Original papers
The thesis is based on the following papers, which are referred to by their Roman numerals in the text:

Paper I
Gimble Berglund, I., Ericsson, E., Proczykowska-Björklund, M. and Fridlund, B. Nurse anaesthetists caring for children requiring anaesthesia. *Nursing Children and Young People*. Accepted to be published

Paper II

The articles have been reprinted with the kind permission of the respective journals.
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### Abbreviations

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<th>Description</th>
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<tr>
<td>Anaesthesiologist</td>
<td>Physician specialized in anaesthesia</td>
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<td>Anaesthetist</td>
<td>Nurse anaesthetist or anaesthesiologist</td>
</tr>
<tr>
<td>CRNA</td>
<td>Certified Registered Nurse Anaesthetist</td>
</tr>
<tr>
<td>CIT</td>
<td>Critical Incident Technique</td>
</tr>
<tr>
<td>EACH</td>
<td>European Association for Children in Hospital</td>
</tr>
<tr>
<td>ENT</td>
<td>Ear, Nose and Throat</td>
</tr>
<tr>
<td>NAS</td>
<td>Numeric Analogue Scale</td>
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<tr>
<td>m-YPAS</td>
<td>modified Yale Preoperative Anxiety Scale</td>
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<tr>
<td>OT</td>
<td>Operating Theatre</td>
</tr>
<tr>
<td>Self</td>
<td>In SI, an internal social object that develops in the interaction with others</td>
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<tr>
<td>SI</td>
<td>Symbolic Interactionism</td>
</tr>
<tr>
<td>SRNA</td>
<td>Student Registered Nurse Anaesthetist</td>
</tr>
<tr>
<td>STAIC</td>
<td>State Trait Anxiety Inventory for Children</td>
</tr>
<tr>
<td>UN</td>
<td>United Nations</td>
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Abstract

Forty to sixty percent of all children having surgery experience preoperative anxiety. Preoperative anxiety is a risk factor for negative behavioural changes postoperative. It is of importance to find strategies in the interaction with the child to reduce anxiety. The overall aim was to describe CRNA’s interaction with the child in relation to anxiety during anaesthesia induction and to describe the translation process of m-YPAS into Swedish and the testing of the psychometric properties in a Swedish context. In paper I an explorative qualitative approach with CIT was used and 32 CRNAs were interviewed. Experiences described were about the organisation which included effect of information, teamwork and time. Other experiences were grouped around interrelations such as, communication, meeting both anxious and calm children and experiences of use of physical restraint. Actions taken to reduce anxiety were optimizing the situation, as acting according to the situation, it could mean altering routines, though always without jeopardizing the safety of the child, preparing ahead and using distraction. Creating interpersonal interaction such as, creating contact, participation and using collaboration with the child, parents and colleagues. In paper II m-YPAS was translated into Swedish using cross cultural back translation. The psychometric properties of m-YPAS were tested in two phases. In phase I 52 children were assessed in real time by two SRNAs and one CRNA using m-YPAS and NAS. In phase II 98 video films of children were assessed by experienced CRNAs in the same way as in phase I. The psychometric properties of m-YPAS were good. The m-YPAS needs training to gain good reliability. Conclusion: In the interaction between CRNAs and the child, being flexible and sensitive to the child, taking the role of the child, and acting according to the need of the child were cornerstones in reducing preoperative anxiety and avoiding use of physical restraint. The m-YPAS can be used as an educational tool to enhance the anaesthetist’s ability to interpret the child’s anxiety. The m-YPAS is a valid and reliable assessment instrument to examine the efficiency of interventions and compare the result of research between cultures.

Key words: Preoperative anxiety, child, nurse anaesthetist, anxiety assessment
Introduction

Many of the general fears a child expresses when asked are connected with situations in the hospital such as blood, injections, disease and death. The situations causing anxiety in the child changes with age and level of development of the child (1-3). Anxiety before anaesthesia and surgery is common in children. A young child runs a higher risk of experiencing preoperative anxiety than an older child. Other risk factors are previous negative experiences of health care and being accompanied by a parent with a high level of anxiety (4-8). The child wants the parents present at anaesthesia induction and parents want to be present if they are given the chance (9-11). In Sweden there is a routine of parental presence at anaesthesia induction (12).

Preoperative anxiety is a risk factor for agitated emergence from anaesthesia and later postoperative negative behaviours such as sleeping and eating disturbances (4, 13). An anxious child is usually uncooperative and there is a risk of the child being physically restrained for anaesthesia induction (14). It is therefore of utmost importance to reduce preoperative anxiety in the child. Different pharmacological and non-pharmacological interventions such as distraction, and psychological preparations are used to reduce the child’s preoperative anxiety (4, 14-25). Coming to the OT the child meets the staff and the anaesthetists who are strangers which add to the anxiety (26, 27). The interaction between the anaesthetists and the child affect the anxiety of the child and the anaesthetists have the potential to decrease the child’s anxiety in the interaction (26). According to the UN’s Convention on the rights of the child (28) “In all actions concerning children, whether undertaken by public or private social welfare institutions, courts of law, administrative authorities or legislative bodies, the best interests of the child shall be the primary
consideration” (28). It is important for anaesthetists to live up to the convention on the rights of the child to assess and reduce the child’s preoperative anxiety. Assessing the child’s anxiety can be a challenge for the anaesthetists since children have diverse ways of showing their anxiety (29). Interventions to reduce preoperative anxiety are studied. There are limited amount of studies on the actions taken by the anaesthetists in the interaction to reduce the child’s preoperative anxiety. It is of importance to study the actions taken by the anaesthetists to reduce the child’s preoperative anxiety to enhance the perioperative care of the child. In order to know the efficiency of different interventions there is a need for reliable and valid assessment instruments developed and adjusted to the setting and culture where the instrument is used (30-32).

**Background**

**Social stages in development**

Children’s social and cognitive development can be seen as going through stages or as a continuum without defined boundaries. The development of the child according to the theory of Piaget comes from the child’s thought process and how that process affects the child’s understanding of the world (33). The psychologist Vygotsky’s main focus in his theory is a sociocultural perspective. In this perspective the development of the child is a continuity and the cognitive competencies grow through the interaction with more mature members of the society (34). Symbolic interactionism talks about four stages the child goes through in the development of self. The new born child does not have a self. The self is developed in the interaction with other people. In the first stage, the preparatory stage the interactions are only imitation of the actions
of others. The interaction does not have a meaning as it lacks a symbolic understanding. In the play stage the child learns words with a shared meaning (35). Similarities can be seen in the theory of Piaget, the preoperational stage, age 2-6, where the child uses symbolic thinking including words to understand the world (33). According to SI the child is defined as a social object by the persons of importance to the child, the significant others. As the child is pointed out by the significant others the child sees himself as a distinct separate social object and assumes the perspective of that significant other. The significant others are often the parents. In this stage the child can only relate to one individual at a time (35). Vygotsky sees the child as an apprentice learning from parents and other people close to the child. The most important learning tool is the specific language of the culture (34). Gradually the child relates to several significant others. In the game stage the child puts all the significant others together into a group and they become “generalized others” (35). The child internalizes the rules of the generalized others, changing in situation but not really changing internally in each new interaction. Similarities can be seen in Vygotsky’s theory which means that with mastering the language children can express their thoughts to social partners and incorporate others ideas and the ideas of the culture as their own (34). In the theory of Piaget the child age 7-11 can interpret experiences rationally rather than intuitively (33). The last stage in SI, the reference group stage the child interacts with many different generalized others. The views of one group can be of importance in one situation and then it has no importance in another situation (35).

