Conduct Problems Prevention Research Group, 2013). It should however be noted that it is still unclear how much EFs can be improved through training (Diamond & Ling, 2016).

Results of this cross-sectional study suggest that SIP skills form a mediating mechanism linking the EFs focused attention and working memory to aggression in adolescents with MBID. The possible mediating role of SIP, however, must be further tested in longitudinal studies. In addition, the causal role of EFs, for example WM, could be examined in an experimental study in which EFs are trained. It could then be investigated whether the effect of experimentally enhanced EFs on less aggression would be mediated by ameliorated SIP skills. These longitudinal and experimental studies could be informative in understanding aggression in youth with MBID and in youth with average intelligence levels.

Future research should also investigate distinctions between adolescents with MID and borderline intellectual functioning, because IQ plays an important role in their levels of EFs and SIP (e.g., Van der Molen et al., 2014; Van Nieuwenhuijzen et al., 2017), and youth with borderline intellectual functioning are understudied in general (Peltopuro, Ahonen, Kaartinen, Seppäla, & Närhi, 2014).

Finally, from current findings, we propose to investigate several types of inhibition more into detail, in order to examine whether cognitive and behavioral inhibition (Nigg, 2000) show different relations with SIP as a mediator of the relation with aggression. These different types of inhibition, and additional EFs such as cognitive flexibility, cognitive control, and planning (Diamond, 2013), should then be incorporated into a more comprehensive model of EFs.

In sum, the current study shows that a broad spectrum of EFs is involved in explaining aggressive behavior in youth with MBID, when models describe not only direct but also indirect links, in this case through SIP. Including both EFs and SIP in the study of aggression is a new direction in research providing insight into social-cognitive aspects of development that may be relevant for the treatment of aggressive behavior in adolescents with MBID.

Chapter 7

Summary and General Discussion

The main aim of this dissertation was to contribute to a better understanding of the heightened level of aggressive behavior among adolescents with mild to borderline intellectual disability (MBID) by studying social information processing (SIP), executive functions (EFs), and situational factors, using new assessment procedures for measuring individual SIP skills. In addition to increasing this understanding, the new assessment procedures adhere to the needs in the clinical field to more concretely describe the social adaptive functioning of youth with MBID and with externalizing behavior problems (Schalock et al., 2010; Van Nieuwenhuijzen, Vriens, Scheepmaker, Smit, & Porton, 2011).

The current study findings revealed associations between several EFs, focused attention, behavioral inhibition, and working memory, and SIP skills, expanding our understanding of aggressive behavior in adolescents with MBID (Chapters 3 and 6). Furthermore, this dissertation provided insight into the several types of social situations that, depending on perpetrator intent, bring to light difficulties and biases in SIP in adolescents with MID and borderline IQ, and adolescents with externalizing behavior problems, as compared to their typically developing peers (Chapter 5). These SIP investigations in adolescents with MBID were made possible by the development of a new digital diagnostic SIP instrument. The steps taken in the process of instrument development were presented in the Chapters 2 and 4 of this dissertation. The studies in these chapters contributed to the valid assessment of individual SIP skills that may be associated with individual outcomes at the behavioral level.

This closing chapter provides an overview of the main findings from the studies presented in this dissertation. Subsequently, the strengths and limitations of the study are discussed. Theoretical implications and future research directions are provided, and finally, the clinical relevance of this study and the implications for clinical practice are discussed.

Summary of Main Findings

A new Assessment Procedure for SIP in Adolescents with Severe Behavior Problems

Youth with MBID have been found to show deviant SIP styles and SIP biases compared to typically developing peers (e.g., Gomez & Hazeldine, 1996; Van Nieuwenhuijzen et al., 2004; 2011), and SIP skills have been found to relate with aggressive behaviors in typically developing youth and youth with MBID (Calvete et al., 2015; Dodge et al., 2015; Lansford et al., 2006; Van Nieuwenhuijzen et al., 2006). SIP assessment procedures used in these studies were, however, mostly focused on typically developing youth or those referred with aggressive behavior problems. In line with the research by Kupersmidt et al. (2011) and Van Nieuwenhuijzen et al. (2011), Chapter 2 aimed to develop a new assessment procedure for SIP in adolescents with severe behavior problems within secure residential care. Adolescents with and without MBID were included in this study, as these represent the population of youth within secure residential care. The description of this new assessment procedure included an interview study with adolescents on relevant themes for social problem situations. These themes were subsequently transformed into videorecorded vignettes for the measure. The outcomes of the interviews and discussions with clinical professionals led to two types of situations, namely dealing with authority and dealing with peers, and three themes: 1) Receiving respect from others, 2) Injustice, and 3) Accepting rules or hierarchy. Social problem situations were then selected from the interviews congruent with these categories and themes and videorecorded vignettes were created. Based on previous studies by Van Nieuwenhuijzen, Bijman et al. (2009), and Kupersmidt et al. (2011) open-ended and multiple-choice items were developed in order to measure SIP skills.

Empirical results as described in Chapter 2 demonstrated first evidence of validity for the new SIP assessment procedure for adolescents. Indications were found for seven constructs within the data that represented SIP constructs and processing styles of social information, for example hostile interpretations and assertive decision-making. Content validity was supported by significant associations between SIP steps, consistent with the SIP model (Crick & Dodge, 1994; Lemerise & Arsenio, 2000). For example, hostile interpretations were related with antisocial goals and the generation of aggressive responses. Indications for criterion validity were also found by examining the relations between SIP and reported behavior, as negatively biased SIP should be associated with aggressive behavior and conduct problems (Dodge & Pettit, 2003). For example, aggressive behavior was related to hostile intent attributions, and rule-breaking behavior was related to aggressive response generation and selection. Within this sample of adolescents in secure residential care no multivariate differences were found on total SIP performance between MBID and peers with average intelligence. This lack of group differences contradicted group differences found in previous SIP studies (e.g., Van Nieuwenhuijzen et al., 2011). One explanation for this absence of SIP differences according to IQ could be a ceiling effect, as the participants in this study showed severe levels of externalizing behavior problems. In the following Chapter 5, the topic of SIP differences was therefore revisited.

A limitation of this study was that the behavioral reports for aggressive and rule-breaking behavior were adolescent self-reports, instead of informant reports. Therefore, indications of criterion validity for this new assessment procedure should be interpreted with caution and tested more thoroughly in future research, such as presented in the following Chapter 4. In conclusion, Chapter 2 provided a solid basis for further development of the SIP assessment procedure into a diagnostic version of the instrument for adolescents with and without MBID.

Executive Functions and SIP in Adolescents with Severe Behavior Problems

Findings in Chapter 2 on SIP assessment provided relevant insight into SIP relations with behavioral outcomes in adolescents within secure residential care. A next step was to further understand individual differences in SIP by linking these to potential underlying cognitive processes. Therefore, Chapter 3 focused on executive functions (EFs, Séguin & Zelazo, 2005; Schoemaker et al., 2012). As EFs are described as higher-order cognitive functions that may affect other (social) cognitive processes, this study

investigated linkages between several EFs and SIP cognitions in adolescents. Although studies have investigated EFs and SIP separately as factors relevant for explaining externalizing behavior in youth with and without MBID, the combination of these lines of research has been neglected throughout the literature. The current study demonstrated that specifically two steps from the SIP model were related to impaired executive functioning in adolescents within secure residential care. First, the positive evaluation of aggressive responses was associated with impaired inhibition. Second, the selection of aggressive responses was associated with a combination of impaired focused attention and inhibition. These first indications of relations between EFs and SIP in adolescents with and without MBID help to understand deviant SIP styles and biases, and indirectly through SIP aggression and rule-breaking behavior.

A limitation of the study was the psychometric quality of the EF measures. For example, the working memory construct included a component that was more related to short-term memory than to the central executive component of working memory (Hambrick, Kane, & Engle, 2005). The study therefore required a consecutive study with stronger EF measures. In the next study presented in Chapter 6, methodological improvements were made. In sum, the results in Chapter 3 demonstrated that EFs as higher-order cognitive functions are relevant to the decision-making process within SIP. This provided a basis for further investigation of the two lines of research on EFs and SIP combined in understanding aggressive behavioral outcomes in vulnerable youth.

The Development of the Social Information Processing Test SIVT

Chapter 4 presented the methodological link between the studies described in Chapters 2 and 3 using the SIP assessment procedure for adolescents in secure residential care and the subsequent Chapters 5 and 6 in which an improved digital diagnostic instrument was used. Chapter 4 described the development of the social information processing test SIVT, based on interview and pilot studies. The SIVT was developed with regard to previous versions of SIP assessment procedures for youth with average intelligence (e.g., Denham, Way, Kalb, Warren-Khot, & Bassett, 2013; Dodge, & Price, 1994; Kupersmidt et al., 2011; Matthys, Cuperus, & Van Engeland, 1999; Schultz et al., 2010; Ziv & Sorongon, 2011), children with MBID (Van Nieuwenhuijzen, Bijman, et al., 2009; Van Nieuwenhuijzen et al., 2011), and the SIP assessment tool for adolescents described in Chapter 2 of this dissertation.

