

The Influence of Health-care Professionals' Specialization and Child's Gender on the
Recognition of Autism Spectrum Disorder in Young Children

Final version

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Preface

Before you lies my Master's thesis called 'The influence of health-care professionals' specialization and child's gender on the recognition of Autism Spectrum Disorder in young children'. It has been written as a part of the Master's program Clinical Child, Family and Education Studies at Utrecht University.

For this research, I used the data from an earlier study called *Evaluating Psychological Problems in School Children* [Beoordeling van Psychische Problemen bij Schoolkinderen (BePPS)], which was done by my thesis supervisor Delia Burke. I have worked with great pleasure on this research. It is a very broad subject which can be applied in many different contexts within the field of social science.

I would like to take this opportunity to thank a number of people who have made this thesis possible. First, I would like to thank Delia Burke for the guidance and support during the process. You inspired me with your enthusiasm and passion for the research field, and always provided my outputs with accurate feedback. Also I would like to thank Jolien van der Graaff for providing feedback as the second assessor. In addition, I would like to say thank you to my boyfriend, family and friends for supporting me in any possible way during this process. Special thanks go to my sister. She convinced me to write my thesis in English. I was an extra challenge at first, but now I am glad that I did, because I learned so much from it! Finally, I would also like to thank you, the reader, for taking the time to read this research. I hope that it will bring you interesting new knowledge and that you enjoy your reading!

Charlotte Balink

Utrecht, 30 May 2018

Abstract

Symptoms of Autism Spectrum Disorder (ASD) are difficult to recognize in young children. If ASD symptoms are not recognized, the diagnostic process is unlikely to be initiated, which may lead to missed diagnosis and, in turn, long-term negative outcomes. This study aimed to investigate how different health-care professionals' (HCPs') specializations (psychologist, pedagogue, and pediatrician) influence the recognition of ASD in young children between 3 and 10 years old, whether recognition of ASD differs between boys and girls, and if there is an interaction effect between HCPs' specialization and child's gender which influences the ability to recognize ASD. Participants ($N = 306$) evaluated a series of vignettes describing children with symptoms of ASD. Results show that psychologists are better able to recognize ASD than pediatricians, but not better than pedagogues. Unexpectedly, child's gender did not influence the recognition of ASD. More attention needs to be paid to mental health problems in pediatric care and to more extensive research into gender differences in ASD.

Keywords: Mental health problems · ASD · Children · Health-care professionals · Symptoms · Recognition

The Influence of Health-care Professionals' Specialization and Child's Gender on the Recognition of Autism Spectrum Disorder in Young Children

Autism Spectrum Disorder (ASD) is a developmental disorder which is characterized by deviations in the social and communication domains (APA, 2013), with a prevalence of 1% of the population (CDC, 2012). The male-female ratio is 4 to 1, and has been stable for many years now (Beggiato et al., 2016). However, symptoms of ASD are difficult to recognize in children under 5 years old (Martínez-Pedraza & Carter, 2009). It is particularly hard to distinguish frequent signs of ASD, like social and communication skills, from typical delays in young children (Martínez-Pedraza & Carter, 2009). ASD is also hard to recognize because symptoms of ASD in children often have similarities with symptoms of other psychological disorders, such as ADHD (APA, 2013). Further, children with ASD often have comorbid disorders like depressive or anxiety disorder, whose symptoms may be recognized earlier (Aggarwal & Angus, 2015).

Distinguishing ASD from other disorders is crucial. If ASD symptoms are not recognized, the diagnostic process is unlikely to be initiated, which may mean no diagnosis is made (Hawkins-Walsh, 2001). Missed diagnoses prevent children with ASD from benefitting from customized treatments. In addition, having a diagnosis often creates clarity around the disorder and can therefore provide understanding of the problem at hand for a child and his environment. Understanding is, therefore, less forthcoming when ASD is not recognized (Aggarwal & Angus, 2015). This is particularly applicable to a child's supervision at school; without the recognition or diagnosis of ASD, children do not receive the personal academic guidance they need, and there is less understanding for the child's situation (Keen & Ward, 2004). In general, early recognition of ASD can help minimize the long-term negative outcomes for the child and the environment (Burke, Koot, de Wilde, & Begeer, 2016).

