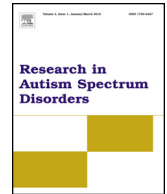




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## An exploration of the judgement of sexual situations by adolescents with autism spectrum disorders versus typically developing adolescents



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### ABSTRACT

**Background:** Inappropriate sexual behaviour, sexual problems and sexual victimization in adolescents with autism spectrum disorders (ASD) is regularly reported in previous research, but little is known about factors associated with these problems, nor about factors associated with a healthy sexuality development in adolescents with ASD. Investigating the judgement of sexual behaviour can be a first step in acquiring insight into inappropriate sexual behaviour in adolescents with ASD.

**Methods:** We assessed how 94 cognitively-able adolescents with ASD and 94 typically developing (TD) adolescents judged the appropriateness of different illustrations of sexual situations and we investigated the differences between the two groups.

**Results:** The highest level of agreement between the judgements of adolescents with ASD and the judgements of an expert panel was found for severely inappropriate sexual behaviours (89.2%) and the lowest agreement was found for appropriate (31.7%) and slightly inappropriate sexual behaviours (26.1%). No significant differences were found between the judgements of the adolescents with ASD and the TD adolescents. Regarding the divergent judgements, adolescents with and without ASD were mostly more strict (i.e., more conservative) than the expert panel in their judgement of sexual situations. Finally, a small percentage of adolescents with and without ASD showed milder (i.e., less conservative) judgements of sexual situations portraying behaviour that was considered severely inappropriate by an expert panel.

**Conclusions:** Our findings showed that, overall, judgement of illustrations of sexual situations does not seem to be hampered in adolescents with ASD. More research is needed to clarify whether this also holds true for their judgements of – and actions in – more complex real life situations.

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## 1. Introduction

In adolescence, many physical, emotional and social changes take place and the psychosexual development accelerates rapidly (Dahl, 2004; Santrock, 2005). During the transition from childhood into adulthood, adolescents require a whole set of new skills and knowledge (White & Roberson-Nay, 2009), making adolescence a challenging period. The development of a healthy sexuality is an important task during adolescence, and for adolescents with autism spectrum disorders (ASD) the physical changes and a clear interest in sexuality and intimate relationships occur similar to adolescents without ASD (Pecora, Mesibov, & Stokes, 2016). Previous research showed healthy sexual and relational functioning in people with ASD and regarding several behavioural aspects of sexuality (e.g., masturbation, dating and kissing) little differences were found between adolescents and adults with and without ASD (Byers, Nichols, & Voyer, 2013; Dewinter, Vermeiren, Vanwesenbeeck, Lobbestael, & Van Nieuwenhuizen, 2015; Dewinter, Vermeiren, Vanwesenbeeck, & Van Nieuwenhuizen, 2016). In contrast to these studies reporting healthy aspects of sexuality in adolescents with ASD, other studies focussed on the challenges young people with ASD run into in adolescence and their psychosexual development (Ginevra, Nota, & Stokes, 2016; Stokes & Kaur, 2005; Stokes, Newton, & Kaur, 2007; Tissot, 2009). Adolescents and adults with ASD reported sexual frustration, lack of outlets for sexual tension, and sexual preoccupations (Murrie, Warren, Kristiansson, & Dietz, 2002; Ray, Marks, & Bray-Garretson, 2004) and a broad variety of inappropriate sexual behaviour has been described in a small group of people with ASD, ranging from asking inappropriate questions, touching others inappropriately, to stalking and public masturbation (Coskun, Karakoc, Kircelli, & Mukaddes, 2009; Dozier, Iwata, & Worsdell, 2011; Hénault, 2006; Realmuto & Ruble, 1999; Ruble & Dalrymple, 1993; Stokes et al., 2007). Case studies illustrated sexual offending behaviours in adolescents and adults with ASD (Chan & Saluja, 2011; Griffin-Shelley, 2010; Haskins & Silva, 2006; Kohn, Fahum, Ratzoni, & Apter, 1998; Murrie et al., 2002). Also, paraphilias, such as exhibitionism, voyeurism, paedophilia and fetishism, have been described in people with ASD (Cooper, Mohamed, & Collacott, 1993; Dozier et al., 2011; Early, Erickson, Wink, McDougale, & Scott, 2012; Hellemans, Colson, Verbraeken, Vermeiren, & Deboutte, 2007; Kellaheer, 2015). Very recently, a study has found that in a group of adolescents and young adults with ASD about one fourth portrayed inappropriate sexual behaviour or struggled with paraphilias (Fernandes et al., 2016). Unfortunately, most of the previous publications on inappropriate sexual behaviour in people with ASD are case studies or deal with methodological limitations, such as small sample sizes or no use of self-report measures. Adolescents with ASD are not only reported to be more at risk to portray inappropriate sexual behaviour, but also to become a victim of sexual bullying or abuse (Edelson, 2009; Sevlever, Roth, & Gillis, 2013). The prevalence of sexual victimization in people with ASD was estimated on 16.6% (Mandell, Walrath, Manteuffel, Sgro, & Pinto-Martin, 2005) and Brown-Lavoie, Viecili, and Weiss, (2014) reported that people with ASD were between two and three times more likely to experience sexual victimization, sexual coercion and rape than people without ASD. All these potential risks cause concerns in parents of adolescents with ASD. Parents have concerns both about the risk of sexual exploitation as well as about the possibility that their child will show inappropriate sexual behaviour (Ballan, 2012; Cridland, Jones, Caputi, & Magee, 2014; Ginevra et al., 2016; Nichols & Blakeley-Smith, 2009; Stokes & Kaur, 2005).