As part of the method for developing the SIVT, an interview study brought forth themes for realistic social problem situations as a basis for vignettes included in the SIVT. Based on interviews in children and questionnaires by their professional caretakers, a group of researchers and clinical professionals agreed upon three themes for social problem situations in relation to peers: 1) Injustice, 2) Being placed at a disadvantage, and 3) Peer provocation and humiliation. Concerning themes in relation to adults, the professionals agreed upon: 1) Trust and distrust, 2) Satisfaction of needs, and 3) Being appreciated and acknowledged. These themes for children were combined with the themes found in previous interviews with adolescents (described in Chapter 2) and

new videorecorded vignettes were developed for both children and adolescents. SIP assessment tools presented so far were not particularly suitable for clinical diagnostic assessment. Therefore, important adjustments were made to the language, difficulty level, and visual support of the items, as compared to previous measures (Kupersmidt et al., 2011; Van Nieuwenhuijzen et al., 2011). In addition, the SIVT vignettes were developed including three realistic situation types, as SIP has been shown to depend on situation types (Matthys et al., 1999). Situations were included with an ambiguous, hostile, or accidental perpetrator intent. The SIVT was developed to help understanding SIP skills in youth with externalizing behavior problems both with MBID and with average intelligence. In addition, two versions of the SIVT were developed, namely for 6 to 12-year-old children and 13 to 17-year-old adolescents. Finally, in order to adhere to clinical relevance, all steps from the SIP model by Crick and Dodge (1994) were included in the SIVT, to be able to draw conclusions upon individual strengths and weaknesses on specific SIP steps.

In two pilot studies, first evidence indicated adequate to good ecological and face validity of the SIVT. This evidence derived from test administrators' observations on responses to items and vignettes reported during test administration, and quantitative results of feedback questions answered by child and adolescent participants on the realism of depicted situations and difficulty level of questions and language used. First indications for content and criterion validity were also found. Theoretically predicted associations between succeeding SIP steps from the SIP model (Crick & Dodge, 1994; Lemerise & Arsenio, 2000) were statistically significant in the empirical data generated with the SIVT, indicating adequate content validity. As described by theory and evidenced in empirical studies (e.g., Dodge et al., 2015; Dodge & Pettit, 2003) SIP biases and impairments are associated with aggression and other behavior problems in youth. In the newly developed SIVT, similar associations were found between the assessed SIP cognitions and aggressive and rule-breaking behavior as reported by caretakers, indicating adequate criterion validity.

Although the findings should be interpreted with caution in light of the small sample sizes in the pilot, it was concluded that the explorations of validity of the SIVT provided an acceptable ground for measurement of individual SIP skills. According to findings in the pilot study, the SIVT was slightly adjusted and optimized for test administration in the subsequent studies in Chapters 5 and 6 of this dissertation.

Situation-Specific SIP in Adolescents with MBID and Externalizing Behavior Problems

The relations between EFs and SIP skills examined in Chapter 3 provided the first evidence of factors that may underlie SIP biases or impairments. In addition, SIP biases and impairments may vary based on situational factors. Leffert et al. (1996; 2010) showed that hostile interpretations of youth with intellectual disabilities differed across situations varying in perpetrator intent. Matthys et al. (1999) also found that SIP of children with externalizing behavior problems depends on the type of problem situation. Although behavior as a general concept is considered situation-dependent

(e.g., Magnusson, 1976), the situation-specificity of cognitive and behavioral functions is understudied in the literature on SIP. Situation-specificity is especially important for understanding social behavior in relation to other individuals. Chapter 5 therefore aimed to help understanding how situational factors could affect SIP skills. The newly developed SIVT was used to investigate several situation-specific SIP skills for adolescents with MBID and for adolescents with externalizing behavior problems. Following the seminal studies by Dodge (1980; Dodge, Murphy, & Buchsbaum, 1984), previous SIP studies focused merely on SIP measured in situations with ambiguous perpetrator intent. In youth with MBID, however, it was expected that hostile and especially accidental situations could be difficult to understand as well. Accidental situations require the integration of positive and benign cues in a situation with a negative outcome, producing a larger cognitive load. These situations were therefore also expected to be relevant for the understanding of SIP deviances and behavioral maladjustment of adolescents with MBID.

The findings in Chapter 5 showed that specifically in accidental situations, adolescents with mild intellectual disability (MID) interpreted a higher purposeful intent of perpetrators compared to their peers with borderline intellectual functioning (BIF) and average intellectual functioning (AF). In these accidental situations, adolescents with externalizing behavior problems generated and selected more aggressive responses than their peers without behavior problems. Additionally, in ambiguous situations, adolescents with MID evaluated and selected more aggressive responses than their peers with AF, but in these respects they did not differ from their peers with BIF. In ambiguous situations, adolescents with MID were more angry than both their peers with BIF and AF. In addition, adolescents with BIF interpreted less purposeful intent in ambiguous situations than their peers with AF, regardless of behavior problems. Finally, specifically in hostile situations, adolescents with externalizing behavior problems selected more aggressive responses compared with their typically developing peers. In hostile situations, there were no specific SIP differences found for youth with MID or BIF compared to AF youth. For the SIP cognitions of encoding, hostile intent attribution, and self-efficacy for aggression, no situation-specific differences were found for groups with MID or with behavior problems. Across all situations combined, adolescents with MID were pervasively biased on these SIP measures, while biases for adolescents with BIF were also notable, but less pervasive.

A limitation of the study was that the statistical power may have been too weak to test the idea of cumulative vulnerability looking at the three-way interaction effects for specific situations in which adolescents with MID or BIF in combination with externalizing behavior problems would be most vulnerable for SIP skill biases or impairments. Increasing power of the study in future research would provide opportunities for investigating this cumulative vulnerability issue in specific situation types. Nonetheless, from these findings it was concluded that both ambiguous and accidental situations were considered relevant when studying SIP biases in adolescents with MBID. The outcomes on situation-specificity have implications for clinical practice and treatment, which are discussed in the final sections of this general discussion. Furthermore, findings in this

chapter indicated that SIP cognitions differ more as a function of the intellectual ability than as a function of externalizing behavior. Therefore, it was recommended that in future diagnostic and empirical research, intelligence and cognitive development should be taken into account when studying SIP of youth who may be naturally at risk for social deficits.

SIP as a Link between Executive Functions and Aggressive Behavior in Adolescents with MBID

Multiple studies investigated aggressive behavior in relation to executive functions and SIP separately (e.g., Dodge et al., 2015; Ogilvie et al., 2011; Orobio de Castro et al., 2002; 2004; Schoemaker et al., 2012). The combination of EFs and SIP as factors relevant in understanding aggressive behavior, however, was missing. Chapter 6 presented a study that was aimed to fill this gap by the combined contribution of EF and SIP to the understanding of aggressive behavior in adolescents with MBID. The study described in Chapter 6 incorporated the knowledge from Chapters 3, 4, and 5, being based on a new model of EFs associations with SIP (Chapter 3) and of specific SIP skills that were found to be pervasively impaired in adolescents with MBID (Chapter 5). A novel perspective was tested by hypothesizing that relations between, on the one hand, the EFs focused attention, behavioral inhibition, and working memory, and, on the other hand, aggressive behavior (e.g., Ogilvie et al., 2011; Oosterlaan et al., 1998; Schoemaker et al., 2012) were statistically mediated by SIP skills in adolescents with MBID. In line with recommendations from the study in Chapter 3, EF constructs were improved by several new neuropsychological tests creating latent variables for each EF. While in Chapter 3 relations between EFs and SIP skills were examined using regression analysis, in Chapter 6, a mediation model was tested. The mediation model included three EF constructs and four SIP skills as mediators in the relation with aggressive behavior assessed by three reporters, in order to be able to draw conclusions based upon a methodologically strong model.

Indirect effects were found from the EFs focused attention and working memory via SIP skills toward the reported aggression of the adolescents. Specifically, lower focused attention was associated with hostile interpretations and self-efficacy for aggressive responses. Via the transitive steps of the SIP model, self-efficacy for aggressive responses finally related to reported aggression in the adolescents with MBID. For working memory, specific relations were found with encoding, hostile interpretations, and aggressive response generation. The interpretations and generations were related to self-efficacy for aggressive responses within the SIP model, which was in turn associated with the reported aggression in the adolescents. Thereby, Chapter 6 also confirmed the direction of the interrelated steps from the theoretical transitive SIP model (Crick & Dodge, 1994; Lemerise & Arsenio, 2000). The relation between SIP and reported aggression was found for the final SIP step from the decision-making process only, which implied that all previous SIP steps were successive and contributed to the final step of the cognitive SIP model. This final step subsequently associated with the reported

aggressive behavior in the mediation models including focused attention and working memory. Finally, direct effects were found for behavioral inhibition toward aggression in adolescents with MBID. The relation between behavioral inhibition and aggression was, however, not mediated by SIP.

Bearing the cross-sectional design of the study in mind, which prevents drawing conclusions about causal relations, the findings of the current study contributed to a more comprehensive model of understanding aggressive behavior problems, which are a common risk in youth with MBID (Douma, Dekker, De Ruiter, Tick, & Koot, 2007; Kaal, Brand, & Van Nieuwenhuijzen, 2012; Sainero, Del Valle, Lopez, & Bravo, 2013). From these outcomes it was concluded that not only direct associations between EFs and aggression and between SIP and aggression seem relevant aspects for treatment and intervention programs that aim to reduce aggression, but in adolescents with MBID, the influences of EFs on SIP should be taken into account as well when aiming to reduce aggression.