Influential Factors in Recognition of ASD

The factors that influence early recognition of ASD in children are not yet fully understood. However, there are some indications that children's ethnicity biases health-care professionals' (HCPs) recognition of ASD (Begeer, El Bouk, Boussaid, Meerum Terwogt, & Koot, 2009). Social-Economic Status (SES) also appears to impact recognition of the disorder (Cuccaro & Wright, 1996). In addition, Burke et al. (2016) found that many symptoms are required to be displayed by a child in order for HCPs to clearly recognise ASD, from which can be concluded that the number of symptoms can influence the ability to recognise ASD in children.

Gender is, however, perhaps the most researched factor in recognition and diagnosis of ASD. ASD is four times more prevalent in boys than in girls (Hartley & Sikora, 2009). It is, however, not clear whether this difference reflects a true difference in prevalence of the disorder between boys and girls, or if symptoms in boys are simply better recognized than in girls. Boys show more repetitive stereotyped behaviour (RSB) and more externalising and social problems than girls, whilst girls show worse emotional difficulties than boys (Mandy et al., 2012). In addition, Hiller, Young and Weber (2016) found in their explanatory study that social deficits and abilities in girls with ASD are different from the deficits and abilities of boys. They found that girls use more mimicking in interactions and have an increased desire to fit-in in social environments. Boys on the other hand show more isolating and withdrawing behaviour. It could be concluded that the milder RSBs, less severe externalising behaviours, and less social deficits may lead to under-recognition of girls in ASD because their symptoms are less visible to HCPs. Furthermore, girls may be better at camouflaging their symptoms (Duvekot et al., 2017). They appear to 'wear a mask' to hide their social-communicative deficits (Bargiela, Steward, & Mandy, 2016). It has been suggested that diagnostic instruments used in ASD may, therefore, not be compatible with girls' characteristics/symptoms of the disorder (Duvekot et al., 2017).

As a result of their lower ASD prevalence, girls are underrepresented in ASD research, which means that samples of girls with ASD are often too small to make gender comparisons (Hartley & Sikora, 2009). This may, in turn, be contributing to recognition since information about girls with ASD is less readily available. Similarly, because HCPs see boys with ASD more often than girls, HCPs have less opportunity to become familiar with symptoms and characteristics of girls with the disorder. In sum, there is no conclusive information regarding the effect of gender on the recognition of ASD and whether current prevalence rates are a true reflection of the disorder in society.

Another possible important influential factor in the recognition of ASD is the type of HCP to evaluate the child. Research shows that all HCPs have difficulties in recognizing ASD in young children, especially when there are few symptoms visible (Burke et al., 2016). However, given that some HCPs are trained specifically to recognise psychological problems whilst others are not, some HCPs could be expected to recognise ASD better than others. For example, psychologists and pedagogues are specifically trained to work with children with mental health and developmental disorders, so they should be able to recognize the signs and symptoms of ASD with ease (Delfos & Gottmer, 2012). Pediatricians on the other hand, are trained to evaluate children primarily in a medical manner, with less emphasis on psychological issues. There is also some evidence that school mentors, and school-based professionals in general, are better at recognising ASD than pediatricians. This may be because pediatricians are generally not involved in detecting possible symptoms of ASD first-hand but see children upon referral. Teachers and school-based professionals, on the other hand, see children on a daily basis, have a large comparison group readily available, so they are expected to notice symptoms earlier (Burke, Koot, & Begeer, 2015). In conclusion, research suggests that there is some variation in ability to recognise the disorder amongst professionals but further research is required.

Current Research

The present study will build upon previous research and aims to investigate if a HCPs' specialization influences the recognition of ASD in young children between 3 and 10 years old. The second aim of this study is to examine whether this relationship between HCPs' specialization and the recognition of ASD in children differs between boys and girls. In line with these aims, the following specific hypotheses were tested: (1) ASD is better recognized by psychologists and pedagogues than pediatricians. No differences are expected between psychologists and pedagogues. (2) Based on the higher prevalence of ASD in boys, we expect that ASD in boys is better recognized than ASD in girls. (3) Psychologists and pedagogues are expected to better recognize ASD in girls than pediatricians.