This contradiction in previous research, with some studies focussing on problematic sexual behaviour, and others indicating a healthy sexual development in adolescents with ASD, calls for research to increase insight in factors associated with the development of (in)appropriate sexual behaviour in adolescents with ASD. Investigating how adolescents with ASD judge sexual situations can be a valuable first step. In the present study, we aimed to get more insight in the judgement of sexual situations by adolescents with ASD, by using the flag system. The flag system can be used to get an indication of how children, adolescents, and adults judge the appropriateness of different sexual situations (Frans & Franck, 2010). We investigated judgement of a wide range of illustrations of sexual situations, and we compared the judgements of adolescents with ASD with the judgements of a matched sample of typically developing adolescents, by contrasting both groups to consensus judgements composed by an expert panel.

This is the first study that examines the judgement on the appropriateness of different sexual situations by adolescents with ASD. As such, this study has an exploratory nature. Possibly, adolescents with difficulties judging the appropriateness of sexual situations might also have difficulties in behaving appropriately in actual sexual situations. In other words, misjudgement of sexual situations might be associated with difficulties in both stating your own boundaries as well as taking other peoples boundaries into account and thereby increasing the chance of engaging in inappropriate sexual behaviour. When adolescents with ASD indeed judge sexual situations differently than the expert panel, and than adolescents without ASD, this might be a first step in explaining the previously reported inappropriate sexual behaviour and vulnerability to sexual victimization in adolescents with ASD.

## 2. Methods

### 2.1. Participants

Participants in this study were 94 adolescents with ASD and 94 typically developing adolescents, all between 12 and 18 years of age. This study was approved by the medical ethical commission of the Erasmus Medical Centre, Rotterdam (MEC-2013-040).

The adolescents with ASD were derived from a larger group of 184 adolescents with a DSM-IV-TR diagnosis of ASD that participated in a large randomized controlled trial on the effects of a psychosexual training program for adolescents with

ASD (Visser et al., 2015). Eligibility criteria for the adolescents with ASD were a total score of 51 or above on the Social Responsiveness Scale (SRS) (Constantino & Gruber, 2002), and an intelligence score in the normal range (total IQ  $\geq$  85).

The typically developing (TD) adolescents were also derived from a larger group of 180 adolescents, collected as part of a Master thesis project from the Erasmus University Rotterdam, and recruited from a large multi-ethnic high school with all education levels, in The Hague, the Netherlands. The control group consisted of adolescents from all education levels, with the majority (53.7%) attending lower general secondary education (in Dutch: VMBO). In the general population in the Netherlands approximately 60% of all students attend this type of high school (CBS, 2016). 32.7% of our control group attended higher general secondary education (in Dutch: HAVO) and 13.7% attended pre-university education (in Dutch: VWO).

