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# Evaluation of Family Check-Up and iComet

*Effectiveness as well as Psychometrics and Norms  
for Parent Rating Scales*

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### **Abstract**

Björnsdotter, A. 2014. Evaluation of Family Check-Up and iComet. Effectiveness as well as Psychometrics and Norms for Parent Rating Scales. *Digital Comprehensive Summaries of Uppsala Dissertations from the Faculty of Social Sciences* 105. 89 pp. Uppsala: Acta Universitatis Upsaliensis. ISBN 978-91-554-9096-6.

This thesis comprise four studies, three regarding psychometrics and norms of parent rating scales, and one study regarding effectiveness of two different interventions. A normative sample consisting of 1443 parents with children aged 10 to 13 years old, was used in the Study I, II and III. In Study IV, 231 self-referred parents with children aged 10-13 years old with externalizing behavior problem (EBP) were randomized to either Family Check-Up (FCU) or iComet.

The Strengths and Difficulties Questionnaire (SDQ) used in Study I proved to be a reliable and valid instrument with high internal consistency, clear factor structure and high correlation with other similar instruments. In addition, the results support the online use of SDQ as well as using norms obtained through traditional administration even when the SDQ has been administrated online. The Emotion Regulation Questionnaire (ERQ) investigated in Study II was shown to have adequate reliability and construct validity. The specific use of expressive suppression or cognitive reappraisal as a parental emotion regulation strategy was correlated as expected to the couple's satisfaction, family warmth, and the employment of adequate discipline strategies. Swedish norms for self-rated ERQs are also presented. Study III investigated the Parental Knowledge and Monitoring Scale (PKMS), which was shown to be a useful instrument for assessing parental knowledge and its sources. Family climate appears to moderate important relationships between parental knowledge and conduct problems with implications for such things as family interventions. Finally, a person-oriented analysis was used in Study IV to subtype the children according to combinations of prosocial behavior and EBP, such as different levels of attention deficit hyperactivity disorder (ADHD) symptoms and/or oppositional defiant disorder (ODD) behaviors. Despite being a heterogeneous group of children with EBP, they were meaningfully grouped into significantly different profiles. Both FCU and iComet resulted in post-treatment measurement within non-clinical range for three of the five profiles. The two profiles that included high levels of ADHD behaviors at baseline assessment continued to have residual symptoms post intervention.

*Keywords:* Norms, rating scales, conduct problems, parent management training, intervention, SDQ, ERQ, parental knowledge and monitoring

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*To Nellie and Charlie,  
with loads of love and gratitude*



# List of Papers

This thesis is based on the following papers, which are referred to in the text by their Roman numerals.

- I Björnsdotter, A., Enebrink, P., & Ghaderi, A. (2013). Psychometric properties of online administered parental strengths and difficulties questionnaire (SDQ), and normative data based on combined online and paper-and-pencil administration. *Child and Adolescent Psychiatry and Mental Health*, 7(1): 40
- II Enebrink, P., Björnsdotter, A., & Ghaderi, A. (2013). The Emotion Regulation Questionnaire: Psychometric properties and norms for Swedish parents of children aged 10-13 years. *Europe's Journal of Psychology*, 9(2): 289-303
- III Björnsdotter, A., Enebrink, P., & Ghaderi, A. (submitted manuscript). Parental Knowledge and Monitoring Scale: Psychometrics, and relations to conduct problems.
- IV Björnsdotter, A., Ghaderi, A., Kadesjö, C., & Enebrink, P. (manuscript). Evaluation of the Family Check-Up and iComet for families with children aged 10-13 years with externalizing behavior problems.

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# Abbreviations

ADHD	Attention Deficit Hyperactivity Disorder
CD	Conduct Disorder
CFA	Confirmatory factor analysis
CU	Callous-unemotional
DBD	Disruptive Behavior Disorder Rating Scale
DSM-IV	Diagnostic and Statistical Manual of Mental Disorders: 4 <sup>th</sup> edition
DSM-5	Diagnostic and Statistical Manual of Mental Disorders: 5 <sup>th</sup> edition
EBP	Externalizing Behavior Problems
ERQ	Emotion Regulation Questionnaire
FCU	Family Check-Up
EPC	Everyday Parenting Curriculum
iComet	Internet-based Communication method
ODD	Oppositional Defiant Disorder
PKMS	Parental Knowledge and Monitoring Scale
PMT	Parent Management Training
SDQ	Strengths and Difficulties Questionnaire



# Introduction

Identifying children and adolescents who already exhibit symptoms or at risk of developing externalizing behavior problems (EBP) is important because it is not only a costly societal problem, but also related to much personal and family suffering. Scales that measure relevant constructs need to be used during screening and assessment in order to facilitate the selection of proper and sufficiently evidence-based interventions as well as enable the treatment outcome to be measured.

While parent management training (PMT) programs are widely considered to be effective evidence-based interventions for children with EBP, there is a need for further understanding of what works for whom and why. Rating scales can help to answer these questions by illuminating constructs that moderate and mediate treatment effects for specific clinical groups. Without this type of tailored assessment with valid and reliable scales, research and clinical work is restricted. Another challenge is reaching out to families in need and keeping the families engaged in the intervention once it starts. This thesis evaluates two interventions with the potential to overcome some of these barriers.

The Family Check-Up (FCU: Dishion & Stormshak, 2007) seeks to enhance motivation for engagement and the internet-based Communication Method (iComet: Enebrink, Högström, Forster, & Ghaderi, 2012) is accessed via the internet and therefore is more accessible.

To evaluate these two interventions, we needed instruments that are valid and reliable for a population of Swedish children ages 10–13. The reliability, validity and factor structure of three parent rating scales are evaluated here: the Strengths and Difficulties Questionnaire (SDQ: Goodman, 1997) when used via the internet, the Emotion Regulation Questionnaire (ERQ: Gross & John, 2003), and the Parental Knowledge and Monitoring Scale (PKMS: Stattin & Kerr, 2000). Norms were also established for parental reports of their children ages 10–13 on the SDQ as well as separate norms for mothers and fathers when self-rating on the ERQ. The SDQ subscales (Goodman, 1997) were used in various ways in the last study (Study IV), e.g. not only as a screening instrument but also as an outcome measurement. The other two instruments have been an essential part of the feedback session of the FCU intervention (Dishion & Stormshak, 2007).

As the number of web-based interventions increases, the psychometric properties of rating scales need to be established for this new era.

Accordingly, normative data was collected using both online and paper-based response modes, enabling an analysis of the differences between the data collection modes.

## Externalizing behavior problems in children

### Definitions and phenomenology

Externalizing behavior problems in children is a wide construct with many dimensions (Hinshaw, 2002) that may include oppositional, defiant, aggressive and/or socially hostile behaviors as well as hyperactivity and impulsivity (Barkley, 1997b; Weisz & Kazdin, 2010). Consequently, the group of children identified with externalizing behavior problems is heterogeneous (Blair, Peschardt, Budhani, Mitchell, & Pine, 2006; Bloomquist & Schnell, 2002; Loeber, Burke, Lahey, Winters, & Zera, 2000). The problem behavior can differ in terms of its etiology (Blazei, Iacono, & Krueger, 2006; Hinshaw, 2002), prognosis (Jensen, Martin, & Cantwell, 1997; Moffitt, 1993; Smith & Hung, 2012) and its responsiveness to different treatments (American Psychiatric Association, 2013; Bloomquist & Schnell, 2002; Collett, Ohan, & Myers, 2003; Tremblay, 2010).

When conceptualizing externalizing behavior problems (EBP), one option is to use a categorical approach as seen in diagnostic manuals, which identify categories such as oppositional defiant disorder (ODD), conduct disorder (CD) and attention deficit hyperactivity disorder (ADHD). The other option would be to use a dimensional approach and speak of externalizing behavior problems (EBP) and conduct problems. It is this latter approach that is used here. Approaching EPB as a dimensional construct has the advantage of capturing the variation inherent in the construct. In contrast to a dichotomous categorical approach, a dimensional approach views EBP on a continuum and allows for scores ranging from low to high on that dimension. The Disruptive Behavior Disorder (DBD) rating scale (Pelham, Gnagy, Greenslade, & Milich, 1992) is one example of a scale that can be used to derive both categorical and dimensional information; it is used here in a dimensional manner (see Studies I and IV). The subscales on the Strengths and Difficulties Questionnaire (SDQ: Goodman, 1997) have also been used with a dimensional approach (see Studies I, III and IV). If a dichotomous categorical approach, as often used in clinical settings, were to be taken, a person will either fulfill the criteria for a diagnosis or not. This is not to say that the categorical approach is not useful: it can create transparency and enable communication regarding a problem. One disadvantage of using this approach is that important differences in severity or type of dysfunction below and above the cutoff points are lost (Hinshaw, Lahey, & Hart, 1993). Another downside of a categorical approach is that it is highly sensitive to

any changes to the criteria for inclusion and exclusion. This is particularly relevant here due to the revisions in the criteria for disruptive behavior disorders in the transition from DSM-IV (American Psychiatric Association, 2000) to DSM-5 (American Psychiatric Association, 2013) that occurred during the course of this research. In DSM-5 (American Psychiatric Association, 2013), externalizing behavior problems in children include the diagnoses ODD and CD, as well as others such as intermittent explosive disorder that will not be further explored here. ADHD has been shifted in DSM-5 from the disruptive, impulse-control and conduct disorders category to a neurodevelopmental disorder to reflect brain developmental correlates associated with ADHD (American Psychiatric Association, 2013). Since the studies conducted for this thesis were made during the DSM-IV period, ADHD symptoms have been regarded as a part of EBP. Thus, the categorical diagnoses considered EBP in this thesis are ODD, CD and ADHD, albeit in a dimensional way, i.e. allowing for different levels of these symptoms.

The diagnosis of ODD (American Psychiatric Association, 2013) is used when the child repeatedly exhibits behavior that violates societal norms and the basic rights of others in conjunction with other behavior such as frequent arguing with adults, defiance or refusal to comply with adults' requests or rules, or being touchy or easily annoyed by others.

CD (American Psychiatric Association, 2013) is a persistent pattern of hostile and deviant behavior, including bullying, threatening or intimidating others or deliberately destroying others' property.

ADHD, the third area of problem behaviors considered here, includes behaviors such as a persistent pattern of inattention and/or hyperactivity-impulsivity that interferes with functioning or development (American Psychiatric Association, 2013). The child with ADHD often fails to pay close attention to details or makes careless mistakes in schoolwork or with other activities, or often does not follow through on instructions and fails to finish schoolwork, or chores (by losing focus or getting side-tracked). The child also frequently has trouble organizing tasks and activities. Other typical behaviors include the child frequently leaving his or her seat when such behavior is not acceptable or having trouble waiting his/her turn.

## Prevalence

Estimates of the prevalence of symptoms or disorders are most often based on the categorical approach. The large variations in reported prevalence rates depend on several factors, such as the characteristics of the population studied, the assessment method (DSM-IV, DSM-5 or ICD-10 criteria), and whether it is point prevalence or lifetime prevalence being studied (Lahey, Miller, Gordon, & Riley, 1999). For example, there are some children with serious disruptive behavior problems who meet the ICD-10 criteria for a CD

or ODD diagnosis (World Health Organization, 2008), but who would not receive a CD or ODD diagnosis according to DSM-IV (American Psychiatric Association, 2000), leading to significant differences in the number of cases reported (Rowe, Maughan, Costello, & Angold, 2005).

DSM-5 (American Psychiatric Association, 2013) summarizes the prevalence rates of different diagnoses in a number of studies. The prevalence of ODD reported in DSM-5 ranges from 1% to 11%, with a mean of 3.3%. The corresponding figure for one-year population prevalence of CD ranges from 2% to more than 10% with a median of 4%. Higher rates were reported among older children as well as among boys. The prevalence of ADHD in population studies indicates that about 5% of children in most cultures fulfill these criteria. There is no data on Swedish prevalence rates, but Heiervang and colleagues (2008) screened and assessed a large normative sample of Norwegian children between the ages of 8 and 10 for psychiatric disorders. They found that ODD/CD occurred in 2.5% of their sample, while 1.3% had ADHD (Heiervang, Goodman, & Goodman, 2008).

## Genetic and environmental causes

The development of externalizing behavior problems is a complex process involving the interaction of biological, psychological and social processes at both individual and environmental levels (Hill, 2002). Three developmental frameworks are used to describe the development of EBP in children: the additive model, the interactionist model and the transactional model (Tolan & Leventhal, 2013). The additive model focuses on how different developmental influences work together in an aggregate way, each producing independent effects to influence developmental trajectories. There is a linear association of accumulated risk factors with the risk of developing EBP. The interactionist model assigns independent risk factors varying degrees of influence on the development of EBP depending on the presence or absence of other risk factors. The transactional model offers even greater complexity and, as such, more closely reflects reality and a modern way of looking at the development of EBP. In transactional models, different development factors influence each other and the individual throughout his/her development. How the different influences on behavior interrelate may change over time or have different meanings over the course of the child's development (Tolan & Leventhal, 2013). The transactional model takes into account an ecological and system perspective; that is, the development of the child or adolescent ought to be understood as a product of the interplay between biological and social processes (Hill, 2002). As expected, heredity and environment are factors to consider. Certain children are more at risk early in life due to their biological dispositions and socio-cultural contexts. Reciprocal influences through mediation among these

variables (e.g. biological dispositions, and life experience with parents, friends and school) may either exacerbate or lessen the risk of developing EBP (Dodge & Pettit, 2003). The transactional model illustrates that risk factors alone are not sufficient to understand the development of EBP. Both of the interventions studied here have a pronounced bias towards this perspective in their theoretical foundation.

There are many risk factors contributing to the development and continuation of EBP. In addition to the influence of factors within the child and his/her family, there may be school, peer and neighborhood factors that affect the child's developmental trajectory. The focus here is on parental behavior, because the interventions studied seek to change parenting skills and how parents respond to and interact with their children.

### The impact of the child's traits

Neurological and genetic factors play a substantial role in the occurrence of ADHD (Barkley, 1997a; Biederman, 2005; Biederman & Faraone, 2005; Wåhlstedt, Thorell, & Bohlin, 2009). Heritable influences are also important in the development of antisocial behavior. As much as 50% of the total variance in antisocial behavior might be explained by genetic influences (Tuvblad & Beaver, 2013). All externalizing behavior disorders (i.e., ODD, CD and ADHD) are influenced by both genetic and environmental factors, though CD and ADHD are more strongly influenced by genetics than by shared environment (Burt, Krueger, McGue, & Iacono, 2001).

Gender does not seem to be a significant moderator of the relative importance of genetic and environmental effects; hence, heritability and environmental estimates are largely the same for boys and girls (Blazei et al., 2006). There have been attempts to explain the gender difference in the prevalence rates of antisocial behavior. One proposes that boys may experience a greater number of risk factors (e.g. delinquent peers or access to substances) or may be more susceptible to the effects of exposure to risks (Blazei et al., 2006).

CU traits, including affective features such as the absence of empathy, shallow affect and a lack of remorse (American Psychiatric Association, 2013; Enebrink, Andershed, & Långström, 2005; Herpers, Rommelse, Bons, Buitelaar, & Scheepers, 2012) are another aspect to consider in the development of EBP. Other characteristics associated with CU are decreased sensitivity to punishment cues and less reactivity to threatening and emotionally-distressing stimuli (Loney, Frick, Clements, Ellis, & Kerlin, 2003).

CU traits are thought to be a useful specifier in diagnosing CD (American Psychiatric Association, 2013), since children high on CU traits have a more severe form of CD as well as a different treatment response. The presence of CU traits suggests a heritable form of EBP less strongly

associated with poor parenting practices (Wootton, Frick, Shelton, & Silverthorn, 1997). The genetic differences within EBP between children with and without CU traits are even larger and more distinct when controlled for symptoms of hyperactivity (Viding, Jones, Paul, Moffitt, & Plomin, 2008). CU traits were, unfortunately, not measured in any of the studies done here, but may be clinically very relevant to the assessment and intervention processes for future PMT programs.

A child's traits can also serve a protective function. Such protective factors are sometimes also referred to as resilience or promotive effects. A sense of self-efficacy, prosocial values and adequate levels of intellectual and academic skills may all work as protective factors for children (Bloomquist & Schnell, 2002). Among neuropsychological factors, high IQ is the best-replicated protective factor against the development of antisocial behavior (Portnoy, Chen, & Raine, 2013).

## The impact of parenting and family functioning

Multiple factors related to parenting and family functioning influence the development, maintenance, and expression of child EBP. Parental factors related to EBP include depression, low levels of social support, antisocial behavior, substance abuse, stress and negative cognitions about one's child (Bloomquist & Schnell, 2002).

Studies have also shown that EBP in children correlates with a number of maladaptive parenting behaviors. Lack of parental involvement with the child, poor supervision and monitoring, as well as inconsistent and harsh discipline practices are typical examples (Blazei et al., 2006; Bloomquist & Schnell, 2002). Other examples include critical, hostile or coercive parenting (Hill, 2002). Obviously even more extreme forms of negative parenting such as physical punishment, child abuse or domestic violence are also associated with child EBP. Since interventions for children with EBP seek to change parents' responses to the child's behavior, constructs such as monitoring, consistency and harsh discipline are assessed.

Other significant risk factors associated with the development of childhood delinquency and later violent or serious juvenile offenses include single parenthood, large family size, frequent turnover of caretakers, low socioeconomic status, parental unemployment, low maternal educational level and parental disagreement about child discipline (Loeber & Farrington, 2000).

In general, parents with their own psychiatric diagnoses have been shown to use more maladaptive parenting behaviors (Johnson, Cohen, Kasen, Smailes, & Brook, 2001). However, the mediating variable between psychiatric diagnosis and EBP is negative parenting behavior and not the psychiatric diagnose per se.

One should not underestimate the importance of emotional quality between child and parent as a protective factor against EBP. Good parenting behavior in this sense includes responsiveness to the child's needs and use of encouragement, praise and physical affection (Barnes, Farrell, & Cairns, 1986). Wang et al. (2011) have reported longitudinal effects of parental knowledge and family management. When the adolescents perceived that their parents had rules, expressed warmth and had knowledge about their lives, they were less likely to engage in antisocial behavior (Wang, Dishion, Stormshak, & Willett, 2011). The study thus shows that parental warmth has an important impact on the child's comfort in sharing information, which in turn increases parental knowledge and the possibility of monitoring the child's whereabouts (Wang et al., 2011). Stattin and Kerr (2000) presented a similar argument when they challenged the construct of parental monitoring. They reported that it was the child's voluntary sharing of information that was associated with lower levels of EBP, rather than the parents' active monitoring behavior. Thus, parental knowledge of the child's whereabouts is more important than their monitoring behaviors, such as control and solicitation of information (Stattin & Kerr, 2000).