Method

Design

For this research, data from an earlier study called *Evaluating Psychological Problems in School Children* [Beoordeling van Psychische Problemen bij Schoolkinderen (BePPS)] (Burke et al., 2016) will be used to answer the research questions. The study examined the influence of multiple variables (the type of problem, the number of symptoms presented, the demographic characteristics of a child, as well as their interactive effects) on HCPs' ability to recognize symptoms of mental health problems. This multi-factorial study used a series of vignettes describing children with symptoms of different mental health problems. The vignettes of various mental health problems with equivalent symptomatology were created using a standardised experimental analogue design. Specifically, all independent variables were systematically varied and randomly presented to ensure they were evaluated equally. The descriptions of each disorder varied only by demographic characteristics and these descriptions of each demographic category were held constant. The full combination of problem type (5) x number of symptoms (2) x ethnicity (5) x gender (2) x age (2) x SES (2)

resulted in a total of 400 possible vignettes. From this, 40 questionnaires were created, each containing 10 vignettes. Multiple types of professionals were randomly assigned to one of the 40 questionnaires. For this study only the vignettes of children with symptoms of ASD (80 vignettes) and only the data from psychologists, pedagogues, and pediatricians will be used.

Participants

In the original BePPS study, 431 child and adolescent HCPs (89% woman) participated. For the current study, only the participants with the specialisation psychologist, pedagogue and pediatrician are used for data-analysis. These include 306 (91.2% woman) HCPs employed in the Netherlands. See Table 1 for participants' descriptive statistics.

Procedure

Participants were recruited through their own workplace or through an affiliation with health-care societies and associations. An advertisement (entitled: *Evaluating School Children with Mental-Health Problems*) was published on employee websites and in online newsletters. The advertisement described the study outline, emphasized the importance of the participation, and included a link to the online survey. Participation was voluntary; participants were not rewarded for their participation.

Before the survey began, participants were presented brief instructions. These instructions stated that the study was interested in a first impression of the vignettes that would be shown, and that vignettes did not provide all information required to make a diagnosis. Consent to use the collected data was obtained here. The first page of the survey collected demographic information about the participants. In the pages that followed, participants were each shown 10 vignettes in combination with a single open question. After the vignettes were completed, participants were asked about their work experience. When completing the survey, participants could not scroll back to alter their responses.

Table 1

Participants' Demographic Characteristics and Descriptive Statistics

Characteristic	<i>N</i>	%
Gender		
Male	24	7.84
Female	279	91.18
Unknown/missing	3	0.98
Age		
18-24	9	2.94
25-39	114	37.26
40-59	157	51.31
60+	26	8.49
HCP specialization		
Psychologist	127	41.50
Pedagogue	90	29.41
Pediatrician	89	29.09
HCP experience		
0-5 years	74	24.18
5-10 years	66	21.57
10-15 years	46	15.03
15-20 years	42	13.73
20+ years	78	25.49
Ethnicity		
Dutch majority	266	86.93
Non-Dutch minority	38	12.42
Unknown/missing	2	0.65

Measures

ASD vignettes. The ASD vignettes were composed using the DSM-IV-TR criteria (APA, 2000). At the time of the study, DSM-5 (APA, 2013) was yet to be published, so DSM-IV-TR was most likely to be the best known version by HCPs in child and adolescent mental health-care. The vignettes were constructed to firstly include the necessary criteria that are required to be met for a diagnosis of ASD. The remaining symptoms included in the

vignette were taken from the single criterion, which lists possible symptoms of ASD. Possible symptoms are clustered into three domains, namely: social interactions, communications, and restrictive behaviours. The symptoms were randomly selected from each of the domains. Two examples of vignettes with ASD are presented in the Appendix.

Recognition of ASD. The primary outcome measure is the recognition of ASD. HCPs evaluated the vignettes by answering the open-ended question *“Please briefly indicate whether you consider the described vignette as a cause for concern. If yes, what do you think is the matter with the child?”* Responses to this question were coded dichotomously as (1) having recognized ASD in the vignette (recognized), and (0) having not referred to ASD in the vignette (not recognized). The response was coded as ‘recognized’ if a participant explicitly named ASD or referred to any disorder as a subcategory of ASD, such as PDD-NOS or Asperger’s Disorder (APA, 2000). Any other response was coded ‘not recognized’.

Specialisation of HCPs. The specialisation of HCPs was indicated by the participants themselves. Participants could choose from the following categories: psychologist, pedagogue, psychiatrist, pediatrician, teacher/school-mentor, social-worker, and other. In this study, we only compare psychologists to pedagogues and pediatricians. HCPs’ specialisation is a nominal variable and has three possible scores: 1 (psychologist), 2 (pedagogue), and 3 (pediatrician).