**Anxiety, fear, distress and stress**

Anxiety is a natural reaction and is there to prevent the human being from being hurt (36). The words anxiety, fear, distress and stress are somehow used
Anxiety in a child

The content of fear experienced by the child changes with the age and development of the child (2, 38). In early childhood the child is afraid of strange persons and objects. At this age separation anxiety also emerges (42). A preschool child is afraid of being alone, darkness, animals and specific people, whilst an older child is more likely to be afraid of diseases and enclosed places. Fear of the unknown, fear of danger and death, medical fears and fear of failure and criticism are other common fears in a school child (1, 3, 43). The frequencies of fears tend to decrease with increasing age from children to adult.
Although one theme, the fear of death and danger continues through childhood to adulthood (43). Medical fears originate from previous frightening experiences while fear of the unknown and fear of danger and death originate from information given by others (1). A child admitted to hospital experiences fears related to being a patient where pain is the item most frequently mentioned. Number two on the list is nursing interventions such as injections. Other common fears in the hospital are separation from family, being left alone, exercise of power by adults and fears of instruments and equipment. The conclusion being that the physical, social and symbolic environment of the hospital is scary to children (44). Behaviour the child display in trying to get out of the situation is crying, trying to run away and expressing negative emotions (29, 45). Children age 4-6 talk about hiding and closing their eyes to get out of the frightening situation in the hospital (45). Fighting the situation the child displays physical resistance and uses words to express that they want to get out of the situation (29, 45).

**Preoperative anxiety in a child**

The incidence of preoperative anxiety in a child at anaesthesia induction is 40-60 % (4, 5, 29). Risk factors for having preoperative anxiety are: previous problems with health care visits, having an anxious parent, young age and a child with low sociability (4-7, 46-48). There are also other factors related to preoperative anxiety in a child, such as fear of the unknown, loss of control and uncertainties about acceptable behaviour in the preoperative setting (49). Preoperative anxiety can lead to prolonged time for anaesthesia induction (4). The anxiety also leads to a post-operative more agitated emergence from anaesthesia (4, 8, 13, 37) and higher postoperative consumption of analgesics (4). Negative behaviour changes (4, 8, 13, 50-52) that later then the immediate recovery such as; general anxiety, fear of the dark, regression, apathy or
withdrawal, sleeping and eating disturbances, aggression to authority and separation anxiety are caused by preoperative anxiety (4, 37, 47). While waiting for surgery some children experience lower levels of physical and psychosocial quality of life in the month prior to surgery compared to healthy children (53).

Assessing anxiety

Development and translation of assessment instruments

Assessment instruments are a way of gathering observations in a structured manner to make sure all observers are assessing the same thing. Items describing and covering the phenomena have to be found. Those items can be found through literature reviews, expert panels or empirically through research carried out for the purpose of developing a scale (54). In order to get good psychometric properties in an instrument scrupulous care has to be taken to choose items and use a language that is easily understood and has the same meaning for the users of the instrument (30). All the items in the instrument should reflect different views of the phenomena. There should be an optimum of items to cover the entire phenomena. The instrument has to be tested for reliability and validity to ensure correctness so that the use of the instrument will not lead to faulty research results due to a malfunctioning instrument. It is often better to use an already existing instrument then develop a new one (54). However an existing instrument in another language needs translation into the target language to be reliable and valid. It is both the cultural context and wording that needs to be translated to ensure that the instrument is suitable for use in the target language. Using the process of translating and then back translating by bilingual persons, then comparing the original version with the back translated version, negotiating consent in the wording. Different ways of describing phenomena can be used in different cultures. Some phenomena may
not even exist in the target culture. It is essential that the instrument in the target language transfers the meaning of the instrument not the actual wording (30).

*Anxiety assessment instruments*

The first step to manage preoperative anxiety is to find reliable valid assessment instrument that can help children to communicate their anxiety. In the busy intraoperative setting an extensive assessment instrument that takes time to fill out may be difficult to use. An instrument that is easy to use and not require a lot of time to fill out is preferred (55). There are extensive instruments to assess anxiety in children that take quite some time for the child to fill out. There are also global instruments measuring one overall anxiety, not different dimensions of the phenomenon (56). Drawing is one way of assessing anxiety. The child can make the drawing and the anaesthetists interpret the drawing according to a template (57, 58). Another way of assessing children’s anxiety is to use observational assessment instruments (31, 59-62). The advantage of observational tools is that it does not bother the child in an already stressful situation (31). For an overview of anxiety assessment instruments see table 1.
Table 1. Overview of anxiety assessments instruments

<table>
<thead>
<tr>
<th>Name</th>
<th>Type of Scale</th>
<th>Age group</th>
<th>Behaviour assessed</th>
<th>Translated into Swedish</th>
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<tbody>
<tr>
<td>STAIC/State Trait Inventory Children (63, 64)</td>
<td>Self-reporting</td>
<td>≥5</td>
<td>Anxiety</td>
<td>Yes</td>
</tr>
<tr>
<td>NAS/Zero to Ten Anxiety Scale (56)</td>
<td>Self-reporting</td>
<td>7-13</td>
<td>Anxiety</td>
<td>Yes</td>
</tr>
<tr>
<td>VAS-Anxiety/Visual Analog Anxiety Scale in Children (65)</td>
<td>Self-reporting</td>
<td>7-16</td>
<td>Anxiety</td>
<td>Yes</td>
</tr>
<tr>
<td>m-YPAS/Modified Yale Preoperative Anxiety Scale (31, 59)</td>
<td>Observational</td>
<td>2-12</td>
<td>Preoperative anxiety</td>
<td>Yes (present study)</td>
</tr>
<tr>
<td>ICC/Induction Compliance Checklist (66)</td>
<td>Observational</td>
<td>2-8</td>
<td>Anxiety and negative behaviour during anaesthesia induction</td>
<td>No</td>
</tr>
<tr>
<td>PACBIS/Preoperative Adult Child Behavioural Interaction Scale (62)</td>
<td>Observational</td>
<td>3-12</td>
<td>Perioperative child and parent behaviour and interactions</td>
<td>No</td>
</tr>
<tr>
<td>CEMS/Children’s Emotional Manifestation Scale (60)</td>
<td>Observational</td>
<td>7-12</td>
<td>Emotional response</td>
<td>No</td>
</tr>
<tr>
<td>OSBD / Observation Scale of Behavioural Distress (67)</td>
<td>Observational</td>
<td></td>
<td>Anxiety</td>
<td>No</td>
</tr>
</tbody>
</table>

*m-YPAS*

Kain et al (1995) (59) constructed the Yale Preoperative Anxiety Scale (YPAS) based on behaviours reflecting anxiety. An expert panel observing video films of children taken into the operating room defined five domains the child’s anxiety
can be expressed in. The domains are 1. Activity, 2. Emotional expressivity, 3. State of arousal, 4. Vocalization, and 5. Use of parents when present. Within these five domains there are 22 items defined and the scale is validated for use in children age 2-6 (59). After modifying the YPAS to be applicable even in the preoperative setting and for another age group the m-YPAS was validated against STAIC (31). STAIC is the most widely used assessment instrument for assessing general anxiety in children (31). The final instrument consists of the same five categories as YPAS but 9 of the 22 items were modified to describe new behaviours observed. The instrument m-YPAS has good-to-excellent inter- and intra-observer reliability and validity for assessing children’s anxiety age 2-12 in the preoperative holding area and during the induction of anaesthesia (31, 59). Because there are different numbers in the categories partial weights are calculated and then added together to obtain a total score ranging from 23–100 for each time-point, with higher scores indicating greater anxiety (31). A calculation example of the scores is four categories containing four items and one category containing six items. With a score of two in each category the calculation is: (2/4 + 2/6 + 2/4 + 2/4 + 2/4) x 100/5=46. If the child is hiding his/her face it is not possible to assess the behaviour “emotional expressivity” and that category is then excluded from the calculation (59). This item is assigned the number 0. The scale is frequently used in research (5, 6, 8). To be able to find new strategies to alleviate a child’s preoperative anxiety in a better way the researchers need valid and reliable assessment instruments to evaluate the result of interventions (25, 31).
Interventions to reduce preoperative anxiety