Parental responses to the child's behavior, which may include the parents' own ability to regulate negative emotions, are also an important part of the coercive family process (Patterson, 1982). Adequate emotion regulation skills such as keeping one's cool or reappraising a problematic situation might enable a parent to cope effectively with a difficult situation, for instance by validating the child's perspective, coaching the child, and using appropriate problem-solving or positive parenting. This is why many PMT have also included sessions regarding this issue, including both interventions investigated here. The parents' ability to regulate their emotions sets an important example for their child. Emotional regulation strategies are further explored in the section regarding the emotion regulation questionnaire.

## The relevance of genetic and environmental causes to the current thesis

The review of genetic and environmental risk factors for developing EBP establishes the groundwork to evaluate the two interventions considered here, as well as the need for rating scales with good psychometrics and norms.

Many behavioral PMT programs assume that there are many factors that contribute to the development of EBP such as the child's traits, the parents' traits and their living situation, as well as how the parents respond to the child. Parenting is often the only factor that parents can actually change and is therefore the best area to target when seeking to minimize the risk of developing EBP. When a parent learns to respond to his or her child in a

more functional way, the parent then has the greatest opportunity to bring about positive change in the child's developmental trajectory. PMT programs target poor parenting behaviors such as inconsistent and harsh discipline, poor monitoring, negative verbalizations toward the child, and low levels of warmth. Parents are instead trained to give positive behavioral support to their child, set healthy limits, and use effective communication and problem-solving skills to enhance the quality of the parent-child relationship.

## Measurement and psychometrics

Before using rating scales, one needs to consider their psychometric properties and collect normative data for the appropriate age span. After all, a rating scale does not deliver objective truths, but rather attempts to measure the degree to which a variable or construct applies (Myers & Winters, 2002). Rating scales with well-documented psychometric properties and norms are needed not only for research but also for clinical practice for screening, pre-intervention assessment, treatment planning and evaluating outcomes.

The usefulness of a rating scale is determined with different measurements of reliability and validity as well as exploratory and confirmatory factor analysis.

### Reliability

Reliability is the degree to which a measure is consistent, i.e. that repeated measurements would give the same result. Reliability thus reflects the amount of random and systematic error inherent in the measurement and also indicates the extent to which the different items in a scale actually measure the same construct.

Different estimates of reliability are internal consistency (the homogeneity of the scale), and test-retest reliability (a measure of the stability of scores over time). Two additional approaches to reliability are inter-rater reliability and parallel reliability. The former measures the agreement among different raters using the same scale and the latter measures the similarities between alternate forms of a scale (Myers & Winters, 2002).

Regarding internal consistency, usually measured as Cronbach's alpha (measurement of the average correlations among the items), correlations are expected to be above .80 to be considered reliable (Collett et al., 2003). Very high reliabilities (.95 or higher) are not desirable however, as this indicates that some items may be unnecessary since they measure almost the exact same thing. The goal is to have items in the rating scale that are similar and

related, with each item contributing some unique information. When data is skewed and/or kurtosis is present, a polychoric ordinal alpha can be calculated instead of Cronbach's alpha (Gadermann, Guhn, & Zumbo, 2012).

To achieve test-retest reliability, a correlation greater than .80 for two administrations at up to 2 weeks apart is considered satisfactory stability, with .70 being satisfactory for tests administered one month apart (Myers & Winters, 2002).

## Validity

Validity refers to whether the scale in question does in fact measure the construct it is meant to measure and is usually determined against several criteria. There are different kinds of validity measures, including content validity, criterion validity and construct validity.

Content validity refers to whether the content (the items) of the scale corresponds to the construct it was designed to measure. Criterion validity concerns the extent to which the scores from a rating scale correspond with (concurrent validity), or predict (predictive validity), another external measure conceptually related to the measured construct (Streiner & Norman, 2008). Two types of concurrent validity are convergent validity and discriminant validity. Convergent validity measures the extent to which the scale correlates with another relevant theoretical variable, which can often be another scale measuring a similar construct. A correlation above .40 between different scales is considered to be acceptable (Collett et al., 2003). Discriminant validity measures the scale's ability to discriminate among different groups, such as between a group known to possess the characteristic being measured and another group that does not. Finally, construct validity explores whether the scale captures a specific theoretical construct. To meet the criteria for construct validity, the scale must exhibit discriminant as well as convergent validity (Cohen, Swerdlik, & Phillips, 1996). One can also use a statistical procedure such as factor analysis to establish factorial validity, which is another type of construct validity (Myers & Winters, 2002).

## Factor analysis

Factor analysis is a multivariate method used to identify whether the correlations among a number of observed variables originated in their relationship to one or more unobserved latent variables (factors) in the data. Exploratory factor analysis (EFA) is used initially and there is no a priori assumption about the relationships among the items. The next step in researching the factor structure of a rating scale is confirmatory factor

analysis (CFA), which tests the hypothesis that some of the items are associated with specific factors.

## Normative data

Meaningful and useful intervention assessment requires access to valid and reliable instruments and norms. Many ratings scales do not have sufficient psychometric information and lack normative data that could be used to interpret scores (Myers & Winters, 2002). Norms are used for different purposes, such as screening, initial assessment, and comparing outcomes with clinical cutoffs.

A major issue related to normative data is the choice of cutoff score (e.g. 90<sup>th</sup> or 95<sup>th</sup> percentile), since that often relates to whether the norms are adequate. Cutoffs are also frequently used as inclusion criteria when identifying children at risk for or already exhibiting EBP. There is a trade-off between sensitivity and specificity when using cutoffs as a few points in either direction can have a significant influence on who will be included in a study and receive intervention and who will not (Myers & Winters, 2002).

Both research and clinical practice share a common interest in reducing symptomology following an intervention, rather than mere comparison to a normative sample. Normative data, however, make it possible to assess if the treatment outcome is a clinically significant change. Two methods can be used: one using a chi-square analysis of the proportion of participants moving from the clinical to nonclinical range (Kendall, Marrs-Garcia, Nath, & Sheldrick, 1999); and the other using the Reliable Change Index (Jacobson & Truax, 1991) that examines the extent to which changes in pre- and post-intervention measurements are reliable or unlikely to be due to chance. Study IV in this thesis does not use either of these methods to discuss the post-intervention results, but instead compares the post-treatment measurement of each cluster to the 90<sup>th</sup> percentile of the normative population sample.

## Parent rating scales

When assessing EBP, different sources of information can be used such as children, teachers, friends and parents, as well as other kinds of records (Bloomquist & Schnell, 2002). Each source contributes a unique perspective. Parents usually provide the most extensive knowledge when it comes to externalized behavior, since they have the opportunity to observe the child in many different contexts. Teachers, however, have the opportunity to compare the child's behavior with classmates in a regular school situation. The focus here is on parent ratings which we considered most useful for measuring EBP and other relevant constructs for children at the age of 10 to

13 years old. Teacher and child ratings were collected during the intervention study (Study IV), but were not analyzed here.

There are often discrepancies among different sources of information, such as between child and parent ratings or between teacher and parent ratings, and no clear pattern exists between informant discrepancies and informant characteristics (De Los Reyes & Kazdin, 2005). Four factors are of particular importance in understanding low correspondence among informants. These factors include contextual factors, the child's developmental level, the parent's own psychopathology, and the types of symptoms being assessed (Myers & Winters, 2002). The ratings given by mothers and fathers of child's EBP showed the least discrepancies in a meta-analysis, indicating that the parents' estimates were relatively similar (Duhig, Renk, Epstein, & Phares, 2000). However, it seems that mothers have a general tendency to estimate their child's symptoms slightly higher than fathers do (Myers & Winters, 2002). Importantly, since many assessments are built on parent ratings, research has shown that maternal depression is associated with the mother's over-reporting of her child's EBP (Fergusson, Lynskey, & Horwood, 1993; Modell et al., 2001).

In addition to parent rating scales and child and parent self-reporting, there are several other assessment methods available, including interviews, intelligence testing, neuropsychological evaluations and direct observation of behavior (Achenbach, 1995; Achenbach & Edelbrock, 1984; Bloomquist & Schnell, 2002; McConaughy, 2005).

More and more questionnaires are now being administered online. Since most studies of the questionnaires' psychometric properties and norms have been established through earlier paper-based administration, there is a gap in the research when it comes to the questionnaires' efficacy when administered online. Some differences from paper-based questionnaires have been identified with online administration (Buchanan, 2003; Luce et al., 2007). For instance, participants filling in questionnaires online gave higher severity ratings than those completing the questionnaire on paper (Joinson, 1998). Other studies have found high correlations in the scores obtained from these different modes of data collection and any discrepancies identified have generally negligible clinical relevance (Andersson, Kaldö-Sandström, Ström, & Strömgen, 2003; Austin, Carlbring, Richards, & Andersson, 2006; Carlbring et al., 2007; Richter et al., 2008).

Several parent reporting questionnaires such as the DBD (Pelham et al., 1992) measure the constructs of ADHD, ODD and CD against the criteria in DSM (American Psychiatric Association, 1987, 2000, 2013). Questionnaires such as the SDQ (Goodman, 1997) measure other constructs as well, including conduct problems, hyperactivity-inattention, peer problems, emotional symptoms and prosocial behavior, and do not use the criteria described in DSM.

Many questionnaires have been used here, both as assessment and baseline measurements and to measure outcomes and moderators. The SDQ (Goodman, 1997), analyzed in Study I, was used in the screening process for the intervention study (Study IV), but also in the cluster analysis and as an outcome measurement in the same study. The ERQ (Gross & John, 2003) considered in Study II and the PKMS (Stattin & Kerr, 2000) used in Study III are both important scales during the assessment and feedback phases of FCU (Dishion & Stormshak, 2007). To allow the intervention study (Study IV) to proceed, we first needed norms and also needed to ensure the psychometric properties of these instruments. As such, the three first studies done as part of this thesis lay the groundwork for the fourth.

The four most important scales will all be discussed below. In addition to the DBD (Pelham, et al., 1992) and the SDQ (Goodman, 1997), the ERQ (Gross & John, 2003), the PKMS (Stattin & Kerr, 2000) are presented.

### The Disruptive Behavior Disorder rating scale

The DBD (Pelham, et al., 1992) is an instrument that originally measured symptoms described in DSM-III-R (American Psychiatric Association, 1987) for all three of the disruptive behavior disorders that had been defined at the time. No explicit theory informs the DBD (Pelham et al., 1992) other than the DSM diagnostic criteria. Therefore, the items in the scale are worded as closely as possible to the DSM-III-R (American Psychiatric Association, 1987), albeit in the form of a rating scale. High internal consistencies were previously reported for the teacher version of the DBD subscales: .96, .95 and .75 for the ADHD, ODD, CD subscales, respectively (Pelham, et al., 1992). In that study, the CD items were limited because many teachers responded “*do not know*” to many of the items (leaving only 2 out of 15 items for the analysis). The reported three-factor solution was: 1) Oppositional/Defiant, 2) Inattention, and 3) Impulsivity/Overactivity (Pelham et al., 1992). In another study, support was found for a four-factor solution of the DBD: 1) Attentional Deficits, 2) Hyperactivity/Impulsivity, 3) Oppositional Defiant/Impulsive behaviors and 4) Conduct Disorder Behaviors (Pillow, Pelham, Hoza, Molina, & Stultz, 1998).

### The Emotion Regulation Questionnaire

The process model of emotion regulation contains five different points where it is possible to regulate one's emotions with different strategies available at each step (Gross, 2014). According to this model, emotion occurs when external or internal input is processed in such a way that an emotion program (such as sadness or amusement) is triggered. Once activated, the emotion program generates certain response tendencies (including physiological changes, subjective feelings, and behavioral

impulses) that prepare the individual to respond adaptively to environmental challenges or opportunities. These tendencies can be more or less adaptive to the situation and can theoretically be manipulated or changed in order to influence the trajectory and final outcome of the emotional response (Gross, 1998, 2001). In so doing, emotions do not force us to act in any particular way: they only suggest that we do. Sometimes the response tendencies are helpful, but not always (for example, when wanting to shout or yell when upset with a child).

The different emotion regulation strategies explained by Gross (2014) are situation selection, situation modification, attentional deployment, cognitive change and response modulation. Situation selection involves behaviors that make it less (or more) likely that one will end up in a situation expected to trigger undesirable (or desirable) emotions. Situation modification, on the other hand, seeks to modify an external situation (such as the physical environment) to influence its emotional impact. One deploys one's attention in the situation to alter one's emotional response. Cognitive change, which includes cognitive reappraisal as one strategy, is a way to change how one thinks about a situation or to reimagine oneself with the capacity to manage the demands the situation poses. Finally, response modulation, including the strategic suppression of one's expressions, is active when one tries to influence the behavioral or physiological components of the emotional response (Gross, 2014).

Emotion regulation strategies can therefore be used by individuals to influence the occurrence, experience, intensity and expression of a wide range of emotions (Gross, 2007). Individuals concerned about their expression and experience of emotions may attempt maladaptive emotion regulation strategies such as suppression and avoidance or hiding and ignoring the emotions (Gross, 2007). The ERQ (Gross & John, 2003) measures two emotion regulation strategies, cognitive reappraisal and expressive suppression; the first is more adaptive and the second may have unintended negative consequences for the individual.

Identifying and measuring parents' self-ratings of their own emotion regulation strategies may give important clues and information for planning interventions. Since many PMT programs seek to change the way parents respond and interact with their child, it may be important to assess the parents' ability to do so and what strategies they use to regulate emotions. Recently, parental emotion regulation has also been highlighted in some PMT programs such as the Incredible Years (Webster-Stratton & Reid, 2010) and the FCU (Dishion, Stormshak, & Kavanagh, 2012). The ability of a parent to regulate his or her negative affect is an important part of providing positive, supportive and warm parenting. Adequate emotion regulation skills such as keeping one's cool or reappraising a problematic situation might enable a parent to cope more effectively with difficult situations (Bariola, Gullone, & Hughes, 2011).

The ERQ (Gross & John, 2003) is a self-report questionnaire targeting how emotions are habitually regulated and managed. Cognitive reappraisal is defined as an antecedent cognitive strategy where future or present situations are reappraised to change their emotional impact. It includes changing or reformulating the way an individual thinks about a situation or the emotion in order to regulate its impact and changes the behavioral and peripheral physiological responses. This strategy is about changing the response tendency as it occurs before it is completely activated (John & Gross, 2004).

Expressive suppression is defined as a response-focused strategy where behavioral reactions or emotional expressions are made covert through straining or inhibiting external facial, bodily, or behavioral signs of the emotion. This strategy follows the emotion response tendency. Since it occurs later in the emotion regulation process, expressive suppression requires a certain amount of effort to maintain control over the continual occurrence of response tendencies (John & Gross, 2004).

The items in the ERQ (Gross & John, 2003) were derived from rationally, the focus was to be as clear as possible with each item indicating the emotion regulatory process that was to be measured. In addition to the general emotion items, both scales included at least one item asking about regulating negative emotions (such as anger and sadness) and one item about regulating positive emotions (such as amusement and joy).

Reappraisal is an adaptive strategy, while suppression is maladaptive (John & Gross, 2004). Those who suppress their emotions generally express less positive emotion and have greater depressive symptomatology, as well as lower self-esteem and life satisfaction compared to those who use cognitive reappraisal (Gross & John, 2003). One study reported that a mother's use of expressive suppression strategies was significantly predictive of her child's use of the same kind of strategies (Bariola, Hughes, & Gullone, 2012). Importantly, one needs to consider both contextual and cultural factors when determining the adaptivity of different emotion regulation strategies. What is seen as an effective strategy in Western Europe may have different consequences in an Asian context, and vice versa (Bariola et al., 2011).

The ERQ has been translated into 21 different languages (Uphill, Lane, & Jones, 2012). The ERQ has been shown to have high internal consistency (Cronbach's alpha) for both the Cognitive Reappraisal (.79) and Expressive Suppression (.73) subscales (Gross & John, 2003). The scales have demonstrated stability across 3 months,  $r = .69$  (Gross & John, 2003) and 2 months, Cognitive Reappraisal,  $r = .67$ ; Expressive Suppression,  $r = .71$  (Balzarotti, John, & Gross, 2010). However, a study conducted with a sample of athletes showed low test-retest stability (Uphill et al., 2012). A recent study of two different samples of adults (Australia,  $N = 550$ ; United Kingdom,  $N = 483$ ) suggests that a nine-item ERQ provides a better fit to the

data than the 10-item ERQ (Spaapen, Waters, Brummer, Stopa, & Bucks, 2014).

No study has validated the ERQ or provided norms for a sample of parents yet. Internet-based questionnaires are now frequently used to collect information, but only a few evaluations exist that compare data collected online with data collected through paper-and-pencil. There is an additional gap in data about how emotional regulation strategies are associated with overall family climate as well as important parenting skills such as using appropriate and consistent discipline.

## The Parental Knowledge and Monitoring Scale

Adequate parental monitoring seems to be related to fewer problem behaviors in their child and is therefore included in many PMT programs for parents of adolescents (Dishion et al., 2012). Even though the children (ages 10–13) targeted here are younger than adolescents, using this instrument to assess this construct is still important during the assessment of a family, so that the intervention can be tailored to their specific needs. Indicators included in the monitoring construct are behaviors such as asking the child about school experiences or having contact with the parents of the child's friends. An instrument that measures monitoring behaviors as well as parental knowledge, if used during and after an intervention, might also make it possible to identify possible mediation paths or whether parental skills have improved after treatment. One of the interventions evaluated in this thesis (the FCU) seeks to assess this kind of parental behavior as part of the intervention (during the feedback session). Nevertheless, parental knowledge and monitoring behavior are valid assessments that provide relevant information in any PMT intervention for school-age children.

Findings concerning the association between parental monitoring and EBP have been mixed, however, which might be due to different ways of operationalizing parental monitoring as a construct (Jensen Racz & McMahon, 2011). The parental monitoring construct can include a number of components, such as direct supervision, knowledge of the child's activities and whereabouts, telephone contact between the parent and child, and rules governing the child's activities (Chilcoat, Breslau, & Anthony, 1996; Jensen Racz & McMahon, 2011). However, as suggested by Stattin and Kerr (2000), most of the measures of parental monitoring are operationalized in terms of what parents know about their child rather than how they monitor their child (i.e., what the parents actively do to obtain information). Consequently, Stattin and Kerr (2000) proposed a distinction between parental knowledge and its sources (including parental monitoring behaviors) and constructed a questionnaire to measure the sources of parental knowledge such as parental solicitation, parental control, and child

disclosure. The psychometric properties of this questionnaire are evaluated here in Study III.

The questionnaire developed by Stattin and Kerr (2000) is referred to as the PKMS after discussion with one of the originators of the questionnaire (H. Stattin, personal communication, July 2, 2013). Stattin and Kerr (2000) found that parental knowledge could be obtained through parental solicitation, parental control, or child disclosure, all of which are positively associated with parental knowledge. However, the correlation was strongest for Child Disclosure, which accounted for 38% of the variance (Stattin & Kerr, 2000). Child Disclosure, but not Parental Solicitation or Parental Control, was also a significant predictor of Parental Knowledge at a one-year follow-up assessment (Kerr, Stattin, & Burk, 2010).

