Summary
Theoretical background

In the 1940’s, psychiatrist Leo Kanner described the behavior of a boy, Donald, who seemed happiest when he could play with his blocks and others would leave him alone (Kanner, 1943). Donald showed remarkably little interest in his social environment. He seemed to be living in a glass bulb, isolated from the others. Today, Donald would be recognized as a child with an autism spectrum disorder (ASD). The current diagnostic criteria for autism still show considerable overlap with the first behavioral observations by Kanner, that is, impairments in the social interaction with others, communication difficulties, and repetitive and restricted interests and behaviors (APA, 2000). The social impairments of children with autism spectrum disorder (ASD) are considered the core impairment of the disorder (APA, 2000; Hobson, 2002; Kanner, 1943). For example, children with ASD find it difficult to form friendships or to share their personal experiences with others.

Our social behavior is largely driven by our ability to empathize with others (de Waal, 2008). Due to the central role of empathy in social behavior, much research in autism has focused on the empathic abilities of children with ASD. These empathic abilities are usually assessed by examining children’s understanding of others’ thoughts, intentions and emotions. In developmental psychology this understanding is also called *Theory of Mind*. Theory of Mind refers to our everyday ideas (theories) about the mental worlds of the people around us. This helps us to better understand and predict others’ behavior. Children with ASD could have difficulties in understanding the thoughts and feelings of others, causing their socially deviant behavior. Indeed young children with ASD usually perform worse on so-called Theory of Mind tests compared to typically developing children (Baron-Cohen, Leslie, & Frith, 1985; Boucher, 2012; Yirmiya, Erel, Shaked, & Solo Monica-Levi, 1998). A classic Theory of Mind test assesses a child’s understanding that people act on their own, sometimes erroneous, ideas about reality and not so much on the basis of objective reality itself. Adolescents with ASD and a normal intelligence level (‘high-functioning’ ASD) have no problems with these classic Theory of Mind tests. More complex tests are therefore needed in order to shed light on the Theory of Mind abilities of older children and adolescents with high-functioning ASD.

Compared to the large number of Theory of Mind studies surprisingly little empirical research has focused on the empathic behavior of children with ASD. For instance, how do children with ASD respond to someone’s sorrow or pain? And in what respect do their responses differ from the behavior of typically developing children? Although children with ASD are not insensitive to the emotions of others, several studies
have shown that young children with ASD, often with an intellectual disability, show less attention and less concern when an unknown adult pretends he/she is hurt (Bacon, Fein, Morris, Waterhouse, & Allen, 1998; Scambler, Hepburn, Rutherford, Wehner, & Rogers, 2007; Sigman, Kasari, Kwon, & Yirmiya, 1992). It is still unclear whether this reduced empathic responsiveness also occurs among older children and adolescents with ASD, but without intellectual disabilities.

Although social impairments of children with ASD are considered the core problem of the disorder, there are also large individual differences in both the severity and the nature of these social impairments (APA, 2000, Mundy, Henderson, Inge, & Coman, 2007; Wing & Gould, 1979). In his first descriptions of children with autism, Leo Kanner (1943) emphasized that these children hardly seemed interested in social contact and they did not feel emotionally connected with others. Following Wing and Gould (1979), these children probably belong to the aloof social subtype. Wing and Gould (1979) distinguished three social subtypes within the autism spectrum. The aloof children hardly respond to the social initiative of others. These children often also have an intellectual disability (Beglinger & Smith, 2005; Borden & Ollendick, 1994; Eagle, Romanczyk, & Lenzenweger, 2010). The passive children initiate little social interaction, but do respond to the social initiatives of others. The active-but-odd children actively seek contact with others, but do this in an unusual way. For instance, they may talk endlessly about the same subject without checking if their conversation partner is still interested. Although most clinicians and researchers firmly agree that the autism spectrum encompasses a heterogeneous group of children, there is remarkably little research on individual differences in social behavior of children and adolescents with ASD.

The first objective of this thesis is to improve our understanding of the empathic abilities of school-aged children and adolescents with high-functioning ASD (HFASD). With ‘empathic abilities’ we refer to the understanding of others’ thoughts, desires, and feelings (Theory of Mind) as well as the empathic responding to the emotions of others (empathic responsiveness). The second objective of this thesis is to identify and explain individual differences in social behavior within the autism spectrum.