Both age and ethnicity are factors that can influence the judgement of sexual behaviour (de Graaf, Kruijjer, van Acker, & Meijer, 2012). Since the two groups differed significantly on these variables, we matched the samples at an individual level (ratio ASD:TD = 1:1) on age (maximum six months apart) and ethnicity (i.e. coming from a Dutch or a non-Dutch cultural background/up-bringing, e.g. a Moroccan, Turkish or Surinamese cultural background). This resulted in two subsamples of 94 adolescents. Table 1 shows the characteristics of the adolescents with ASD and the TD adolescents after matching on age and ethnicity. We tested the group differences after matching on age, gender and ethnicity with an independent sample *t*-test and chi squares and the magnitude of the difference with Cohen's *d* and phi. Only gender remained significantly different between the groups, with more boys in the ASD group.

## 2.2. Materials & design

For descriptive purposes, in addition to the SRS, a 65-item questionnaire filled out by parents, we used a clinical observation measure for ASD severity, the Autism Diagnostic Observation Schedule-2 (ADOS-2) (Lord et al., 2012). The ADOS-2 is a semi structured, standardized measure to assess social interaction, communication, play, and stereotyped behaviour for individuals suspected of having ASD. Both the SRS total score and the ADOS-2 calibrated severity score provide a dimensional measure of ASD symptom severity, with higher scores reflecting a greater degree of social impairment (Constantino & Gruber, 2002; Hus & Lord, 2014). The SRS total score and the ADOS-2 calibrated severity score in Table 1 show that the ASD sample consisted of adolescents with a wide range of ASD symptom severity. Furthermore, using the ADOS diagnostic algorithm, 44.6% of the ASD sample met the cut-off for ASD and 47.8% met the cut-off for autistic disorder.

The flag system (in Dutch: het Vlaggensysteem) (Frans & Franck, 2010) was administrated to assess judgement of sexual situations portraying appropriate and inappropriate behaviours. The flag system consists of a set of 44 drawn illustrations of children and adolescents displaying sexual behaviours in different situations. The flag system offers professionals who work with children and adolescents a tool to assess sexual behaviour, to discuss it with colleagues and children and adolescents themselves and to respond appropriately. Six criteria were used by an expert panel to judge whether sexual behaviour is regarded as appropriate or as inappropriate in a society (Frans & Franck, 2010; Ryan, Leversee, & Lane, 2011). The first criterion is 'consent', or mutual agreement. The second criterion is 'equality', meaning that in a sexual interaction both parties must be evenly matched, so that one does not dominate the other. The third criterion is 'free will', in other words, whether one party puts pressure on the other party, or uses a form of pressure in the sexual interaction (Ryan et al., 2011). The fourth criterion is 'appropriate for age', looking at if behaviour is expected and accepted at a certain age, or is more appropriate in younger or older children or adolescents. The fifth criterion is 'appropriate for context', meaning that different contexts are associated with different rules and whether privacy rules are followed, for instance behaviour may not be appropriate in the playground, but may be in the bedroom. The last criterion is 'self-respect', looking at the physical or psychological harm to the child that shows the behaviour (Frans & Franck, 2010).

In the first step of the development of the flag system the developers used these six criteria to define four flags (green, yellow, red, and black). These flags are linked to how parents, caregivers and professionals can offer an appropriate response when they come across these behaviours. A green flag means that the sexual behaviour meets the six criteria, for example explicit sex conversations at thirteen with same age peers, or showing and comparing intimate body parts with same age peers in a private place. Green flag behaviour can be respected or confirmed. A yellow flag means that there are occasional and slight transgressions in one or several criteria, for instance not age-appropriate sexual contact with a same age peer or

**Table 1**  
Characteristics of the adolescents with and without ASD.

	Adolescents with ASD N=94	TD adolescents N=94	Testing group difference
Gender (male), n (%)	79 (84.0%)	63 (66.3%)	$\chi^2(1, N = 188) = 8.17, p < 0.01, \varphi = 0.21$
Age (in years), M $\pm$ SD (range)	15.38 $\pm$ 1.37 (12.4–18.6)	15.47 $\pm$ 1.34 (12.7–18.3)	$t(186) = -0.47, p = 0.64, \text{Cohen's } d = -0.03$
Ethnicity (Dutch), n (%)	67 (70.5%)	67 (70.5%)	$\chi^2(1, N = 188) = 0.000, p = 1.00, \varphi = 0.00$
Total IQ, M $\pm$ SD (range)	104.37 $\pm$ 12.30 (85–142)	–	
SRS total score M $\pm$ SD (range)	96.18 $\pm$ 25.46 (52–158)	–	
ADOS-2 calibrated severity score, M $\pm$ SD (range)	6.1 $\pm$ 2.13 (1–9)	–	

Note: M = mean; SD = standard deviation; SRS: Social Responsiveness Scale; ADOS-2: Autism Diagnostic Observation Schedule.