**Non-pharmacological interventions**

**Psychological preparations**

Psychological preparation programs are used to reduce a child's anxiety. Age appropriate preparation programs and individualized therapeutic play have been successful in reducing anxiety in a child. The programs consist of a guided tour of the OT, the child can play with the equipment and a role play giving anaesthesia to a doll. There are also opportunities for the child to ask questions about the procedures (18-21). The perioperative dialogue is a concept where the same anaesthetist meets the child beforehand, the same familiar anaesthetist gives the anaesthesia and visits the child postoperatively which inspires confidence in the child and thus reduces anxiety (15, 68). Familiarization with the equipment before surgery also reduces anxiety (11, 69). Evaluating an existing preadmission educational visiting program Rice et al found lower anxiety in the waiting area but not at anaesthesia induction compared to the child and parents choosing not to visit. The program consists of a visit to the preoperative waiting area two weeks in advance to meet the staff and to see some of the equipment (16). An advanced program containing video modelling and education before surgery adding distraction on the day of surgery, parental presence, coaching of the parents and familiarizing the child with the equipment is successful in reducing children’s preoperative anxiety. The program has the advantage of not needing to add pharmacological intervention with the side effects of sedative drugs (11).
**Distraction and relaxation**

Programs with distraction and relaxation such as, calming music together with a reduction of staff so that the only persons interacting with the child are the anaesthetists giving anaesthesia are successful in reducing anxiety. The child is significantly less anxious than with standard care at anaesthesia induction (22). Using relaxation such as hypnosis (70) and guided imagery where fantasy is used to take the focus of the child away from the procedure also reduces anxiety (71). Interactive music therapy is effective at separation from parents and at entrance into the OT compared to a child not receiving any distraction. At anaesthesia induction however there is no reduction of anxiety. (72). Distraction where the child plays handheld videogames is effective as an anxiety reducer (73). Clowns accompanying the child are an effective way of managing children’s preoperative anxiety. Children accompanied by both a clown and parents do not exhibit higher anxiety in the OT than in the holding area. Parental presence alone does not have the same good outcome as parents and clowns together (23, 74).

**Parental presence**

In some countries parental presence during anaesthesia induction is not standard procedure while in other countries the parents are always present at anaesthesia induction (8, 12, 16, 22, 49, 74). There is no difference in anxiety at induction with parents present or absent. On the other hand the anxiety in the child separated from the parents is higher at separation than in the child accompanied by the parents assessed at the same time point (22, 75). Where parental presence is not a routine procedure parental presence is used as “rescue therapy” if the child expresses extreme anxiety on separation (8, 22, 37, 72). One way to reduce the anxiety at separation from parents is to let the parents be present at anaesthesia induction (75). It is shown that anxious parents are one
of the risk factors for preoperative anxiety in the child (5, 47). The use of
reassurance and empathy by the parents is interpreted as an expression of fear
by the child and that type of communication increases the child’s anxiety (76-
78). Coaching the parents in coping promoting behaviour is a way to get past
that (79). With family-centred preparation for surgery parents are less anxious
than parents without the preparation and thus reducing the risk factor of an
anxious parent (11). There is no difference in the anxiety of the child if one or
two parents are present at anaesthesia induction, but when both parents are
present at anaesthesia induction, they are less anxious than being the sole parent
present (80). Even though there are inconclusive results on parental presence at
induction (4, 10, 74) the EACH charter, article two, states that the child has
the right to have their parents present at all times even at anaesthesia induction
(81). Given a choice both parents and the child want the parents to be present
at anaesthesia induction (10, 82-84).

**Pharmacological interventions**

Premedication with sedatives is commonly used to reduce preoperative anxiety
in children (25, 85-88). The place of premedication to treat preoperative
anxiety is discussed. The argument for is that reducing preoperative anxiety in
the child is paramount and that using drugs is a good way to accomplish this.
The argument against using pharmacology is that there are side effects to the
drugs used and the use of premedication should be individualized, not a
standard procedure. The way to reduce anxiety should be by a multimodal
preoperative program not drugs (89).
A Child’s rights versus physical restraint

According to the EACH resolution on child restraint accepted in June 2010 “Restraint should be avoided in medical procedures unless there is no alternative in a life threatening situation” (90) and the Convention on the Rights of the Child, article three paragraph one, states that “in all actions concerning children the best interest of the child should be taken into consideration” (28). When the child is uncooperative physical restraint is sometimes used for anaesthesia induction (14, 37, 91, 92). Ninety per cent of anaesthetists would use physical restraint to proceed with anaesthesia in an uncooperative six year old child scheduled for strabismus surgery. The anaesthetist is less inclined and more uncomfortable using physical restraint with increasing age of the child (91). There are however diverging views on using physical restraint among anaesthetists. There are anaesthetists who are against the use of physical restraint of the child (14). Cancelling surgery because the child is uncooperative is not an option for some anaesthetists while for others cancelling and rescheduling the surgery in non-life threatening situations are more rule then exceptions (89, 91). Anaesthetists working mainly with children are more likely to cancel and reschedule an uncooperative child than anaesthetists working on a less regular basis with children (91). The EACH charter (81) also states that where a child is cared for the staff shall have specific training in caring for children.

Nurse anaesthetist

The profession nurse anaesthetist, CRNA, exists in Sweden, Norway, Denmark, Switzerland, France and the United States (93, 94). CRNAs in Sweden have a one year post graduate education and get the title Registered Nurse with
Graduate Diploma in Specialist Nursing – Anaesthesia Care (93). The responsibilities in the profession can vary between countries but the common feature is that the CRNA is independently administering anaesthesia (93, 94). In most other countries the anaesthesiologist administers anaesthesia with the assistance of an anaesthetic nurse. The anaesthetic nurse is trained in assisting the anaesthesiologist in the administration of anaesthesia but is not independently administering anaesthesia (93). In Sweden the CRNAs are nurses with qualifications to, with some support from an anaesthesiologist, independently induce, maintain and conclude general anaesthesia in elective surgery to patients without severe systemic diseases. In patients with severe systemic diseases and acute surgery the CRNAs administer anaesthesia in collaboration with an anaesthesiologist (93, 94). The CRNA, apart from the medical care, also plans the care together with the patient aiming at creating trust, alleviating anxiety and fear and protecting the integrity of the patient (93).

Interaction

Symbolic interactionism

Symbolic interactionism is a sociological perspective that explains human behaviour with more focus on interaction than personality and society’s impact on individuals. The theory is considered to have begun with Herbert Mead, and later his student Herbert Blumer (95). SI has three central elements. 1. People act relating to the meaning the symbols they encounter have for them. 2. The meaning of symbols is defined from social interaction with others. 3. These meanings are modified through an interpretive process used in interaction with others (96). The meaning of a situation results from on-going interactions with others and on-going interaction within the individual (thinking). The cause of
actions is created in the individuals thinking not just conditioned by someone else. Each individual has freedom of choice in their actions although with some limitations from societal and cultural norms. In interaction the individual reflective thinking enables a communication that is meaningful to everyone participating in the communication, where there is a common understanding of the symbols used (35). Words are the most important symbols, giving people the opportunity to think and help individuals to understand and interpret the world. Body language is a type of symbol frequently used and interpreted (35).

Another key element in SI is taking the role of the other which is to understand the other’s perspective and it is one of the keys to successful teaching, support and empathic behaviour. It helps the person to understand how one’s own actions affect other people (35, 97).