Strengths and Limitations

The work in this dissertation contributed to developing the first diagnostic instrument for assessment of individual SIP skills in both children and adolescents with MBID and with externalizing behavior problems. Previous SIP studies provided assessment procedures mostly for children (e.g., Kupersmidt et al., 2011; Van Nieuwenhuijzen et al., 2011), or adolescents with average intelligence (Vagos et al., 2016). In the current study, the large sample was collected through purposeful sampling based on the variables age, sex, intellectual ability, and externalizing behavior. The use of purposeful sampling created a possibility for making relevant comparisons between clinically aggressive and typically developing youth, taking into account the differences in intellectual level that are common in groups of youth with severe behavior problems (Douma, Dekker, De Ruiter, Tick, & Koot, 2007; Kaal, Brand, & Van Nieuwenhuijzen, 2012; Sainero, Del Valle, Lopez, & Bravo, 2013). In addition, the studies presented in this dissertation were based on direct testing not only of several SIP skills, but also of three executive functions that were constructed as latent variables based on three or four observed variables. Chapters 2 and 3 tested first assessment procedures for SIP and EFs in adolescents with and without MBID. The outcomes of these studies were used to improve all methods in subsequent studies described in Chapters 4, 5, and 6, providing a more valid assessment of EFs and SIP. Chapter 4 presented the extensive methodology used in order to develop the SIVT. This SIP instrument was developed through a comprehensive interview study, including not only interviews in children with MBID, but also questionnaires in professional caretakers, and focus group meetings with clinical professionals. The process of development was described into detail for scientific transparency. Subsequently, in a pilot study the new instrument materials were tested in several groups of youth varying in age, sex, intellectual abilities, and externalizing behaviors. This extensive process of interview and pilot studies provided a solid ground for developing an instrument for the

measurement of individual SIP skills. The thorough methodologies used in the current set of studies formed a solid basis to draw conclusions upon the relations between situational factors, executive functioning, SIP, and behavior in adolescents with MBID.

Despite these strengths, several limitations should be taken into account when interpreting the outcomes of the current set of studies. The definition of mild to borderline intellectual disability includes not only the intellectual functioning of the individual (MBID with IQ 50-84), but also the level of social adaptive functioning (Schalock et al., 2010). Although SIP is considered to play a role in social adaptation and social maladjustment, the participants in the current study were not assessed on other existing measures of social adaptive functioning. Especially for the group of youth with borderline intellectual functioning (BIF with IQ 71-84), the assignment to the group of MBID merely based on full scale intelligence scores may have resulted in including adolescents with acceptable levels of social adaptive functioning. Some of these adolescents may not experience social adaptive and behavioral problems in daily life and are therefore different from most youth with MID. The study in Chapter 5 was intended to compare SIP between the adolescents with MID and BIF separately, but a more thorough investigation of these different groups including social adaptive functioning measures is recommended (Peltopuro, Ahonen, Kaartinen, Seppälä, & Närhi, 2014). Another limitation of the current dissertation was the lack of attention to emotions and emotion regulation. Emotional states and emotion regulation may impact SIP and externalizing behavior (Lemerise & Arsenio, 2000; Orobio de Castro, Bosch, Veerman, & Koops, 2003; Orobio de Castro, Slot, Bosch, Koops, & Veerman, 2003). As emotional states are transitional, these aspects should be considered relevant during (diagnostic) assessment of SIP skills in youth. Chapter 5 included one item measuring "anger" of the participants toward the situations presented, however, it did not measure state emotions or regulatory systems, which should be taken into account in further examination of the current findings. Finally, a limitation was the cross-sectional design of the study, as a result of which inferences about the role of EFs and SIP in the development of aggressive behavior could not be made.

Implications

Implications for Future Research

The findings in the current dissertation generated insight into factors that relate to SIP in adolescents with MBID or with externalizing behavior problems. These findings support the SIP model (Crick & Dodge, 1994; Lemerise & Arsenio, 2000) and the biopsychosocial model (Dodge & Pettit, 2003) by demonstrating the theorized interrelations between SIP steps, relations between SIP and aggressive behavior, and associations between EFs or situational factors with SIP skills as outcomes. Longitudinal studies, however, are required to establish which components of EFs and SIP may play a role as predictor or mediator in the development of aggressive behavior in youth with MBID, youth with externalizing behavior problems, and typically developing peers. In

addition, experimental studies manipulating EFs and SIP across several situations are required in order to study causal relations between the (social) cognitive factors and behavioral outcomes.

One implication of the current findings on SIP skill differences between IQ groups and behavior groups is that SIP should be tested across multiple types of situations instead of only in ambiguous situations (Dodge, 1980; Dodge et al., 1984). The SIP research agenda in previous decades relied on the initial SIP studies in ambiguous situations, thereby neglecting important situational factors such as perpetrator intent. The current dissertation evidenced the relevance of including ambiguous but also accidental situations in particular when studying SIP biases and impairments in adolescents with MBID and with externalizing behavior problems. Future research should include these and other situational factors, such as perpetrator type (friend, enemy, neutral; Ray, Norman, Sadowski, & Cohen, 1999) for a better insight into individual difficulties and strengths of youth in real life social problem situations.

Using the diagnostic SIVT instrument developed within the studies of this dissertation, individual SIP profiles were generated for children and adolescents with externalizing behavior problems of different intellectual functioning levels. These SIP profiles indicated the specific SIP steps on which impairments or biases were present for each individual. As some individuals may have biases in hostile interpretations mainly, and others may experience difficulties in generating or evaluating several response options, the relations with aggressive behavior as an outcome may be different for each individual. Future research should focus on individual participant data to investigate subgroups of youth with specific SIP profiles requiring treatment that is tailored to improving these SIP skills. The SIP profiles could be examined in combination with individualized treatment and intervention programs. Randomized controlled trials are needed to test the effectiveness of tailoring treatment and intervention programs to individual SIP profiles on the outcomes such as aggression, as opposed to using standardized treatment and intervention for aggression.

Another implication of the current work is the insight provided into relations between EFs and SIP skills in adolescents with MBID. The study of these associations is relatively new for all populations of youth, but especially for youth with MBID (Van Nieuwenhuijzen & Vriens, 2012). The indirect effects found for focused attention and working memory via SIP skills toward aggressive behavior provided a more in-depth insight into the pathways for cognitive factors that may be relevant in the development of aggression. These findings implicate that executive functioning provides an important basis for complex social cognitive skills to develop. The level of executive functioning should therefore be taken into account when studying SIP biases and impairments in the population of youth with MBID, and potentially also youth with externalizing behavior problems. In addition, comprehensive EF models including different types of inhibition, such as cognitive and motivational inhibition (Bexkens et al., 2014; Nigg, 2000), in combination with planning abilities and cognitive flexibility need to be studied more extensively. In the current study, associations of focused attention, behavioral inhibition, and working memory with SIP skills were examined; however, it is expected that new directions may be found when investigating different EFs more extensively. Including these in a longitudinal design for testing mediation from several EFs via SIP skills toward aggression could increase the understanding of deviant patterns of behavior.

Finally, as a future research recommendation, it is proposed to investigate the development of SIP skills throughout childhood and adolescence. First, examining SIP by chronological age from childhood into adolescence could provide relevant insight into crucial phases of social cognitive development. Second, as deviances in SIP have been found for youth with MBID compared to typically developing peers, it should be examined whether there is a delayed SIP development for youth with MBID (Gomez & Hazeldine, 1996), or whether there is a deviant or biased SIP development for youth with MBID. Future research could make comparisons of specific SIP skills between groups with and without MBID matched by chronological and developmental age in order to investigate these questions.

Implications for Clinical Practice

The findings presented in the current set of studies are also relevant for clinical practice. The work in this dissertation contributed to understanding that variation in SIP is related to intellectual level and executive functioning performance. General intelligence level and executive functioning skills may therefore be relevant to include when interpreting clinical assessment outcomes for understanding individual SIP skills. As youth with MBID may be at risk for having impairments in EFs (e.g., Van der Molen et al., 2007), the current work implies that expectations of "normal SIP" may have to be adjusted with regard to the general intellectual and EF performance of youth with MBID. In other words, what can be expected in terms of SIP based on an individual's level of intelligence or executive functioning? To assess the extent to which SIP is biased, diagnostic testing of SIP and related cognitive factors is required.

Based on the involvement of SIP in externalizing problems, direct treatment of SIP biases may be considered as a therapeutic approach. In medicine, the transition is being made from evidence-based medicine to personalized medicine. In line with this, Ng and Weisz (2016) suggest that personalized psychological interventions could boost the effectiveness and clinical utility of empirically supported therapies. Neurocognitive functions among which EFs are eligible for personalizing psychological treatments (Matthys, 2012; Matthys, Vanderschuren, Schutter, & Lochman, 2012; Matthys & Lochman, 2018). Improving EFs may increase the effect of cognitive behavioral therapy in which SIP skills are targeted that have been shown to mediate intervention outcomes by the interpretation of other people's intentions, generation of possible behavioral responses, and evaluation of the likely positive and negative consequences of the potential responses (Dodge, Godwin, and The Conduct Problems Prevention Research Group, 2013).