## The Strengths and Difficulties Questionnaire

The SDQ (Goodman, 1997) is a brief screening instrument for behavioral and emotional problems in children and adolescents. The SDQ's emphasis on strengths in addition to difficulties makes it appealing to community contexts (Goodman & Scott, 1999), where, indeed, the instrument is widely used. The instrument was developed in the United Kingdom and several versions are available in different languages. The SDQ can be completed by parents and teachers, and there are versions for children ages 2–4 and ages 4–17. A form for youth self-rating is also available for 11- to 17-year-olds.

The first Swedish translations of the parent and teacher versions of the SDQ became available in 1996. Swedish translations of the remaining versions of the SDQ were completed in 2003. At the same time, revisions were made to the wording of the 1996 versions to improve their coherence with the Danish and Norwegian versions (Heiervang et al., 2004).

The SDQ items were initially selected on the basis of relevant concepts, such as those underlying categories from childhood psychopathology and a factor analysis (Goodman, 1997; Goodman & Scott, 1999; Malmberg, Rydell, & Smedje, 2003).

Factor analytic studies conducted internationally have yielded mixed results. The five psychological dimensions of the SDQ have been confirmed in studies in Sweden (Smedje, Broman, Hetta, & von Knorring, 1999) Britain (Goodman 2001), the Netherlands (Muris, Meesters, & van den Berg, 2003) and Germany (Woerner et al., 2003). Exploratory factor analyses of the U.S. NHIS data, have, however, found that the best-fitting factor solution involved only three dimensions: externalizing, internalizing, and a prosocial dimension (Dickey & Blumberg, 2004), a finding also found in Finnish youth self-reporting data (Koskelainen, Sourander et al., 2001).

The increased use of online data collection in both screening and intervention studies, as well as in clinical practice, raises questions regarding

the psychometrics and norms of instruments when administered online. Some systematic differences have been noted in response to questionnaires administered online versus on paper (Buchanan, 2003; Joinson, 1998; Luce et al., 2007), however most studies have found high correlations between scores obtained from either mode of administration. The clinical relevance of reported discrepancies due to the different methods of obtaining data is generally negligible (Andersson et al., 2003; Austin et al., 2006; Carlbring et al., 2007; Richter et al., 2008). Studies on the psychometrics of online instruments measuring child behaviors, including the SDQ, are scarce. Although the parent version of the Swedish SDQ has been widely used in epidemiological as well as clinical studies, there remains a lack of normative data based on large representative Swedish samples spanning the entire age range (Obel et al., 2004). Norms are available for children ages 6–10 as a group, but the generalization of that sample is questionable since it is not a representative sample. Hence, there is a need for norms for Swedish children ages 10–13. There is also a lack of research investigating differences in the norms and psychometric properties of data collected online versus with paper-and-pencil.

## Parent management training programs

Parent management training (PMT) programs include interventions with different theoretical backgrounds that include the active acquisition of parenting skills to enhance their child's behavior and adjustment (Kaminski, Valle, Filene, & Boyle, 2008).

Over the past decades researchers and clinicians have developed effective PMT programs (Dretzke et al., 2009; Lundahl, Risser, & Lovejoy, 2006; Serketich & Dumas, 1996) to decrease childhood EBP. In three meta-analyses, the effect sizes of PMT on parent-reported child EBP indicated a moderate short-term effect,  $d = 0.42$  (Lundahl et al., 2006),  $d = 0.53$  (Furlong et al., 2012), and  $d = 0.67$  (Dretzke et al., 2009). Another meta-analysis that conducted an overall measurement of outcomes based on observed parenting behaviors/skills and levels of child EBP reported a moderate effect size,  $d = 0.34$  (Kaminski et al., 2008).

George Patterson and his colleagues started developing family-based interventions for aggressive behavior in the 1960s at the Oregon Social Learning Center. Their work is the foundation of many of the PMT programs used today, in particular the seminal work (Patterson, 1982) regarding coercive family processes as a precursor to the development of EBP.

The core mechanism of the coercive interactions is when the parent responds to the child's display of mild oppositional behavior with a prohibition, and the child in turn responds by escalating her/his defiant behavior. A mutual escalation ensues and continues until the parent

withdraws, thus negatively reinforcing the child's problem behavior. The coercion model regards child conduct problems as learned behaviors since the parent's behavior increases the likelihood of the child exhibiting further EBP (Patterson, 1982).

The coercive process also involves a number of other parenting practices that contribute to the development of EBP, such as inconsistent discipline, unclear commands, poor monitoring, emotional reactivity to child misbehavior driven by the parent's own feelings rather than the child's actual behavior, and insufficient positive reinforcement of prosocial behavior (Bloomquist & Schnell, 2002; Hill, 2002).

The Parent Management Training – Oregon Model belongs to the first wave of behavioral PMT programs targeting those dysfunctional parenting practices by teaching parents basic behavioral principles for modifying child behavior (Eyberg, Nelson, & Boggs, 2008). The central skills covered in the program include setting limits and discipline, monitoring and supervision, problem-solving, positive involvement, and encouraging skills. The focus is also on positive reinforcement of prosocial and desired behaviors and negative consequences (response cost) for deviant behaviors, such as the removal of privileges or time-outs (Ogden & Amlund Hagen, 2008).

Second wave PMT programs tailor the intervention according to the individual family's needs. These programs have also sought to address the problem of treatment engagement and adherence by adapting the intervention according to the parent's ability to participate (Kazdin, 2008). The FCU (Dishion & Stormshak, 2007) is among these second generation interventions which will be described in more detail in the next section.

The challenge for future research and practice, however, is successfully implementing these programs in community settings and also reaching out effectively to many more families in need (Forgatch, Patterson, & Gewirtz, 2013; Kazdin, 2008, 2013; La Greca, Silverman, & Lochman, 2009). Another important finding is that PMT programs are effective and lead to the desired outcomes in only approximately two thirds of the cases (Beauchaine, Webster-Stratton, & Reid, 2005), thus suggesting the need to tailor and adapt the interventions for those for whom PMT programs are not sufficient.

The availability of internet access in the general population enables implementation of PMT on a larger scale. In Sweden, the internet became more common and available for people by the mid-1990s (Vernmark & Bjärehed, 2013), and, by 2012, 89% of the population had access to the internet (Finndal, 2012). In addition, people are increasingly using smartphones as a complement to computers. There are many benefits to online access to parent support, such as allowing access to evidence-based treatments regardless of where one lives, transparent treatment modules, the ability to work independently and flexibly (not restricted by geographic

distances, physical disabilities or therapist availability), the ability to repeat the content of a session as needed, as well as to obtain rapid feedback from therapists regarding their homework assignments (Vernmark & Bjärehed, 2013).

To better adapt and tailor interventions, we need to understand for whom the intervention is actually effective and those who do not benefit from regular PMT. In other words, we need to have a better understanding of what moderates the treatment outcomes.

Lundahl et al. (2006) conducted a meta-analysis of those factors that moderate PMT treatment outcomes, including socioeconomic status, child age, treatment delivery and clinical symptom level. The socioeconomic status moderated differently depending on how the program is delivered. Financially disadvantaged families benefited significantly more from individually delivered PMT compared to group delivery (Lundahl et al., 2006). These findings have important clinical implications as they suggest that poorer families should be given face-to-face intervention to enhance effectiveness. Lundahl et al. (2006) also found that children with higher levels of EBP prior to treatment changed more after treatment than those with lower initial levels of EBP.

No significant moderating effects of child age were found in the meta-analysis (Lundahl et al., 2006), although effect sizes were greatest for younger children and lowest for older children.

Given that the target group in this thesis is older children, ages 10–13, it is worth mentioning that another meta-analysis (Serketich & Dumas, 1996) found a strong correlation ( $r = 0.69$ ,  $p < .001$ ) between child age and desirable outcomes, showing that families with older children benefitted most from PMT. The oldest sample group in that study had a mean age of 10.1 years, so it is not exactly comparable with our target group, but the tendency is still interesting. At the same time, it seems that delivery of PMT interventions prior to adolescence has a larger impact than those delivered after the onset of adolescence (Dishion, Patterson, Stoolmiller, & Skinner, 1991). Thus the existing literature remains inconclusive as to if and how child age affects PMT outcomes. Further research may help clarify the relative effects of PMT programs for children of different ages. The question may seem theoretical in nature, since regardless of when the intervention is most effective, for the family in need, the sooner the intervention starts the better. Perhaps it would be more interesting to know that even if the intervention did not occur when the child was younger, it is still effective to intervene in families even when the child or adolescent is older.

As one of the interventions evaluated here is internet-based, it is of interest that a meta-analysis of the moderating effect of PMT delivery, a self-directed PMT (such as iComet) had the same effect as other modes of delivery on child EBP outcome,  $d = 0.51$  (Lundahl et al., 2006). The authors argue that further research on self-directed PMT is needed since only eight

studies were included in that meta-analysis. In the years since, additional studies looking at internet-based PMT have reported promising results. In Sweden, iComet has been evaluated with reports of moderate effect sizes on most child EBP measurements (Enebrink, Högström, Forster, & Ghaderi, 2012). Triple P Online has also been evaluated, with moderate effect sizes reported for post-intervention child EBP measurements (Sanders, Baker, & Turner, 2012).

A meta-analysis was conducted (Kaminski et al., 2008) to identify more specifically those components in different PMT programs that have had the greatest impact. The components shown to be the best predictors of larger effects on treatment outcomes, measured as fewer childhood EBP, were positive interactions with the child, responsiveness, sensitivity and nurturing, time-outs, problem-solving, modeling and practicing with one's own child. Four components were predictive of smaller outcome effects: emotional communication, promoting social skills, having a curriculum or manual, and the inclusion of ancillary services. The two intervention programs studied here contain the six most important components, as well as a curriculum.

## Family Check-Up

The FCU (Dishion & Stormshak, 2007; Dishion et al., 2012) is a family-centered intervention and further development of Parent Management Training, Oregon Model (Forgatch, Patterson, & DeGarmo, 2005). Theoretically, the FCU has its base in social learning theory and family theory, and it is grounded in the coercion model of parent-child interactions (Patterson, 1982). A unique aspect of the FCU is its ability to adapt and tailor the intervention based on the family's specific needs and the parent's level of motivation. The periodic and sometimes brief model of intervention is another unique quality of FCU as families are able to get help during challenging periods, such as different development phases or contextual transitions (Dishion et al., 2012).

EPC consists of three different modules: positive behavior support, setting healthy limits, and building family relationships. The EPC can vary from 1 to 12 sessions (Dishion et al., 2012). Positive behavior support includes topics such as parent requests and child cooperation, parent praise for the child's cooperation, behavior-change plans with incentives, and barriers to behavior-change plans. When discussing setting healthy limits, topics such as monitoring, guidelines for setting limits, proactive limit setting as well as challenges and emotion regulation are discussed. The module on relationship building skills addresses themes such as negotiating conflicts and choosing solutions to family problems, as well as proactive positive routines and shared family activities and routines (Dishion et al., 2012).

In the FCU model, families are usually offered a menu of intervention options such as parent skills training, parent groups, family therapy, child interventions, school interventions or other support based on available resources (Dishion et al., 2012). Tailoring and individualizing the intervention to match the family's unique situation is probably useful for all families, but seems especially important for financially disadvantaged families (Lundahl et al., 2006).

In addition, the research provides support for the idea that families with children who exhibit EBP may be best treated with continuing care models (Lundahl et al., 2006). This may help parents better maintain their skills and modify them as the child develops and new challenges arise. The annual check-ups offered in FCU serves this kind of function.

### Communication Method via the Internet (iComet)

Comet ("COmmunication METHod") is a Swedish PMT program (Kling, Forster, Sundell, & Melin, 2010), from which the online version iComet was derived (Enebrink et al., 2012). The iComet is a program based on social learning theory and cognitive-behavioral therapy (Hassler Hallstedt, Schwan, & Forster, 2005; Kling et al., 2010). A few adaptations have been made to the online version of the program, such as cutting the number of sessions down from 11 to 7. However, three of the sessions include homework assignments that last for two weeks, leading to a total intervention length of 10 weeks. The face-to-face Comet program includes a meeting of the parent, the child's schoolteacher and the therapist, which is not a part of iComet.

The content of iComet is similar to other PMT programs and focuses on parenting skills such as positive behavior support, communication, problem-solving and parents' management of their own dysfunctional emotions (Högström, Enebrink, & Ghaderi, 2013). The topics covered include positive behavior support, effective commands, praise, routines and responsibilities, problem-solving, setting limits, parents' regulation of their own emotions, and the proper use of time-outs (Högström et al., 2013).

The sessions online are composed of video vignettes, written materials and illustrations. After each session, the parents answer multiple choice questions about the content of the session and receive automatic feedback on their choices. This reinforces correct statements and provides explanations to enhance their learning of the material. To enhance adherence to the intervention, a facilitator provides feedback on the parent's work in the program via email and also assigns the next session.

## Limitations to previous research

After decades of research on PMT programs, there remain some key gaps in the previous research. Three challenges for future PMT include reaching out to parents in need, keeping the parents in treatment and achieving outcomes that represent clinically significant changes to the child's EBP. This kind of research depends on establishing reliable and valid scales with norms for the target population. Without these scales, no screening, assessment or evaluation of the outcomes, etc. is possible. Since data collection is now frequently done online, there is a need for research investigating possible differences in responses due to the mode of administration.

This thesis focuses on the most prominent need: being able to deliver evidence-based PMT interventions in routine care for families in need in Sweden. One option is to offer tailored brief interventions (such as FCU) and enhance parental motivation to engage in the treatment. As face-to-face programs are cost-intensive, it is not realistic to insist that such programs to be the only way to go large scale in Sweden. Not only because of budgetary constraints, but also because of other barriers such as stigmatization, logistics, accessibility, etc. Another option for delivering evidence-based PMT is therefore the internet.

There are four kinds of gaps in previous research: First, there is a general lack of effectiveness trials that evaluate interventions for childhood EBP used in routine care. Second, very few studies have evaluated self-directed PMT programs delivered via the internet. I am not aware of any study based on random assignment of routine care participants to internet PMT or face-to-face intervention in routine care. Third, FCU has not yet been evaluated in a Swedish context, and the impact of cultural settings on interventions makes such a study necessary. Finally, the increased use of online data collection in both screening and intervention studies, as well as in clinical practice, raises questions regarding the psychometrics and norms of instruments when administered online. Considering the lack of evaluated questionnaire to use at assessment and as evaluation of intervention there is a need for psychometric evaluations and norms of relevant scales targeting children ages 10–13 in Sweden.

# The empirical studies

## Aims of this thesis

This thesis evaluates the effectiveness of Family Check-Up (FCU) as an intervention in a community setting for children ages 10–13 exhibiting signs of EBP compared to another active treatment (iComet). To allow proper assessment of the behavioral problems and make intervention with FCU possible, Swedish norms for the relevant scales were needed along with an investigation of the psychometric properties for data collected online and that collected through paper-and-pencil administration.

Study I therefore sought 1) to examine the psychometric properties of the online administered parental ratings of the SDQ in terms of its internal consistency, factor structure, and concurrent validity with other instruments measuring similar constructs; and 2) to provide parental norms for the SDQ from a nationwide representative sample of Swedish parents of children ages 10–13.

The aim of Study II was 1) to evaluate the internal consistency and factor structure of the ERQ in a community sample of parents; 2) to obtain norms for self-ratings on the ERQ subscales; and 3) to evaluate the associations of the ERQ self-ratings to couple distress/marital adjustment, family warmth and conflict, and parenting strategies.

The aim of Study III was 1) to examine the internal consistency, predictive validity, and factor structure of the sources of parental knowledge, as well as compare the online and paper-based versions of the PKMS; 2) to investigate which of the PKMS subscales (Parental Solicitation, Parental Control, Child Disclosure or Secrecy) is the best statistical predictor of parental knowledge and reported child conduct problems; and 3) to examine whether family warmth and/or family conflict moderate the link between parental knowledge and its sources to child conduct problems.

Finally, Study IV 1) evaluates the plausibility of different subtypes/profiles derived from critical features of child behavior (i.e. ADHD and ODD symptoms as well as prosocial behavior); 2) examines possible differences among the established profiles and the intervention outcomes, as measured by the SDQ Total Difficulties score, Family Warmth and Family Conflict questionnaires; and 3) evaluates whether treatment engagement differs depending on the child's cluster profile and the type of intervention.

## Methods

### Procedure and participants

#### **Studies I, II and III**

A total of 2,800 children stratified by sex and age (10, 11, 12 or 13 years, respectively) were randomly selected across Sweden and their parents were asked to complete a survey including the SDQ (Goodman, 2001), DBD (Pelham et al., 1992), ERQ (Gross & John, 2003), Parenting Practices Interview (Reid, Webster-Stratton, & Hammond, 2007; Webster-Stratton, Reid, & Hammond, 2001), Dyadic Adjustment Scale (Sabourin, Valois, & Lussier, 2005), PKMS (Stattin & Kerr, 2000), and Family Warmth (Criss & Shaw, 2005), and Family Conflict (adapted from the PAL2 project by the University of Oregon Child and Family Center).

An invitation letter was sent to all families detailing the purpose and procedure of the study. They were also informed that they would be randomly assigned to take the surveys either online or on paper. All of the parents were also provided with a pre-paid envelope and a checklist where they could indicate whether they preferred not to participate in the study and whether they preferred to receive a paper-based questionnaire via mail if they were randomly assigned to the online administration (in order to decrease the drop-out rate).

A total of 170 parents asked to receive the questionnaires on paper; 28 of whom had been randomly assigned to the online questionnaire. Accordingly, these 28 parents received the paper form of the questionnaire, which 23 of them returned; these responses were excluded from the analyses comparing parents' responses on paper versus online.

Randomization was done using [www.randomizer.org](http://www.randomizer.org). The parents were also referred to a website where they could read more about the study. A reminder was sent out to the parents a month later. Telephone calls were also made to a subset of parents randomly selected across children's age and sex to remind them about the study. Within 3 to 6 weeks after the phone call, a third wave of information letters, informed consent forms and questionnaires were sent out to all remaining non-respondents. The response rate was 51.2% ( $N = 1,433$ ), where 31.9% ( $n = 457$ ) responded online and 68.1% ( $n = 976$ ) responded on paper. Of the respondents, 52.8% were mothers and 47.2% fathers. For the norms and subgroup analyses, stepparents, since they were so few, were included in the main group of mothers or fathers as appropriate.

Demographic data was not obtained from parents who actively declined to participate (462 families) or from parents who failed to respond to participation reminders. Therefore, it was not possible to analyze the socio-demographic differences between responders and non-responders. The educational level of those parents who chose to participate was considerable

higher than the average educational level of parents in Sweden. Thirty-two percent of the total population of Sweden has a college/university degree, but 53.7% of the sample reported having such a degree. On the other hand, 44% of the total population has only a high school diploma, in line with the figure obtained in our study (39.9%).

