's research writing course for graduate students. Part of the course requirements was to submit texts online for review and to give peer feedback to fellow-students' research text sections. I agree to allow the written comments I provided others and the changes I made to my own texts to be used in the research study Doctoral Peer Feedback Online conducted by Karyn Sandstrom.

I understand that the written texts and feedback will be used in a research project that investigates the manner in which doctoral students comment upon one another's texts in an electronic forum and how they use the comments they receive from others. I understand that my comments will be saved in a coded, anonymous condition on the University of Umeå server in a password protected storage area. The researcher will take every measure to guarantee that use of my comments and texts will be of a nature that readers will not connect the used elements of the texts and/or comments to me, and that no reader will have access to any of the results or conclusions of my research that may be indicated in the texts.

I understand that this participation is entirely voluntary and that at any time I may withdraw my texts and comments without needing to give any explanation for the decision. Such withdrawal can be initiated by contacting the researcher at the email address provided on this form.
My signature below indicates that I agree to allow Karyn Sandstrom to use my comments and texts for analysis as limited by the above-stated criteria.

12.4 APPENDIX E - EXAMPLE OF INDIVIDUAL LETTER FOR SECOND REQUEST

Dear Ben,

It is Karyn Sandstrom, your former writing instructor from SLU. I hope this address still works for you now that you are done with your doctoral work. I’m writing to you regarding a research project that I am doing where I look at doctoral students’ use of peer review. You might remember that I sent out a general email when our research writing class was over where I asked for volunteers to participate in a research project. At that time, I began analyzing peer review of those volunteers to see what kinds of comments they tended to give. In the process of analyzing the data of the participant group, I discovered that I need to also look at the kinds of comments that they received in order to understand the changes in the comments that they gave. This is interesting in my field because there are theories about how one reviewer’s comments can affect the next reviewer’s comments. For me to be able to understand how one of my study participants changes her review practices, I need to understand the kinds of comments that she received. This is why I am writing to you. You gave comments on a text that belongs to a participant in the study. I would like your permission to code the comments that you gave on this text that you reviewed. I can show you what I mean by coding the comments.

In one place you wrote "It could be useful to have one short paragraph stating your main findings: eg. My results showed that fire derived charcoal did have effects on seedling establishment but the nature of the effects depended both on charcoal species and soil.” This comment would be coded as Storyline because you are encouraging the writer to clarify her findings through a rhetorical change. Your comment becomes tabulated in the category for Storyline, and then I will be able to see if the participant received many Storyline comments or only a few. Your comments will become codes, and then those codes will be tabulated.

This may seem like a very small thing to ask permission for, but because you gave the review in the role of a student, and I was in the role of a teacher, I want to be extra careful with everyone’s work. I would have asked your permission sooner, but it only became clear recently that this step in the research was important to my understanding of what the participants were doing. Essentially, I am asking if I can label the kinds of comments you gave in a text so that the comments can be tabulated into my results. Your comments are entirely anonymous, obviously. I’ll wait to hear from you. Please feel free to write back if you have any questions.

Sincerely,

Karyn Sandstrom
12.5 Appendix F - Resources Used in the Compilation of the RA Genre

Universities where courses suggested seminal texts

College of Biological Sciences, University of Minnesota
Bamfield Marine Science Centre, Bamfield, BC
Faculty of Sciences, San Diego State University
College of Natural Sciences, Colorado State University
Polytechnique, Montreal
Biological Sciences, Columbia

*Common text books used by graduate departments*

Writing Papers in the Biological Sciences (McMillan, 2012)
Academic Writing for Graduate Students (J. F. Swales, Christina, 2012)
A Scientific Approach to Scientific Writing (Blackwell, 2011)
Writing Scientific Research (Cargill, 2009)
Mastering Scientific and Medical Writing (Rogers, 2007)
Successful Scientific Writing (Matthews, 2008)
English for Writing Research Papers (Wallwork, 2011)
English for Scientific Research (Jansson, 2013)
How to Write and Publish a Scientific Paper (Day, 2011)
Writing Science: How to Write Papers That Get Cited and Proposals That Get Funded – (Schimel, 2012)

*Author Guidelines from model articles*

Conservation Biology
Ambio
Journal of Ecology
Trends in Ecology and Evolution
Fish and Fisheries
Polar Biology
Biological Conservation
Ecology (Ecological Society of America)

*Guides required by journals used in this study*

ACS style guide
Council of Biology Editors: Scientific Style and Format
Chicago Manual of Style
The Chicago Guide to Communicating Science
MIT Guide for Science and Engineering Communication