Personalizing interventions, however, depends on the identification of individual differences in psychological functions, among which SIP and EFs (Matthys, 2012). The

diagnostic instrument SIVT may help identifying these individual SIP skills that can be used subsequently in tailoring treatment and interventions. In clinical assessment of a child or adolescent, the distinction is made between a categorical diagnosis (e.g., based on DSM-5) and a diagnostic or case formulation. The latter includes a hypothesis regarding the risk and protective factors that play a role in the maintenance of the problems, in particular those factors that are modifiable as opposed to stable. The factors that play a role in the maintenance of the problems and that are modifiable will be the targets of interventions (Matthys & Powell, 2018). SIP skills belong to modifiable risk factors for aggressive behavior problems. Cognitive behavioral therapeutic interventions or other interventions may therefore be used to change the specific biases in adolescents' SIP, to improve the effectiveness of the interventions.

The individual SIP outcomes produced by the SIVT may shed light on the social adaptive functioning of the client, which is a core problem for youth with MBID (Schalock et al., 2010). In the current social world, social interactions are becoming more complicated by the use of social media (e.g., O'Keeffe & Clarke-Pearson, 2011), and social adaptation and social status are perceived as indicators of being a successful individual in society (e.g., Yang & Brown, 2013). As social adaptation is a challenge for youth with MBID, they are at risk for having a lower status in this complex social world. SIP skills are among the modifiable risk factors for social adaptation and behavior problems, therefore, using the individual SIP outcomes of the SIVT may help to understand and intervene with part of the social adaptation problems in youth with MBID.

An implication derived from the findings in Chapter 5 included the importance of measuring SIP in ambiguous but also in accidental situations. Specifically in situations with accidental perpetrator intent, adolescents with MID may be biased in their purposeful intent attributions and adolescents with externalizing behavior problems may experience problems in generating and selecting adequate responses. These SIP biases found in accidental situations can be combined with the assessment of SIP in ambiguous situations. Diagnostic assessment should include these different situation types when measuring SIP, in order to understand the specific settings that seem problematic for individual adolescents with MBID or with average intelligence and behavior problems. Guidance and treatment for reducing aggression could also include this perspective in tailoring training of SIP skills in the most difficult situations for the individual.

Finally, the first indications on validity of the SIVT from the pilot study in Chapter 4 have implications for the SIVT outcomes that can be validly used to draw conclusions about SIP in youth with and without MBID. Importantly, several validity and reliability criteria need to be investigated more thoroughly in the larger sample of youth who were recruited for the main study of this dissertation, instead of relying only on the validity measures in the pilot study data. These improvements in investigating the psychometric characteristics of the SIVT are recommended for clinical use of the instrument in client populations with MBID and with externalizing behavior problems.

General Conclusion

The work in this dissertation addressed social information processing skills and the executive functions and situational factors related to SIP in adolescents with mild to borderline intellectual disability and externalizing behavior problems, by means of new valid assessment procedures for measuring individual SIP skills.

Figure 1 shows the overview of the conceptual model with relations that were found in the specific chapters of this dissertation. The five studies added to the existing literature not only by confirming the well-established relations between SIP and externalizing behavior in a neglected population of adolescents with MBID, but also by providing an understanding of SIP by differences in intelligence, executive functions, and situational factors.

SIP assessment procedures were developed in Chapters 2 and 4. By explorations of validity with regard to the SIP model by Crick and Dodge (1994), and the theorized relations of SIP with aggressive behavior as an outcome, the assessment procedures were found adequate to good and it was concluded to use the SIVT instrument for the measurement of individual SIP skills.

In Chapter 5, SIP skills of adolescents with MBID or with externalizing behavior problems were found biased specifically in situations with accidental and ambiguous perpetrator intent. These findings provided insight into the importance of including situation-dependency as a factor in SIP assessment of different groups of vulnerable adolescents.

The executive functioning relations with SIP skills in adolescents with MBID were examined in Chapters 3 and 6. In both studies, focused attention associated with the decision-making process of SIP. This provided new knowledge for understanding the influence of impairment in this core EF on deviances in social decision-making in adolescents with MBID. Chapter 6 provided new insights into mediation of EF relations with aggression via SIP skills by presenting a direct relation for behavioral inhibition with aggression, but indirect pathways for focused attention and working memory via SIP skills toward aggression. Understanding the relations of EFs with SIP skills in adolescents with MBID increased the understanding of aggressive behavior as well.

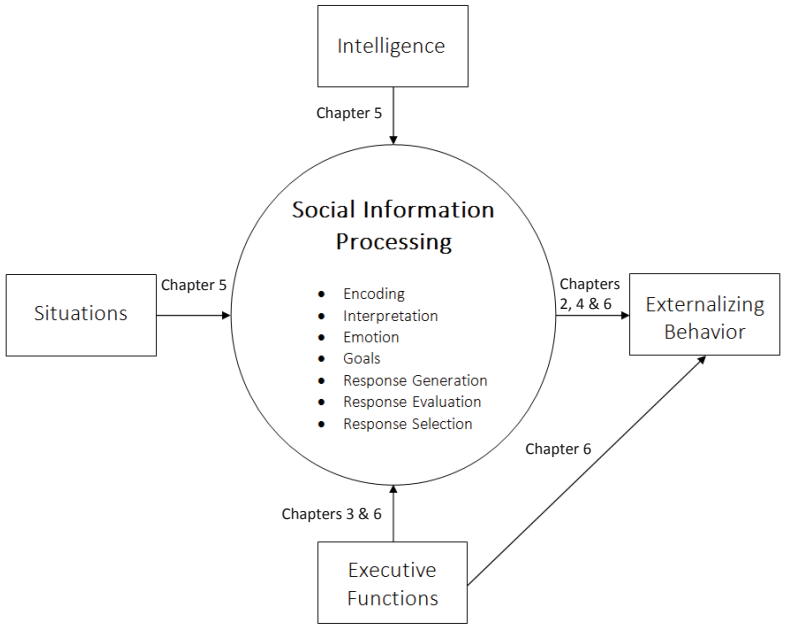

Figure 1. Overview of the Relations Found in the Chapters of this Dissertation

References

Achenbach T. M. (1991a). *Manual for the Child Behavior Checklist / 4-18 and 1991 profiles.* Burlington: University of Vermont, Department of Psychiatry.

Achenbach, T. M. (1991b). *Manual for the Youth Self-Report and 1991 profiles*. Burlington: University of Vermont, Department of Psychiatry.

Achenbach, T. M., & Edelbrock, C. (1991a). *Child behavior checklist.* Burlington: University of Vermont, Department of Psychiatry.

Achenbach, T. M., & Edelbrock, C. (1991b). *Youth Self-report and Profile.* Burlington: University of Vermont, Department of Psychiatry.

Allison, P. D. (2002). Missing data: Quantitative applications in the social sciences. *British Journal of Mathematical and Statistical Psychology*, *55*, 193-196. doi:10.1348/000711002159653

Alloway, T. (2010). Working memory and executive function profiles of individuals with borderline intellectual functioning. *Journal of Intellectual Disability Research, 54*, 448-456.

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Arlington, VA: American Psychiatric Publishing.

Armelius, B. A., & Andreassen T. H. (2007). Cognitive-behavioral treatment for antisocial behavior in youth in residential treatment. *Cochrane Database Systematic Review*, *4*. doi:10.1002/14651858.CD005650.pub2

Angold, A. (2002). Diagnostic interviews with parents and children. In M. Rutter and E. Taylor (Eds.), *Child and Adolescent Psychiatry* (pp. 32-51). Oxford: Blackwell.

Ary, D. V., Duncan, T. E., Duncan, S. C., & Hops, H. (1999). Adolescent problem behavior: The influence of parents and peers. *Behaviour Research and Therapy*, *37*, 217-230.doi:10.1016/S0005-7967(98)00133-8

Baddeley, A.D. (1986). *Working memory*. Oxford, UK: Oxford University Press.

Baddeley, A. (2003). Working memory: looking back and looking forward. *Nature Reviews. Neuroscience, 4*, 829.

Bexkens, A., Van der Molen, M. W., Collot d'Escury-Koenigs, A., ML, & Huizenga, H. M. (2014). Interference control in adolescents with mild-to-borderline intellectual disabilities and/or behavior disorders. *Child neuropsychology, 20*, 398-414.

Bird, H. R., Gould, M. S., & Staghezza, B. (1992). Aggregating data from multiple informants in child psychiatry epidemiological research. *Journal of the American Academy of Child & Adolescent Psychiatry*, *31*, 78-85. doi:10.1097/00004583-199201000-00012

Burke, J.D., Loeber, R., & Birmaher, B. (2002). Oppositional defiant disorder and conduct disorder: a review of the past 10 years, Part II. *Journal of the American Academy of Child Psychiatry, 4*, 1275 – 1293.

Calvete, E. & Orue, I. (2011). The impact of violence exposure on aggressive behavior through social information processing in adolescents. *American Journal of Orthopsychiatry, 81*, 38-50. doi:10.1111/j.1939-0025.2010.01070.x

Calvete, E., & Orue, I. (2012). Social information processing as a mediator between cognitive schemas and aggressive behavior in adolescents. *Journal of Abnormal Child Psychology, 40,* 105-117.