**Method**

The results presented in this thesis are derived from two studies: (1) a pilot-study in children (7-10 years) and adolescents (16-22 years) with HFASD (6-20 years) (n = 26, 88% boys) and a typically developing comparison group (n = 26, 85% boys) (see Chapter 4), and (2) a main study involving 214 (86% boys) children and adolescents with HFASD
from 6 to 20 years and 73 (85% boys) typically developing children and adolescents (see Chapters 2, 3, 5, and 6). Participants with HFASD from the main study are largely (90%) recruited through a school for special education. The other participants with HFASD came from regular education or a youth care institution. The participants from the comparison group were recruited through regular primary and secondary schools in the proximity of Amsterdam.

Participants took part in individual psychological assessments at school, including measures of social competence. One of the measures consisted of five stories to assess the Theory of Mind skills of the participant. In addition, during the assessment the experimenter expressed particular emotions (joy, sadness, pain) to evoke empathic behavior in the participant. After the study, parents and teachers of the participants received a questionnaire about the participant’s behavior.

**Theory of Mind**

A central question in Chapter 2 is whether school-aged children and adolescents with HFASD struggle to understand the mental world of others. Or put differently: Do they show limitations in their Theory of Mind? We used five complex Theory of Mind stories to ascertain participants’ understanding of the mental states (such as intentions or emotions) of story characters. Children and adolescents with HFASD performed similarly on the Theory of Mind stories as the comparison group. This is particularly surprising, because previous research - mainly among young children with ASD - consistently showed that children with ASD perform worse on classic Theory of Mind tests. Our results therefore suggest that Theory of Mind, as operationalized in this study, is not a valid explanation for the social impairments seen in children and adolescents with HFASD during everyday social interactions. On the other hand, because of the verbal and explicit nature of the Theory of Mind stories, it may be easier for individuals with HFASD to understand the intentions and emotions of a story character than the often unspoken intentions and emotions of a conversation partner during an actual interaction. The extent to which children and adolescents with HFASD are able to correctly identify the intentions and emotions of others might be largely determined by their attention and the verbal and explicit nature of the emotional signals of others.

**Empathic responsiveness**

In the study described in Chapter 3, we used two different methods to map empathic responsiveness of children and adolescents with and without HFASD: (1) an
observation of the empathic responsiveness of the child towards the experimenter, and (2) empathic responsiveness of the child as reported by the parent. On three separate occasions during the assessment the experimenter showed an emotion (joy, sadness, pain) according to a standardized protocol. The responses of each participant were recorded on video and coded. An empathic response was a response where the participant appropriately addressed the experimenter’s emotional state ('Are you okay?') or offered solutions to improve the experimenter’s emotional state. Participants with HFASD responded largely similar to the emotions of the experimenter as participants with a typical development. Thus, we observed no difference in empathic responsiveness between the two groups. It must be noted that both groups showed relatively few explicit empathic responses. The non-significant group difference in empathic responsiveness in this study counters results from previous studies which primarily included young children with ASD and an intellectual disability. Therefore, it seems that children and adolescents with ASD and a normal intelligence are able to respond equally well (or poorly) as their peers without ASD to the emotions of an unfamiliar adult in a semi-structured situation. Their normal intelligence and higher age may play a positive part in their empathic responsiveness.

However, parents of a child with HFASD did expect their child to show significantly fewer empathic responses compared to parents of a typically developing child. This finding suggests that children and adolescents with HFASD respond less empathically to the emotions of others in daily life compared to their peers without HFASD. It is important to note that most parents with a child with HFASD indicated that their child would respond empathically in some cases (53% of all parent reported responses was an empathic response), but less frequently so when compared to children in the comparison group (78% of all reported responses was an empathic response).

**Self-presentation**

In the study reported in Chapter 4, we examined a basic but vital part of everyday social behavior: introducing oneself to others. More specifically, we examined whether children and adolescents with HFASD would be able to present themselves positively and whether their self-presentation would be strategically adjusted to the specific preferences of an audience. The ability to present yourself positively to another while taking the other’s preferences into account, in other words, a successful self-presentation, requires an understanding of what the other person wants to hear (social understanding), but also depends on the motivation to portray a positive image of yourself (social motivation). We found that children and adolescents with HFASD, like the participants in the comparison
group, spoke more positively about themselves when their self-presentation served a positive objective (e.g., the prospect to take part in a prize winning game). Participants with HFASD were less strategic in their self-presentation: they are less likely to highlight those specific skills or interests that are most relevant to the listener. For instance, if the other person loves football, it may be wise to include positive things about football in your self-presentation. However, some participants with HFASD explained that they felt it was important to stay true to themselves, sometimes at the expense of a strategic self-presentation. Children and adolescents with HFASD possibly do not wish to create a positive image of themselves as much as their peers without HFASD. This outcome is in line with accumulating evidence for a reduced social motivation in children and adolescents with ASD (Chevallier, Kohls, Troiani, Brodkin, & Schultz, 2012b).