**Fig. 1.** Green flag illustration “Two 12 year old girls look together in a lingerie catalogue”.  
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sexual experimenting between same age peers when mutual consent is uncertain or when peer pressure plays a role. Yellow flag behaviour can be limited (but not forbidden). A red flag means more serious or repeated transgressions of the criteria, such as intimate contact between two adolescents who differ more than six years in age or sexual behaviour with coercion from one party to the other. Red flag behaviour should be forbidden. A black flag is tantamount to sexual abuse or seriously risky sexual behaviour, such as rape, forced sex or exhibitionism. Black flag behaviour should be forbidden and followed up with setting boundaries, punishment or treatment (Frans & Franck, 2010). An example illustration for each colour category of the flag system is shown in Figs. 1–4.

The second step in the two year development of the flag system was that multiple focus groups of health care professionals decided upon the most accurate flag for each illustration. Then, the flag system was tested out with typically developing adolescents, and in an expert panel of child health care professionals consensus on the correct flag was reached.

In this study, given the age range of our participants, the adolescents were shown 23 illustrations portraying younger adolescents (12–14 years, 11 illustrations) and older adolescents (14–17 years, 12 illustrations). At the bottom of each illustration, there is a line of text explaining the situation, for instance: ‘A 15-year old boy shows his penis in front of a webcam’. The illustrations are explicit and the line of text is straight forward. The age of the portrayed adolescents is given in this line of text in order to judge the age-appropriateness of the behaviour in the illustration. This is the first study to explore the flag system as a measure of judgement, as such the psychometric properties of the flag system are unknown.

### 2.3. Procedures

Written informed consent was obtained from all adolescents and their primary caregivers. Among the adolescents with ASD the flag system was administered individually. The research assistant first explained the meaning and the use of the four flags (green, yellow, red and black) that were visible on the table during the whole examination. Then the research assistant showed the 23 illustrations one-by-one in a random order to each participant. The order of the illustrations was the same for all participants. With each illustration, the research assistant read aloud the explaining line of text and then asked the adolescent to select one flag, best judging the sexual situation shown in the illustration. The first illustration was used as an exercise: After the adolescent chose a flag for the first illustration, the research assistant gave the adolescent feedback on the



**Fig. 2.** Yellow flag illustration “A 12 year old girl sits on a 17 year old boy’s lap”.



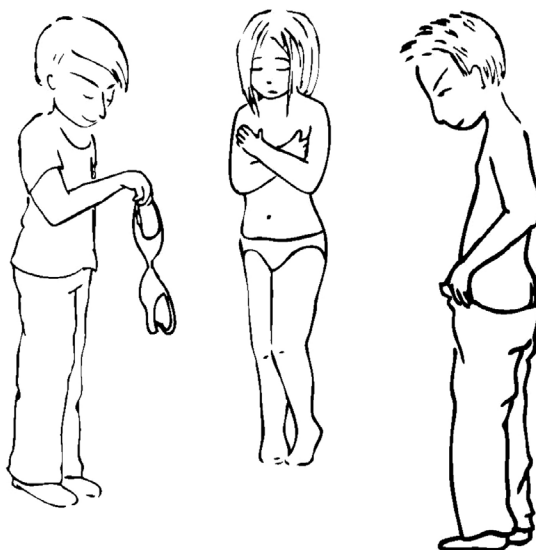
**Fig. 3.** Red flag illustration “A 15 year old girl shows her breast on the internet in exchange for calling credit”.

correct flag, and again explained the meaning of the four flags, in order to reassure the adolescent understood the procedure. For the other illustrations, the research assistant wrote down the chosen flag, without giving feedback to the adolescent during the test. The illustrations were shown in the same order for all cases, with the correct flags in a random order for the adolescents. The TD adolescents received the same verbal instruction and feedback and judged the illustrations in the same random order, but filled out the flag system on paper in a classroom setting. Neither group (ASD or TD) received any information on the six criteria used to judge the portrayed behaviour.

For each illustration, a participant either chose the same (i.e., correct) or a divergent (i.e., incorrect) flag as compared to consensus judgements by the expert panel. A divergent judgement could indicate either a milder (i.e., less conservative) judgement or a stricter (i.e., more conservative) judgement, as compared to the judgements of the expert panel.