Calvete, E., Gamez-Guadix, M., & Garcia-Salvador, S. (2015). Social information processing in child-to-parent aggression: Bidirectional associations in a 1-year prospective study. *Journal of Child and Family Studies, 24*, 2204-2216.

CBS, Central Bureau for Statistics in the Netherlands (2017, April 10). Retrieved from https://www.cbs.nl/nl-nl/achtergrond/2016/47/bevolking-naar-migratieachtergrond

Chmelka, M. B., Trout, A. L., Mason, W. A., & Wright, T. (2011). Children with and without disabilities in residential care: Risk at program entry, departure and six-month follow-up. *Emotional and Behavioural Difficulties*, *16*, 383-399.doi:10.1080/13632752.2011.616346

Cicchetti, D., & Rogosch, F. A. (2002). A developmental psychopathology perspective on adolescence. *Journal of Consulting and Clinical Psychology, 70*, 6-20. doi:10.1037/0022-006X.70.1.6

Coccaro, E. F., Fanning, J. R., Fisher, E., Couture, L., & Lee, R. J. (2017). Social emotional information processing in adults: Development and psychometrics of a computerized video assessment in healthy controls and aggressive individuals. *Psychiatry Research, 248*, 40-47. doi:10.1016/j.psychres.2016.11.004

Crick, N. R., & Dodge, K. A. (1994). A review and reformulation of social information processing mechanisms in children's social adjustment. *Psychological Bulletin, 115,* 74-101. doi:10.1037/0033-2909.115.1.74

Crone, E. A., & Dahl, R. E. (2012). Understanding adolescence as a period of social-affective engagement and goal flexibility. *Nature reviews. Neuroscience*, *13*, 636.

Cuperus, J. M. (1997). Sociale probleemoplossing bij kinderen met gedragsstoornissen [social problem solving in children with behavior disorders] PhD thesis, University Utrecht, The Netherlands.

Danielsson, H., Henry, L., Messer, D., & Rönnberg, J. (2012). Strengths and weaknesses in executive functioning in children with intellectual disability. *Research in Developmental Disabilities, 33*, 600-607.

Dekker, M. C., & Koot, H. M. (2003). DSM-IV disorders in children with borderline to moderate intellectual disability. II: Child and family predictors. *Journal of the American Academy of Child and Adolescent Psychiatry, 49,* 923-931.

Dekker, M. C., Koot, H. M., Van der Ende, J., & Verhulst, F. C. (2002). Emotional and behavioral problems in children and adolescents with and without intellectual disability. *Journal of Child Psychology and Psychiatry, 43,* 1087-1098.

Denham, S. A., Bouril, B., & Belouad, F. (1994). Preschoolers' affect and cognition about challenging peer situations. *Child Study Journal, 24*, 1-21.

Denham, S. A., Way, E., Kalb, S. C., Warren-Khot, H. K., & Bassett, H. H. (2013). Preschoolers' social information processing and early school success: The challenging situations task. *British Journal of Developmental Psychology, 31*, 180-197. doi: 10.1111/j.2044-835X.2012.02085.x

De Sonneville, L.M. J. (1999). Amsterdam neuropsychological tasks: A computer aided assessment program. In B.P.L.M. Den Brinker, P.J. Beek, A.N. Brand, S.J.Maarse, & L.J.M. Mulder (Eds.), *Cognitive ergonomics, clinical assessment and computer assisted learning: Computers in psychology* (Vol. 6). Lisse, The Netherlands: Swets & Zeitlinger.

Diamond, A. (2002). Normal development of prefrontal cortex from birth to young adulthood: Cognitive functions, anatomy, and biochemistry. In D. Stuss & R. Knight (Eds.), *Principles of frontal lobe function* (466-503). New York: Oxford University Press.

Diamond, A. (2006). The early development of executive functions. In E. Bialystok & F.I.M. Craik (Eds.), *Lifespan Cognition: Mechanisms of Change* (pp. 70 – 95). New York: Oxford University Press.

Diamond, A. (2013). Executive functions. *Annual review of psychology, 64*, 135-168.

Diamond, A., & Ling, D. S. (2016). Conclusions about interventions, programs, and approaches for improving executive functions that appear justified and those that, despite much hype, do not. *Developmental Cognitive Neuroscience, 18,* 34–48.

Dodge, K. A. (1980). Social Cognition and Children's Aggressive Behavior. *Child Development, 51*, 162–170. doi:10.2307/1129603

Dodge, K. A. (1986). A social information processing model of social competence in children. In: M. Perlmutter (Ed.), *Minnesota symposium on child psychology: Vol. 18. Cognitive perspectives on children's social and behavioral development* (pp. 77-125). Hillsdale, NJ: Erlbaum.

Dodge, K. A., & Frame, C. L. (1982). Social cognitive biases and deficits in aggressive boys. *Child Development, 53*, 620-635. doi:10.2307/1129373

Dodge, K. E., Godwin, J., and The Conduct Problems Prevention Research Group (2013). Social-information-processing patterns mediate the impact of preventive intervention on adolescent antisocial behavior. *Psychological Science, 24,* 456–465.

Dodge, K. A., Laird, R., Lochman, J. E., & Zelli, A. (2002). Multidimensional latent-construct analysis of children's social information processing patterns: Correlations with aggressive behavior problems. *Psychological Assessment*, *14*, 60–73. doi:10.1037/1040-3590.14.1.60

Dodge, K. A., Malone, P. S., Lansford, J. E., Sorbring, E., Skinner, A. T., Tapanya, S., ... Bacchini, D. (2015). Hostile attributional bias and aggressive behavior in global context. *Proceedings of the National Academy of Sciences*, *112*, 9310-9315. doi:10.1073/pnas.1418572112

Dodge, K. A., McClaskey, C., & Feldman, E. (1985). Situational approach to the assessment of social competence in children. *Journal of Consulting and Clinical Psychology*, *53*, 344–353. doi:10.1037/0022-006X.53.3.344

Dodge, K. A., Murphy, R. R., & Buchsbaum, K. (1984). The assessment of intention-cue detection skills in children: Implications for developmental psychopathology. *Child Development, 55*, 163-173. doi:10.2307/1129842

Dodge, K. A., & Pettit, G. S. (2003). A biopsychosocial model of the development of chronic conduct problems in adolescence. *Developmental Psychology, 39*(2), 349-371. doi:10.1037/0012-1649.39.2.349

Dodge, K. A., & Price, J. M. (1994). On the relation between social information processing and socially competent behavior in early school-aged children. *Child Development*, *65*, 1385-1397.

Douma, J. C. H., Dekker, M. C., De Ruijter, K. P., Tick, N. T., & Koot, H. M. (2007). Antisocial and delinquent behaviors in youths with mild or borderline disabilities. *American Journal on Mental Retardation, 112*, 207-220.

Douma, J. C. H., Dekker, M. C., Verhulst, F. C., & Koot, H. M. (2006). Self-reports on mental health problems of youth with moderate to borderline intellectual disabilities. *Journal of the American Academy of Child and Adolescent Psychiatry, 45*, 1224-1231. doi:10.1097/01.chi.0000233158.21925.95

Embregts, P. J. C. M., & Van Nieuwenhuijzen, M. (2009). Social information processing in boys with autistic spectrum disorder and mild to borderline intellectual disabilities. *Journal of Intellectual disability Research, 53,* 922-931.

Eriksen, B. A., & Eriksen, C. W. (1974). Effects of noise letters upon the identification of a target letter in a nonsearch task. *Attention, Perception, & Psychophysics, 16*, 143-149.

Fontaine, R. G., Burks, V. S., & Dodge, K. A. (2002). Response decision processes and externalizing behavior problems in adolescents. *Development and Psychopathology*, *14*, 107-122.

Goldstein, D., Hahn, C. S., Hasher, L., Wiprzycka, U.J., & Zelazo, P. D. (2007). Time of day, intellectual performance, and behavioral problems in morning versus evening type adolescents: is there a synchrony effect? *Personality and Individual Differences, 42*, 431-440.

Goldweber, A., Bradshaw, C. P., Goodman, K., Monahan, K., & Cooley-Strickland, M. (2011). Examining factors associated with (in)stability in social information processing among urban school children: A latent transition analytic approach. *Journal of Clinical Child & Adolescent Psychology, 40*, 715-729

Gomez, R., & Hazeldine, P. (1996). Social information processing in mild mentally retarded children. *Research in Developmental Disabilities, 17*, 217-227. doi:10.1016/0891-4222(96)00005-4

Hambrick, D. Z., Kane, M. J., & Engle, R. W. (2005). The role of working memory in higher-level cognition: Domain-specific versus domain-general perspectives. In R. Sternberg & J.E. Pretz (Eds.), C*ognition and intelligence: Identifying the mechanisms of the mind* (pp. 104–121). New York, USA: Cambridge University Press.

Hayes, A. F. (2009). Beyond Baron and Kenny: Statistical mediation analysis in the new millennium. *Communication Monographs, 76*, 408-420.

Healy, K. N., & Masterpasqua, F. (1992). Interpersonal cognitive problemsolving among children with mental retardation. *American Journal on Mental Retardation, 96*, 367-372.