Child’s gender. In this study, a distinction in gender is made. The vignettes differed by children’s gender (boys vs. girls). The gender was never explicitly mentioned but was reflected in the appropriate name and pronoun.

Data Analyses

Reliability analysis was conducted using the Cohen’s kappa statistic (κ). Twenty percent of the vignettes were randomly selected from the full sample for coding by a second, independent rater. The inter-rater reliability for all ASD vignettes was found to be $\kappa = 1.00$ (p

< .001), indicating a perfect agreement between the two raters. To answer the research questions and to test the hypotheses, a binary logistic regression was used. The binary logistic regression consists of three parts: The effect of the predictor on the outcome, the effect of the moderator on the outcome, and the interaction effect of ‘predictor x moderator’ on the outcome (Field, 2013). Binary logistic regression has a few assumptions. All assumptions have been checked and no violations have been made (Field, 2013). For entering the variables, the forced-entry method was used. This was found to be the best option, because the alternative method (the stepwise method) can result in substantial bias of estimated regression coefficients. This is not the case with the forced-entry method (Steyerberg, Eijkemans, & Habbema, 1999). All analyses were done using *IBM SPSS Statistics 24*.

Results

In total, there were $N = 306$ participants who rated ASD vignettes; 211 (69%) of the HCPs were able to recognize symptoms of ASD in the vignettes and the remaining 95 (31%) HCPs did not recognize symptoms of ASD in the vignettes.

Firstly, a model without any predictors was analyzed. This showed no significance ($\chi^2 = 8.05$, $df = 4$, $p = ns$). The model was 69% accurate in its predictions of the recognition of ASD symptoms. Predictors must be added to see if the χ^2 value increases.

The second model included the main predictors ‘HCPs specialization’ and ‘child’s gender’. The main effect for ‘HCPs’ specialization’ was significant ($\chi^2 = 7.08$, $df = 2$, $p = .029$), which means that HCPs’ specialization significantly influences the recognition of ASD. Specifically, results show that psychologists significantly influence the recognition of ASD in comparison to pediatricians ($\chi^2 = 6.88$, $df = 1$, $p = .009$). This means that psychologists are more than two times better at recognizing ASD compared to pediatricians. All coefficients and odds ratios for the model’s predictors are presented in Table 2. In contrast to this finding, pedagogues do not significantly influence the recognition of ASD in comparison to

pediatricians ($\chi^2 = 0.96$, $df = 1$, $p = .ns$), which means that there is no difference in the recognition of ASD symptoms between pedagogues and pediatricians. When comparing pediatricians to psychologists, results show that they do not significantly differ in their recognition of ASD symptoms ($\chi^2 = 0.09$, $df = 1$, $p = .ns$). ASD was recognized in 98 (77.2%), 60 (66.7%) and 53 (59.6%) of vignettes by psychologists, pedagogues and pediatricians, respectively. The first hypothesis stated that ASD is better recognized by psychologists and pedagogues than by pediatricians, and that there will be no differences between psychologists and pedagogues. Based on the above results we can say that these findings are partly in line with the stated hypothesis. Psychologists can indeed recognize ASD better compared to pediatricians, but this is not the case for the pedagogues. The expectation that no difference in recognition between psychologist and pedagogues was present has been proven in this data.

Next, the main effect of 'child's gender' was not significant ($\chi^2 = 0.09$, $df = 1$, $p = .ns$). This means that the child's gender does not have an effect on the recognition of ASD. From the total $N = 306$, 168 (54.9%) of the vignettes described girls with ASD, whilst 138 (45.1%) of the vignettes described boys with ASD. From the vignettes describing girls, 116 (69%) were recognized, in comparison to 95 (68.8%) of the vignettes describing boys. The fact that ASD is not better recognized in boys than in girls is not in line with the stated hypothesis.

The third model included the possible interaction effect between 'HCPs specialization' and 'child's gender'. This interaction was not significant ($\chi^2 = 1.02$, $df = 2$, $p = .ns$), which means that the interaction between the HCPs specialization and the child's gender has no significant effect on the recognition of ASD.