#### 2.4. Analyses

Firstly, we calculated the average percentages of the same and divergent (i.e., milder or stricter) judgements for the adolescents with ASD and the TD adolescents for each illustration in the flag system, all illustrations together and per set of illustrations with the same colour, in comparison with the judgements of the expert panel. For the percentages divergent judgements only the sets of illustrations that make milder judgements possible (i.e., yellow, red & black), and only the sets of



**Fig. 4.** Black flag illustration “Two 16 year old boys force a 14 year old girl to engage in sexual games”.

**Table 2**  
Percentage of chosen flags per set of illustrations.

Set of illustrations	N	Adolescents with ASD (n=94)			TD adolescents (n=94)			Comparison ASD and TD group		
		Same judgements	Divergent judgements		Same judgements	Divergent judgements		Same judgements	Divergent judgements	
			Milder (i.e., less conservative)	Stricter (i.e., more conservative)		Milder	Stricter		Milder	Stricter
Overall	22	45.07%	16.68%	55.38%	37.89%	18.93%	62.93%	$t(42)=0.844$ , $p=0.40$ , Cohen's $d=0.25$	$t(30)=-0.265$ , $p=0.79$ , Cohen's $d=-0.09$	$t(32)=-1.002$ , $p=0.32$ , Cohen's $d=-0.34$
Green flag behaviours	6	31.74%	N.a.	68.26%	24.38%	N.a.	75.62%	$t(10)=0.820$ , $p=0.43$ , Cohen's $d=0.47$	N.a.	$t(10)=-0.820$ , $p=0.43$ , Cohen's $d=-0.47$
Yellow flag behaviours	6	26.06%	15.60%	58.33%	23.61%	14.79%	62.66%	$t(10)=0.358$ , $p=0.73$ , Cohen's $d=0.21$	$t(10)=0.265$ , $p=0.80$ , Cohen's $d=0.15$	$t(10)=-0.341$ , $p=0.74$ , Cohen's $d=-0.20$
Red flag behaviours	5	39.79%	23.83%	36.38%	24.64%	27.32%	48.04%	$t(8)=1.996$ , $p=0.08$ , Cohen's $d=1.26$	$t(8)=-0.206$ , $p=0.84$ , Cohen's $d=-0.13$	$t(8)=-0.910$ , $p=0.39$ , Cohen's $d=-0.57$
Black flag behaviours	5	89.15%	10.85%	N.a.	84.90%	14.68%	N.a.	$t(8)=1.289$ , $p=0.23$ , Cohen's $d=0.81$	$t(8)=-1.148$ , $p=0.28$ , Cohen's $d=-0.72$	N.a.

Note: 22 illustrations of the flag system showing different sexual situations were used. In the flag system these illustrations are divided in four colour sets, based on the appropriateness of the portrayed sexual behaviour. Displayed are the average percentages of the same and divergent (i.e., milder or stricter) judgements of the adolescents with ASD and the TD adolescents, compared against the judgements of an expert panel.

illustrations that make stricter judgements possible (i.e., green, yellow & red) were selected. Because the first illustration was used as an exercise illustration, we excluded this illustration in the analyses.

Secondly, we compared the judgements of the adolescents with ASD with the judgements of TD adolescents, by testing the differences in percentages same and divergent judgements between the ASD and the TD group with independent sample *t*-tests for all illustrations together ( $n=22$ ) and for each set of illustrations with the same colour (green, yellow, red, and black). We considered results with a *p* value  $<0.05$  as significant. We have calculated effect-sizes for all results using Cohen's *d*, with 0.2 regarded a small effect, 0.5 a medium effect and 0.8 a large effect. With two groups of 94 participants and a power of 0.80 we would be able to demonstrate results with an effect-size of 0.366 (Cohen, 1988).

### 3. Results

For both groups, the average percentages of the same and divergent (i.e., milder or stricter) judgements, compared against consensus judgements of the expert panel, overall and for each of the four colour sets of illustrations of the flag system, are shown in Table 2. When the 22 illustrations were considered together, the mean percentage of similarly chosen flags was not significant, meaning the judgements of the adolescents with and without ASD were equally similar to the consensus judgements of the expert panel. Also, when the four colour sets of illustrations were taken separately, we found no significant differences between the two groups on the same judgements. Regarding the divergent judgements, both groups showed higher percentages of stricter (i.e., more conservative) judgements than milder (i.e., less conservative) judgements and no significant differences were found between the adolescents with ASD and the TD adolescents on the overall percentages of stricter and milder judgements, nor when the colour sets of illustrations were taken separately.