#### **Study IV**

Families with a child aged 10 to 13 years, living in six different districts of the city Gothenburg were invited to participate in the study. The criterion for inclusion was the presence of some degree of problem behavior as indicated by scoring 3 points or more on the Conduct Problems subscale of the SDQ (Goodman, 1997, 1999), as rated by the parent or child's teacher. Exclusion criteria were simultaneous participation in another treatment for conduct problems or other interventions initiated by the office of social services, and comorbid psychiatric diagnoses (e.g. depression, obsessive compulsive disorder or autism).

This study is based on data from a randomized trial with ongoing data collection for two follow-up years, with the effectiveness of the FCU and iComet being evaluated using a variable-oriented approach. The study is registered at [controlledtrials.com](http://controlledtrials.com) (ISRCTN09352710). The families were informed about the study through letters sent to 13,000 families with a child in the target age cohorts in all the participating districts of Gothenburg, bulletin board advertisements, as well as through parent meetings at the schools. Parents interested in participating sent in a letter or email of interest and were then contacted by a research assistant or graduate student for more information. Research assistants conducted a screening interview by telephone to identify whether the families met the criteria for inclusion. If so, the parents were informed that their participation in the study was voluntary and that they could choose to withdraw at any time.

After obtaining informed, written consent, the parents and the child's teacher were asked to respond to the SDQ (Goodman, 1997). Children above the cutoff ( three points or more) on the SDQ Conduct Problems subscale (Goodman, 1997) were included in the study ( $n = 231$ ). Parents were then asked to provide more background information and respond online to other questionnaires. If the parent or teacher expressed a preference for completing the questionnaires with paper-and-pencil, he or she was then sent paper-based questionnaires by regular mail with a pre-paid envelope included.

Using an online randomization service ([www.randomizer.org](http://www.randomizer.org)), the families were then randomly assigned to either FCU ( $n = 122$ ) or iComet ( $n = 109$ ). A trained therapist for those assigned to FCU and a research assistant or graduate student for those assigned to iComet contacted each family to start the intervention once the questionnaires were completed. The participants had the opportunity to choose among four different gifts after completing the questionnaires (such as two cinema tickets, a gift card, or a

donation to charity, all with the same monetary value of approx. \$30). The project was approved by the Regional Ethical Review Board (dnr 2010/119).

The interventions used in this study were the FCU and iComet. The FCU (Dishion & Stormshak, 2007) is a brief face-to-face intervention consisting of a three-session assessment designed 1) to determine the presence of those risk and protective factors known to have an impact on a child's psychological development; and 2) to enhance parent engagement in the program and motivation to make changes in those areas where risks have been identified. The 3-session assessment is followed by an optional parent management training program entitled the Everyday Parenting Curriculum (EPC), which is tailored to the each family's individual needs and goals.

The FCU assessment starts with an initial contact with the parents, followed by an interview centered on the parents' concerns and their perceptions of their child's behavior. The parents are also asked to complete questionnaires to gather information about family background, child behavior, and parenting practices. During the second session, a family observation is conducted, consisting of a videotaped home visit requiring families to complete five interactive tasks, each lasting 5 minutes. These tasks are videotaped to enable parenting skills and parent-child interaction patterns to be encoded. The video may later be used in the feedback session, as well as in EPC sessions when appropriate. The cornerstone of the FCU is the third session, a structured feedback session that emphasizes parenting, focuses on family strengths, and enhances parent motivation to make changes in those areas where risk factors are present (Dishion & Stormshak, 2007). It is important to note, though, that the FCU and EPC manuals were translated into Swedish, but without any cultural adaptations. Since tailoring the intervention is a standard part of its delivery, the adaptations may largely consist of the choice of intervention modules to use. Table 1 shows that certain sessions, such as one on setting limits, are not as frequently used in the Swedish context as they might be in the EPC's original US context.

The iComet (Enebrink et al., 2012) intervention is the online version of the group-based Swedish PMT program Comet (Kling et al., 2010). The iComet consists of seven sessions during a 10-week period. The time required to complete each session is estimated to be approximately 1.5 hours, followed by assignments for the following week where the skills are practiced. To enhance adherence to the intervention, a facilitator provides feedback on the parent's work in the program via email and also assigns the next session. All facilitators were trained in iComet and were instructed to give feedback to reinforce engagement with and focus on the program. The parents were also able to communicate via email with a facilitator as needed to receive support with problem-solving or clarification of the program's content. The topics for the seven sessions are: 1) self-directed play and positive interaction; 2) preparations before activities and effective commands; 3) praise; 4) routines and responsibilities; 5) choosing battles

(extinction of negative behavior and reinforcing positive behavior); 6) structured problem-solving; 7) rules and time-outs (Högström et al., 2013; Kling et al., 2010).

Of the 122 families randomly assigned to the FCU, sixteen (13.1%) families chose not to participate in the study before even starting the intervention, leaving 106 families who eventually started the FCU. The assessment phase of the FCU intervention, ending with the feedback session, was completed by 100 families (82.0%). Of these, 78 (63.9%) families then chose to participate in EPC (ranging from 1-12 sessions). For an overview of those parts of EPC in which families participated, see Table 1. The most frequently used sessions were numbers 1, 2, and 3 with respectively 100%, 92% and 55% of the family participating. Sessions 8 and 12 were the least requested sessions. A total of 82 (67.2%) families completed their post-treatment assessment, twelve of which only received the FCU, while 70 took the FCU assessment and the EPC.

Table 1. *Content and frequencies of chosen sessions in the FCU condition*

<b>Session</b>	<b>Content</b>	<b>Number of families</b>
1	Positive behavior support: Parent requests and child cooperation	78 (100%)
2	Positive behavior support: Parent praise for positive behavior	72 (92%)
3	Behavior-change plans: Instruction and incentives	43 (55%)
4	Behavior change plans: Reviewing, revising, and reducing barriers to change	31 (40%)
5	Monitoring daily activities: Daily structure and listening	16 (21%)
6	SANE guidelines for setting limits: Identifying consequences and monitoring questions	23 (29%)
7	Proactive plan for setting limits: Giving consequences and ignoring mild problem behaviors	5 (6%)
8	Challenges to limits and emotion regulation	2 (3%)
9	Improving family relationships with negotiation	12 (15%)
10	Choosing solutions for family problems	14 (18%)
11	Proactive parenting and planning: Positive routines that reduce stress	10 (13%)
12	Shared family routines: Communication skills that promote engagement and enjoyment	2 (3%)

Of the 109 families randomly assigned to iComet, 24 (22%) families chose not to participate in the study right away. Some families (18 or 17%) never logged into the iComet website and were thus excluded from the outcome results analysis. A total of 39 (35.8%) families assigned to iComet completed three sessions or more (out of a total of seven) and were considered treatment completers. Fifty-six (51.4%) families submitted post-treatment measurement data, of which 48 completed at least 1 session and were thus included in outcome analyses.

## Measures

### Studies I, II, III and IV

In Study I, the SDQ (Goodman, 1997) and the DBD (Pelham et al., 1992) were used. Study II includes the ERQ (Gross & John, 2003). It also used two subscales from the Parenting Practices Interview (Reid et al., 2007), the Dyadic Adjustment Scale (Sabourin et al., 2005), Family Warmth (Criss & Shaw, 2005; Pianta & Nimetz, 1991) and Family Conflict, which is an adaptation of the PAL2 project by the University of Oregon Child and Family Center. Study III used the PKMS (Stattin & Kerr, 2000) as well as the Conduct Problems subscale of the SDQ (Goodman, 1997). Family Warmth (Criss & Shaw, 2005; Pianta & Nimetz, 1991) and Family Conflict were also assessed in Study III. Finally, Study IV used two subscales (ADHD and ODD) from the DBD (Pelham et al., 1992) and the Prosocial Behavior and Total Difficulties subscales from the SDQ (Goodman, 1997). Again the Family Warmth (Criss & Shaw, 2005; Pianta & Nimetz, 1991) and the Family Conflict subscales were used. All of the instruments will be described in more detail below.

### *The Strengths and Difficulties Questionnaire*

The SDQ (Goodman, 1997; 2001) contains 25 items divided into five subscales: Emotional Symptoms, Conduct Problems, Hyperactivity-Inattention, Peer Problems and Prosocial Behavior. A 3-point Likert-type scale is used to indicate how well each item applies to the target child (0 = *Not true*, 1 = *Somewhat true*, and 2 = *Certainly true*), and five of the items are reversed. A sample item assessing the child on the Prosocial Behavior subscale is "*Considerate of other people's feelings*". A sample item for the Conduct Problems subscale is "*Often has temper tantrums or hot tempers*".

A high score on the Prosocial Behavior subscale indicates a strength, while high scores on the other four subscales indicate difficulties. Adding together these four subscale scores generates the Total Difficulties score. The scoring algorithms that allow the subscale scores to be prorated if at least three of the five subscale items are complete can be found at [www.sdqinfo.org](http://www.sdqinfo.org).

In Study I, the internal consistency (polychoric ordinal alpha) of the online data ( $N = 457$ ) is high (Emotional Problems: .89, Hyperactivity-Inattention: .89, Peer Problems: .85, Prosocial Behavior: .91 and Conduct Problems: .89). In Study III, only the Conduct Problems subscale was used ( $N = 1442$ ) with an internal consistency (polychoric ordinal alpha) of .89.

#### *The Disruptive Behavior Disorder rating scale*

The DBD (Pelham et al., 1992) is an instrument originally designed to assess the symptoms listed in DSM-III-R (American Psychiatric Association, 1987) for all three disruptive behavior disorders identified at that time. After the DSM-III-R was revised and issued as DSM-IV, three items were no longer included in the scoring of the questionnaire. These items were number 10 “*Often engages in physically dangerous activities without considering possible consequences (not for the purpose of thrill-seeking), e.g. runs into street without looking*” item 14, “*Often swears or uses obscene language*” and item 21 “*Often shifts from one uncompleted activity to another*”. Item 5, “*Often initiates physical fights with other members of his or her household,*” does not correspond to any criteria in either the DSM-III-R or the DSM-IV, and is therefore not included in the scoring.

The DBD version used here includes 41 items, whereas earlier versions had 45 items (Pelham et al., 1992). The subscales are: ADHD (18 items, where AD consists of 9 items and HD of 9 items), ODD (8 items) and CD (15 items). The items are worded as closely as possible to the DSM criteria taking into account the scale format. The questionnaire can be used by parents and teachers.. A 4-point Likert-type scale is used (0 = *not at all*, 1 = *just a little*, 2 = *pretty much*, and 3 = *very much*). It is also possible for teachers to respond “*don't know*” to items in this questionnaire (Pelham et al., 1992).

The responses on the DBD can be summarized using a symptom count, which is completed by adding the number of items on each subscale that have been rated a 2 or 3 and then comparing this sum to the DSM-IV diagnostic criteria. When this method is employed, the cutoff for the two ADHD subscales is 6 of 9 items and for the ODD scale 4 of 8 items. For CD, however, the total numbers of “*yes*” responses to each CD question are counted. Three or more symptoms indicate a CD diagnosis (Barkley, 1997b). Alternatively, composite scores can be calculated by adding the items within each subscale and then dividing by the total number of responses (Pelham et al., 1992). In the studies conducted here, this form of composite scoring was used.

The internal consistency (polychoric ordinal alpha) of the four subscales (Inattention, Hyperactivity/Impulsivity, ODD and CD) varied between .97 and .99.

### *The Emotion Regulation Questionnaire*

The ERQ is a self-report questionnaire (Gross & John, 2003) containing 10 items, targeting emotion-regulation processes and strategies. It has two subscales, six items covering the Cognitive Reappraisal subscale and four items the Expressive Suppression subscale. Individuals filling out the ERQ questionnaire are asked to rate the extent to which they typically try to change their emotional responses to situations by changing their thoughts or behavior. A 7-point Likert-type scale is used (1 = *strongly disagree*, 4 = *neutral*, and 7 = *strongly agree*). Higher mean scores on a subscale indicate that the strategy is more frequently used. A sample item for the Cognitive Reappraisal subscale is “*I control my emotions by changing the way I think about the situation I’m in*”, while the Expressive Suppression subscale is assessed with items such as “*I control my emotions by not expressing them*”. There are no reversed items. The internal consistency (Cronbach’s alpha) of the Cognitive Reappraisal subscale in the present sample was .81 and .73 for the Expressive Suppression subscale.

### *The Parenting Practices Interview*

The Parenting Practices Interview (Reid et al., 2007) is an 80-item questionnaire measuring parenting practices. The parents are asked to evaluate how often they use a certain strategy on a 7-point Likert scale. For Study II, we included two subscales, the 15-item Harsh and Inconsistent Discipline subscale and the 12-item Appropriate Discipline subscale. The internal consistency (Cronbach’s alpha) for the first was .84, while it was .80 for the second.

### *The Dyadic Adjustment Scale*

To measure the quality of the relationship between the parents, a brief 4-item version (Sabourin et al., 2005) of the Dyadic Adjustment Scale was used (Spanier, 1976) in Study II. The original scale has 32 items, targeting dyadic satisfaction, dyadic consensus, dyadic cohesion, and affectional expression (Spanier, 1976). Sabourin and colleagues (2005) concluded though that the brief version of the Dyadic Adjustment Scale was informative at all levels of couple satisfaction. The internal consistency (Cronbach’s alpha) of the short version of the Dyadic Adjustment Scale was .60 in the present study.

### *The Parental Knowledge and Monitoring Scale*

The PKMS (Stattin & Kerr, 2000) consists of two parts: 1) Parental Knowledge, which contains eight items and provides an overall measurement of parental knowledge; and 2) three subscales that measure various ways of obtaining information, including the monitoring strategies of Parental Solicitation (5 items), Parental Control (4 items) and Child Disclosure (5 items).

Items on the questionnaire are answered on a Likert scale that ranges from “Almost always” to “Never,” or from “Several times a week” to “Never,” or from “Very often” to “Almost never,” or from “Very good knowledge” to “No or almost no knowledge”. One example of an item in the Parental Knowledge section is “Do you know what your child is doing in her/his free time”. Parental Solicitation includes questions such as “Have you been in contact with and talked to the parents of your child’s friends this month”. An example of an item on the Parental Control subscale is “Does the child need your permission to be out late on a weekday evening”.

The Child Disclosure subscale was originally based on five items. Later research saw the reclassification of the first two items onto the new Secrecy subscale: “Does the child keep a lot of secrets about what happens in her/his free time” and “Do you think that the child hides a lot about what she/he does on evenings and weekends”. The remaining three questions constitute the Child Disclosure subscale: “Does the child usually want to tell how school is going (how she/he is doing in various subjects, relations with teacher, etc.)”; “When the child has been out in the evening, does she/he want to tell what she/he has experienced”; and “Does your child tell you how she/he is doing in the various subjects in school”. The items on each subscale are coded and totaled so that higher scores indicate higher levels of each construct.

#### *The Family Warmth and Family Conflict scales*

The Family Warmth and Family Conflict are assessed as part of FCU with both parent and child answering questions; in the present study, only the parents’ ratings have been used. The Family Warmth scale consists of 5 items taken from the Adult-Child Relationship Scale (Criss & Shaw, 2005), which is an adaptation of the School-based Student-Teacher Relationship Scale (Pianta & Nimetz, 1991). These scales tap into the adult’s feelings about the child and attachment-related behavior (Hyde et al., 2013). An example of an item on this scale is “If upset, this child seeks comfort from me” which is answered on a 5-point Likert scale ranging from “Definitely not” to “Definitely”. The internal consistency (Cronbach’s alpha) for the Family Warmth scale in the sample for Studies I, II and III was .80, while it was .82 for the sample in Study IV at baseline measurement and .81 when measured post-intervention.

The Family Conflict scale is comprised of 4 questions adapted from the PAL2 project by the University of Oregon Child and Family. The reports from the parent and the child are measured by averaging the responses to four items. These items are broad and include conflicts involving all family members, and reflect the frequency with which parents and children engage in severe or maladaptive conflict behaviors. The scale consists of items such as “We got angry at each other”; “How often do you got your own way by getting angry” and “One of us got so mad, we hit the other person”.

Responses ranged from 0 (*Never*) to 6 (*More than 7 times last month*). The internal consistency (Cronbach's alpha) for the Family Conflict scale in the sample for Studies I, II and III was .70 while it was .72 for the sample in Study IV at baseline measurement and .81 when measured post-intervention.

## Statistical analysis

### Studies I, II and III

The Statistical Package for the Social Sciences (SPSS) version 19 was used for the statistical analysis. Pearson's Chi-square test, *t*-test and ANOVA were used to explore possible differences in categorical and continuous background variables. To explore whether parents with different levels of education and marital status (each with more than two conditions) responded significantly different to the SDQ, the ERQ and the PKMS, multiple group comparisons after significant F-tests were done using Bonferroni correction.

Cohen's *d* or partial eta squared was used as a measure of effect size for group comparisons. Cronbach's alpha was used when calculating the internal consistencies of the various subscales. However, due to considerable skewness and/or kurtosis on a number of items in the SDQ and the DBD that was quite high in some cases, and given the response format (3 points only), a polychoric ordinal alpha (Gadermann et al., 2012) was calculated instead of Cronbach's alpha when more appropriate. Polychoric correlations between the items in each subscale were first obtained from PRELIS (Jöreskog & Sörbom, 1988). The average correlation ( $r_{\text{average}}$ ) was then entered into the formula provided by Gadermann et al. (2012) where *k* is the number of items in the scale:

$$\text{Polychoric ordinal alpha} = (k * r_{\text{average}}) / (1 + (k-1) * r_{\text{average}})$$

Confirmatory factor analysis (CFA) was conducted in Studies I, II and III. For the CFA, LISREL 9 (Jöreskog & Sörbom, 1993) was used. The global model fit to the data was tested by a Chi-square test, root mean square error of approximation (RMSEA), comparative fit index (CFI) and goodness of fit index (GFI). The alpha was set to  $p < .05$ . If the model fits the data, the Chi-square value is frequently significant. Other measures of fitness are usually used to correct for the effect of sample size on the Chi-square test. The RMSEA is one such measure that varies between 0 and 1, with smaller values indicating a better fit. An RMSEA score of .06 or less indicates an acceptable to good fit. The CFI and GFI should be .90 or larger to indicate a good fit.

The data was screened for the presence of outliers, which were adjusted to prepare for the parametric analyses. The correlations were investigated using Pearson's *r*.

In Study III, the relationships between each PKMS subscale and conduct problem behaviors were further investigated using a multiple regression analysis. Hierarchical multiple regression was used to investigate whether various sources of parental knowledge would help explain the variation in conduct problems beyond the relationship between parental knowledge and conduct problems. Finally, a moderation analysis was conducted using PROCESS (Hayes, 2013).

#### **Study IV**

Pearson's Chi-square test for categorical variables and *t*-test for continuous variables were used to explore differences in background and baseline variables between the intervention and profile subgroups, and in the baseline measurements for those who filled out post-treatment assessment and those who did not. Cronbach's alpha was used to determine the reliability of the different subscales included in the study.