Helseth, S. A., Waschbusch, D. A., King, S., & Willoughby, M. T. (2015). Aggression in children with conduct problems and callous-unemotional traits: Social information processing and response to peer provocation. *Journal of Abnormal Child Psychology, 43*, 1503-1514. doi:10.1007/s10802-015-0027-6

Horsley, T. A., Orobio de Castro, B., & Van der Schoot, M. (2010). In the eye of the beholder: Eye-tracking assessment of social information processing in aggressive behavior. *Journal of Abnormal Child Psychology, 38*, 587-599. doi: 10.1007/s10802-009-9361-x

Hrabok, M., Brooks, B. L., Fay-McClymont, T. B., & Sherman, E. M. S. (2014). Wechsler intelligence scale for children-fourth edition (WISC-IV) short-form validity: A comparison study in pediatric epilepsy. *Child Neuropsychology, 20*, 49 – 59. doi:10.1080/09297049.2012.741225

Huijbregts, S. C. J., De Sonneville, L. M. J., Van Spronsen, F. J., Licht, R., & Sergeant, J. A. (2002). The neuropsychological profile of early and continuously treated phenylketonuria: orienting, vigilance, and maintenance versus manipulation-functions of working memory. *Neuroscience and Biobehavioral Reviews, 26*, 697-712.

Jansen, M. G., Schüller, C. M. L., Oud, J. H. L., & Arends, C. (1995). Evaluatieonderzoek in de residentiële jeugdhulpverlening [Evaluation in Residential youth care]. *Kind en adolescent, 16*, 144-155. doi 10.1007/BF03060598.

Kaal, H. L. (2010). *Beperkt en gevangen? De haalbaarheid van prevalentie onderzoek naar Verstandelijke beperking in detentie* (Cahier 2010-11). The Hague, the Netherlands: WODC.

Kaal, H., Brand, E., & Van Nieuwenhuijzen, M. (2012). Serious juvenile offenders with and without intellectual disabilities. *Journal of Learning Disabilities and Offending Behaviour, 3*, 66-76.

Knorth, E. J., Harder, A. T., Zandberg, T., & Kendrick, A. J. (2008). Under one roof: A review and selective meta-analysis on the outcomes of residential child and youth care. *Children and Youth Services Review, 30,* 123-140.

Kenny, D. A. (2016). *Mediation.* Retrieved from http://davidakenny.net/cm/mediate.htm

Kenny, D. A., Kashy, D. A., & Bolger, N. (1998). Data Analysis in Social Psychology. In D. Gilbert, S. Fiske, & G. Lindzey (Eds). *The handbook of social psychology,* 233-265.

Klingberg, T. (2010). Training and plasticity of working memory. *Trends in Cognitive Sciences, 14*, 317-324.

Klingberg, T., Fernell, E., Olesen, P. J., Johnson, M., Gustafsson, P., Dahlström, K., . . . Westerberg, H. (2005). Computerized training of working memory in children with ADHD-a randomized, controlled trial. *Journal of the American Academy of Child & Adolescent Psychiatry, 44*, 177-186.

Kort, W., Schittekatte, M., Dekker, P. H., Verhaeghe, P., Compaan, E. L., & Bosmans, M., & Vermeir, G. (2005). *WISC-III^{NL} Wechsler Intelligence Scale for Children. Manual.* Amsterdam: Harcourt Test Publishers.

Kupersmidt, J. B., Stelter, R., & Dodge, K. A. (2011). Development and validation of the social information processing application: a Web-based measure of social information processing patterns in elementary school-age boys. *Psychological Assessment, 23,* 834-847. doi:10.1037/a0023621

Landis, J. R., & Koch, G. G. (1977). The measurement of observer agreement for categorical data. *Biometrics, 33*, 159-174. doi:10.2307/2529310

Lansford, J. E., Malone, P. S., Dodge, K. A., Crozier, J. C., Pettit, G. S., & Bates, J. E. (2006). A 12-year prospective study of patterns of social information processing problems and externalizing behaviors. *Journal of Abnormal Child Psychology*, *34*, 709-718. doi:10.1007/s10802-006-9057-4

Larkin, P., Jahoda, A., & MacMahon, K. (2013). The social information processing model as a framework for explaining frequent aggression in adults with mild to moderate intellectual disabilities: a systematic review of the evidence. *Journal of Applied Research in Intellectual Disabilities, 26*, 447-465. doi:10.1111/jar.12031

Leffert J. S., & Siperstein G. N. (1996). Assessment of social-cognitive processes in children with mental retardation. *American Journal on Mental Retardation, 100,* 441-455.

Leffert, J. S., Siperstein, G. N., & Widaman, K. F. (2010). Social perception in children with intellectual disabilities: the interpretation of benign and hostile intentions. *Journal of Intellectual Disability Research, 54*, 168-180. doi:10.1111/j.1365-2788.2009.01240.x

Lemerise, E. A., & Arsenio, W. F. (2000). An integrated model of emotion processes and cognition in social information processing. *Child Development*, *71*, 107-118. doi:10.1111/1467-8624.00124

Lemerise, E. A., Gregory, D. S., & Fredstrom, B. K. (2005). The influence of provocateurs' emotion displays on the social information processing of children varying in social adjustment and age. *Journal of Experimental Child Psychology*, *90*, 344-366. doi:10.1016/j.jecp.2004.12.003

Lerner, M. D., & Lonigan, C. J. (2014). Executive function among preschool children: Unitary versus distinct abilities. *Journal of psychopathology and behavioral assessment, 36*, 626-639.

Lewis, M.D., Granic, I., Lamm, C., Zelazo, P.D., Stieben, J., Todd, R.M., et al. (2008). Changes in the neural bases of emotion regulation associated with clinical improvement in children with behavior problems. *Development and Psychopathology, 20,* 913-939.

Lynam, D. R. (1996). Early identification of chronic offenders: Who is the fledgling psychopath?. *Psychological Bulletin*, *120*, 209. doi:10.1037/0033-2909.120.2.209

Magnusson, D. (1976). The person and the situation in an international model of behavior. *Scandinavian Journal of Psychology*, *17*, 253-271.

Matthys, W. (2012). Zwak ontwikkelde neurocognitieve functies belemmeren sociale leerprocessen bij gedragsstoornissen. *Kind en Adolescent, 33*, 120-129.

Matthys, W., Cuperus, J., & Van Engeland, H. (1999). Deficient social problem-solving in boys with ODD/CD, with ADHD, and with both disorders. *Journal of the American Academy of Child and Adolescent Psychiatry, 38*, 311-321. doi:10.1097/00004583-199903000-00019

Matthys, W., & Lochman, J. E. (2005). Social problem solving in aggressive children. In: M. McCurran & J. McGuire (Eds.), *Social problem solving and offending: Evidence, Evaluation and Evolution* (pp. 51-66). Chichester: John Wiley & Sons.

Matthys, W. & Lochman, J.E. (2018). Future directions. In J. E. Lochman and W. Matthys (Eds.). *The Wiley Handbook of Disruptive and Impulsive-Disorders* (pp. 504-517). Chichester: Wiley-Blackwell.

Matthys, W., Maassen, G. H., Cuperus, J., & Van Engeland, H. (2001). The assessment of the situational specificity of children's problem behavior in peer-peer context. *Journal of Child Psychology and Psychiatry, 42*, 413–420. doi:10.1111/1469-7610.00734

Matthys, W. & Powell, N.P. (2018). Problem solving structure of assessment. In J.E. Lochman and W. Matthys (Eds.). *The Wiley Handbook of Disruptive and Impulsive-Disorders* (pp. 373-389). Chichester: Wiley-Blackwell.

Matthys, W., Vanderschuren, L. J. M. J., Schutter, D. J. L. G., & Lochman, J. E. (2012). Impaired neurocognitive functions affect social learning processes in oppositional defiant disorder and conduct disorder: Implications for interventions. *Clinical Child and Family Psychology Review, 15*, 234-246.

McCart, M. R., Priester, P. E., Davies, W. H., & Azen, R. (2006). Differential effectiveness of behavioral parent-training and cognitive-behavioral therapy for antisocial youth: A meta-analysis. *Journal of Abnormal Child Psychology, 34,* 527–543.

McQuade, J.D., Murray-Close, D., Shoulberg, E.K., & Hoza, B. (2013). Working memory and social functioning in children. *Journal of Experimental Child Psychology, 115*, 422-435. doi:10.1016/j.jecp.2013.03.002

Miyake, A., & Friedman, N.P. (2012). The nature and organization of individual differences in executive functions: Four general conclusions. *Current Directions of Psychological Science, 21*, 8-14.

Miyake, A., Friedman, N.P., Emerson, M.J., Witzki, A.H., Howerter, A., & Wager, T.D. (2000). The unity and diversity of executive functions and their contributions to complex frontal lobe tasks: a latent variable analysis. *Cognitive Psychology, 41*, 49-100.

Morgan, A. B., & Lilienfeld, S. O. (2000). A meta-analytic review of the relation between antisocial behavior and neuropsychological measures of executive function. *Clinical Psychology Review, 20,* 113-156.