Because of the still existing differences in gender between the two groups after matching, we explored whether the results were different when analyzing boys separately. Unfortunately, not enough girls with ASD participated to perform separate analyses for girls. For boys, we found a significant difference with a large effect-size between the groups on the percentage same judgements for the sexual behaviours that are severely inappropriate and liable to punishment (black flag illustrations) ( $t(8)=-2.886$ ,  $p=0.02$ , Cohen's  $d=1.83$ ). Logically, we also found a significant difference with a large effect-size on the average percentages of milder judgements for these black flag illustrations ( $t(8)=-2.687$ ,  $p=0.03$ , Cohen's  $d=-1.70$ ). These results show that TD boys were less conservative in their judgements of sexual behaviour that the expert panel considered severely inappropriate and liable to punishment, compared to boys with ASD.

#### 4. Discussion and implications

The aim of this exploratory study was to investigate how cognitively-able adolescents with ASD judge the appropriateness of different sexual situations, using the flag system (Frans & Franck, 2010), because a divergent judgement might explain factors associated with the development of inappropriate sexual behaviour that have been reported in adolescents with ASD. As a comparison, we also investigated how an age and ethnicity matched group of typically developing (TD) adolescents judged the illustrations of sexual situations, and whether their judgements differed from the judgements of the adolescents with ASD.

Results showed that approximately half of the adolescents with ASD judged the illustrations of sexual situations similarly to consensus judgements of an expert panel of health care professionals. Surprisingly, no significant differences were found between the judgements of the adolescents with ASD and the TD adolescents. The only difference was found between boys with ASD and TD boys, with the TD boys giving more milder judgements (i.e., being less conservative) regarding sexual behaviours that the expert panel considered severely inappropriate and liable to punishment, compared to the boys with ASD.

Both adolescents with and without ASD had most trouble judging perfectly appropriate sexual behaviours (i.e., situations portraying normal experimenting behaviours) and slightly inappropriate sexual behaviours (i.e., sexual behaviour that violates one criterion, for instance not being totally age-appropriate or taking place in the wrong context). The results showed that all adolescents tend to be more cautious with regard to these sexual behaviours. A possible alternative explanation for this finding is that a comparison was made with an expert panel of child health care professionals, instead of norm data obtained from adolescents from Dutch and/or Belgian society. Possibly, the health care professionals in the panel were used to working with – and talking about – sexuality, making their views more liberal than the views in our society in general.

Furthermore, the vast majority of adolescents with and without ASD accurately identified sexual behaviours that are severely inappropriate and liable to punishment, for instance when they were asked to judge forced sexual contact or exhibitionism. However, 10% of the adolescents with ASD and 15% of the TD adolescents gave a milder (i.e., less conservative) judgement of these sexual situations, indicating that (at least on paper) they underestimated the dangers of these inappropriate sexual behaviours. This group might reflect those adolescents that are vulnerable to develop inappropriate sexual behaviours or to become a victim of sexual abuse. Underestimating the inappropriateness of sexual behaviour might put adolescents at risk to develop inappropriate sexual behaviour or to become a victim of sexual abuse, making it equally important to identify both these adolescents with and without ASD early and, if needed, provide them extra guidance and information regarding why certain sexual behaviour is inappropriate.

Based on previous research reporting inappropriate sexual behaviour as well as sexual vulnerability in adolescents with ASD (Edelson, 2009; Fernandes et al., 2016; Hénault, 2006; Sevelever et al., 2013; Stokes et al., 2007) we expected that especially adolescents with ASD would have the tendency to give milder (i.e., less conservative) judgements of sexual behaviours. In contrast, we found that their divergent judgements were more strict (i.e., more conservative) than those of the expert panel and comparable to the judgements of the control group of adolescents without ASD.

The current study demonstrated that adolescents with ASD at least have sufficient knowledge to adequately judge different sexual situations, which might seem in contradiction with existing research showing that adolescents with ASD often lack the knowledge required to successfully express their sexuality (Pecora et al., 2016). However, future research should further clarify whether adolescents with ASD cognitively know and are aware of the rules of appropriate and inappropriate sexual behaviour, and subsequently, if they can act upon these rules in more complex real life situations.