Interactions between a child and anaesthetists

Anaesthetists spend on average six minutes with the child. Only 6% of that time is spent on non-medical talk and close to two minutes used in talking with the child, the rest of the time is spent talking with the parents (98). The type of communication used during the limited time is vital to reduce the child’s anxiety (84). Negative suggestions or words with negative emotional or sensory content increase anxiety in the child. Focusing on the child’s emotions such as showing empathy, empathic touch and reassurance is behaviour in the adult that increase the anxiety in the child. Giving the child inappropriate control over situations they cannot control are other distress promoting behaviours (27, 99). Coping promoting behaviour such as non-procedural talk, distraction, using humour and medical reinterpretation and information reduce the child’s anxiety (27, 79, 99, 100). Serenity can be transmitted to the child by the anaesthetists if they have the necessary communication skills (84). The information given to the child it should also be age appropriate (101, 102). The
perioperative dialogue is communication over time. It is an on-going dialogue starting preoperatively and continuing intra- and postoperatively. The perioperative dialogue gives the child, the parents and the anaesthetists the benefit of familiarity, seeing a familiar face and time and courage to ask questions otherwise held back (15, 26, 68, 103). An atmosphere of trust and mutual respect is created in the perioperative dialogues which reduces anxiety (15, 68, 104, 105).

**Rational of the thesis**

Preoperative anxiety is common in a child undergoing surgery. There is much research published on how to reduce preoperative anxiety in the child using psychological preparation, distraction, parental presence and sedative drugs. Non-pharmacological interventions or sedative drugs can be used by itself or in combination. Using sedative drugs has its limitations with the side effects of the drugs. When anxiety is manifested as an uncooperative child physical restraint is sometimes used. The child has the right to have their interests taken into account in all circumstances. Coming into the hospital and the encounter with the anaesthetists the child is at the mercy of the staff. The anaesthetists can in the interaction with the child either increase or decrease the child’s anxiety. There is little research done in how the anaesthetists in the interaction with the child reduce preoperative anxiety. Thus to study the CRNA’s experiences and actions in the interaction with the child to reduce anxiety is important to gain more knowledge about how to care for a child. In order to make a proper assessment of the child’s anxiety and to be able to compare research done in different cultures a valid assessment instrument in the appropriate Swedish cultural setting is needed. A reliable and valid observational assessment
instrument that can be used to compare research between cultures such as m-YPAS is needed.

**Aim**

To describe CRNA’s interaction with children in relation to anxiety during anaesthesia induction and to describe the translation process of m-YPAS into Swedish and the testing of psychometric properties in a Swedish context.

**Material and Method**

**Design and Perspectives**

A descriptive and a methodological design were used. The ontological and epistemological frameworks are in nursing science and have a holistic view on reality. The base is a naturalistic perspective where reality is seen as a complex entity (106). The individual is seen as a thinking active participant in the environment. Social reality is created in symbolic interaction with others and reality is seen through the meaning of symbols. Knowledge is pragmatic, those actions tested and working for the individual are remembered and learned (35). In line with this perspective an explorative design with a qualitative approach, CIT according to Flanagan (1954) was used in paper I. The focus of the method is on experiences and actions taken by the individual to gain knowledge. The CRNAs were asked about experiences and actions taken in their work with children. In paper II the translation process was done to have an assessment instrument that is culture specific and the words (symbols) used
have the same understanding for everyone using the instrument. To assess a complex phenomenon a global rating instrument risks being fragmented. To be able to see the whole complex of the phenomena the m-YPAS, assessing many aspects of the individual’s behaviour, was translated in a culturally sensitive way. Quantitative analyses was used to test the psychometric properties of the translated instrument. For an overview of the structure of the papers see table 2

Table 2. Overview of the structure of the papers,

<table>
<thead>
<tr>
<th>Paper</th>
<th>Aim</th>
<th>Design</th>
<th>Participants</th>
<th>Data collection</th>
<th>Data Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>To explore nurse anaesthetist’s experiences and actions when administering and caring for children requiring anaesthesia</td>
<td>Descriptive qualitative approach</td>
<td>32 CRNAs from three different hospitals</td>
<td>Interviews according to Critical Incident Technique</td>
<td>Critical Incident Technique</td>
</tr>
<tr>
<td>II</td>
<td>To describe the translation process of m-YPAS into Swedish and the testing of the reliability and validity of the measure when used with Swedish children</td>
<td>Translating m-YPAS into Swedish and psychometric testing</td>
<td>Phase I, 52 children undergoing ENT surgery. Age 2-12 years Phase II, 98 children undergoing ENT surgery. Age 3-7 years</td>
<td>Assessing child’s anxiety using m-YPAS in a pilot study and the main study</td>
<td>Interrater reliability, internal consistency concurrent and construct validity</td>
</tr>
</tbody>
</table>

CRNA = Certified Registered Nurse Anaesthetist; ENT = Ear Nose and Throat; m-YPAS = modified Yale Preoperative Anxiety Scale
Setting
The context was OTs in five hospitals where one of the hospitals was a children's hospital. Study I was performed at three of the hospitals including the children's hospital. Study II was performed in two different outpatient surgery departments in middle sized hospitals in the southern part of Sweden. All children in study II were undergoing ENT surgery.

Paper I
Participants
A purposeful sampling was used to get maximum variation in demographic data. Table 3. Altogether 32 CRNAs were included in the study. The head of each of the three departments was contacted with information about the study and they all gave their approval. Further information was sent to the head of each department who then gave the information to CRNAs and asked for participation. The head of department was asked to make a selection of participants to get as wide a variation as possible. The percentage of female CRNAs is higher than male CRNAs which made an impact on the sample (107).

Table 3. Sociodemographic and professional data of the nurse anaesthetists presented as numbers

<table>
<thead>
<tr>
<th>Age</th>
<th>Female/Male</th>
<th>Have children/Have no</th>
<th>Years of experience as a CRNA</th>
<th>Working in a children's hospital/general hospital</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>3-5</td>
<td>6-10</td>
</tr>
<tr>
<td>31-40 yr</td>
<td>7</td>
<td>4/3</td>
<td>3/4</td>
<td>2</td>
</tr>
<tr>
<td>41-50 yr</td>
<td>14</td>
<td>12/2</td>
<td>13/1</td>
<td>3</td>
</tr>
<tr>
<td>51-60 yr</td>
<td>9</td>
<td>9/0</td>
<td>6/3</td>
<td>1</td>
</tr>
<tr>
<td>&gt; 61 yr</td>
<td>2</td>
<td>1/1</td>
<td>1/1</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>32</td>
<td>26/6</td>
<td>23/9</td>
<td>6</td>
</tr>
</tbody>
</table>
Critical Incident Technique

Critical Incident Technique was developed by Flanagan at the end of World War II to identify successful behaviour from the most competent pilots in the USA air force during critical incidents to solve practical problems (108). CIT should be looked at as a set of principles which must be flexible for the given situation. CIT is a procedure to collect important facts about human behaviour in specific situations. The situations should be well defined and the goals of the actions clear. Flanagan (1954) has described five steps; 1. Identification of the general aim of the study; 2. Planning and specifications. 3. Data collection. 4. Data analysis. 5. Interpreting and reporting (108). The method can illuminate aspects of best and worst practice in nursing, and help nurses to understand their role in the interaction between nurses and patients (109). Different data collection methods can be used such as observations, interviews and written self-reports (108). The rigour in the collection of data in CIT is of great importance. The participant’s ability to recall events is crucial to ensure trustworthiness of the study as is the interviewer’s ability to help the informant to be as specific as possible (110). In CIT it is the number of critical incidents collected that is of importance. One hundred incidents may be enough but depending on the complexity of the situation more incidents needs to be analysed until saturation is reached (111).

Data collection

Data was collected using semi structured interviews by the researcher and were digitally recorded. The interviews were transcribed verbatim by a secretary. Two test interviews were performed to ensure that the questions and the interview technique would capture the required information. These interviews were included in the study. The interviews took from 9 to 60 minutes. Information that the interview would focus on critical incidents in relation to anaesthesia induction in children was given to the CRNAs beforehand. The CRNAs were
asked to describe critical incidents in children age 3-12. The opening question was: “Can you tell me an incident when you were giving anaesthesia to a child where you felt that the child was calm going to sleep?” Likewise, “Can you tell me an incident where you felt that it wasn’t good, the child did not cooperate and was anxious going to sleep or you had to cancel the surgery due to the child being too anxious?” Follow up questions were given to clarify an incident. The time frame for the situation chosen to find incidents that met the aim was from the first encounter with the child through to anaesthesia induction.