Historic Texts on the Research Article
Shaping Written Knowledge: The Genre and Activity of the Experimental Article in Science, (Bazerman, 1988)

Communicating Science: the Scientific Article from the 17th Century to the Present, (Gross et al., 2002)

Articles from Academic Journals

Chemistry journal articles: An interdisciplinary approach to move analysis with pedagogical aims, (Stoller & Robinson, 2013)

A corpus-based environmental academic word list building and its validity test, (Jia Liu & Han, 2015)

Citation practices among non-native experts and novice scientific writers, (Mansourizadeh & Ahmad, 2011)

Interactional metadiscourse in research article abstracts, by Gillaerts (Gillaerts & Van de Velde, 2010)and Vand de Velde

Disciplinary and paradigmatic influences on interactional metadiscourse in research articles, (Hu & Wang, 2014)

On the use of demonstrative pronouns and determiners as cohesive devices: A focus on sentence-initial this/ these in academic prose, by Gray (Gray, 2010)

A genre-based investigation of discussion sections of research articles in dentistry and disciplinary variation, (Basturkmen, 2012)

Verb form indicates discourse segment type in biological research papers: Experimental evidence, (de Waard & Pander Maat, 2012)

Disciplinary and ethnolinguistic influences on citation in research articles by Hu (Hu & Wang, 2014) and Wang

Guiding the reader (or not) to re-create coherence: Observations on postgraduate student writing in an academic argumentative writing task, (Basturkmen & von Randow, 2014)

The Discussion section as argument: The language used to prove knowledge claims, by Parkinson

The article of the future: Strategies for genre stability and change, (Pérez-Llantada, 2013)

Measuring the voice of disciplinarity in scientific writing: A longitudinal exploration of experienced writers in geology, (Dressen-Hammouda, 2014)

A pragmatic approach to the macro-structure and metadiscoursal features of research article introductions in the field of agricultural sciences, (Del Saz Rubio, 2011)

Structural patterns in empirical research articles: a Cross-disciplinary Study, (L. Lin & Evans, 2012)

Epistemic modality in English-medium medical research articles: a systemic functional analysis, (A. Yang et al., 2015)

Convincing peers of the Value of one’s research: a genre analysis of rhetorical promotion in academic writing, (Martín & León Pérez, 2014)

12.6 Appendix G Summary of Features of the RA Genre

Locate information according to reader expectations

- Use IMRD unless indicated otherwise.
  - Emphasize important results by placing them first.
  - In discussion, connect results to objectives as they were stated in introduction.
  - Use short, sharp sentences for results. Do not embed them in long sentences.
  - Use discussion to explain new knowledge.

Use visuals to clarify

- Use diagrams or flowcharts to better explain the method.
- Use tables/graphs for repetitive determinations/matrices of data.
- Use illustrations for improved comprehension and use graphics for complex concepts.
- Use figures to direct reader’s attention to emphasized issues.
- Do not use figures for ideas that are more effectively expressed in text.

Make connections explicit for the reader

- Use words and phrases to show relationships within sentences, between sentences, between paragraphs and between sections in order to flag new information, changes in foci, and past key points; alert readers to summaries, reformulations, and definitions.
- Use metadiscoursal markers: transitions, frame markers (finally, to conclude), endophoric markers (as demonstrated in the figure, in table 2), evidentials (as shown in work by...), and code glosses (such as, for example).
- Use anaphoric determiners (this, these, that, those) and nominalizations to show relationships between ideas.

Do not complicate reader’s experience

- Make no unnecessary text interruptions
- Use key words and consistent terminology - avoid synonyms.
- Use only as many words as necessary to accomplish meaning.
- Titles are expected to be concise
- Make reference to standard procedures in M&M; do not enumerate
- Brevity accomplished through restrained use of initialisms.
- Passive is more wordy than active, so consider carefully what you gain.
- Dummy subjects make sentences longer- limit their use.
Choose words carefully

- Avoid phrasal verbs—choose strong, one-word verbs.
- Use initialisms, noun clusters and extended noun phrases when precision would be otherwise compromised.
- Choose the more simple word for the sake of clarity when a choice exists between two equally precise words that mean the same.
- Consider reader’s struggles when deciding about lexical density.
- Be cautious with foreign words and abbreviations.
- Define acronyms.
- Choose words and expressions that provide more clarity for a wider readership: avoid jargon, euphemisms and new coinages.