In order to analyze the effectiveness of the interventions for different subgroups of children, a person-oriented cluster analysis (Bergman, Magnusson, & El-Khoury, 2003) was performed. Cluster analysis (Bergman et al., 2003) was conducted to group the children into profiles based on critical variables identified in the baseline measurement. In this study, the focus was on such variables as ADHD and ODD symptoms as well as Prosocial Behavior. The cluster analysis followed the LICUR procedure (Bergman et al., 2003).

Three one-way ANOVAs including Tukey post-hoc tests, with cluster categorization as the independent variable, and the subscales Prosocial Behavior, ADHD and ODD as dependent variables, were then conducted to examine whether the clusters differed on the subscales.

The within-group effect sizes are presented as Cohen's *d*. A Cohen's *d* of 0.8 was considered a large effect, 0.5 a medium effect and 0.2 a small effect (Cohen, 1988). The effects of the interventions for each cluster subtype were evaluated with ANCOVA. The independent variable was the intervention (either FCU or iComet) and the dependent variable were the outcome measurements (post-intervention measurements of Total Difficulties, Family Warmth and Family Conflict), controlling for the baseline measurements on these same scales.

# Study I: Psychometric properties of online administered parental Strengths and Difficulties Questionnaires (SDQ), and normative data based on combined online and paper-and-pencil administration

## Results

### Psychometrics of SDQ online data

The internal consistency (polychoric ordinal alpha) of the SDQ was high (based on online data,  $N = 457$ ). Summarized, the internal consistency ranged from .85 to .91 (Emotional Problems: .89, Hyperactivity-Inattention: .89, Peer Problems: .85, Prosocial Behavior: .91, and Conduct Problems: .89). The internal consistency based on data from mothers ( $n = 243$ ), and fathers ( $n = 214$ ), as well data regarding daughters ( $n = 240$ ) versus sons ( $n = 217$ ) were virtually identical (ranging from .84 to .91).

CFA of the SDQ for data from the online administration resulted in excellent fit ( $\chi^2 = 413.45$ ,  $p < .001$ , RMSEA = .035, 90% CI for RMSEA = [0.213 - 0.455], GFI = .93, and CFI = .96). The model showed a similar excellent fit for mothers, ( $\chi^2 = 360.3$ ,  $p < .001$ , RMSEA = .012, 90% CI for RMSEA = [0.0 - 0.029], GFI = .92, and CFI = .95), but the fit indices showed a considerable lack of fit for fathers. Further scrutiny of the data revealed that item 22 (*Steals from home, school or elsewhere*) was the source of the problem. Rerunning the CFA without item 22 resulted in an excellent fit ( $\chi^2 = 392.23$ ,  $p < .001$ , RMSEA = .017, 90% CI for RMSEA = [0.0 - 0.034], GFI = .91, and CFI = .91). Rerunning the analysis considering only male children led to an excellent fit (RMSEA = 0.0, and 90% CI for RMSEA = [0.0 - 0.0], GFI = .99, and CFI = .99). The CFA for the analysis of girls only also resulted in similar fit indices (RMSEA = .025, and 90% CI for RMSEA = [0.005 - 0.036], GFI = .91, and CFI = .94).

To analyze the concurrent validity of the SDQ, the DBD was used as another relevant questionnaire measuring similar constructs. The Hyperactivity–Inattention and Conduct Problems subscales, as well as the Total Difficulties score on the SDQ and the DBD subscales, were related to each other significantly and meaningfully. The correlations for the online sample ( $N = 454$ – $456$ ) were all significant at  $p < .001$ , which means that they would remain significant even after Bonferroni correction. Prosocial Behavior was negatively correlated to all the subscales of the DBD, while other subscales of the SDQ correlated positively, as expected, with the DBD. The Emotional Problems and Peer Problems subscales showed less correlation to all DBD subscales, also in line with expectations.

### Swedish norms for children ages 10–13

A comparison of mean scores on the SDQ Total Difficulties scale, as well as on the other five SDQ subscales, between those who responded online versus those who completed the paper-based questionnaire did not show any significant differences, neither when mothers and fathers are considered separately or as a group, nor were there significant differences associated with child age and/or sex, or for the group of children as a whole, with one exception. The SDQ Hyperactivity-Inattention subscale reported by fathers of 10-year-old girls ( $M = 2.84$ ,  $SD = 1.95$ ) completing the online assessment was significantly higher ( $t(75) = 2.51$ ,  $p = .021$ , Cohen's  $d = 0.60$ ) than the corresponding scores given by fathers using the paper-based questionnaire ( $M = 1.75$ ,  $SD = 1.7$ ). This may be due to the fact that this subgroup of fathers is small ( $n = 25$ ), thus making the responses susceptible to bias. The presence of extreme scores violates the assumptions of the parametric analyses. Otherwise, the magnitude of effect concerning the difference in mean scores reported online versus on paper-and-pencil was virtually zero. Since this finding would not remain after correcting for multiple comparisons, the decision was made to combine the data from all responses from both mothers and fathers either collected online or on paper. No significant differences were found in the SDQ subscales or in the Total Difficulties score among parents with different marital statuses or levels of education (recoded into high or low to increase the power in the analyses), with two exceptions. Parents with lower levels of education reported significantly higher scores on the Hyperactivity-Inattention subscale (mean difference = 0.34) and also gave higher SDQ Total Difficulties scores (mean difference = 0.79). These differences correspond to an effect size of  $d = 0.16$  and  $d = 0.15$  respectively, which are considered small effect sizes.

Since the norms obtained online were not significantly different from those from the paper-based questionnaire, they were combined. Parental norms for the SDQ, based on children's age and sex, are reported in the original article.

### Discussion

The SDQ is a widely used, cost-effective way to collect data from different informants such as parents, teachers, and the child him/herself. Data from the SDQ may serve many different purposes, such as screening in an assessment process to determine the need to collect more data and/or as an aid in selecting the most effective intervention, as well as baseline and post-intervention assessments to analyze the effect of treatment.

However, the usefulness of these kinds of questionnaires is dependent upon their psychometric properties and the availability of norms from the general population. The psychometrics of the SDQ in previous research have

been fair to good given the mixed findings when trying to reproduce its original five-factor structure. Overall, satisfactory internal consistency and test-retest reliability have been reported (Dickey & Blumberg, 2004; Hagquist, 2007; Rønning, Handegaard, Sourander, & Mørch, 2004; Smedje et al., 1999; Stone, Otten, Engels, Vermulst, & Janssens, 2010).

The present study is the first one to provide more information on the psychometrics of the SDQ when administered online. Given the large skewness and kurtosis of three of its items, a polychoric ordinal alpha was used to investigate its internal consistency. The SDQ subscales showed good to excellent reliability, ranging from .85 to .91. This is higher than what other studies have reported, for example .57 to .77 (Goodman, 2001), .58 to .76 (Woerner, Becker, & Rothenberger, 2004), .51 to .75 (Smedje et al., 1999) and .59 to .80 (Hawes & Dadds, 2004). These studies did not use a polychoric ordinal alpha, but instead Cronbach's alpha, which might explain some of the differences. The reported internal reliability pattern is very similar across the studies, with the Hyperactivity-Inattention subscale having the strongest reliability and the Peer Problems subscale having the weakest. In another Swedish study, the reported internal consistency figures ranged from .52 to .75, again with the Hyperactivity-Inattention subscale having the highest internal consistency, while the Conduct Problems subscale had the lowest internal consistency (Malmberg et al., 2003). The SDQ correlated significantly with the DBD in the expected direction, providing further evidence of the validity of the SDQ. In addition, the confirmatory factor analysis of data obtained from the online administration of the SDQ resulted in an excellent fit. The validity of the five-factor model was supported, which supports its construct validity. Norms for the SDQ (parent version) for the targeted age group are scarce. In a previous validation study of the SDQ (Malmberg et al., 2003), data were obtained from 263 randomly selected parents of children ages 5–15 in the general population, but the authors did not present the norms in detail other than a figure presenting the mean values of the Total Difficulties score and the subscale scores for the entire sample. Another study with a Swedish sample of 6-to-8-year-olds and 10-year-olds presented the results as endorsement rates for each item and medians and cutoffs per subscale and sex (Smedje et al., 1999), all of which are also insufficient for making comparisons. A comparison of the norms from the present study to an Australian study (Hawes & Dadds, 2004) with somewhat younger children shows good correspondence, with the exception of this study's slightly lower mean value of reported Emotional Symptoms for girls (1.6) compared to the Australian study (2.0). The same pattern emerged in comparing this study's norms for boys to the Australian norms. Our norms also correspond quite well with those obtained from other Scandinavian countries (Obel et al., 2004). Comparing the central tendency figures here with those obtained in Denmark (Aarhus) and Norway (Akershus) shows that data in the present study fits slightly better with the Norwegian norms,

but is slightly higher than the Danish norms. However, the differences are small and the pattern of data in the present study confirms the conclusion made by Obel et al. (2004) that SDQ scores are very similar across Nordic countries. An important finding in the present study is that norms obtained from online administration of SDQ are very similar to those obtained from the paper-based version. This study therefore supports the idea that the SDQ can be used for online data collection without any concerns about its psychometric properties or about comparisons of obtained scores to the norms established from a paper-based response mode.

The present study had some limitations that are worth mentioning for future replications. The first was a larger response to the paper-based assessments than to the online ones. However, we did not find any differences between those responding online compared to those who responded using paper-and-pencil. The parents' educational level is slightly higher than the average educational level of parents in Sweden, a common bias in research studies. Parents with higher levels of education are more willing to participate in such studies than those with lower levels. Nevertheless, we found no substantial differences (with at least medium or close to medium effect sizes) on the SDQ between respondents with higher versus lower levels of education. The percentage of girls and boys at each age interval was also compared to the national data on all girls and boys ages 10–13 as retrieved from Statistics Sweden ([www.scb.se](http://www.scb.se)). At each age interval in the total population, about 48.5% are girls and 51.5% boys. In this study sample, the mean percentage of girls at these ages was about 51% (boys 49%). Sex distribution of boys and girls in the sample might thus be viewed as representative of the general population of children at these ages. The response rate (just above 51%) was low despite several reminders and some incentives (worth approximately \$30) to increase the response rate. It would also have been informative to have had some data as to the ages of those parents who responded. Unfortunately, this parameter was not included in the questionnaire. A lack of information regarding the children's characteristics (such as native language, birth order and number of siblings) is another limitation to this study. Such information would have been helpful for investigating the representativeness of the sample compared to national data. Finally, some studies have shown that those who do not respond to surveys regarding psychological problems tend to suffer from such problems themselves to a higher extent than those who are more willing to participate (Beglin & Fairburn, 1992). Translated into the context of the current study, parents whose children exhibit some conduct problems may have been less willing to participate. On the other hand, the norms obtained in our study are in line with norms based on studies with lower drop-out rates. Nevertheless, our findings need to be interpreted with caution as the risk of positive selection cannot be ruled out. As the participating parents reported a higher level of education than that found in the general population, and a larger

portion of them were married, available norms from the present study should also be viewed in light of these limitations.

## Study II: The Emotion Regulation Questionnaire: Psychometric properties and norms for Swedish parents of children aged 10-13 years

### Results

The internal consistency (Cronbach's alpha) of the Cognitive Reappraisal and Expressive Suppression subscales were, respectively, .81 and .73.

To evaluate the construct validity of the ERQ, a CFA was conducted. The chi-square analysis of the model was significant ( $\chi^2$  (34;  $N = 1366$ ) = 408.61,  $p < .001$ ), thus rejecting the model based on the data, a finding that is common in large samples. On the other hand, fit indices adjusted for the large sample size showed that a two-factor model had fairly acceptable fit: RMSEA = .089, and 90% CI for RMSEA = [.082; .097], CFI = .91, and GFI = .93. Modification indices in LISREL suggested that the model would attain a better fit by relating items 4 and 9 to cognitive reappraisal, despite the fact that both of these items are very clear examples of the expressive suppression strategy. In addition, modification indices suggested that the error covariance among quite a few indicators (i.e., ERQ items) should be allowed to correlate. If the error covariances of items 1 and 3 on the ERQ are allowed to correlate, the fit indices improve drastically (RMSEA = .066, and 90% CI for RMSEA = [.058; .074], CFI = .95). When the model was tested for fathers only, slightly better fit indices emerged RMSEA = .083, and 90% CI for RMSEA = [.072; .095], CFI = .92, and GFI = .94. The chi-square was still very high and significant ( $\chi^2$  (34;  $N = 650$ ) = 186.68,  $p < .001$ ). Modification indices in LISREL once again suggested that item 4 and 9 should be related to cognitive reappraisal to reach a better fit as well as letting the error covariances of some indicators correlate. Testing the model for mothers only, resulted in slightly less favorable fit ( $\chi^2$  (34;  $N = 716$ ) = 252.44,  $p < .001$ , RMSEA = .094, and 90% CI for RMSEA = [.084; .105]), CFI = .89, and GFI = .92). Modification indices suggested a path between cognitive reappraisal and item 9 on the ERQ, as well as two paths from expressive suppression to items 8 and 10, in addition to letting the error covariances of the indicators correlate. Finally, the Cognitive Reappraisal and the Expressive Suppression subscales were significantly correlated ( $r = .10$ ,  $p < .001$ ) albeit with a small effect size.

Norms for the ERQ Cognitive Reappraisal and Expressive Suppression subscales are presented in the original article. The norms are then displayed separately for mothers and fathers, and percentiles for both tails are provided, based on the mean scores for each subscale.

The Cognitive Reappraisal subscale correlated positively and significantly, but with a small magnitude (i.e., below  $r = .3$ ), with the brief version of the Dyadic Adjustment Scale, the Family Warmth and Appropriate Discipline; further, a significant negative correlation was found

between Cognitive Reappraisal and Harsh and Inconsistent Discipline. There were no significant correlations between either of the ERQ subscales (i.e. Cognitive Reappraisal and Expressive Suppression) and Family Conflict ( $p > .05$ ). A weak but significant negative correlation was found between the Expressive Suppression subscale and the Dyadic Adjustment Scale and Family Warmth, while a weak positive correlation was found between Expressive Suppression and Harsh and Inconsistent Discipline. The correlation between Appropriate Discipline and Expressive Suppression was non-significant ( $p > .05$ ).

## Discussion

This study presents data from one of the first evaluations of the ERQ in a normative randomized sample of parents. Our findings contribute both to the knowledge of the psychometric properties of the ERQ in a Swedish context, and also to what kind and level of emotion regulation that parents use. Another contribution of these findings is a greater understanding of the relationship among two different kinds of emotional regulation strategies and the family variables of marital adjustment, parenting strategies and family climate. Earlier research by Gross and John (2003) regarding ERQ has shown adequate factor structure and Cronbach's alpha for the ERQ in a sample of undergraduate students (on average, .79 for the Cognitive Reappraisal and .73 for Expressive Suppression subscales). Wiltink et al. (2011) present norms from a representative community study of adults ( $N = 2524$ ; mean age 49.4 years,  $SD = 18.2$ ) and report acceptable reliability (Cronbach's alpha of .82 on Cognitive Reappraisal and .76 on Expressive Suppression). However, confirmatory factor analysis did not completely confirm the original factor structure, leading the authors to modify one item (number 8). The ERQ seems to work well, however, in a large representative sample of Swedish parents. Its psychometric properties in terms of internal consistency, factor structure, and correlation to various other relevant measures correspond well to earlier studies (e.g. Gross & John, 2003).

Only a few significant demographic differences were found in the current sample, all representing small effects, with one exception. Fathers reported significantly higher levels of expressive suppression strategy compared to mothers, a difference with a medium effect size. This is in line with earlier studies reporting higher frequency of use of suppression among men (e.g. Gross & John, 2003).

The two subscales were correlated ( $r = .10$ ,  $p < .001$ ) with a relatively small effect size. Other studies have reported an absence of a correlation between the Cognitive Reappraisal and Expressive Suppression scales (e.g. Gross & John, 2003). In addition, the CFA basically confirmed two rather independent factors, similar to those reported earlier (Gross & John, 2003; John & Gross, 2004). Whereas Gross and John (2003) report two

independent factors through both exploratory and confirmatory factor analyses and describe a good fit, Wiltink et al. (2011) could not completely replicate the two-factorial solutions of the ERQ ( $\chi^2(42) = 1172.44, p < .001, RMSEA = .11, SRMR = .097, CFI = .90$ ). In the latter study, reductions in the overall chi-square are reported when allowing item 8 to load on both factors ( $\chi^2(41) = 662.95, p < .001, RMSEA = .078, SRMR = .064, CFI = .95$ ). The RMSEA level in the CFA should preferably be below .06 to indicate good fit, but levels up to .08 are considered indicative of acceptable fit. The fit indices in our models are at the borderline levels, and making some minor adjustments to the model would lead to acceptable fit (e.g. allowing some error covariances among the indicators to correlate). We chose not to make such modifications simply to be able to report a better fit, as such changes are not ecologically valid in terms of how the instrument was formed, used and perceived by the participants. Overall, the fit indices are very close to what is considered to be adequate.

As hypothesized, in line with earlier research showing that individuals who use cognitive reappraisal as a strategy have closer relationships (Gross & John, 2003), the Cognitive Reappraisal subscale correlated positively with marital adjustment and the Family Warmth subscale. No significant correlations were found between the Cognitive Reappraisal and Family Conflict subscales. As related to parenting practices, however, the Cognitive Reappraisal subscale was found to correlate in a significantly positive direction to Appropriate Discipline and negatively with Harsh and Inconsistent Discipline. We expect parents who use expressive suppression to have more strained relationships and higher incidence of family conflicts. As earlier research has reported, individuals who suppress report less emotional closeness, more avoidance of sharing, and discomfort with closeness in their relationships (Gross & John, 2003). The Expressive Suppression subscale was negatively correlated with marital satisfaction and Family Warmth, and positively with Harsh and Inconsistent Discipline.

Another interesting and important result was that the lack of any clinically meaningful differences between responding via the internet versus the paper-and-pencil way. Hence, the ERQ seems to be a stable instrument that can be administered via the internet in addition to the conventional way.

Generally, it is suggested that when a parent responds sympathetically and supportively to his/her child, the child may learn how to regulate his/her emotions in a new situation, whereas a parent's punitive or dismissive reaction to the child's emotions have been related to negative child outcomes (for a review, see Bariola et al., 2011). It would be theoretically and clinically valuable to obtain a multi-faceted, comprehensive understanding of the connection between parental emotion regulation strategies and the child's emotion regulation strategies, psychosocial functioning and psychopathology. Parental antecedent or response-focused emotion regulation strategies, such as cognitive reappraisal or expressive suppression,

may work in combination with various parenting strategies (either appropriate strategies or harsh, inconsistent discipline) and other characteristics of the family (e.g. parent-child relationship quality) as moderating or mediating variables for the development of child emotion regulation strategies. They might also have an effect on the outcome of interventions for both parents and children in terms of whether they internalize or externalize problems. Increasing our understanding of how these variables interact and their importance for treatment outcomes would be one path towards more individualized treatment options. Further research among diverse populations into cognitive reappraisal and expressive suppression in the context of other emotion regulation strategies is needed to drive further theoretical development of the concept of emotion regulation. The present study provides one step in that direction by validating the ERQ in a sample of parents and providing norms.