**Data analysis**
The transcribed interviews were read through by the researcher at the same time as listening to the digital recordings to ensure credibility since the interviews were transcribed by a secretary. The data were read through over and over again for the researcher to become familiar with the content. Critical incidents were identified and grouped into experiences and actions (n=193). Within respective group the incidents were registered either as successful behaviour or unsuccessful behaviour. Meaning unites were extracted from the behaviours. According to CIT (112) the behaviours were compared in order to find similarities and differences and grouped together in subcategories. The subcategories in Experiences; (n=16) and in Actions; (n=25) were then compared for similarities and differences and then grouped into categories (Experiences; n=6 and Actions; n=6). From the categories emerged two main areas in both Experiences and Actions.

**Paper II**

**Participants**
Two samples of children were included; the pilot study (phase I) a total of 61 consecutive children (2–12 years) undergoing ENT surgery were asked to participate, age-group validated for m-YPAS (31, 59). Of the 61 children 52
were included in the study. Drop-out is described in paper II. In the main study (phase II) 102 consecutive children (3-7 years) undergoing ENT surgery were asked to participate. Ninety-eight children in the age group (3-7 years) were included. Drop-out is described in paper II. The sample was video filmed for a previous project and is described in detail elsewhere (113).

**Instrument translation**

The original version of m-YPAS was translated into Swedish according to strategies developed by Brislin (30). Approval to use and translate the instrument was obtained from the copyright owner (Kain ZN). The translation was done in 4 steps. In step I two experienced bilingual persons translated the original English version independently, an anaesthesiologist and a systems analyst. In step II consensus was reached on a common Swedish version by an expert panel (Anaesthesiologist, CRNA and a child and adolescent psychiatrist). Step III, translation back to English was carried out by an English teacher understanding the Swedish language, but without knowledge about the m-YPAS or having seen the original version in English. Step IV, the two English versions were compared and correction of the Swedish translation was done. The result was in agreement with the English original, the translation was considered to be correct see appendix 1.

**Psychometric testing**

Psychometric testing is testing the characteristics of the instrument. This is done by testing the reliability and validity of the instrument. The reliability of the translated m-YPAS was tested as internal consistency and interrater reliability. The internal consistency measures the correlation between the items on the scale ensuring they measure aspects of the same phenomena. Interrater reliability is testing the extent of agreement between several coders assessment of the same behaviour for each item (54). Concurrent and construct validity was
tested. Concurrent validity, comparing one instrument to another valid instrument at the same time ensuring the instruments measure the same criteria (54). Construct validity, ensuring the instrument measures the construct under investigation was tested. The process was divided into two phases. Phase I, a pilot study in real time. Phase II assessing video films. Minor revisions consisting of including the words “adequate reaction to premedication” in item one in all categories. The final version of m-YPAS was tested.

**NAS**

Numeric Analog Scale (NAS) (56). A self-reporting scale graded from 0-10 with word anchors, inspired by Crandall, was used as an instrument to compare the m-YPAS with (56).

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not at all</td>
<td>little</td>
<td>medium</td>
<td>a lot</td>
<td>worst</td>
<td>imaginable</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 1. NAS = Numeric Analog Scale with word anchors

**Data collection**

In Phase I data were collected in March and April 2008. Usual standard practice at the hospital was followed. Assessment instruments used were m-YPAS and NAS. Anxiety scores were obtained at premedication and at anaesthesia induction. Two nurses studying to become nurse anaesthetists (SRNA) and one CRNA were performing the assessment. The CRNA filled out the assessment from memory after the procedure was done. The SRNAs obtained the induction scores looking through a window into the OT. The parents assessed the child’s anxiety using NAS. All children got premedication
with paracetamol 40 mg/kg body weight (orally/or rectally). One child got sedative premedication (Sufentanil) intranasal.

In phase II the data were collected at another hospital in the southern part of Sweden. Usual standard practice at the hospital was followed. Assessment instruments used were m-YPAS and NAS. Anxiety scores were obtained at premedication and at anaesthesia induction. Video films from a previous research project (113) were assessed by two experienced CRNAs. Four video films were assessed together to reach consensus. The rest of the films were assessed independently. Standard procedure included premedication with 0.5 mg/kg body weight of midazolam and paracetamol 40 mg/kg, either orally or rectally.

**Data analyses**

Internal consistency of m-YPAS was tested using Cronbach’s alpha coefficient. The values preferably range between 0.7 - 0.9 depending on the number of items and sample size. Lower values than 0.70 indicate that the items in the scale is not measuring the same thing. With more items in a scale the value of Cronbach’s alpha would have to be higher to be considered good (54). The instrument m-YPAS consists of 22 items thus Cronbach’s alpha should preferably be close to 0.90. For interrater reliability Cohen’s kappa was used to calculate total agreement since it was an ordinal scale and weighted kappa was used to calculate partial agreement. A value of < 0.20 indicates poor agreement, 0.21-0.40 fair agreement, 0.41-0.60 moderate agreement, 0.61-0.80 good agreement and 0.81-1.0 very good agreement (114).

Construct validity, as it was a non-parametric non-normal distributed sample, Wilcoxon signed-rank test was used. When comparing more than two groups, phase I (SRNA 1 and 2, CRNA and parents) Friedman test was used (115).
Concurrent validity, comparing one instrument to another assessment instrument the correlation between m-YPAS and NAS, was analysed with Spearman’s rank correlation ($r^*$) test since it was ordinal data (115).

**Ethical considerations**

The treatments, procedures and methods in health care need to be evaluated to make sure the best care possible is given (116). In accordance with the principle of beneficence (117) this research was performed in order to be able to give the child the highest standard of health care in line with the UN convention on the rights of the child (28). According to the Declaration of Helsinki the researcher should “protect the life, health, dignity, integrity, right to self-determination, privacy, and confidentiality of personal information of research subjects” (116). According to the principle of non-maleficence (117) there was no risk of harming life or health in the participants. Video filming can be an ethical dilemma intruding on the integrity of the individual filmed. No pressure was put on the participants to give consent to be part of the research. (117) It was ensured that the participants got the same care even if they chose not to consent in line with the principle of justice (117). The video films were not shown to anyone else but the researchers and the interviews were voluntary. In the interviews the CRNAs were told not to tell anything they did not want to. The confidentiality of the persons involved was guaranteed. The data was stored in a locked fire proof cupboard. No individual could be identified in the findings presented. According to the principle of autonomy (117) all individuals who were participating in the study received information and were made aware that they could discontinue their involvement in the study whenever they wanted to without giving any reason. The participants were informed in a way suitable for their level of knowledge that is for the CRNAs in terms they understood. The
information was given several times and the participants were asked to pose questions. According to the Act of 2003 (118) all guardians gave written consent to participate in the research. All children who could understand the information were asked if they wanted to participate and if they did not want to participate they were excluded even if their guardians gave consent. This thesis was performed in accordance with the declaration of Helsinki (116). The laws in Sweden were also followed and according to that there was no need for an ethical approval from the Ethical Board when interviewing staff, paper I. Paper II was approved by the medical Ethic Committee at Linköping University, Linköping, Sweden (Dnr 97374 M71-08). The researcher in this thesis did not have any conflicting interests that might influence the result of the research outcome. The researcher in this project was experienced in the work of anaesthesia and had appropriate knowledge about research methods.
Results

Paper I

Two main areas and three categories under each main area emerged from the CRNA’s experiences and two main areas and three categories under each main area emerged from the CRNA’s actions. The CRNAs had experiences of the organizations’ influence on their work, how stress and lack of information could reduce their ability to create a relationship with the child. They also described how teamwork enhanced their ability to optimize the situation. The CRNAs described creating contact with the child and how they used participation and collaboration to enhance the situation. The CRNAs talked about preparing ahead but also how they acted differently in response to the situation at hand see table 4 and 5.
TABELL 4 HÄR
| Tabell 5 här |
The CRNA’s experiences in the encounter with children

Organization focused
The CRNAs experienced that the organization of the work either facilitated or obstructed the possibilities to decrease the child’s preoperative anxiety.