Choose sentence structure carefully

- Careful with use of non-restrictive clauses where restrictive clauses are needed for tight modification.
- Check for misplaced modifiers and dangling participles.
- Adhere to the SVO order of sentences, avoid marked syntax such as negative constructions and parenthetical phrases.

More is not better

- No excess data in visuals.
- Remove unnecessary modifiers.
- Choose simple cohesion devices when possible.
- Careful with many modifiers since there are few places available.

Show how you are connected

- For credibility, tie own work to legitimate, critical social processes.
- Support decisions with citations throughout the text.
- Do not overwrite.
- Anticipate dissenting opinions and attend to them in advance.
- Remove yourself from common research procedures and replace with the research items.
- Choose traditional vocabulary, no colloquial or spoken expressions

Do not alienate the reader

- To project degrees of epistemic commitment, choose verbs carefully.
- Do not to sound haughty or superior.
- Do not tell reader how to think.
- Use bias-free, gender-neutral language
- Do not overly criticize earlier knowledge building. Use neutral language in reference to others’ research.
- To emphasize findings and de-emphasize the researchers, use non-integral citations
Argue your case

- Make a case for the methods chosen if necessary.
- Provide the reader with enough detail in order to check the results against the methods and so to assess appropriateness of the research design.
- Show mathematical evidence to support claims when relevant.
- Do not inadvertently interpret the data in the results section.
- Use visuals to strengthen your claims.
- Sufficiently explain how own interpretations of the results are valid.
- Use meta-discourse to provide interpretative cues about claims.
- Point out significance that the claims have to the theories of the discipline.

Sound objective to obtain credibility

- Use “it-clauses” to create distance between writer and claims.
- Nominalize to theorize.
- Avoid personal phraseology and interactional discourse.
- Sound distant when you make a claim.
- Avoid self-mention

12.7 Appendix H - Initial 42 Categories

Below are the 42 original categories as folded into the eventual 5 major categories.

Research Knowledge

connecting theory to own research
intertextuality
mistake likely made
questioning base scientific knowledge
questioning the methodology
science RA text norm
argumentation
validity
information missing
questionable relevancy

Correctness

grammar & word order
word choice – lay term
mechanics, spelling and punctuation
usage/form
style guide question

*Precision*

ambiguous due to referent
inconsistent key concepts
missing critical detail
imprecise disciplinary word
need for differentiation
reviewer provides scientific phrase or rule
redundant information creates confusion
mixed meaning due to tense
ambiguous noun cluster

*Voice & Stance*

brevity
hedge/boost
sound like a scientist
sound more/less formal
be more/less visible

*Coherence and Order*

Excess text
Missing/wrong connections
Internal paragraph order
Suggest splitting text
Expected IMRD sections
Cohesion in sentence
One idea per sentence
text movement for rhetorical impact
Shift in order of paragraphs in text section
Internal sentence order
Subheadings
Use of visuals
confusion due to overloaded sentence
## 12.8 Appendix I - Subcategories with Examples