Diversity in empathy

Even though children and adolescents with HFASD as a group respond less empathically in everyday life (as reported by parents) compared to peers without HFASD, this does not mean that every individual with HFASD shows less empathy. The study described in Chapter 5 builds on the premise that individual child characteristics play an important role in the expression of empathy. More specifically, in Chapter 5 we examined whether individual differences in temperament, Theory of Mind and executive functioning (i.e., cognitive functions that guide goal-oriented behavior) contribute to differences in empathic responsiveness within the group of children and adolescents with HFASD. We found that a child’s temperament is predictive of his/her empathic responsiveness as reported by parents. The more emotional a child’s temperament, the less he/she will be inclined to respond empathically to others’ emotions. Also, children with a high level of sociability, thus children who prefer to be with others rather than being alone, respond more empathically to the emotions of others. In short, children and adolescents with HFASD vary in their temperamental make-up - just like their peers in the general population - and these temperamental differences can be meaningfully linked to differences in their empathic responsiveness. In addition, children who show a poor inhibitory control of their behavior according to their parents, were more likely to show empathic responses to the emotions of the experimenter. Children with HFASD who find it hard to control their behavior, possibly respond rather impulsively to the emotions of an unfamiliar adult. Theory of Mind, the ability to understand others’ thoughts and feelings, was not related to the degree of empathic responsiveness. The lack of association between Theory of Mind task performance and empathic responsiveness may be because the ability...
Summary
to identify the mental states of story characters (as in a Theory of Mind test) is not exactly the same as the ability to detect an emotion during a social interaction.

Diversity in social behavior

In Chapter 6 we discuss the different social interaction styles of children and adolescents with ASD and a normal intelligence. To date, research into social interaction styles was mainly performed among individuals with ASD and intellectual disabilities. Because children with an aloof or passive interaction style often were less intelligent than children with an active-but-odd interaction style (Beglinger & Smith, 2005; Borden & Ollendick, 1994; Castelloe & Dawson, 1993; Roeyers, 1997), it remained unclear whether children’s social interaction style was not just a feature of their intellectual level. In our study, 40% of children and adolescents with HFASD showed a high degree of active-but-odd social behavior, that is, they relatively often initiate social contact, but do this in an unusual or awkward way. Children with HFASD who showed more active-but-odd social behavior according to their parents, also showed more autistic traits, symptoms of hyperactivity, inhibition problems and socio-emotional problems according to parents and teachers. It is therefore important for clinicians to realize that socially active behavior of a child with HFASD does not necessarily indicate that this child experiences fewer problems than a child with HFASD and a predominantly passive behavioral style. In fact, children and adolescents who tend to show active-but-odd social behavior, may have more or different problems than those who remain more aloof or passive during social interactions. These differences can be used as potential leads for more personalized interventions for children and adolescents with HFASD.

Conclusion

Since the first descriptions of children with autism by Leo Kanner (1943), much has changed in our ideas of autism. Yet, most scientists and clinicians still agree that social impairments form the core of the disorder. A first conclusion of this thesis is that the empathic and social disabilities in ASD, as previously and consistently shown in young children with ASD (sometimes with an intellectual disability), are less straightforward in school-aged children and adolescents with ASD and a normal intelligence (HFASD). When compared to typically developing peers, they show a comparable understanding of other minds and a comparable empathic responsiveness to others’ emotions in a structured situation. The structure of the test (situation) and intellectual abilities may help children and adolescents with HFASD to overcome or conceal some of their social and
empathic disabilities. However, parent reports indicate that children and adolescents with HFASD do in fact respond less empathically to others’ emotions in everyday situations compared to peers. Also, it appears that some children and adolescents with HFASD are characterized by a reduced social motivation. More specifically, they seem to be less motivated than typically developing peers to make a positive impression on others when this impression jeopardizes their own sense of self.

A second important conclusion of this research is that children and adolescents with HFASD show large individual differences in their empathic and social behavior. A lack of empathic responsiveness or a lack of social initiative do not seem to be universal characteristics of HFASD per se, but they are shaped by individual differences in age, temperament, inhibitory control, and hyperactivity. It is important for both scientists and clinicians to appreciate that the autism spectrum represents a heterogeneous group of individuals. However, as long as we strive to categorize people (disorder versus no disorder) - which may be efficient, if not necessary, in a clinical setting - , the large diversity within the autism spectrum will remain a source of frustration and confusion. If we view these individual differences as meaningful instead, they may be used as an important step towards a better understanding of autism spectrum disorder.