## Study III: Parental Knowledge and Monitoring Scale: Psychometrics, and relations to conduct problems

### Results

The data obtained from parents who responded online was not significantly different from the data obtained from those who completed paper-and-pencil questionnaires. Consequently, the decision was taken to combine all of the data, regardless of the mode of collection, and use it in the analyses as a whole.

The internal consistency (Cronbach's alpha) of the original PKMS subscales ranged between low and acceptable (Parental Knowledge .80, Parental Solicitation .71, Parental Control .70, and Child Disclosure .66). Splitting the Child Disclosure subscale into Secrecy and Child Disclosure, as suggested by Frijns and colleagues (2010), led to a higher internal consistency for each subscale (Secrecy .90 and Child Disclosure .79).

The confirmatory factor analysis (CFA) of the PKMS for the total sample with the new factor structure (i.e. Secrecy and Child Disclosure as two different constructs instead of a single Child Disclosure construct) resulted in a close to acceptable fit ( $\chi^2 = 216.09$ ,  $p < .001$ , RMSEA = .088, 90% CI for RMSEA = [.082, .093], GFI = .92, and CFI = .99) better than that for the original factor structure proposed by Kerr and Stattin (2000). The modification indices for attaining a better fit suggested allowing correlations between the error terms of a few indicators. To avoid overfitting, only the error terms of the first and second items within Parental Solicitation that were similar in content were allowed to correlate in the next CFA. After this adjustment, the CFA resulted in an almost acceptable fit ( $\chi^2 = 163.83$ ,  $p < .001$ , RMSEA = .076, 90% CI for RMSEA = [.071, .082], GFI = .95, and CFI = .99).

All four sources of information (Parental Solicitation, Parental Control, Child Disclosure, and Secrecy) correlated significantly ( $p < .001$ ) with Parental Knowledge. Parental Solicitation and Parental Control were significantly correlated with Parental Knowledge ( $r = .40$  and  $r = .27$ , respectively). In line with previous research, Child Disclosure showed the highest correlation with Parental Knowledge ( $r = .45$ ), and Secrecy correlated negatively with Parental Knowledge, but to a lesser extent ( $r = -.16$ ).

Parental Knowledge and Conduct Problems were significantly correlated ( $r = -.27$ ,  $p < .001$ ). Although the association between Parental Solicitation and Conduct Problems was significant ( $p < .001$ ), the correlation was low in magnitude ( $r = -.15$ ). Parental Control was not significantly correlated with Conduct Problems ( $r = -.02$ , *ns*). There was low correlation ( $r = -.20$ ,  $p < .001$ ) between Child Disclosure and Conduct Problem, while the highest

correlation was obtained between Secrecy and Conduct Problems ( $r = .35, p < .001$ ).

A multiple regression analysis was conducted to further investigate the independent associations between each of the PKMS subscales and Conduct Problems. All of the PKMS subscales that showed significant bivariate correlation above were entered into the multiple regression as predictors of the Conduct Problems subscale (from the SDQ). The model was significant ( $F(4, 1390) = 73.12, p < .001$ ) and accounted for 17.4% of the variance. Secrecy contributed the most to the prediction ( $\beta = .31, p < .001$ ), followed by Parental Knowledge ( $\beta = -.17, p < .001$ ), and Child Disclosure ( $\beta = -.09, p < .001$ ). Parental Solicitation did not contribute significantly to the model. No evidence of multicollinearity was found, as the variance inflation factors were all below 1.5 (compared to the critical values of 2.5, 3 or 4), and tolerance was between .73 and .99.

To ascertain whether the sources of parental knowledge would contribute to the statistical prediction of conduct problems over and beyond parental knowledge, a multiple hierarchical regression analysis was conducted by first entering Parental Knowledge in the first block and then entering into the second block as predictors all of its sources that had shown bivariate correlation with conduct problems (i.e., Parental Solicitation, Child Disclosure, and Secrecy). Parental Knowledge significantly predicted Conduct Problems ( $F(1, 1393) = 105.11, p < .001, R^2 = .07, \beta = -.27, 95\% \text{ CI for } \beta = [-.13, -.09]$ ). When the sources of Parental Knowledge were entered in the next step, the model was still significant ( $F(4, 1390) = 58.14, p < .001, R^2 = .17$ ) with a significant  $R^2$  change ( $p < .001$ ). Secrecy contributed the most to the model ( $\beta = .31, p < .001, 95\% \text{ CI for } \beta = [.15, .21]$ ), followed by Child Disclosure ( $\beta = -.09, p < .001, 95\% \text{ CI for } \beta = [-.09, -.02]$ ). Parental Solicitation did not emerge as a significant predictor. The results remained virtually unchanged when child sex and age were controlled in the analyses.

We conducted a moderation analysis using PROCESS (Hayes, 2013) to determine whether any of the relationships between the subscales of the PKMS and Conduct Problems were moderated significantly by the moderators we had hypothesized. Family Warmth significantly moderated the relationship between Parental Knowledge and Conduct Problems,  $t(1411) = 2.06, p = .039$ . The results suggest a slightly stronger association between Parental Knowledge and Conduct Problems among families with lower Family Warmth than those with moderate to high Family Warmth. In a similar fashion but in the opposite direction, Family Conflict significantly moderated the same relationship,  $t(1412) = -2.97, p = .003$ . For families with a high level of Family Conflict, the relation between Parental Knowledge and Conduct Problems was stronger than for those with moderate or low level of Family Conflict.

Another finding was the significant moderating effect of Family Conflict on the relationship between Parental Solicitation and Conduct Problems

( $t(1392) = -2.45, p = .014$ ). In families with more Family Conflict, the negative relationship between Parental Solicitation and the child's Conduct Problems seems to be stronger than in families with lower levels of conflict. Family Warmth did not have the same kind of moderating effect between Parental Solicitation and Conduct Problems.

## Discussion

The internal consistencies of all the subscales were in line with previous research (Kerr & Stattin, 2000), but Child Disclosure had lower reliability in this sample (.66) compared to the study by Kerr and Stattin (2000). However, when Child Disclosure was divided into Secrecy and Child Disclosure, the alpha increased to .90 and .79, respectively. The wording and content of the two first questions in the original Child Disclosure subscale are specifically about the child's keeping secrets regarding what happens during his/her leisure time and hiding what the child does at night and on weekends. Both previous research and our findings support a division of the Child Disclosure subscale into Secrecy and Child Disclosure subscales. Importantly, Secrecy had the strongest association with Conduct Problems ( $r = .35$ ), higher than both the association between Parental Knowledge and Conduct Problems ( $r = -.27$ ) and the correlation between Child Disclosure and Conduct Problems ( $r = -.15$ ). These findings, which are also in line with previous research (Frijns, Keijsers, Branje, & Meeus, 2010), lend support to the specificity of the construct of Secrecy. It also has clinical implications since it points out the importance of intervening in childhood secrecy.

The associations between each PKMS subscale and Conduct Problems were in the direction expected, although Parental Control did not correlate with Conduct Problems significantly or meaningfully. Kerr and Stattin (2000) found a significant association ( $r = .26$ ) between Parental Control and Parental Knowledge. However, their sample consisted of 14-year-old youths and their parents, whereas the present study is based only on parental reports of younger children (ages 10–13 years). No age differences emerged in our analyses, and a thorough investigation of the data showed no tendencies for a correlation between Parental Control and Conduct Problems for 13-year-old children compared to younger children.

The four-factor structure of the PKMS in the present CFA showed an almost acceptable fit. The model adequately explained the data and the fit indices showed that separating the Secrecy and Child Disclosure subscales provides a better model in relation to the data than the original three-factor solution.

When the association between the PKMS subscales and Conduct Problems was investigated with multiple hierarchical regression, Secrecy and Child Disclosure were statistical predictors of Conduct Problems with a significance beyond that already explained by Parental Knowledge, even

when the children's age and sex were controlled. Parental Solicitation did not emerge as a significant predictor, even though it was included in the regression analysis due to its significant association with Conduct Problems. One implication of these findings is to reconsider the monitoring strategies prescribed to parents, as suggested more than a decade ago by Stattin and Kerr (2000). Secrecy and Child Disclosure are stronger predictors of Conduct Problems and Secrecy shows the strongest correlation to Conduct Problems. Secrecy and Child Disclosure should be given greater attention in PMT programs for children at this age as important determinants of Parental Knowledge and predictors of Conduct Problems.

In light of the moderation analyses that show that the associations between Parental Knowledge and Conduct Problems are moderated by Family Warmth and Family Conflict, it might be equally important to focus on parent training methods that enhance Family Warmth and decrease Family Conflict because such a family climate might also enhance Child Disclosure and decrease Secrecy. When these findings are considered in light of research that shows how important disclosing disagreements between adolescents and parents (Darling, Cumsille, Caldwell, & Dowdy, 2006) can be for enhancing parental knowledge, the importance of strategies that improve Family Warmth becomes even more salient.

Interestingly, none of the potential moderators had any effect on the association between Secrecy and Conduct Problems, but this association was the strongest of all the associations between each PKMS subscale and conduct problems. This finding might signal that other processes and mechanisms are at work when parents perceive their child as keeping many secrets. More research is needed to generate and investigate informed hypotheses about these mechanisms. One potential hypothesis is that secrecy occurs mostly when the child or adolescent is already engaged in certain behaviors or believes that his/her behaviors, regardless of the level of warmth in family, might lead to punishing reactions from the parents if revealed. However, a note of caution is warranted when interpreting the findings regarding the importance of Family Warmth as a moderator. If we scrutinize the questions comprising this scale ("*If upset, this child seeks comfort from me*"; "*This child likes telling me about him/herself*"; "*It is easy to be in tune with what this child is feeling*"; "*This child is open with me about sharing feelings and telling me how things are*" and "*Dealing with this child makes me feel good about how I am handling things*"), it becomes evident that Family Warmth has been operationalized in such a way that is not absolutely distinct from the construct of Child Disclosure. Nevertheless, the focus on the emotional tone and behavioral representations of warmth in the family lends support to the validity of this construct as a measure of Family Warmth. Future replications of this study using other measures, such as a constructive replication (Lykken, 1968) and a longitudinal design are needed.

PKMS is a promising instrument for assessing parental knowledge and its sources. All subscales of the PKMS except for Parental Control were significantly correlated with Conduct Problems. Beyond Parental Knowledge, Secrecy, and Child Disclosure were significant statistical predictors of Conduct Problems. The correlations between Parental Knowledge and Conduct Problems were moderated by Family Warmth and Family Conflict. Family Conflict also had a moderating effect on the relationship between Parental Solicitation and Conduct Problems. When considering the design of future PMT programs, these findings cautiously indicate the need for further focus on child secrecy as an important predictor of parental knowledge and child conduct problems. Family warmth and conflict would seem to moderate the relationships between parental knowledge and conduct problems if future prospective studies were to replicate these findings with information obtained from both children and parents.

## Study IV: Evaluation of the Family Check-Up and iComet for families with children aged 10-13 years with externalizing behavior problems

### Results

The cluster solutions were derived from the randomized families' baseline measurements ( $n = 231$ ). Based on the criterion for selecting a cluster solution, a five-cluster solution was derived, explaining 65.39% of the total error sum of squares. The profiles are illustrated in Figure 1, where each cluster has been plotted based on the z-score for each variable as compared to the norms for the population. There are significant differences among the profiles, with the largest differences between Clusters 1 and 3. In summary, Clusters 1 and 2 are characterized by fewer behavior problems with high levels of prosocial behavior. Clusters 3 and 5, however, have the highest ratings for behavior problems, but Cluster 5 is high in prosocial behavior while Cluster 3 is low in prosocial behavior. Finally, Cluster 4 has medium levels on all ratings compared to the other clusters included in this sample.

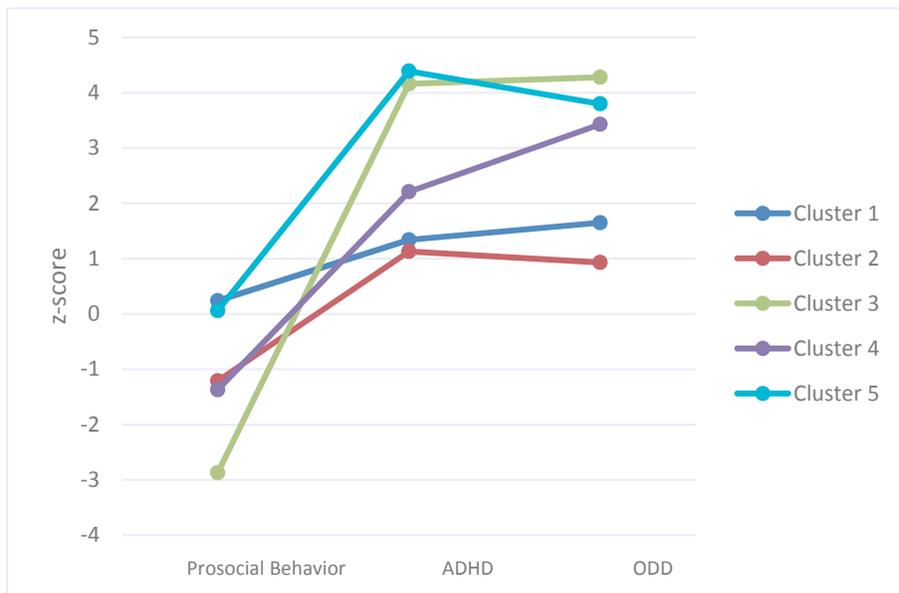


Figure 1. The emerging profiles based on z-scores of ODD and ADHD symptoms as well as Prosocial Behavior in each cluster.

The effect size for the main outcome measure (SDQ Total Difficulties score) ranged from  $d = 0.31$  to  $1.16$ , indicating small to large effects depending on the cluster and the intervention given. Large effect sizes were obtained for Cluster 3 regardless of the intervention program as well as for

those who received FCU in Cluster 4 and Cluster 5. The effect sizes for Family Warmth were also small to large in magnitude, ranging between  $d = -0.29$  and  $1.10$ . For Cluster 5 participants who received FCU, the level of Family Warmth decreased with a small effect size after the intervention,  $d = -0.29$  (i.e. the reverse direction of what we had hypothesized). Cluster 3 receiving FCU intervention saw the largest effect size for Family Warmth ( $d = 1.10$ ). When Family Conflict was evaluated, effect sizes ranged between  $d = -0.29$  and  $0.79$ . Regardless of intervention, most clusters showed small to nonexistent effect sizes with regard to Family Conflict. Participants in Cluster 2 receiving the iComet intervention reported a small increase in Family Conflict following intervention ( $d = -0.29$ ). Cluster 3 differed from the other clusters, showing a large decrease in Family Conflict after the interventions (FCU  $d = 0.79$  and iComet  $d = 0.73$ ).

To test whether various cluster profiles had significantly different outcomes (regardless of intervention), three separate ANCOVAs were conducted. There were no significant differences among the clusters on any of the scales: Total Difficulties ( $F(4, 129) = 2.19, p = .075$ ), Family Warmth ( $F(4, 128) = 0.47, p = .755$ ) or Family Conflict ( $F(4, 128) = 1.59, p = .185$ ).

To examine how the interventions worked for each specific cluster, two-way factorial ANCOVAs were used. No significant interaction effects emerged between cluster and type of intervention: SDQ Total Difficulties ( $F(4, 129) = 0.733, p = .571$ ), Family Warmth ( $F(4, 128) = 1.867, p = .121$ ), and Family Conflict ( $F(4, 128) = 0.215, p = .930$ ).

Regarding drop-out and engagement in treatment, we counted families who completed three or more of the total 7 iComet sessions or the assessment phase of FCU as treatment completers. The proportion of completers in each cluster (both interventions included) was relatively even, ranging from 47.2% to 67.4%. However, there was a considerable difference between the proportions of completers in the clusters depending on whether they received the FCU or the iComet. For the FCU, 71.9% to 90.3% of the families in the clusters attended at least 3 sessions, i.e. finished the first phase of FCU. The corresponding figures for the clusters receiving iComet were 11.8% to 47.4%. Cluster 2 participants who received iComet only had 11.8% who completed at least 3 sessions. Cluster 2 receiving iComet differs from Cluster 2 receiving FCU in two ways: first, there were only a few ( $n = 10$ ) families in this cluster who were assigned to iComet. Second, the baseline value for SDQ Total Difficulties for Cluster 2 families assigned to iComet was higher ( $M = 16.40$ ) compared to those families in the same cluster assigned to the FCU ( $M = 11.53$ ).

## Discussion

Research regarding the effectiveness of PMT interventions in “real life settings” is essential in order to evaluate whether the interventions really

work (Costin & Chambers, 2007). This study examined two different interventions for families with children with EBP in a community-based setting.

By conducting a person-oriented cluster analysis based on the critical variables (i.e. subscales score from ADHD, ODD and Prosocial Behavior), five distinct profiles emerged. This implies that children with EBP are a heterogeneous group within which significantly different subgroups can be identified.

The three clusters who were relatively low in ADHD symptoms (Clusters 1, 2 and 4) only differed somewhat regarding Prosocial Behavior and ODD symptoms.

Interestingly, both Cluster 2 families assigned to FCU and Cluster 1 families assigned to iComet were already within the non-clinical range at baseline measurement. Clusters 1 and 2 thus had lower initial levels of EBP and also exhibited prosocial behaviors. Clusters 1, 2 and 4 were all within the non-clinical range after PMT, with moderate effect sizes for all clusters and both interventions regardless of whether the families received FCU or iComet. The only exception was the large effect size seen in Cluster 4 families receiving FCU. This is in line with a comparable study of iComet (Enebrink et al., 2012), which reported moderate effect sizes ( $d = 0.70$ ) measured by the SDQ Total Difficulties score. This result indicates that FCU and iComet both function well and are sufficient primary interventions for these profiles.

Those children most at risk for continuing EBP are those with comorbid problems with ADHD and ODD symptoms (Clusters 3 and 5 in this study). There is an important difference, though, between these two burdened clusters. Cluster 3 has Prosocial Behavior scores almost three *standard deviations* below the mean for the general population, indicating that this specific cluster may have problems with peer and other social relationships since their social skills may be substandard.