<table>
<thead>
<tr>
<th>Coherence and Order</th>
<th>Use of visuals</th>
<th>You might want to consider to change the order of individual diagrams in this figure, because in your text you first start talking about diagram D, then about C, then about B, etc.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>You need to refer to the table in the text before the table occurs.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>I like the use of figures and pictures to describe the mechanical device used. It would probably be hard to explain this with text only.</td>
</tr>
<tr>
<td>subheadings</td>
<td></td>
<td>It might also be easier to follow if the text was split into more sections- maybe with sub-headings?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Shouldn’t this be under a subheading of “experimental design?”</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Consider sub-headings of a more general character “the survey” “company structure” to get a structure more easy to follow.</td>
</tr>
<tr>
<td>Move to new section</td>
<td></td>
<td>To me, parts of the text seem to belong in either methods or discussion.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>This can be moved to acknowledgements.</td>
</tr>
<tr>
<td>Internal order of text section</td>
<td>start by describing the experiment and what you measure in general terms, then describe the experiment setup and finally describe all the details of the rig.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Structure of the first part: talk first about the growth and then the allocation.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>This section can be improved if you rearrange it so that it ends with the discussion about your study. Even if it is just to say that you didn’t study edge effects.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Maybe you could think about presenting your result first rather than previous findings.</td>
</tr>
<tr>
<td>Reformulates order of sentence</td>
<td>I would move it to the end of the sentence and change order” ...solid timber in average for the las..</td>
<td></td>
</tr>
<tr>
<td>One Idea per Sentence</td>
<td>Here I got lost. Commas needed, or break up in two sentences?</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pretty long sentence with lots of information. Think it would be more readable if it was broken up.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Put this in a new sentence.</td>
</tr>
<tr>
<td>Cohesion in sentence</td>
<td></td>
<td>I don’t understand what you want to say with this sentence in relation to the first part of the sentence.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Get rid of the parentheses. For me it disturbed the flow when I read.</td>
</tr>
<tr>
<td>Cohesion among sentences</td>
<td>Or in contrast, or something that links to the previous sentence and indicated contradiction</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>You could start with something like: “Not only this, but there have even...” so that it connects better to the last sentence.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Should you have an “And therefore” or “and consequently”? It is a consequence of the fact that they have no forest, and the “but” sounds like an opposed idea.</td>
</tr>
<tr>
<td>Cohesion/order within and among paragraphs</td>
<td>Move this to the second to the last sentence in the paragraph.</td>
<td></td>
</tr>
<tr>
<td>------------------------------------------</td>
<td>---------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>These two paragraphs were a bit difficult to follow because you combine the growth effects with the ratio effects. It might be better to separate them and then contrast them.</td>
<td>Why don’t you join this to the previous paragraph, where you talk about “reasons” and have the “results” in the next?</td>
<td></td>
</tr>
<tr>
<td>Missing Information</td>
<td>Can you state the mean length for each one, even if it is in the graph? It is not so easy to see.</td>
<td></td>
</tr>
<tr>
<td>I suggest you add a sort of introduction to the methods’ section.</td>
<td>There is something with this sentence that makes me wonder about what the field study was about instead of being able to accept the path and go on.</td>
<td></td>
</tr>
<tr>
<td>Excess Information</td>
<td>You already wrote this a few sentences earlier</td>
<td></td>
</tr>
<tr>
<td>I can see that. You do not have to name it.</td>
<td>I actually think this sentence is superfluous, and you could probably remove it entirely.</td>
<td></td>
</tr>
<tr>
<td>Emphasis of information</td>
<td>As it is now, this aspect is sort of hidden in the middle of a lot of other words, which I think is unfortunate.</td>
<td></td>
</tr>
<tr>
<td>First time I read this I completely missed the part where you pointed out the need to study moose behavior.</td>
<td>This took me by surprise.</td>
<td></td>
</tr>
<tr>
<td>Precision</td>
<td>Check the use of tense in the entire section. You should be using past tense and not present.</td>
<td></td>
</tr>
<tr>
<td>it would be more correct to save the present for statements and use past to explain what you actually did.</td>
<td>I think this should be in present tense, because no one can question whether you form a hypothesis or not: it is a fact and therefore present tense</td>
<td></td>
</tr>
<tr>
<td>Redundant or excess detail</td>
<td>Choose one. Delete the other.</td>
<td></td>
</tr>
<tr>
<td>It’s enough to say that the protective screen had a smaller diameter than the tank. That it was round is already obvious when diameter is mentioned.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reformulates for clarity</td>
<td>Can you just say on “EM fungal respiration”</td>
<td></td>
</tr>
<tr>
<td>it would be clearer if you stated here that what this table shows is “total number of individuals caught in the traps per species “</td>
<td>Maybe you could say: In the first step, a “prior” probability distribution for X needs to be obtained.</td>
<td></td>
</tr>
<tr>
<td>Stable isotopes composition, or ratio of stable isotopes</td>
<td>Needs Differentiation Define this. It’s really subjective.</td>
<td></td>
</tr>
<tr>
<td>Issue</td>
<td>Suggestion</td>
<td></td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Doesn’t BB 5 differ also? Maybe?</td>
<td>Might be more informative if you differentiate the style of “yes and no”, and “unl and dwunl”.</td>
<td></td>
</tr>
<tr>
<td>More precise word</td>
<td>Positions, sampling points? Point to me is something rather abstract</td>
<td></td>
</tr>
<tr>
<td>Salmonides or Pike? Which one?</td>
<td>I suggest Experimental Material instead of Biological Material</td>
<td></td>
</tr>
<tr>
<td>More detail needed</td>
<td>Enriched compared to what? To the soil under the litter? Why is there enrichment in the litter?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>When you say tree volume, do you mean timber or also canopy volume including branches?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Maybe you could say “In the first step a prior probability distribution....”</td>