Nas, C. N., Orobio de Castro, B., & Koops, W. (2005). Social information processing in delinquent adolescents. *Psychology, Crime & Law, 11*, 363-375. doi:10.1080/10683160500255307

Ng, M. Y., Weisz, J. R. (2016). Building a science of personalized intervention for youth mental health. *Journal of Child Psychology and Psychiatry, 57,* 216-236. doi: 10.1111/jcpp.12470

Nigg, J. T. (1999). The ADHD response-inhibition deficit as measured by the stop task: Replication with DSM–IV combined type, extension, and qualification. *Journal of Abnormal Child Psychology, 27*, 393-402.

Nigg, J. T. (2000). On inhibition/disinhibition in developmental psychopathology: views from cognitive and personality psychology and a working inhibition taxonomy. *Psychol Bull, 126*, 220.

Nigg, J. T. (2006). *What causes ADHD? Understanding what goes wrong and why*. New York: The Guilford Press.

Nosek, B. A., & Banaji, M. R. (2001). The go/no-go association task. *Social cognition, 19*, 625-666.

Ogilvie, J. M., Stewart, A. L., Chan, R. C. K., & Shum, D. H. K. (2011). Neuropsychological measures of executive function and antisocial behavior: a meta-analysis. *Criminology, 49*, 1063-1107. doi:10.1111/j.1745-9125.2011.00252.x

O'Keeffe, G. S., & Clarke-Pearson, K. (2011). The impact of social media on children, adolescents, and families. *American Academy of Pediatrics*, *127*, 800-804.

Oosterlaan, J., Logan, G.D., & Sergeant, J. A. (1998). Response inhibition in AD/HD, CD, comorbid AD/HD+ CD, anxious, and control children: A meta-analysis of studies with the stop task. *Journal of Child Psychology and Psychiatry and allied disciplines, 39,* 411-425.

Oostermeijer, S., Van Nieuwenhuijzen, M., Van de Ven, P., Popma, A., & Jansen, L. (2016). Social information processing problems related to reactive and proactive aggression of adolescents in residential treatment. *Personality and Individual Differences, 90*, 54-60. doi:10.1016/j.paid.2015.10.035

Orobio de Castro, B., Bosch, J. D., Veerman, J. W., & Koops, W. (2003). The effects of emotion regulation, attribution, and delay prompts on aggressive boys' social problem solving. *Cognitive Therapy and Research*, *27*, 153-166.

Orobio de Castro, B., Merk, W., Koops, W., Veerman, J. W., & Bosch, J. D. (2005). Emotions in social information processing and their relations with reactive and proactive aggression in referred aggressive boys. *Journal of Clinical Child and Adolescent Psychology*, *34*, 105-116. doi:10.1207/s15374424jccp3401_10

Orobio de Castro, B., Slot, N. W., Bosch, J. D., Koops, W., & Veerman, J. W. (2003). Negative feelings exacerbate hostile attributions of intent in highly aggressive boys. *Journal of Clinical Child and Adolescent Psychology, 32*, 56-65.

Orobio de Castro, B., Veerman, J. W., Koops, W., Bosch, J. D., & Monshouwer, H. J. (2002). Hostile attribution of intent and aggressive behavior: A meta-analysis. *Child Development, 73,* 916-934. doi:10.1111/1467-8624.00447

Peltopuro, M., Ahonen, T., Kaartinen, J., Seppälä, H., & Närhi, V. (2014). Borderline intellectual functioning: a systematic literature review. *Intellectual and Developmental Disabilities, 52*, 419-443. doi:10.1352/1934-9556-52.6.419

Poland, S. E., Monks, C. P., & Tsermentseli, S. (2015). Cool and hot executive function as predictors of aggression in early childhood: Differentiating between the function and form of aggression. *British Journal of Developmental Psychology*.

Polderman, T.J.C., Posthuma, D., De Sonneville, L.M.J., Stins, J.,F., Verhulst, F.C., & Boomsma, D.I. (2007). Genetic analyses of the stability of executive functioing during childhood. *Biological Psychology, 76*, 11-20.

Preacher, K. J., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior research methods, 36*(4), 717-731.

Preacher, K. J. and Hayes, A. F. (2008). "Contemporary approaches to assessing mediation in communication research". In *The Sage sourcebook of advanced data analysis methods for communication research*, Edited by: Hayes, A. F., Slater, M. D. and Snyder, L. B. 13–54. Thousand Oaks, CA: Sage.

Raikes, H. A., Virmani, E. A., Thompson, R. A., & Hatton, H. (2013). Declines in peer conflict from preschool through first grade: Influences from early attachment and social information processing. *Attachment & Human Devevelopment, 15*, 65-82. doi:10.1080/14616734.2012.728381

Ray, G. E., Norman, M., Sadowski, C. J., & Cohen, R. (1999). The Role of Evaluator-Victim Relationships in Children's Evaluations of Peer Provocation. *Social Development, 8*, 380-394. doi:10.1111/1467-9507.00102

Sainero, A., Del Valle, J. F., López, M., & Bravo, A. (2013). Exploring the specific needs of an understudied group: children with intellectual disability in residential child care. *Children and Youth Services Review*, *35*, 1393-1399. doi:10.1016/j.childyouth.2013.04.026

Schalock, R. L., Borthwick-Duffy, S. A., Bradley, V. J., Buntinx, W. H. E., Coulter, D. L., Craig, E. M., . . . Yeager, M. H. (2010). *Intellectual disability: Definition, classification, and systems of supports. Eleventh Edition.* Washington, DC: American Association on Intellectual and Developmental Disabilities.

Schoemaker, K., Mulder, H., Decovic, M. & Matthys, W. (2012). Executive functions in preschool children with externalizing behavior problems: a meta-analysis. *Journal of Abnormal Child Psychology, 41,* 457-471.

Schuiringa, H., Van Nieuwenhuijzen, M., Orobio de Castro, B., & Matthys, W. (2017). Executive functions and processing speed in children with mild to borderline intellectual disabilities and externalizing behavior problems. *Child Neuropsychology, 23*, 442-462.

Schultz, D., Ambike, A., Logie, S. K., Bohner, K. E., Stapleton, L. M., VanderWalde, H., . . . Betkowski, J. A. (2010). Assessment of social information processing in early childhood: Development and initial validation of the Schultz test of emotion processing-preliminary version. *Journal of Abnormal Child Psychology, 38*, 601-613. doi:10.1007/s10802-010-9390-5

Schultz, D., & Shaw, D. S. (2003). Boys' maladaptive social information processing, family emotional climate, and pathways to early conduct problems. *Social Development, 12*, 440-460. doi:10.1111/1467-9507.00242

Séguin, J.R., & Zelazo, P.D. (2005). Executive function in early physical aggression. In J. Archer, R. E. Tremblay, W. W. Hartup, & W. Willard (Eds.), *Developmental origins of aggression* (pp. 307 – 329). New York: Guilford.

Silverstein, A. B. (1970a). Reappraisal of the validity of WAIS, WISC, and WPPSI short forms. *Journal of Consulting and Clinical Psychology, 34,* 12-14. doi:10.1037/h0028680

Silverstein, A. B. (1970b). Reappraisal of the validity of a short form of Wechsler's scales. *Psychological Reports, 26,* 559-561. doi:10.2466/pr0.1970.26.2.559

Simmonds, D. J., Pekar, J. J., & Mostofsky, S. H. (2008). Meta-analysis of Go/No-go tasks demonstrating that fMRI activation associated with response inhibition is task-dependent. *Neuropsychologia, 46*, 224-232.

SIVT, Sociale InformatieVerwerkingsTest [Computer software]. Stoof, C., Wiedemeijer, E., Roest, M., Van de Velde, J., & Van Rest, M.M. Vrije Universiteit Amsterdam, the Netherlands: iOS.

Ståhlberg, O., Anckarsäter, H., & Nilsson, T. (2010). Mental health problems in youths committed to juvenile institutions: prevalences and treatment needs. *European Child and Adolescent Psychiatry, 19,* 893-903.

Swaab, H., De Sonneville, L., Cohen-Kettenis, P., Gielen, A., Buitelaar, J., & Van Engeland, H. (2000). Visual sustained attention in a child psychiatric population. *Journal of the American Academy of Child and Adolescent Psychiatry, 39*, 651-659.

Uterwijk, J. (2000). *WAIS-III Dutch version.* Technical manual. Lisse: Swets & Zeitlinger.

Vagos, P., Rijo, D., & Santos, I. M. (2016). Scenes for social information processing in adolescence: Item and factor analytic procedures for psychometric appraisal. *Psychological assessment*, *28*, 416.

Van der Helm, G. H. P., Matthys, W., Moonen, X. M. H., Giesen, N., Van der Heide, G. S., & Stams, G. J. J. M. (2013). Measuring inappropriate responses of adolescents to problematic social situations in secure institutional and correctional youth care: A validation study of the TOPS-A. *Journal of Interpersonal Violence, 28,* 1579-1595. doi: 10.1177/0886260512468322.

Van der Molen, M., Henry, L., & Van Luit, J. (2014). Working memory development in children with mild to borderline intellectual disabilities. *Journal of Intellectual Disability Research, 58*, 637-650.