The results for Cluster 3 showed a large effect size regarding SDQ Total Difficulties score for both FCU and iComet ( $d = 1.00$  and  $d = 1.16$ , respectively), but both groups' scores are still above the clinical range (i.e. the 90<sup>th</sup> percentile) following the interventions. The problem behaviors might continue to decrease over time, since the starting point was high and there is a trend toward improvement. However, long-term follow-up data is needed to shed further light on the potential changes over time within each cluster. If their problems are not reduced over time, they might be at high risk for further EBP (Barkley, 1997). These behaviors might interact negatively with the lack of prosocial behavior and be accompanied by peer problems or other social maladjustments. At this point, however, we argue that neither FCU nor iComet were sufficient interventions for the children in this cluster. Since this is a high-risk group, and neither FCU nor iComet proved sufficient, more effort should be put on identifying children with

profiles such as those in Cluster 3 and developing more effective forms of intervention.

Cluster 5 is characterized by having severe ADHD problems and ODD behaviors, but it differs from Cluster 3 with the presence of prosocial behavior. The outcome analysis revealed quite different effect sizes depending on the type of intervention given to families with children belonging to this profile. FCU resulted in a large effect size ( $d = 0.89$ ) compared to a small effect size for iComet ( $d = 0.31$ ). This might be because genetic factors play a substantial role in the occurrence of ADHD (Barkley, 1997a; Biederman, 2005; Biederman & Faraone, 2005) and parents with ADHD-problems themselves may have difficulties with online interventions (Vernmark & Bjärehed, 2013). As argued in the introduction, these families might also require additional more ADHD-specific interventions targeting core symptoms of their attention, impulsivity and hyperactivity problems. Even though their prosocial behavior may act as a protective factor, the comorbidity with high levels of ADHD and ODD symptoms signals that the children belonging to this profile also constitute a group at high risk for further EBP.

Neither of the interventions offered in this study included social skills training for the child or a specific focus on ADHD problems. This indicates an area requiring further development in the next generation of parent management training programs. It may be difficult to motivate parents of children presenting with these profiles to continue with another intervention focusing on ADHD or social skills training after completing a regular PMT program. An alternative would be to identify children belonging to these clusters at assessment and offer a more tailored intervention from the start. One way to develop future PMT programs could be to include optional modules targeting areas such as core ADHD symptoms and prosocial behavior skills, as needed. Future research is needed to investigate whether adding or changing treatment modules can accomplish clinically significant improvement for children in Clusters 3 and 5.

Another aim of this study was to evaluate whether treatment engagement differs depending on cluster profile and the intervention offered. We chose engagement because we were analyzing how many modules the parents completed. Another way to measure engagement is adherence to treatment which may also include how well the parents actually followed the program, i.e. not only completing modules, but also assessing the quality of the participation such as how well they applied knowledge and completed homework assignments. Program acceptance (measured with different sources such as recruitment rates, patient drop-outs and patient-completed questionnaires) is another option for analyzing whether the intervention offered is adequate (Kaltenthaler et al., 2008).

The results show that a larger number of families randomly assigned to iComet chose not to start the intervention than those assigned to FCU (39%

versus 18%), but this was not associated with cluster membership. This indicates that many families randomized to iComet were not exposed to any intervention at all. Perhaps many of the families that applied to the study were expecting a face-to-face intervention and therefore discontinued when they received iComet. In another study where participants knew beforehand that the intervention would be online, all (100%) participants started the intervention and 83% completed it (Enebrink, 2013; Enebrink et al., 2012; Högström et al., 2013). In another study using the online-based Incredible Years (Taylor et al., 2008), 76% of the participants completed more than half of the modules. A study evaluating Triple P Online (Sanders et al., 2012) reported that 67% completed half of the sessions. This is in contrast to the 36% who completed iComet in this study. A reason for the low rate of completion for iComet might be the fact that the program was developed for children ages 3–12 and does not specifically target children ages 10–13. There was also no alliance-building in this study of the iComet intervention since the introduction to the program was conducted by one person and another person then acted as facilitator to the families during the program. No time limits were set, although parents were encouraged to complete one session a week, but they had access to the session for as long as they wanted. In FCU, 92% of those randomized to the intervention completed at least the first stage of the intervention. One of FCU's strengths is that its first session focuses on creating an alliance with parents and the perception among parents that the treatment has started. Other variables that might influence parental engagement are that meetings are booked, they have a personalized contact, and the work is not done independently by the parents.

This study illustrates the importance of distinguishing between different profiles of children when conducting assessments. For most of the families included in this study, both FCU and iComet were sufficient interventions and the child's problem behaviors were within the non-clinical range after intervention. Two of the profiles, however, need the interventions to be further adapted and/or supplemental interventions to achieve sufficient results (i.e. post-treatment scores within normal range). Perhaps a longer period of time is needed to achieve these results, regardless of the intervention given. Both of these two clusters had high levels of EBP at baseline measurement. The children in Cluster 3 also received very low scores on Prosocial Behavior and thus might have made more improvement if social skills training or parenting skills such as perspective taking had been a part of the intervention. Common to both Clusters 3 and 5 were the high level of ADHD symptoms, indicating that a more specific module about ADHD or ADHD adjustments would have been appropriate modifications for both of these clusters.

# General discussion

## Norms: to be or not to be

When screening participants prior to an intervention, as done in Study IV, general population norms help us to be much more informed when selecting participants at risk. Unfortunately, the proportion of subjects who choose not to participate in population-based studies has increased dramatically during recent decades (Gerrits, Van Den Oord, & Voogt, 2001), as was also seen in our normative sample with a response rate of 51.2% (31.9% of whom responded online, while the remainder responded on paper). How can we understand this high non-response rate and the implications it has on the norms used in research or clinical settings?

Beyond the generally increasing tendency to avoid participation in questionnaire-based studies, the low response rate in Studies I, II and III, might also be explained by some other factors, including the extensive number of items on the questionnaires and their focus on such areas as psychiatric symptoms. We also saw differences in response rate depending on assessment mode. The 2,800 parents were evenly randomized (50/50%) when asked to complete the questionnaire on paper or online. The response rate for the paper-based questionnaire was higher; as a result, there was more normative data collected using this method. Access to a computer and the internet can probably be ruled out as explanations for the lower online response rates, since the vast majority of Swedes have access to both.

As far as I know, no other normative studies have compared these two ways of collecting data from a normative sample. Many studies have compared answering questionnaires online or by a computer versus paper-and-pencil, but they are not comparable since they were either clinical studies (Andersson et al., 2003; Austin et al., 2006; Carlbring et al., 2007; Luce et al., 2007), population studies with other available response modes (such as one group responding online but in a classroom setting while another group responded online but at home (Denniston et al., 2010), or studies where participants filled out the questionnaire on site (classroom) with either computer or on paper (Booth-Kewley, Larson, & Miyoshi, 2007).

A few hypotheses have been made about why higher response rate was obtained by paper-and-pencil than online. Those asked to respond on paper may find their options more flexible, such as being able to complete the questionnaire during a bus ride or skipping items they do not want to answer,

etc. Responding online might not convey the same sense of anonymity as responding on paper. Finally, the physical presence of the questionnaire might itself be a trigger (reminder) to respond, a stimulus not present when an online response is expected.

Data collected with a high non-response rate most likely has both a systematic bias (e.g. participants with more psychiatric problems or reading and writing difficulties are more likely not to fill out the questionnaire, while those with higher levels of education would be more likely to respond) and a non-systematic bias (for example, participants simply forget, do not want to fill out the questionnaire, do not have the time, or are not interested in helping with research). These kinds of bias have implications when norms are used. The norms for the SDQ established in Study I most probably reflect both systematic and non-systematic bias. The systematic bias is reflected in the higher levels of education among the participants than the average for the Swedish population. In one interesting study of SDQ, 97% of children were assessed by their teachers, while only two thirds of their parents also completed their questionnaires (Heiervang et al., 2007). When comparing those children with questionnaire data from both respondents with those only with data collected from the teacher, the latter group had significantly higher levels of teacher-reported total difficulties (Heiervang et al., 2007). This study indicates that parents of children exhibiting more EBP are less likely to participate in studies, which most likely also applies to our normative studies (Studies I, II, and III)

These potential bias factors imply that our norms (in Study I) are most likely slightly lower on scales measuring difficulties (such as Conduct Problems, Peer Problems, Emotional Symptoms) and slightly higher on scales measuring strengths (such as Prosocial Behavior) compared to the general population. The extent to which this affects different cutoff points is difficult to know, but caution is indicated. The implications of using norms, such as those established in Study I, might be result in some false positives in the screening process with subjects without problems being included in the intervention study. Of course, a primary objective for a screening process is to have as many true positives (people who do have problems) and as few false positives as possible. For example, it was more important to include borderline individuals in Study IV (where the cutoff point on the Conduct Problems scale was rather low at 3 points), because it was also considered a first-line intervention with an additional preventative focus. When using cutoffs, there is a trade-off between sensitivity (the true positive rate) and specificity (the true negative rate), as a few points in either direction can have a significant influence on who will be included in a study and receive intervention and who will not (Myers & Winters, 2002). Including family responses to questionnaires and comparing their ratings to a biased norm may be problematic because parents may perceive their issues as larger than they actually are (compared to the population at large). It might also lead to

labelling or stigmatizing children as at risk, when they actually are not. The advantage of liberal cutoffs, however, is that they make help available to many parents who actually think they have problems with their child. Taking Study IV as an example of using established norms, the disadvantages caused by the bias are less than the benefits of using Swedish norms for children in the same age range. In studies in other fields, such as medicine, it would be much more problematic to give a drug to individuals with no need for it. The side effects for the participants in our intervention study are likely manageable, even if they are time-consuming for the participants and costly for society.

## Online assessments: pros and cons

Assessments are increasingly being performed on computers or online; therefore our studies (Studies I, II and III) compared online responses with traditional paper-and-pencil responses in order to analyze how the mode of administration affected the psychometric properties of the scales. In the normative Swedish sample, we did not find any differences due to response mode, implying that online data collection with sustained psychometric properties is possible (Studies I, II and III). Our sample did not identify any difference between response modes; accordingly, those norms established in paper-based questionnaires can also be applied to data collected online. There are many implications to being able to conduct assessments online, such as ease of administration, elimination of missing responses, avoidance of data entry costs, automatic scoring, flexible presentation and immediately available results (Booth-Kewley et al., 2007). Some of these advantages depend on how the questionnaires are presented online to the respondents. Can respondents go back and review questions they have responded to, skip items, or change responses? Are there features designed to remedy a lack of response, such as reminder prompts or presenting skipped items again? If respondents can skip items, it is likely that the number of missed responses will increase. On the other hand, if respondents cannot skip items, perhaps respondents will quit when faced with items they do not know how to answer. Perhaps none of the alternatives suggested in the questionnaire apply or are acceptable to the respondent. In one study, there were more missing responses in computer-based assessments than on paper-based ones (Denniston et al., 2010).

In the future, however, there would be a considerable advantage to computer-based assessments. For example, individuals with reading deficits could use the computers to read the questionnaire items out loud and even respond orally. As far as I know, this kind of adaptation has not yet been used in normative sampled or intervention studies.

Studies comparing computer and paper-based testing have used different combinations of procedures, therefore it is quite difficult to make comparisons and draw general conclusions (Booth-Kewley et al., 2007) on the best mode for administering questionnaires, given all the pros and cons. When deciding how to collect data, study-specific factors need to be considered. Our studies (Studies I, II and III) represent a step forward because they enable us to take more informed decisions, because the psychometric properties of the questionnaires and norms studied were shown to be adequate when data was collected online. Future normative studies may also wish to consider the larger non-response rates we saw when questionnaires were to be filled out online.

## Reliable and valid scales in a Swedish context using traditional and online response modes

In Study I, where the SDQ was evaluated with a randomly selected sample of Swedish parents, it was found to be a reliable and valid instrument with a clear 5-factor structure. Study I is particularly useful because it shows that data for the SDQ can be collected online without compromising its reliability and validity. In addition, the norms obtained by paper-and-pencil corresponded to those obtained via the internet. Finally, Study I helps address some of the gaps in our knowledge resulting from the lack of normative data for Swedish parents of children aged 10-13. One source of systematic bias in Study I (lower response rate among parents with children with EBP) (Heiervang et al., 2007) does have some implications. First, it may lead to problems with specificity since the false positive rate is increased. Another result that emerged was that parents with lower levels of education reported significantly higher scores on the Hyperactivity-Inattention subscale (mean difference = 0.34) as well as higher Total Difficulties scores (mean difference = 0.79), however the corresponding effect sizes were small ( $d = 0.16$  and  $d = 0.15$ , respectively). Since the data collected to establish the norms is biased towards parents with higher levels of education, both the Hyperactivity-Inattention and Total Difficulties subscales are suspected to be lower in the established norms than among the general population.

Study II investigated parents' emotion regulation strategies, and their correlation to marital adjustment, family climate and parenting skills. As these are important factors in the development of child EBP, we analyzed these constructs to deepen our understanding. This was also one of the first studies ever to analyze ERQ among parents.

The ERQ investigated in Study II was shown to have adequate reliability and construct validity, even though the CFA revealed some difficulties with

the two-factor structure. Four of the items (4, 8, 9 and 10) that were distinct operationalizations of the latent variables (two for cognitive reappraisal and two for expressive suppression) suggest a path to the opposite factor (by modification indices). How did this occur? Were the questionnaire's instructions too vague? To what extent are people generally aware of their strategies to regulate their emotions? Perhaps they use different strategies or no strategy at all when regulating positive emotions instead of negative emotions. Perhaps they did not understand the questions correctly or did not understand all the items in the questionnaire.

As hypothesized, the results revealed a positive correlation between ERQ ratings of functional emotion regulation (i.e. cognitive reappraisal), and marital adjustment, family warmth, and appropriate discipline, and a negative correlation with harsh discipline. The results indicate that cognitive reappraisal of situations is a useful skill to practice in parent training programs to improve functional interactions with the child and/or a spouse/partner. However, the correlations were small in magnitude. There is also a risk that this sample was biased by the non-responders, therefore it would be worth comparing these results with those from a clinical sample.

The ERQ might be clinically relevant for use with families with children exhibiting EBP since it enables the clinical professional to obtain a broader picture of what determines parenting practices and skills which depend on a functional ability to regulate their emotions. How parents react does influence a child's disclosure and secrecy behaviors (Tilton-Weaver et al., 2010).

Parental monitoring is a construct considered important in child-rearing practices for years. Stattin and Kerr (2000) questioned this long-accepted construct by arguing that the most important aspect of monitoring with a child's EBP is not so much the parents' active monitoring behavior as the parents' knowledge of the child's activities and whereabouts. Stattin and Kerr therefore constructed the PKMS scale to measure parental knowledge. The scale not only takes into account the various means of obtaining knowledge, including active parenting behaviors of solicitation and control, but also voluntary disclosure on the child's part. Later research then found that the PKMS Child Disclosure subscale actually tapped into two distinct and important constructs, one being child disclosure and the other secrecy. This distinction is important, especially since the main finding in Study III was the link between secrecy and conduct problems, with the highest correlation ( $r = .35, p < .001$ ) in our study's normative sample. Since this was a cross-sectional study, it is impossible to derive any conclusions about causality and its direction. Is it that children engaging in problem behaviors keep a lot of secrets from their parents or does the secrecy result in missed opportunities for parents to model and problem-solve difficult situations with the child that leads to more EBP?

Moreover, it would have been useful to correlate parents' ratings to the children's ratings on secrecy. This was not possible in our study since normative data from children were not collected. But it does make one wonder about the extent to which they would correspond? The parents were asked about their perception of the degree of the child's secrecy, but how much do parents actually know about how many secrets a child has?

Nevertheless, the implication for PMT programs is that secrecy, if apparent, needs specific attention. Moderating analysis regarding family conflict and family warmth were conducted to better understand the relationship between secrecy and conduct problems. No moderation effects were found, thus indicating that other mechanisms might be involved. As far as clinical implications are concerned, what can actually be done to decrease secrecy?

Study III supports the conclusion that the PKMS seems to be a promising scale for assessing parental knowledge and monitoring with acceptable psychometric properties within a Swedish normative sample. The problematic lack of associations between the Parental control subscale of PKMS and Conduct Problems might be due to bias caused by non-response (as discussed above). The lack of significant correlations may be the result of the most burdened families not participating in the study. It might also be that operationalizing the parental control construct is not effective in the target population (children ages 10–13). The ineffective items might be: *“If the child has been out very late one evening, does the child then have to tell you in detail what she/he has done”* and *“If the child is going out on a Saturday evening, does she/he then need to tell you ahead whom she/he is going to meet and where they are going”*. These items do not seem as applicable to the younger children in the study even though this kind of information is very relevant in clinical work or as used in the intervention study (Study IV).

When analyzing potential moderators such as family climate, the most interesting finding was that Family Warmth significantly moderated the relationship between Parental Knowledge and Conduct Problems. The results suggest a slightly stronger association between Parental Knowledge and Conduct Problems among families with lower Family Warmth than for those with moderate to high level of Family Warmth. Given that Parental Knowledge also correlated significantly ( $r = -.27, p < .001$ ) with Conduct Problems, a deeper understanding of this relationship may have clinical implications. As we already know, it is important for the parent to build a close and securely-attached relationship to the child, making parental knowledge per se less important. In clinical practice, however, the opposite perspective is more relevant: if the relationship between child and parent is lacking in warmth, the role of parental knowledge becomes more important. What kind of active behaviors can the parent then undertake to increase the

child's voluntary disclosure or decrease his/her level of secrecy? This may be a question for future investigation.

## Second-wave PMT programs that are effective, but not enough for everyone

Child EBP are a deplorable problem, not just for the child, but also for the family involved and for society as a whole. It is therefore urgent to reach out to those families in need and offer effective and accepted interventions that parents will follow. Since the number of families in need is so large, it is not realistic to believe that we can offer conventional evidence-based face-to-face or group-format interventions for everyone, not only for economic reasons, but also due to other barriers such as accessibility, logistics, stigmatization and a limited supply of trained therapists. Therefore, new ways to address these issues on a larger scale are called for.

### Internet-based PMT intervention

Most people in Sweden use computers on a regular basis. The increased sales and use of smart phones and tablet devices has also created new possibilities for parents to take part in various forms of interventions via the internet (Ly, Dahl, Carlbring, & Andersson, 2012). The issue of accessibility then seems to be solved for parents when they take part of online PMT. The results in our study also show that, for families with children exhibiting low to moderate levels on the ODD subscale, iComet was an effective and sufficient intervention that decreases the child's total difficulties score. Those children with low levels of ADHD-symptoms at the baseline assessment were within the non-clinical range when assessed after intervention. These promising results with online PMT programs is also in line with other studies (Enebrink et al., 2012; Sanders et al., 2012; Taylor et al., 2008). However, the results have other implications worth discussing. Of those families in clusters 1, 2 and 4, who started the intervention and completed the post-intervention assessments ( $n = 27$ ), seven parents received the whole program (i.e. all 7 sessions). Twelve parents (44%), however, received 3 or fewer sessions (these sessions are about self-directed play, positive interaction, preparations before activities, and giving effective commands and praise). We are then forced to ask how effective the intervention actually is. Are just a few sessions enough to make a real difference? Are the lower total difficulties scores due to biases of social desirability or a spontaneous remission of symptoms? Since we did not have a control group not receiving intervention, the conclusions we can draw are limited. Changes in parent-rated Family Warmth showed small effect sizes

(Cohen's *d*) from baseline to post-intervention, ranging between 0.36 and 0.44. This may reflect some changes in parental skills during the intervention (e.g. more positive interaction with their children). However, the subgroups were small ( $n = 9, 4$  and  $13$  respectively) and due to the design of the study, no conclusions concerning the causes of the outcome could be made. The norms used to set the cutoff for clinical level may also be biased, due to the normative sample discussed above (in "Norms: to be or not to be"), which then would mean that the participants are well below the clinical level after intervention. Cluster 1 receiving iComet condition was below clinical level even before intervention. The intervention study was designed to be inclusive since it was focused not only on intervention, but on the prevention of EBP; therefore, the participation cutoff was kept low. This may influence the effect sizes of the results, since the possibilities for improvement are limited if the child's EBP were minimal to start out with.