<td></td>
</tr>
<tr>
<td></td>
<td>What exactly is it that is compensated?</td>
<td></td>
</tr>
<tr>
<td>Ambiguous referent</td>
<td>What results exactly are confirmed or are in the same line? ..what was similar exactly? Results from N2 and N1?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Your study or Williams 2001?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Maybe even clearer to write “Spatial autocorrelation” instead of referring back with “this”.</td>
<td></td>
</tr>
<tr>
<td>Too Dense</td>
<td>It’s not a noun cluster, but it definitely looks like some kind of cluster</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Do you mean variability of susceptibility? Not my mission really to comment on your title, but I think it is a bit too complicated</td>
<td></td>
</tr>
<tr>
<td>Consistency</td>
<td>Difficult to grasp, is it Sales deviating in short-term?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Be consistent with the unit you use for depth. Cm vs. “-cm</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Are there any differences between reservoirs and dams in this context?</td>
<td></td>
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<tr>
<td></td>
<td>Use the same word all the time. Sawmills/mills?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>I think you should stick to one word scenario/conditions</td>
<td></td>
</tr>
<tr>
<td>Research Knowledge</td>
<td>Influencing the total amount of available DNA and by excluding potential PCR inhibitors (any reference here?)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>How did you determine where to put the holes? Is that important information that should be here?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Not fully explained why this is related to habitat selection.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The section on general knowledge and conservation importance of the study is great but your justification does not seem to come out clear. The greater portion of the paragraphs tend to say what is already known</td>
<td></td>
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<tr>
<td></td>
<td>the fishes were weighed... explain then that the average weight was taken.</td>
<td></td>
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<tr>
<td></td>
<td>Could it be relevant to inform the reader on maybe why or how the periods were decided upon?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>I would recommend that you elaborate a bit more on this. What would, for instance, be the benefits of this proposed research?</td>
<td></td>
</tr>
<tr>
<td>Questioning the Reasoning</td>
<td>I understand that it can stagnate, but why does it decline? Could you briefly mention some possible reasons?</td>
<td></td>
</tr>
<tr>
<td>--------------------------</td>
<td>----------------------------------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Is it really suppression of productivity? I think it could boost productivity too in some cases. So maybe just “consequences of fire on plant productivity”?</td>
<td></td>
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<tr>
<td></td>
<td>why were such illegal activities included in the study if they didn’t target the study population?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>but also the females travel because the entire population is roving?</td>
<td></td>
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<tr>
<td></td>
<td>Here you have a possible learning effect since most operators must work hard not to do simultaneous work</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Is this necessary to have for this study if it only concerns herbivores?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>I thought that you didn’t need to predict the prior distribution because it was “what we already know before we observe any new data”</td>
<td></td>
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<tr>
<td></td>
<td>How do you go about creating a sample experimentally?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wasn’t mortality not fully known?</td>
<td></td>
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<tr>
<td></td>
<td>If the above given information is not accurate why refer to it. If there isn’t any good references you might want to explain why it is not accurate</td>
<td></td>
</tr>
<tr>
<td></td>
<td>If you wanted to compare, why only examine corridors and not selective thinning?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>I don’t know your field very well, but isn’t it questionable to motivate research on pine with references to continuous forestry?</td>
<td></td>
</tr>
<tr>
<td>Questioning the inclusion of information</td>
<td>I think this information is important for the lab not for the reader</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Maybe this can be left out, since it is so well known</td>
<td></td>
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<tr>
<td></td>
<td>Spatial autocorrelation is a very common event, isn’t it? I mean, it occurs in almost any spatial dataset, right? So is that really an important result you want to highlight?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Does this have to be here? You just referred to another study that already described the model.</td>
<td></td>
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<tr>
<td></td>
<td>Does this information add something for the method description?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Why is this threshold value important?</td>
<td></td>
</tr>
<tr>
<td>Voice and Stance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Too Foreign or different</td>
<td>You use a lot of Swedish translation, I don't know where do you expect to submit it but it seems inappropriate for an international journal (to me who is not Swedish)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Maybe a little bit too artistic</td>
<td></td>
</tr>
<tr>
<td>Register</td>
<td>This sentence sounds chatty. Reformulate it.</td>
<td></td>
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<tr>
<td></td>
<td>“Doesn’t” not formal... should always be written in full. In this case I think it should be ‘did not’</td>
<td></td>
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<tr>
<td></td>
<td>Is therefore of importance for</td>
<td></td>
</tr>
<tr>
<td></td>
<td>I am not sure this is accepted in formal English. You could say...</td>
<td></td>
</tr>
<tr>
<td>Level of conviction</td>
<td>I wouldn't use &quot;general details are true&quot;, it feels that the others are wrong! Or maybe is that a statistic jargon? -</td>
<td></td>
</tr>
</tbody>
</table>
It is reasonable to assume that the share of contract machines…”
Btw, why you assume? Do not you know it rather?