Information transfer
When the CRNAs did not have access to sufficient information about the specific child in advance it made it difficult for the CRNAs to make the necessary preparations for the child. This was obvious when it came to a child with special needs. “When I met the child…. I got the information that he had autism…he did not have a language ….I did not know that so I was taken by surprise.” In organizations where there was a routine in place to transfer information the CRNAs described how easy it was to work and that they felt they were well prepared for the encounter with the child.

Degrees of teamwork
When the CRNAs had confidence in the colleague the work was easier. They described how easy the communication was and the trust in their colleagues, not needing to talk a lot but trusting in the other team members and each one doing their part. “It had to do with the nurse working with me, because he had been there previous times I had used this technique”. But when working with someone the CRNAs did not trust could ruin the entire situation. “Someone who sneaks in between the child and me so that we lost the contact we had.”

Effects of time
When the CRNAs felt lack of time and there was no time for preparation or reflection and being stressed they felt they did not have time to prepare the
child the way they wanted. “They are almost standing outside the door knocking and want to come in, so I became a little bit stressed” There were also descriptions of how good it was to have the time needed. “But it is also about time, I had time to sit there and explain.”

Interrelation focused

The CRNAs described the influence the relations between the actors in the preoperative setting had on their work with the child.

Possibilities to communicate

When there were difficulties in getting the parents to cooperate it also influenced the rest of the procedure. The CRNAs described difficulties in getting a rapport with the child without eye contact. “He did not look, he did not give any response, he did not answer…” Then the rest of the procedure was also described as difficult. There were other children whom the CRNAs experienced easy communication with straight away and then the rest went well. He came and gave me a toy that I could give back and our communication started like that”. Getting eye contact was describes as important for good communication. “He gave me eye contact straight away and then it was not so hard”.

Children’s degree of acceptance

The CRNAs described meeting a child who showed anxiety in different ways. There were children who were screaming and kicking while others were reserved and did not give eye contact. Some children could verbalized what they were afraid of “The patient laid down and held on desperately (to the bed) and was screaming that he did not want to” while others did not know what they came to the hospital to do and was scared when they found out. Other children
were well prepared, they knew what was going to happen and just acted on the knowledge. “Just lay down, took the mask and inhaled the anaesthetic.”

**Use of physical restraint**

The CRNAs described experiences of physically restraining a child although they did feel bad about it. They experienced this in different situations. It could be that the parents wanted to have the surgery done at the time even if the child was anxious and needed another approach. “He was maybe 10 years or even older and he was reluctant, he did not want to, no, but the parents were very determined to have it done at the appointed time”. Other situations were a child with special needs where the CRNAs did not feel they could communicate and get through to the child. There were emergency surgeries where the CRNAs did not find they had any other alternative to restraining the anxious child. “But I remember one patient ….who we had to anesthetize because it was a serious diagnosis….I was lying on top of him and pressed the mask to his face.” “Yes, we had to hold him tight and inject, but you do not feel good about it, you feel that this is wrong”.

**The CRNA’s actions in the encounter with children**

**Optimizing the situation**

Success factors to decrease anxiety were when the CRNAs prepared in advance, used distraction or acted in the situation to make the situation as good as possible.

**Acting according to the situation**

To reduce the child’s anxiety the CRNAs assessed the situation and changed their actions when they saw the child needed something else, always without jeopardizing the safety of the child. “We did a quick evaluation and saw that we
needed to give pain relief and diverted from what we usually do... gave him pain relief and anesthetize him in the bed.” It could be refraining from using frightening equipment “Puts on a pulsoxymeter when he became slightly muddled... just flushed a little oxygen from a little distance but did not put on any other unnecessary things”. Sometimes it helped the child to change induction mode from intravenous induction to inhalation. In other situations it did not help to change the induction method, the child was already so anxious the CRNAs decided together with the anaesthesiologist to cancel the surgery and reschedule. In some situations the key to success was to act immediately without delay while in other situations the CRNAs allowed the child the time they needed. There were situations where the CRNAs took charge and made the decisions without asking, other times they let the child be a part of the decision. If the routine was not to use sedative drugs, the CRNAs judged it helpful to use these in a certain child “We gave Sufentanyl® to this boy because we wanted him to have a memory from here that was positive”. All actions were in accordance with how they assessed the situation and the child in front of them.

Preparing ahead

There were different ways of familiarizing the child with the CRNAs. One way was to have the child come to the OT and meet the CRNAs several times before scheduled surgery. When the CRNAs judged the child ready they scheduled surgery and made sure the specific CRNA was the one giving anaesthesia. “She thinks it is fun to come to us, she has got confidence in me... if I am here I usually take care of her! They also prepared the child by familiarizing it with the equipment and letting it play with the equipment.” I had him coming three times before we could go ahead with the surgery.” They also prepared by making plans beforehand how to proceed. A child with special needs were given
preparation according to the specific need of the child “They had received a photo of me sent to them in advance so he recognised me when he came”.

Using distraction
In the procedures when the CRNAs knew the child was scared they distracted the child’s attention from the procedure. There were unlimited ways of distracting the child. When the CRNAs found the specific child’s interest they used that to divert the child’s attention. They also used colleagues to divert the child’s attention while they were putting an intravenous line in place or gave premedication. “I was inserting the cannula and my colleague was showing stickers. She has unlimited imagination and can keep the child’s attention for quite a long time”.

Creating interpersonal interaction
Different strategies were used to have a good interaction. The CRNAs described having a good contact with the child, having the child participate and collaborating with the child’s parents and colleagues made it easier to prevent anxiety.

Creating contact
The CRNAs used small talk just to create a rapport with the child. There were CRNAs who found out the child’s specific interest and talked about that and thus reduced the anxiety. “And then we started to talk about her interest in horses…..we talked a lot about that.” Medical reinterpretation was another strategy to reduce the tension in the child and make the equipment seem less scary. “The rubber mask we keep it for a while…… and joking about that it looked like a clown nose or an elephant nose.” The CRNAs also used nonverbal communication like playing with the child. Again the CRNAs who focused on the child and the specific needs of the child were successful in creating contact.
Creating participation

Instead of being a passive onlooker the CRNAs tried to involve the child in the situation by giving the child a choice. The choice was never to leave but within the scope of possibilities, like sitting or lying or where the cannula would be placed. “We asked if he wanted to sit up or lay down and he wanted to lie down, so he lay down”. Giving the child a chore to be responsible for made the child an active partner. “Now it is time for you to put the ice cube on the site we looked at before, and he took the ice cube and put it on his arm”.

Using collaboration

The rest of the staff in the OT and the parents played an important role in the procedure. “Then we gave reports to each other; I anaesthetised her on Wednesday and then it was like this….yes it was good……she thought it was good….then we will do it the same way today”. The CRNAs used collaboration with the parents to enhance the situation. “I asked the parent to talk to the child at home about what was going to happen.” Planning together with the child and the parents were successful.

Paper II

The translated m-YPAS was shown to be a reliable and valid instrument to use to evaluate interventions in the Swedish context and as an educational instrument to teach anaesthetists to interpret a child’s preoperative anxiety.

Psychometric testing of the Swedish version of m-YPAS

The internal consistency was high at both premedication and induction in both phase I and II. Cronbach’s alpha was 0.83-0.90 at premedication in phase I and
0.88-0.89 in phase II. At anaesthesia induction Cronbach’s alpha was 0.92-0.96 in phase I and 0.84-0.89 in phase II.