Larger drop-out rates were seen in those receiving intervention online in Study IV and we have made hypotheses to explain this. The participants in our study applied for an intervention without knowing whether they would receive face-to-face intervention or an online PMT program. Since the drop-out rates for other internet-based intervention studies do not have the same high drop-out rates (Enebrink et al., 2012), the parents' preliminary expectation about delivery mode might be a reason. In general, online interventions work well when participants actively request that mode of delivery themselves (Vernmark & Bjärehed, 2013). Another issue is that the online intervention might have been perceived as impersonal since aspects building alliance were not emphasized enough and built into our study's delivery mode (Study IV); this is another difference to the study with lower drop-out rates (Enebrink et al., 2012). This may need to be addressed in future studies to ensure that this is not the barrier to intervention.

We then need to ask to what extent it is desirable and appropriate to use iComet in regular care settings and thereby increase the opportunities for families to receive help. Our study (Study IV) indicates that iComet may be an option, even preferable if the parents accept online intervention and the child's EBP are mild to moderate. High levels of ADHD-symptoms may be an indicator that other interventions are needed. Importantly, if participating parents have their own problems concentrating, such as ADHD, this may be an aggravating factor in using online interventions. The benefits from online interventions, such as the opportunity to work independently and flexibly, might be pitfalls for a parent with ADHD. Problems with executive function and the need for structure make online intervention even more difficult to complete. If the ADHD symptoms are too pronounced, online intervention can be inappropriate.

## Brief, tailored face-to-face-intervention with focus on parent motivation

Since one of the challenges in the future is implementing evidence-based interventions for child EBP in community settings, the intervention study (Study IV) was essential. The FCU was then administered by regular personnel in Swedish routine care settings, such as social service centers and schools. The FCU is also delivered face-to-face; this has been shown to have greater impact than group-based interventions for economically disadvantaged families. In our study, only seven families (5.7%) randomly selected to receive FCU indicated that their monthly income was not enough to meet their expenses, but even then I doubt these results would be comparable to economically disadvantaged families in places such as the United States. Overall less poverty and social stratification is present in the Nordic countries than in other economic and political systems (Heiervang et al., 2007).

In Study IV, the FCU resulted in moderate to large effect sizes. Those children with low levels of ADHD-symptoms at the baseline assessment were within the non-clinical range when assessed post-intervention. For those randomly assigned to the FCU who subsequently completed the post-intervention assessment, 38 families (46.3%) were within the non-clinical range at baseline, although there was a decrease in the total difficulties score post-intervention. How can these improvements be explained? In general, for all families randomized to FCU (regardless of their cluster belonging), they attended the two sessions about positive behavior support. All (100%) who chose to use the EPC attended the first session on positive behavior support, with 92% also attending the second session on the same topic. The third most popular session was about behavior change plans, with 53% of the parents attending. The outcome measurement of Family Warmth also showed small to moderate effect sizes, ranging between 0.24 and 0.58 (for Clusters 1, 2 and 4), with the corresponding effect sizes figure for Family Conflict ranging between 0.17 and 0.36. Drawing any conclusions is problematic because the scores were only obtained from parents. These parents also had contact with a therapist who gave them feedback on the post-intervention assessment and the scores might be biased by social desirability. Other information sources would therefore have been quite valuable, but they were unfortunately not possible within the framework of Study IV.

## When more is needed

In families where parents rated their child high on ODD- and ADHD symptoms at the baseline assessment, post-intervention scores remained within the clinical range (90<sup>th</sup> percentile). This cutoff was set using the

norms, which suggests that the cutoff is actually lower than that in the general population (due to bias). This indicates that more of the participants would actually fall within the non-clinical range if the 90<sup>th</sup> percentile was set to a higher score on the scale.

However, in this study, the FCU was not delivered exactly as originally intended, since no other options besides the EPC were available. The EPC manual makes it optional to offer other resources or other services available within the community. For research reasons, we chose not to include these kinds of additional options. The FCU does, however, have the potential to be flexible and tailored to address such problems as ADHD-symptoms and a lack of pro-social skills. Despite the fact that the EPC manual does not include specific modules for those areas, the model does allow other available resources to be added to enhance effectiveness.

It becomes essential, then, that assessment personnel have access to scales that measure key constructs as well as the competence to be able to distinguish among different problems and disorders and to know what and when to prioritize. A growing body of longitudinal data has demonstrated that there is substantial heterogeneity in developmental trajectories leading to conduct problem behavior (McMahon, Witkiewitz, & Kotler, 2010). CU traits are one specifier that needs to be identified in assessments, as also highlighted in the latest update of the DSM-5 (American Psychiatric Association, 2013). In our study, we unfortunately did not include any specific instrument to measure the CU traits construct due to the already large number of questionnaires included. One option would have been to include the CU trait subscales such as the Antisocial Process Screening Device (Frick & Hare, 2001).

Another implication from the results of Study IV is that when a high level of ADHD symptoms co-occurs with ODD behaviors, neither the iComet nor the FCU appear to be a sufficient form of intervention. Considering that what drives the early onset of ODD symptoms is impulsivity and/or hyperactivity components of ADHD (Burns & Walsh, 2002), more emphasis is needed on those deficits in PMT programs targeting these families. In our study, 85 children belonged to the clusters (3 and 5) with high levels of ADHD. Both of these clusters were characterized with having ADHD-levels four *standard deviations* above the mean in the normative sample. Even though the normative sample might be biased due to a perceived lack of participation by families with psychiatric problems, four standard deviations above the mean for ADHD-symptoms indicate some kind of problems on this dimensional scale. Since only 17 children were diagnosed with ADHD, many of the children may have deficits that significantly impact their functioning, but are perhaps not receiving adequate help in the form of understanding parents making demands at the appropriate level or ongoing support in school or other interventions. In an overview of evidence-based psychosocial treatments for ADHD (Pelham & Fabiano, 2008), the

interventions proposed for children with ADHD included behavioral training for parents, classroom behavior management and peer behavioral interventions (i.e., summer treatment programs for the child targeting peer relationships and functioning in a recreational setting). More research is however needed regarding problem-solving and communication training.

Combinations of ADHD, ODD and CU traits have additional implications for clinical practice. One interesting finding in support of the idea presented in Study IV about subgrouping children, is that children or adolescents who are impulsive and antisocial but not high on CU traits are actually more sensitive to punishment cues and more prone to emotional distress than other youth (Loney et al., 2003). As a clinician, assessing these critical variables is crucial for effective intervention.

One can always make arguments based on a cost-benefit analysis, i.e., that it is important to reach out to as many families as possible with effective treatments. The results may indicate though that the families belonging to the two subgroups in Study IV with the highest EBP burdens are most likely to need other interventions as well. Since these groups with comorbid ADHD symptoms and ODD behaviors are at risk for further EBP with corresponding costly societal problems, it can be considered a good investment to target these families at assessment and offer them a more effective, albeit cost-intensive, treatment.

## Acceptance, engagement and adherence to intervention

Parent acceptance is a key component to consider when evaluating new forms of intervention delivery (Kaltenthaler et al., 2008). The internet makes it possible for many parents to access evidence-based intervention for their child's EBP; therefore, the acceptance of this delivery mode is of interest.

Clinical trials show that acceptance of intervention is a primary attenuating factor in the clinical effectiveness of services delivered compared with the efficacy of treatment. An overview of the acceptance of computer-based cognitive behavior treatment for depression used proxy acceptance indices based on recruitment/take-up rates, patient drop-outs and patient-completed questionnaires (Kaltenthaler et al., 2008). Take-up rates were then defined as the percentage of persons who agreed to start treatment relative to the total number invited. In our study, we chose to write about drop-out and engagement; take-up rate could not be measured because there were many different reasons why parents chose not to participate in the study. The possibility to receive an online intervention was definitely not stated as the main reason for not participating. Instead, the level of engagement was assessed by analyzing how many parents who never started the intervention program among those who were randomly assigned to that program and also the proportion of those who participated in at least 3 sessions of the

intervention. This is only a general way to discuss this problem, but it does give us a hint about acceptance problems with online PMT programs.

To enhance the acceptance of internet-based interventions, there may be a need to correct misperceptions, explain the rationale behind them, provide evidence of their efficacy or set time limit for access. When delivering interventions online, it might also be even more important to focus on the therapeutic alliance at the introduction session, since this is much harder to achieve later via the internet. Techniques such as motivational interviewing may then be applicable. This remains a new area of research; hopefully, future research will focus more on enhancing acceptance and compliance with online interventions.

Compliance is also difficult to measure. It can be based on the number of modules completed, sessions attended or assignments done. La Greca et al. (2009) found that it was not parents' attendance that was the most consistent predictor of treatment response, but the quality of their participation. Specifically, the quality of parents' participation predicted improvements such as the parents' positive perceptions of their children and warmth they directed toward their children. Therefore, they argue that it is the quality and not the quantity of parent involvement that is important (La Greca et al., 2009).

## Clinical and statistical significance

Recent decades of research have shown that PMT programs are evidence-based interventions for childhood EBP. However, it is important to expand the range of outcomes studied to determine whether an intervention has a clinically meaningful impact on children's day-to-day lives. Three general ways of evaluating the effects of interventions have to be distinguished: statistical significance, the practical significance (effect size), and the clinical significance (indices that the intervention is actually resulting in meaningful changes to the child's everyday functioning). It is important then that effect size has no necessary connection to clinical impact (Kazdin, 2013). It may be significant that statistical changes are the most common outcome measures used in intervention research (La Greca et al., 2009).

In Study IV, we identified that practical significance (i.e., effect size) of the outcomes were problematic since we saw that for two subgroups of children the interventions were not enough to make a significant clinical difference. We then compared the scores at post-intervention with a clinical cutoff point. Others have then suggested that the cutoff point for the clinical range should be roughly above the 90<sup>th</sup> percentile of the total difficulties SDQ scores (Goodman, 1997; Rønning et al., 2004), and we used that as a comparison. Even if no diagnostic criteria were used, the score on the dimensional Total Difficulties subscale were within the clinical range. The

result then indicated that the intervention was probably not enough to make a clinical significant impact on the children's day-to-day functioning.

## Implications of the findings and future directions

The major contribution and implication of the findings from Studies I, II and III is that all three scales (SDQ, ERQ and PKMS) have acceptable psychometric properties within a Swedish normative sample. The scales can also be used regardless of response mode, i.e., either paper-based or online.

Furthermore, the norms for SDQ obtained on paper-based surveys corresponded to those obtained online. Study I has also closed the gap in available SDQ norms for children ages 10 to 13 in Sweden. Since the norms may show both systematic and non-systematic bias, future research could collect data with high response rates from participants with lower levels of education or lower socio-economic statuses, since these groups appear to be more commonly among the non-responders. Mere replication of our study's procedure would probably lead to an over-representation of those with higher education and thus result in the same bias.

An implication of the results from Study II is that cognitive reappraisal of situations might be a useful skill to practice in PMT programs. This would allow parents to improve their functional interactions with the child and/or spouse/partner. The results showed that this strategy corresponded positively with marital adjustment, family warmth and appropriate discipline. Factors such as family warmth and appropriate discipline are core components in intervening with the coercive parenting model. However the ERQ does not target emotion regulations strategies used when interacting with a child's disclosure behavior or EBP; future research would include the development of a questionnaire more adequate to use when assessing prior PMT programs.

When analyzing potential moderators in Study III, we found that Family Warmth significantly moderated the relationship between Parental Knowledge and Conduct Problems. Given that Parental Knowledge also correlated significantly with Conduct Problems, a deeper understanding of this relationship may have clinical implications. As we already knew, it is important for the parent to build a close and securely-attached relationship to the child, making parental knowledge per se less important. In clinical practice, however, the opposite perspective is more relevant, i.e., if the relationship between child and parent is lacking in warmth, the role of parental knowledge becomes more important. What kind of active behavior can the parent then undertake to increase the child's voluntary disclosure or decrease his or her levels of secrecy? This would be a question for investigation in future research.

Study IV gave promising results regarding the implementation of the FCU in a Swedish context and also the use of online PMT. Both resulted in moderate to large effect sizes comparable with other PMT programs. As there was no control group receiving no treatment and the interventions received were rather brief, conclusions regarding their effectiveness are limited. Future study should also include a control group not receiving intervention. Since drop-out rates were also relatively high among those receiving the iComet intervention, further research on implementing online interventions in a community-based setting is needed. It will be interesting to find out if an assessment more geared towards building alliance and a custom form of iComet that would allow parents to choose among different modules would enhance its acceptance as well as its outcomes. Individual-tailored online interventions in other areas have shown promising results (Carlbring et al., 2011). As proposed earlier, additional modules could include a more specific ADHD module, a model to support parents in training their child's social skills, or emotion recognition training. These kinds of modules could possibly be even added to the FCU, and also with much greater school involvement.

## Limitations

The three studies focusing on different rating scales (Studies I, II and III) all had some general limitations. The first was that we obtained a larger response on paper-based questionnaires than from those taken online. However, we found no significant or meaningful differences between the two response modes. In addition, the educational level of the parents taking the surveys was slightly higher than the average educational level among parents in Sweden. This seems to be a common bias in research studies. In other words, parents with higher education are more willing to participate in such studies than those with lower levels of education. Nevertheless, we found no substantial differences between respondents with higher versus lower levels of education. The percentage of girls and boys at each age interval was also compared to the national data on all girls and boys aged 10-13 years retrieved from Statistics Sweden ([www.scb.se](http://www.scb.se)). At each age interval in the total population, about 48.5% are girls and 51.5% boys. On average, girls made up 51% of our study sample. The sex distribution in the sample might thus be viewed as representative of the general population of children at these ages. The response rate (just above 51%) was low despite several reminders and some incentives to increase the response rate. It would also have been informative to have some data on the age of the responding parents. Unfortunately, this parameter was not included in the questionnaire. Studies have also shown that those who do not respond to surveys regarding psychological problems more often tend to suffer from such problems than

those who are more willing to participate (e.g., Beglin & Fairburn, 1992). Translated into the context of the current study, parents whose children exhibit some EBP might be less willing to participate in studies such as this one. On the other hand, the norms obtained in our study are in line with those based on studies with lower drop-out rates. Nevertheless, our findings need to be interpreted with caution, since a risk for positive selection cannot be ruled out.

Moreover, very little data was available for comparing the parents who responded to those who actively chose not to participate in the study or to those who never responded to any of our letters of invitation. Information from more than one source (e.g. parents, children, and teachers) and a longitudinal design would enhance the total strength and interpretability of the findings.

Regarding Study II, where norms were established for parents' self-rated ERQ, the limited age span of the children restricted the representativeness of this sample of parents in relation to the population of parents in general. Nevertheless, these are critical ages when it comes to child development and knowledge about the emotion regulation strategies of parents with children at these ages is important.

Throughout the analysis, only parental reports have been used. Even though child and teacher reports would be valuable validation of parent reports, they have other limitations. In Study IV, when analyzing the outcome of interventions (i.e. decrease in child problems and improved family climate), post-intervention data was only used from those families who completed at least one session of intervention. No ITT analyses were conducted since there were no significant baseline differences for those who provided post-intervention measurements and those who chose not to, nor were there any substantial effect sizes to consider beyond the lack of statistical significance. Although ITT analyses are generally viewed as important for generalizing the results to the population, the interpretation of results from the ITT analyses are not as straightforward because they include subjects who never started any of the interventions. Finally, there was no control group who did not receive intervention, which makes it more difficult to distinguish the effects of the intervention from spontaneous remission.

## Concluding remarks

Identifying children and adolescents who exhibit EBP, and providing early treatment is important not only because the problems may continue to develop leading to the child's further maladjustment but also because it is a costly societal problem. Consequently, there is a need for valid and reliable questionnaires that measure relevant constructs. Since assessments often is

done online there is a need to evaluate the questionnaires psychometric properties when responded online versus the traditional way by paper-and-pencil. To establish norms from a random normative sample is useful not only at assessment but also when interpreting the results from intervention studies. Evidence-based interventions should then be made available as required.

It is particularly challenging, however, to reach out to the families in need and then keep them engaged in the intervention once started. This thesis evaluates two interventions with the potential to overcome the barriers of unavailability and large drop-out rates. Three different parental ratings scales (SDQ, PKMS and ERQ) were evaluated and norms were established in order to conduct the intervention study. All three questionnaires were shown to be suitable for both online and paper-based administration in a Swedish context. The two-factor structure of ERQ showed an almost acceptable fit, indicating some difficulties with the constructs which might be due to many different reasons. There is though a small positive relationship between more appropriate parenting skills and cognitive reappraisal, and also between expressive suppression and inappropriate parenting skills, which might have implications for future PMT programs and interventions for childhood EBP. The evaluation of PKMS showed a large correlation between the Secrecy and Conduct Problems subscales that was higher than the well-documented relationship between the Parental Knowledge and Conduct Problems subscales. This should be the impetus for future research and may be another important construct to include in future PMT programs.

This thesis also supports the short-term effectiveness of interventions such as the FCU and the iComet. FCU is a brief, face-to-face intervention shown to have high parent engagement and consequently fewer drop-outs. The iComet also shows promising results, but the number of drop-outs was high and relatively few sessions were completed. If parental acceptance of the program can be raised by tailoring the program more specifically to their needs, iComet might prove to be a cost-effective intervention with many advantages, including 24/7 access for parents.

Unfortunately, the sample sizes were small when analyzing different profiles of children, but the results indicated that children with EBP are a heterogeneous group. Importantly, the results showed that children with high levels of ADHD symptoms at their baseline assessment, neither FCU nor iComet was sufficiently effective. These children still had clinical levels of difficulties after intervention. This finding highlights the importance of assessing the level of ADHD symptoms prior to intervention, as this may indicate that alternative or complementary interventions are needed. If replicated in future research, this finding will have an impact on the future implementation of such interventions. Other modules, extended or complementary interventions are potential options that future research can shed light on. This thesis contributes to increased knowledge of

psychometrics and norms for the SDQ, ERQ and PKMS when used online as well as the traditional way, and also the effectiveness of two interventions targeting child EBP.

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