If that is true, the only way for I think this statement is too
strong...you could say “if this holds”

Presence/Distance
The model results may hold, as We think our model results are still
valid because....

The samples for the bulk density were dried (changed to) We dried
the samples for...

Correctness
Word choice
from sounds a little bit better for me, if it is still correct to say
to stay or to be?

Because of / Since ... it was important to...?

Between is for 2 things, and among for more than 2

Word form
“Is decreasing” = something that actually happens- “it could be
expected that... decreases.”

..associated with stump harvest harvesting

Lays or laid?

Grammar
The age of the samples were determined--was
..with less frequent rainfalls during a summer months--the

I think that ”selection device” is a noun and you can't use ”by
equipping” when refering back to a noun.

Adjective, it doesn’t fit me there

Which noun does this pronoun represent?

Two participles in a row

Mechanics and style
I am not familiar with your field and how species are presented
exactly - but latin names – in italic?
daily at 6-8AM and 6-8PM” is it really written in that way with the
AM/PM?

This seem a bit odd to me because its starting a sentence. May be
you should rather spell it out.

I’m not sure, but I think this should be hyphenated? “Southwest”?

punctuation
I think it should be semicolon and colon, seems like equal clause
sentences

I would delete this comma here since it is the market which has high
demands.

Punctuation after ca. Look for the same thing in the rest of the text.
12.9 Appendix J - Directions for Coding

Coding Scheme for the focus of comments

Directions for Coding The question is *what do reviewers focus upon when commenting on peers’ texts?*

- Code the comments in only one category
- Use context to determine the nature of an ambiguous comment.
- Code as ambiguous (A) if you cannot determine what category it should be.
- Code the comments even if they suggest bad advice.

P = Precision of scientific expression

Definition: Code as precision (P) comments that refer to ways that English lexicon and syntax are used to make meaning unambiguous

Precision may include instances where the reviewer notes...

- Lexical concerns about consistency, accuracy and specialization of terminology, including concerns about initialisms, non-discipline specific jargon, euphemisms, new coinages, and ambiguous words.
- Syntactic concerns about ambiguous placement of modifiers, dummy subjects, large separation between subject and verb, negative constructions, stacked modifiers, unnecessary nominalizations,

RK = Research Knowledge

Definition: Code as Research Knowledge (RK) comments that questions the scientific activities of the research and/or the reporting of the research as to accurately reflect the scientific activities

Research Knowledge may include instances where the reviewer notes...

- Concerns about the reasoning, including adequacy of the review of literature, positioning of the research within the discipline, analysis of data, relevance of the discussion, validity of the knowledge claims
- Issues about the correctness of factual information and appropriateness of theory
- Questions about the research activities such as choice and procedures in methodology, appropriateness of analytical tools, inclusion/exclusion of a research step,

CO = Cohesion and Order

Definition: Code as Cohesion and Order (C&O) comments that focus on the order, connectedness, sufficiency of information and the use of arrangement for rhetorical effect at the sentence, inter-sentence, paragraph and text level.

Cohesion and Order may include instances where the reviewer notes...

- cohesion as affected by meta-discourse, linking words & phrases, old to new information, and decisions to combine or separate clauses and phrases.
- order as it affects the clarity of message, and as it conforms to IMRD and to common organizational patterns such as classification, chronology, cause and effect, etc.
- readability as affected by the amount of text as judged against the unit (sentence length, paragraph length, as affected by over-writing &/or insufficient information, and clarity of figures.

V = Stance & Voice
Definition: Code as Stance and Voice (S&V) the comments that focus on the strength of the position and/or the persona the writer appears to be taking in the text.

Stance & Voice may include instances where the reviewer notes...
- the strength and authority of language as matched to the status of knowledge and/or assessment, including hedging and boosting
- the discourse appropriateness of attitudinal markers and authorial role, including anonymity, assertiveness, use of engagement features, formality/informality, presence/distance, individuality/collectiveness

C = Correctness of English
Definition: Code as correctness (C) the comments that reflect the lexico-grammatical conventions of English that would be understood and valued by a reader even if he or she had no knowledge of the genre of RA’s in the natural sciences.