Van der Molen, M., Van Luit, J., Jongmans, M., & Van der Molen, M. (2007). Verbal working memory in children with mild intellectual disabilities. *Journal of Intellectual Disability Research, 51*, 162-169. doi:10.1111/j.1365-2788.2006.00863.x

Van Lieshout, M., Luman, M., Buitelaar, J., Rommelse, N., & Oosterlaan, J. (2013). Does neurocognitive functioning predict future or persistence of ADHD? A systematic review. *Clinical Psychology Review, 33*, 539-560.

Van Nieuwenhuijzen, M. (2010). *De (h)erkenning van jongeren met een lichte verstandelijke beperking. [The recognition of youth with mild intellectual disabilities].* Amsterdam, The Netherlands: SWP.

Van Nieuwenhuijzen, M., Bijman, E. R., Lamberix, I. C. W., Wijnroks, L., Orobio de Castro, B., Vermeer, A., & Matthys, W. (2005). Do children do what they say? Responses to hypothetical and real-life social problems in children with mild intellectual disabilities and behaviour problems. *Journal of Intellectual Disability Research, 49,* 419-433. doi:10.1111/j.1365-2788.2005.00674.x

Van Nieuwenhuijzen, M., Bijman, E. R., Lamberix, I. C. W., Wijnroks, L., Vermeer, A., & Matthys, W. (2009). *Handleiding voor de SPT-MLK Aangepaste versie. [Manual of the SPT-MLK. Adjusted version].* Utrecht: Utrecht University, Department of Developmental Psychology.

Van Nieuwenhuijzen, M., Orobio de Castro, B., Valk, I. van der, Wijnroks, L., Vermeer, A., & Matthys, W. (2006). Do social information processing models explain aggressive behaviour by children with mild intellectual disabilities in residential care? *Journal of Intellectual Disability Research, 50,* 801-812. doi:10.1111/j.1365-2788.2005.00773.x

Van Nieuwenhuijzen, M., Orobio de Castro, B., Van Aken, M.A.G., & Matthys, W. (2009). Impulse control and aggressive response generation as predictors of aggressive behaviour in children with mild intellectual disabilities and borderline intelligence. *Journal of Intellectual Disability Research, 53,* 233-242.

Van Nieuwenhuijzen, M., Orobio de Castro, B., Wijnroks, L., Vermeer, A., & Matthys, W. (2004). The relations between intellectual disabilities, social information processing, and behavior problems. *European Journal of Developmental Psychology, 1,* 215-229. doi:10.1080/17405620444000111

Van Nieuwenhuijzen, M., Orobio de Castro, B., Wijnroks, L., Vermeer, A., & Matthys, W. (2009). Social problem-solving and mild intellectual disabilities: Relations with externalizing behavior and therapeutic context. *American Journal on Intellectual and Developmental Disabilities, 114,* 42-51. doi:10.1352/2009.114:42-51

Van Nieuwenhuijzen, M., & Vriens, A. (2012). (Social) Cognitive skills and social information processing in children with mild to borderline intellectual disabilities. *Research in Developmental Disabilities, 33*, 426-434. doi:S0891-4222(11)00377-5 [pii] 10.1016/j.ridd.2011.09.025

Van Nieuwenhuijzen, M., Vriens, A., Scheepmaker, M., Smit, M., & Porton, E. (2011). The development of a diagnostic instrument to measure social information processing and its precursors in children with mild to borderline intelligence. *Research in Developmental Disabilities,32*, 358-370. doi:10.1016/j.ridd.2010.10.012

Van Rijn, S., De Sonneville, L., Lahuis, B., Pieterse, J., Van Engeland, H., & Swaab, H. (2013). Executive function in MCDD and PDD-NOS: A study of inhibitory control, attention regulation and behavioral adaptivity. *Journal of Autism and Developmental Disorders, 43*, 1356-1366.

Verhulst F.C., Van der Ende J. & Koot H.M. (1996). *Handleiding voor de CBCL/ 4-18 [Manual for the CBCL/4-18]*. Rotterdam, the Netherlands: Sophia Children's Hospital/ Erasmus Medical Centre.

Verhulst, F. C., Van der Ende, J., & Koot, H. M. (1997a). *Handleiding voor de Teacher's Report Form (TRF). [Manual for the TRF]*. Rotterdam, the Netherlands: Sophia Children's Hospital/ Erasmus Medical Centre.

Verhulst, F. C., Van der Ende, J., & Koot, H. M. (1997b). *Handleiding voor de Youth Self-Report (YSR). [Manual for the YSR]*. Rotterdam, the Netherlands: Sophia Children's Hospital/ Erasmus Medical Centre.

Visser, E., Berger, H., Van Schrojenstein Lantman-De Valk, H., Prins, J., & Teunisse, J. (2015). Cognitive shifting and externalising problem behaviour in intellectual disability and autism spectrum disorder. *Journal of Intellectual Disability Research, 59*, 755-766.

Wechsler, D. (1949). *Wechsler Intelligence Scale for Children*. San Antonio, TX, US: Psychological Corporation.

Wechsler, D. (1955). *Manual for the Wechsler Adult Intelligence Scale*. Oxford, England: Psychological Corporation.

Weisz, J. R., Weiss, B., Han, S. S., Granger, D. A., & Morton, T. (1995). Effects of psychotherapy with children and adolescents revisited: a meta-analysis of treatment outcome studies. *Psychological Bulletin, 117*, 450.doi: 10.1037/0033-2909.117.3.450

Weyandt, L.L. (2005). Executive function in children, adolescents, and adults with Attention Deficit Hyperactivity Disorder: Introduction to the special issue. *Developmental Neuropsychology, 27,* 1 – 10.

Willner, P., Rose, J., Jahoda, A., Stenfert Kroese, B., Felce, D., Cohen, D., … Hood, K. (2013). Group-based cognitive-behavioural anger management for people with mild to moderate intellectual disabilities: cluster randomized controlled trial. *British Journal of Psychiatry, 203*, 288-296.

Wolfe, K.R., Vannatta, K., Nelin, M.A., & Yeates, K.O. (2015). Executive functions, social information processing, and social adjustment in young children born with very low birth weight. *Child Neuropsychology,21,* 41-54. doi:10.1080/09297049.2013.866217

Yang, C. C., & Brown, B. B. (2013). Motives for using Facebook, patterns of Facebook activities, and late adolescents' social adjustment to college. *Journal of Youth and Adolescence*, *42*, 403-416.

Ziv, Y., & Sorongon, A. (2011). Social information processing in preschool children: Relations to sociodemographic risk and problem behavior. *Journal of Experimental Child Psychology, 109*, 412-429. doi:10.1016/j.jecp.2011.02.009

Memorabele Uitspraken

Van Nieuwenhuijzen, M., Van Rest, M. M., Embregts, P. J. C. M., Vriens, A., Oostermeijer, S., Van Bokhoven, I., & Matthys, W. (2017). Executive functions and social information processing in adolescents with severe behavior problems. *Child Neuropsychology, 23,* 228-241. doi:10.1080/09297049.2015.1108396

Van Rest, M. M. (2014). Waarnemen, interpreteren, reageren. *Markant, tijdschrift Vereniging Gehandicaptenzorg, 19, (4),* 28-31.

Van Rest, M. M., Matthys, W., Van Nieuwenhuijzen, M., De Moor, M. H. M., Vriens, A., & Schuengel, C. (2017). Social information processing skills link executive functions to aggression in adolescents with mild to borderline intellectual disability. *Manuscript under review.*

Van Rest, M. M., Van Bokhoven, I., Van Nieuwenhuijzen, M., Vriens, A., Embregts, P. J. C. M., & Matthys, W. (2014). Developing a new assessment procedure of social information processing in adolescents within secure residential care. *Research in Developmental Disabilities, 35,* 1402-1411. doi:10.1016/j.ridd.2014.03.010

Van Rest, M. M., Van Bokhoven, I., Van Nieuwenhuijzen, M., Vriens, A., Embregts, P. J. C. M., & Matthys, W. (2014). De Sociale InformatieVerwerkingsTest (SIVT) voor jongeren binnen gesloten residentiële jeugdzorg. *Onderzoek & Praktijk, stichting Landelijk Kenniscentrum LVB, 12, (2),* 31-42.

Van Rest, M. M., Van Nieuwenhuijzen, M., Embregts, P. J. C. M., Vriens, A., Van Bokhoven, I., & Matthys, W. Working memory deficits in adolescents with mild to borderline intellectual disability in secure residential care. *Manuscript in preparation for submission.*

Van Rest, M. M., Van Nieuwenhuijzen, M., Kupersmidt, J. B., Vriens, A., Schuengel, C., & Matthys, W. (2017). Accidental and ambiguous situations reveal specific maladaptive social information processing skills in adolescents with intellectual disability. *Manuscript under review.*

Van Rest, M. M., Van Nieuwenhuijzen, M., Vriens, A., & Matthys, W. (2017). Development of the Social Information Processing Test SIVT: A computer-based diagnostic instrument for children and adolescents with externalizing behavior problems and mild to borderline intellectual disability. *Manuscript in preparation for submission.*

Van Rest, M. M., Van Nieuwenhuijzen, M., Vriens, A., Schuengel, C., & Matthys, W. (2014). Developing a new digital diagnostic instrument for social information processing in youth with externalizing behavior problems with and without mild to borderline intellectual disabilities [special edition IASSIDD poster abstracts]. *Journal of Applied Research in Intellectual Disabilities, 27,* 391.