##### 4.1. Limitations and clinical implications

This study was the first to explore the judgement of different sexual situations by adolescents with ASD, and therefore some limitations that need to be addressed in future studies can be identified. Firstly, we acknowledge that the flag system is primarily a normative and pedagogical framework, developed as a tool to facilitate discussion about sexual behaviours of children or adolescents with parents, caregivers and professionals (Frans & Franck, 2010). In this study the flag system was explored as an assessment tool, while the psychometric properties are yet unknown. To our knowledge, no other instruments are available for measuring judgement of – or insight into – appropriate and inappropriate sexual behaviours, and the flag system thus might be a useful first starting point towards a more sophisticated measure. Also, even though the experts reached consensus on the most appropriate flag for each sexual situation, some of the portrayed sexual behaviour is open for different interpretations on the appropriateness of the situation and the most suited flag. The difference in administration between the two groups (individual report to a research assistant for the adolescents with ASD versus on paper in a classroom setting for the TD adolescents) might have influenced how they each judged the portrayed behaviours. Also, more generally, reporting on a delicate matter like sexual situations might be influenced by social desirability which can be different for adolescents with ASD and TD adolescents. Therefore, future studies should reconsider the way of administration in all participants.

Secondly, we do not know how the adolescents reached their judgement, so whether the adolescents considered particular criteria to judge the illustrated sexual behaviours (i.e., consent, equality, coercion, appropriate for age, appropriate for context and self-respect). Therefore, it remains to be investigated why the adolescents give stricter or milder judgements

of sexual behaviours across different situations. Further research is needed to investigate the judgements of adolescents with ASD in more ecologically valid settings. Thirdly, sexuality is culture-specific (Barbaree & Marshall, 2008) and the flag system was developed based on research from Western Europe and North America. For instance, the developmentally appropriate ages for certain sexual behaviours cannot be generalised to other cultures and educational contexts (Frans & Franck, 2010). Future research could focus on whether the illustrations in the flag system and the allocation of a certain flag to a certain illustration are different for people (with and without ASD) coming from other countries or cultures.

Due to these limitations, we acknowledge that, although this exploratory study had a reasonable sample size, results should be interpreted with caution, and more research on both a healthy sexuality development as well as the development of inappropriate sexual behaviour in adolescents with ASD is required. Furthermore, although we explored differences separately for boys, power was limited to do so, therefore future studies are also required on the differences in psychosexual development between boys and girls (Pecora et al., 2016).

Nevertheless, the outcomes of this study can be valuable for clinical practice. For long, the focus of guidance in adolescent sexuality has been on dangerous behaviours and pathology, rather than on normative, positive aspects. Currently, this viewpoint is changing towards a more positive and normative viewpoint on adolescent sexuality (Tolman & McClelland, 2011), which is in line with our findings of no aberrant judgement by adolescents with ASD. In general, adolescents acquire knowledge and skills through sexual exploration and experiences, and in this way they learn the rules of social, intimate and sexual interaction (Frans & Franck, 2010). Little room for sexual exploration and unfulfilled desires can increase the risk to develop sexual frustration (Hénault, 2006). The focus of parents of adolescents with ASD and health-care providers working with this group is, in our observation, still mainly on keeping these adolescents safe and preventing them from becoming either a perpetrator or a victim of inappropriate sexual behaviour. We believe that focussing only on dangers can have an unintended downside: it might make adolescents with ASD over-cautious with regard to age appropriate sexual behaviours and might even deter adolescents with ASD from showing normative explorative sexual behaviours, and in this way may hamper sexual development and perhaps even increase sexual frustration. With this paper we would, therefore, like to add to the growing field of research to the psychosexual development of people with ASD. Clearly, more research is needed into why some people with ASD develop inappropriate sexual behaviour and why some others are vulnerable for sexual abuse. Yet, just as importantly, future research should also focus on normative aspects of sexuality, with the purpose of promoting a positive and safe psychosexual development in adolescents with ASD.

### Conflict of interest

Kirsten Visser, Athanasios Maras and Esther van der Vegt are co-authors of the Tackling Teenage Training program, a Dutch psychosexual guidance program for adolescents with ASD, for this they do not receive remuneration.

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