Correctness may include instances where the reviewer notes issues of...
- Grammar
- Mechanics/punctuation
- Spelling
- Choice and usage of everyday vocabulary

12.10 APPENDIX K - RELATIVE EASE AND DIFFICULTY IN CLASSIFYING COMMENTS

COHERENCE AND ORDER
Easy-to-classify in Coherence and Order review included comments about cohesion, for example, where the reviewer suggests the writer combine ideas because they very much relate to each other or where the reviewer feels the writer has misjudged the cohesion of a part of the text and subsequently points out that the sentence doesn’t link well to the rest of the paragraph. Comments that were more difficult to classify in Coherence and Order were those that suggest text should be moved to another section, since such comments reflect knowledge concerning the genre of scientific texts, not simply general rhetorical knowledge. For example, a comment that recommends text being placed under a subheading of “experimental design” could arguably more closely reflect scientific knowledge (another category) because the reviewer is making a distinction about the function of a text unit which may or may not be understood by the writer. Classification in such cases required extra attention to the surrounding text.
PRECISION
Easy-to-classify Precision comments are those where the reviewer identifies a text unit that may be imprecise, redundant or overly wordy. An example of imprecision is the comment *In what context? The organizational context?* A comment on redundancy would be *that it was round is already obvious when diameter is mentioned.* A comment on wordiness would be where the reviewer condenses a long sentence, removing unnecessary prepositional phrases, and then writes "*produce charcoal*" is shorter, and I think it says the same thing. More complicated Precision comments include those that may at first glance either point to usage as connected to the discourse community, or alternatively, point to usage as understood to be correct by lay standards. For example, a writer uses the word *significant* as an adjective, whereby the the reviewer asks *was it really significant?* Such a comment is classified as Precision since it questions the meaning of the word as informed by the discourse community, not from a lay person's understanding of correct usage.

Most difficult to determine as Precision comments were those that give few clues for determining whether the comment points to something that is problematic with the successful communication of the science or alternatively, with the actual research. For example, in the comment *Why is it a difference between pellet and faeces?* we can understand it to mean "why are you using two words for the same thing?" which would be considered Precision, or we can understand it to mean "why did you differentiate between these two forms of excrement in your experiment?" which would be considered Research Knowledge. For a comment to be considered Precision, there should be evidence that the reviewer is questioning the way in which the research activities are materialized into textual constructs, not that the reviewer is questioning the actual research activities.

RESEARCH KNOWLEDGE
The easiest to identify RK comment refers to research activities that would be observable or measurable, for example, steps taken in the methods and observations made in the results. *You might wanna explain why you used all these methods. For many it might appear strange that you used multiple and linear regression.* Also obvious are comments about the details of the materials, samples, plots, software and time sequences, for example, *only one seed was analyzed? or name of the software?* More challenging to classify are the RK comments that focus on the reported thinking that was required in the research, for example the way the writer motivates the need for the research, how she justifies the use of a particular sampling technique, or how she explains the significance of her findings. An example of such a comment is the following: *I would add a sentence about the bad effect of MeHg on health and biodiversity so we understand the dilemma.*

The most difficult kinds of comments to determine regarding Research Knowledge were of two types, one which was previously described in Precision where review about the communication of science must be differentiated from comments on the actual science. The other kind of difficult-to-judge comment is represented in the following comment: *The assumptions could be better explained. I also think that you could further discuss why they have influenced your results.* Such a comment could be considered a cohesion issue in that the reviewer requests more development in the text. The distinguishing factor here is whether the comment refers to the missing prose as it affects the comprehensibility of the text or whether it puts into question the validity of the research. In this case, it is the latter, so it is a Research Knowledge comment.
VOICE AND STANCE
Comments are relatively easy to determine as V&S when the reviewer explicitly asks for a change in tone or register, or questions the amount of authority projected in the writing. For example, This sounds like spoken English. I would use another, more formal expression. Comment types that were more difficult to classify included unexplained overstrikes to omit relative pronouns, definite articles, and prepositional phrases. Such marks could be perceived to be Precision in their attempt to make the text more concise. However, such words take up practically no text space, so I interpreted such marks as V&S when the intention seemed directed at making the text more sparse and impersonal, more "scientific" sounding. Most challenging to determine as V&S were comments that encouraged changes in passive or active voice. Encouraging passive voice may be, for example, a question of protocol within certain discourse communities rather than seen as a degree of presence. Equally ambiguous, a reviewer encouraging active voice could reflect Precision rather than V&S, since sentences in the active voice are clearer for the reader. Comments of this sort with too few available clues were left uncategorized.