The interrater reliability in phase I weighted kappa was fair to moderate (Kw; 0.25-0.56) at premedication. The ratings differed for SRNA 2 compared to SRNA 1 and CRNA. There was no significant difference between the raters at induction and weighted kappa was moderate to good (Kw; 0.48-0.79). In Phase II rated by two CRNAs experienced in paediatric anaesthesia assessing video films the agreement was moderate to good at premedication (Kw; 0.59-0.78) and good to very good at induction (Kw; 0.66-0.91).

Construct validity, measured between premedication and induction the result in phase I was a significant (p<0.001) difference in m-YPAS scores with higher scores at induction the more stressful time than at premedication. In phase II all children had got sedative premedication and there was no significant difference between the two rating points.

Regarding concurrent validity the correlation between NAS and m-YPAS score were measured in both phase I and II at premedication and induction. In phase I when rated by the SRNAs, the correlations between m-YPAS and NAS was weaker at premedication (r² =0.39–0.48) when the child was less anxious than at the induction-time (r² =0.78). The correlation between parents ratings and CRNA, SRNA 1 and SRNA 2 with NAS was lower at premedication (r’ 0.43-0.69) than at induction (r’ 0.78-0.82). The correlation between m-YPAS and NAS rated by the CRNA was good both at premedication and induction, r=0.68-0.79. In phase II rated by experienced CRNAs the correlation between m-YPAS and NAS was good at premedication (r²) = 0.69-0.75 and at induction (r²) =0.79-0.87.
Discussion

In the result of paper I the CRNAs described experiencing of difficulties in communication with the child and use of physical restraint. The CRNAs described experiencing putting a screaming child to sleep using physical restraint. According to EACH resolution “restraint should be avoided in medical procedures unless there is no alternative in life threatening situations” (90). There is a clear framework prohibiting use of physical restraint in a child but it is still used especially in a child with special needs (14, 91). In paper I those experiences were described in terms of uneasiness by the CRNAs. The use of physical restraint in other situations than life threatening can be seen as a failure (89). An anxious child is likely to be uncooperative and running the risk of being physically restrained for anaesthesia induction (7, 14, 46, 91). The CRNAs were using strategies to decrease the child’s anxiety, to get the child to cooperate to avoid use of physical restraint.

The CRNAs talked about the influence the relations between the actors in the preoperative setting had and how they tried to make the situation as good as possible. SI is based on interaction, using symbols. In the interaction the situation is defined in accordance with the interpretation of the symbols used. Actions are taken according to that definition of the situation (35). Interpreting the symbols, body language and words, used by the child could be a challenge. Obvious signs of anxiety are crying, screaming, nonverbal resistance, verbal resistance and negative verbal emotions (29, 40, 45). These behaviours were described in the categories “Vocalization” and “Activity” of m-YPAS. Other signs are less obvious such as just being motionless and silent. Sitting still and being quiet are not as obvious signs of anxiety as being loud and physically resisting, but they are equally important signs of anxiety (40, 82). These more
subtle symbols of anxiety were described in m-YPAS in the categories “Vocalization”, “Emotional expressivity” and “State of apparent arousal”.

The CRNAs were flexible in their actions and the focus was on the interpretation of the needs of the child, which can be described as taking the role of the other that is one of the pillars in SI (35). The CRNAs described how they diverted from routines, acted very quickly or took the time the child needed. The CRNAs acted according to how they defined the situation in the interaction with the child. Knowledge about the child’s general common fears in different development phases and taking that into account (1, 3, 49, 119) helps in defining the situation. Learning the content of m-YPAS could be a way to enhance the CRNAs ability to interpret the symbols used by the child.

Coming to the OT includes experiencing both blood and injections which are a part of a child’s general fears (1, 3) so it is perfectly relevant for the child to be anxious in the preoperative setting. Meeting unknown people dressed in a strange outfit might trigger the fear of specific people (120). In the play stage where the child is interacting with one important significant other at a time (35) strange persons such as the CRNAs can be scary. A child describes separation from parents and being left alone as increasing the anxiety (45, 120).

Asking the child to be an active participant in the procedure and to collaborate with the child and parents were parts of the interactions used by the CRNAs. Involving parents and the child in the preparation for surgery is effective in reducing preoperative anxiety in the child (11). Both parents and the child want to be involved in the care (121, 122). The child wants to be listened to and respected by the nurses (68, 121, 122). One item in the category “fears of danger and death” is fear of not being able to breath (119). For the child getting an anaesthesia mask on the face can be interpreted as not being able to breathe and trigging this anxiety. The CRNAs altered the mode of anaesthesia induction according to their interpretation the child.
In the interaction the CRNAs must be able to create trust, confidence and security in the child and parents (26, 45, 123, 124). Creating contact and preparing ahead were strategies the CRNAs used. Talking about the child’s interest in horses was one example mentioned of taking the child’s mind away from the situation and creating contact. The CRNAs described situations where they prepared to meet the child in advance to get to know the child and to familiarize the individual child with themselves and the environment. The perioperative dialogue where the CRNAs meet the child in advance, give anaesthesia and meet the child after surgery, is one way of creating continuation and enhancing the interaction between CRNAs and the child (15, 26, 68, 103). Accordingly m-YPAS could be used to interpret the symbols used by the child expressing anxiety in this encounter before surgery. According to the interpretation of the child the planning of the perioperative care and deciding when sedative premedication is needed could be done.

In the Swedish translation of m-YPAS to fit the cultural setting the sentence “appropriate reaction to sedative premedication” was added to the first item in all categories. In SI the meaning of symbols is defined by social interaction with others (96). The child’s behaviour was defined as heavily sedated. The addition was done because there were no items fitting the behaviour of the child premedicated with sedative drugs according to the interpretation by the researchers. According to the Swedish assessors the second item was the one most fitting in three of five categories to the heavily sedated behaviour. That is the child being still and quiet with a neutral face expression. This can be relating to anxiety in the Freeze phase in the physical stress response theory (40). In the Swedish instrument the premedicated behaviour was placed in the first item, the researcher’s interpretation of how the scale has been used in the English version. The instrument m-YPAS has been used since 1997 in assessing both children premedicated with sedative drugs, mostly Midazolam,
and children without any sedative premedication (4, 72, 73, 125, 126). The question arises whether the differences in the interpretation of the meaning of the symbols used by the child is cultural or if there are other reasons the signs of sedation was not included in the original instrument. The effect of premedication has been rated as being non anxious in the first item in the categories (31).

In phase II there was no difference in anxiety scores between premedication and anaesthesia induction. Most children in phase II had got sedative premedication with Midazolam. This is in line with the original use of the instrument, that children premedicated with sedative drugs are assessed as not anxious (31). On the other hand children premedicated with Midazolam have shown an avoidant behaviour two weeks after surgery (127). Midazolam reduces explicit memory while the implicit memory is intact (87). This might indicate that even though the symbols used by the child is interpreted as not anxious the child are not calm. It might also indicate that the symbols used by the child sedated with Midazolam do not have the same meaning for the anaesthetists as it has for the child. Hence the Swedish addition “appropriate reaction to sedative premedication”. When the CRNAs chose to use sedative premedication, the choice of drug was intentional and according to their meaning of the situation and the interpretation of the child in front of them. The drug was chosen according to the effects and side effects, wanting the child to have a good memory of the anaesthesia induction. This is in line with the discussions of pros and cons of using sedative premedication (89).

The instrument m-YPAS is extensive with five categories and 22 items. Assessors need training in using the instrument to have the same understanding of the items (31). The interrater reliability was higher between the two CRNAs in phase II compared with the SRNAs in phase I. This could be explained by the two CRNAs experience in child anaesthesia. That is in accordance with
another study that experienced anaesthetists are better in predicting anxiety in children than inexperienced anaesthetists (128). According to Kain et al (1997) the rating can be completed in less than one minute (31). However the researcher in this thesis found that it took a longer time to complete the ratings than one minute. It can somehow be difficult to use the instrument in the clinical setting just before anaesthesia where the CRNAs have limited time to create contact with the child (98).