CORRECTNESS
Comments about Correctness were generally easy to classify. Student reviewers were often explicit about their concerns, for example, asking Which noun does this pronoun represent? Reviewers referred to style guidelines, for example, This (number) seems a bit odd to me because it's starting a sentence. May be you should rather spell it out. Comment types which were more challenging to classify were reviewers' focus on particular forms. Form of verbs, for example tense, could either be considered Correctness or Precision, while usage of modals could be considered Correctness or Voice and Stance. The context of such comments was usually sufficient to determine the intentions of the comments.

EXAMPLES OF AMBIGUOUS COMMENTS
Research Knowledge or Coherence and Order?
Take this away? I imagine that the reader has the background to know that it is the easier model (or maybe you can add that in the introduction.) You even write in the next sentence "the simplicity of the Kalman..."
Does this reference contain anything essential to the reader? If not, consider removing it entirely.
Is this very important for the reader?
Who does it concern etc? Just to underline the wide perspective and importance of your topic. I also would like to see some kind of finishing sentence of the abstract, underlining what your results will mean or how they can be used in a wider perspective?

Voice and Stance or Precision?
Deleted: far from tree influence
Some active voice here? "We performed the analysis with the statistical program R."
The way you formulated this feels weird--something with the way "more" is used in this way.
I'm not really following your logic. I don't get the impression that the two methods are being compared with earlier methods, rather with one another (except the sentence in the beginning, but there the emphasis was to show they wouldn't be compared). Is this coming maybe later when you have more results? Emphasize that more. You want to sell your methods.

Correctness or Precision? More correct to have "n" though... vilka är det?

Insufficient Information No Clue Am I right? I guess it is

12.11 Appendix L - Steps of Revision Analysis

<table>
<thead>
<tr>
<th>Step</th>
<th>Data used</th>
<th>Analysis conducted</th>
<th>Answers what question?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A) First draft reviewed by peer 1,2,3</td>
<td>Classify review comments using 5 categories from study 2 (correctness, C&amp;O, precision, research knowledge, V&amp;S)</td>
<td>What types of review comments does this writer get from peers?</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>B) Second draft sent to content specialist 1,2,3 AND Computer compressed version of 1 A+B, 2A+B, 3A+B</td>
<td>Reclassify review comment to reflect writer’s interpretation. Is the review comment ambiguous? Yes= reclassify the review comment to align with writer’s interpretation. No= classify the revision as 3rd action.</td>
<td>Which comments need re-labelled according to writer’s interpretation? Which comments must be further analyzed as 3rd action revisions?</td>
</tr>
<tr>
<td>3</td>
<td>B) Second draft sent to content specialist 1,2,3 AND Computer compressed version of 1 A+B, 2A+B, 3A+B</td>
<td>Identify change that writer made in connection to review comment. Classify writer response into 1) No, 2) accept reviewer change, 3) third action</td>
<td>How does the writer respond to different types of comments?</td>
</tr>
</tbody>
</table>
|   | Collection of writer’s 3<sup>rd</sup> action revisions | Identify nature of the revision in contrast to the review comment  
Categorize the types of third action revisions for that writer | What revisions does the writer seem to make when not aligned with reviewer suggestion? |
|---|---------------------------------------------------|---------------------------------------------------------------------|----------------------------------------------------------------------------------|
| 5 | Mark-up list of all writer’s changes to revised texts 1,2,3 | Identify all revisions made to second drafts.  
Search for connection to a review comment.  
Highlight revisions connected to a peripheral review comment (step 5)  
Highlight revisions unconnected to review comment (step 6). | What other revisions were made not obviously associated with PR comments?  
Which (if any) distant review comments seem to affect other revisions?  
Save for analysis 5  
Save for analysis 6 |
| 6 | Revisions connected to a peripheral review comment | Identify the way in which the distant revision was connected to the revision.  
Sometimes able to categorize in the 5 classes, other times, not. | Which comments seem to have a snowball effect? Or, which comments does the writer seem to be more affected by? |
| 7 | Revisions unconnected to review comment | Describe the type of revision made. | What kinds of revisions/rewrites does the writer make that seem unassociated with PR? |
Description of Initialisms

CMPR – Computer mediated peer review
C&R – Composition and Rhetoric
EAP – English for academic purposes
ESP – English for specific purposes
FtoF – face to face peer review
L2 – Second language – languages other than an individual’s mother tongue(s)
L1 – First language(s) or mother tongue(s)
NCTE – National Council of Teachers of English
NNES – Non-native English speakers
PR – Peer review
RA – research article
SCT - SocioCultural Theory
SLU – Swedish University for Agricultural Sciences
SLW – Second language writing –writing in a non-native language
ZPD – Zone of proximal development