Methodological considerations

In qualitative research trustworthiness refers to credibility, dependability, confirmability and transferability. Credibility refers to the truth of the data and the interpretation of it (115). The same person performed all the interviews in accordance with Andersson (111). The researcher was familiar with the area and could thus ask further in-depth questions when the participant had difficulties in expressing themselves. There were participants who had difficulties to start with to recall specific incidents even though they had time to prepare, but as the conversation continued they all recalled vivid memories of specific incidents. The incidents collected were special incidents that stuck out in the memory of the participants as an exceptional incident with either a successful outcome or a poor outcome and where the participant was able to have a vivid recollection of the incident. This implies that the incidents were trustworthy. Dependability refers to the stability of the research. If the findings would be similar in the same context with the same participants if repeated (115). All the incidents reported were well remembered and stuck out in the memory of the participant this ensured that the incidents reported really were critical to ensure the dependability in the data collected. Confirmability, refers to the objectivity, that the data is the data provided by the participant (115). All interviews were digitally recorded and transcribed verbatim to ensure accuracy. When the
researcher is familiar with the area the researcher can have preconceived opinions. To prevent this to be affecting the result, the research team had repeated discussions about the findings and finally reached negotiated consent (129). Transferability, refers to the extent the findings can be applicable in other settings than in this paper (115). A child’s anxiety is the same in different medical settings thus it should be transferable to other medical procedures a child undergoes.

In quantitative and methodological research the rigour of a study refers to validity and reliability. The validity in the research is that the method used actually examining the stated phenomena. The reliability of the research reflect the measurement errors in the research (54). The best way of enhancing the reliability in an observational instrument is to train the observer (115). The two SRNA observers in phase I were inexperienced in child anaesthesia and in using the instrument which might have influenced the result. The experienced CRNA who made the assessment had to recall the event from memory and that might have influenced the assessment even though it was done just after the child was induced or just after the end of the surgery. In phase II the two CRNAs were experienced in children’s anaesthesia and had more trained in using the instrument. This might be one reason for a higher agreement between the raters in phase II.

In phase I two of the assessors were standing outside the OT looking in through a window. Standing outside can make the assessors miss both verbal and behavioural signs in the child. Staff moving around inside the OT could have forgotten the observers outside the window and possibly placed themselves in front of the window so that a part of the child or the entire child was not visible to the observers. The position was chosen because too many people in the OT made the child more anxious and also due to hygienic reasons. In video filming the cameras are placed in a fixed position and if the children move outside the range of the camera the child could not be assessed. In phase II where video
films were used there was no assessment point where the child could not be seen
due to camera angles.
One issue with m-YPAS is that if you cannot see the child in one of the
categories that affects the counted scores. For example in the category
“Emotional Expressivity” if the child hides the face the category is not counted
(31). The more categories taken out the less accurate the assessment would be
since the instrument is built on assessing different aspects of the phenomenon.
NAS was used to compare m-YPAS. NAS is a global self-reporting scale and
validated as such for children age 7-13 (56). The CRNAs and the parents used
the NAS as an observational global assessment instrument. To our knowledge
there is no observational anxiety instrument translated and validated for use in
the preoperative setting therefore the use of NAS. The reason parents assessed
the child’s anxiety was to get a more holistic view of the child’s anxiety. In
phase I the assessment was done in real-time and two students SRNAs and an
experienced CRNA made the assessments.
For the SRNAs the correlation was stronger at anaesthesia induction where the
child was more anxious than at premedication where the child was less anxious.
It could be that it was easier for the SRNAs to rate the more obvious signs of
anxiety than the more subtle signs. In phase II the two experienced CRNAs
made their assessment watching video films and had time to stop and ponder
their assessment which presumably would make them more accurate.

Comprehensive understanding

Creating interpersonal interaction takes courage, to be there and see the
suffering of the child takes courage (130). Caring for a child suffering in pain
nurses sometimes have feelings of fear and powerlessness (131). Moral courage
as explained by May (1994) has its roots in the empathy for human suffering
(132). Courage is to be there for the patient, the courage to care, to show that
the CRNAs believe the patient and safeguard the rights of the patient (123). It is dependent on the ability to really see another human beings suffering and then being forced to act to relieve it (132). Taking the role of the other prompted the CRNAs to find ways to manage the child’s anxiety. The CRNAs used symbols the child understood and created an interaction with mutual understanding. An example was to name the anaesthesia mask a clown nose. Courage helps the CRNAs to be there for the child. In other situations it could be to cancel the surgery and reschedule without jeopardizing the safety of the child. To make the decision to cancel and reschedule surgery takes courage as it might cause a dispute with the physicians involved (89, 92). CRNAs used small talk and tried to find the child’s specific interest using symbols (35) the child understood. Using non-medical talk and the child’s specific interest created an unthreatening atmosphere and enhanced the interaction. These actions came from experience of working with children and skills in interpreting the symbols used by the child. Not everyone has the same skills in interpreting a child’s symbols. The instrument m-YPAS is created based on specific behaviours reflecting anxiety (59). In SI the symbols used needs to have the same meaning for everyone involved in the interaction to be meaningful (35). The instrument m-YPAS can be seen as a structured way of interpreting symbols used by the child. The anaesthetists can use m-YPAS as an educational instrument to help with the interpretation of the child.
Conclusions

Acting according to the situation, being sensitive to the child and flexible in altering actions according to the needs of the child are key strategies to reduce the child’s preoperative anxiety and avoiding use of physical restraint. Creating a rapport with the child and making the child an active participant are important strategies. Learning the content of m-YPAS can be a way to enhance the anaesthetist’s ability to interpret the symbols used by the child. The m-YPAS is a valid and reliable assessment instrument to examine the efficacy of interventions and to compare the result to other cultures. Using the same instrument across cultures makes it possible to compare the result of research between countries.

Clinical implications

- The anaesthetists need to be sensitive to the individual child and alter actions according to the needs of the child (paper I).

- An organization that enables the nurse anaesthetist to be flexible and sensitive to the child and to familiarize the child with the anaesthetists and the environment is needed (paper I).

- The Swedish m-YPAS can be used as an educational instrument to teach anaesthetists what to look for in assessing the child’s preoperative anxiety (paper II).
• The Swedish m-YPAS can be used as an assessment instrument in evaluating the efficiency of interventions in research in a Swedish setting (paper II).
Svensk sammanfattning


**Konklusion**

Att agera i enlighet med situationen, vara lyhörd och flexibel och att ändra agerande i enlighet med barnets behov var viktiga strategier för att reducera barns preoperativa oro och undvika fasthållning vid anestesinduktion. Att skapa en god kontakt och göra barnet till en aktiv deltagare är viktiga strategier. Att lära sig innehållet i m-YPAS kan vara ett sätt att öka anestesijuksköterskors möjlighet att tolka barnets oro. Den översatta m-YPAS är ett reliabelt och valit skattningsinstrument för att undersöka effekten av interventioner och jämförelser resultatet i ett internationellt sammanhang.
Kliniska implikationer

- Anestesisjuksköterskor behöver vara lyhörda för det individuella barnet och i mötet med barnet anpassa sitt agerande efter barnets behov (studie I).

- En organisation behövs som gör det möjligt för anestesisjuksköterskor att vara flexibla och lyhörda för det individuella barnet och att möjligheter finns att möta anestesisjuksköterskan före anestesinduktion (studie I).

- Den svenska m-YPAS kan användas som ett undervisnings-instrument för anestesisjuksköterskor för bedömning av barns preoperativa oro (studie II)

- Den svenska m-YPAS kan användas som ett skattningsinstrument för forskning i den svenska kontexten (studie II)
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