Table 2

Multi-level Logistic Regression Coefficients and Odds Ratios for HCP Recognition (N = 306)

	B (SE)	95 % CI for odds ratio		
		Lower	Odds Ratio	Upper
HCPs specialization				
Psychologist ^a	0.85 (.32)**	1.24	2.33	4.38
Pedagogue ^a	0.31 (.32)	0.73	1.36	2.53
Pedagogue ^b	-0.54 (.31)	0.32	0.59	1.08
Gender				
Boys ^c	-0.08 (.25)	0.57	0.93	1.53
HCPs specialization x gender				
Psychologist x boys ^d	0.42 (.62)	0.46	1.52	5.09
Pedagogue x boys ^d	0.61 (.63)	0.54	1.85	6.28
Pediatrician x boys ^e	-0.42 (.62)	0.20	0.66	2.20

Note. Reference category: ^apediatrician, ^bpsychologist, ^cgirls, ^dpediatrician x girls, ^epsychologist x girls

* $p < .05$, ** $p < .01$

Discussion

The aims of the present study were to investigate how a HCPs' specialization influences the recognition of ASD in young children between 3 and 10 years old, whether recognition differs between boys and girls, and if there is an interaction effect between HCPs' specialization and child's gender which influences the ability to recognize ASD. The current data from a large study BePPS (Burke et al., 2016) showed that there are some differences in the ability to recognize ASD between HCPs. However, contrary to expectations, results show no significant difference between boys and girls in the recognition of ASD. Finally, gender did not moderate the relationship between HCPs' specialization and ability to recognize ASD.

As expected, psychologists appear to be better in recognizing ASD compared to pediatricians. Mental health problems require a different perspective than a medical one, which is, in general, focused on physical problems. Psychologists are trained to specifically attend to deviations from normally developing mental health. It is, therefore, not surprising

that their ability to recognize symptoms of ASD surpasses that of pediatricians. This finding is in line with a study that showed that pediatricians only recognized one in five children with behavioural problems related to mental health problems (Simonian, 2006). It is, however, important for pediatricians to recognize signs of mental health problems. Although there has been an increase in specialized mental health-care centers in recent times, children with mental health problems remain most likely to seek help at a medical center, like a hospital, in the first instance. In such cases, pediatricians need to be vigilant gatekeepers to control the access to mental health-care, thereby ensuring that children reach psychologists and other specialists, such as pedagogues (Simonian, 2006).

The results from this study reveal that psychologists and pedagogues do not appear to differ in their ability to recognise ASD. The education of a psychologist and pedagogue is very similar, with both specialists trained to detect signs and symptoms of ASD and other mental health problems (Delfos & Gottmer, 2012). In addition, psychologists and pedagogues also spend a similar amount of time working with children with ASD. Their ability to recognize ASD could, therefore, be expected to be equal.

This study also examined the influence of gender on the recognition of ASD. Based on the higher prevalence of ASD in boys, it was expected that ASD in boys would be better recognized than ASD in girls. However, both boys and girls were recognized in more than two thirds of the vignettes. This means that there appear to be no difference in the recognition of ASD in boys and girls. This result suggests that differences in recognition cannot explain the gender differences occurring in the prevalence of ASD. This result is in agreement with Duvekot et al. (2017), whose findings showed that no gender differences were found in the prediction of ASD by overall levels of symptoms, sensory symptoms, and cognitive functioning. Furthermore, the lack of gender differences in the recognition of ASD in this

study allows us to be confident that the risk of underdiagnosing ASD in girls is low, contrary to what other studies have found (Begeer et al., 2012; Mandy et al., 2012).

Finally, potential interaction effects of HCPs' specialization and gender on the recognition of ASD were examined in the current study. It was expected that psychologist and pedagogues would recognize ASD better in girls than pediatricians but no such effect was found. There are no differences between the three types of HCPs in recognizing ASD in boys versus girls.

The results discussed have implications for the clinical mental health practice. Specifically, it has become clear that there is a need for attention to mental health problems amongst pediatricians, particularly given their increasing role as gatekeeper in medical facilities (Simonian, 2006). Prevalence of psychiatric disorders among children and adolescents is rising, which is reflected in behavioural, psychosocial, and educational problems (Cassidy & Jellinek, 1998). The sooner symptoms are identified, the better problems can be dealt with and customized treatment can be provided (Aggarwal & Angus, 2015). For this reason, greater attention must be paid to signs and symptoms of ASD and mental health problems in general, amongst young children. Regular and focussed supplementary training may aid pediatricians in their ability to recognise symptoms of ASD. Although psychologists and pedagogues are better at recognising ASD than pediatricians, in this study they only recognised 69% of the cases with ASD. This amount is also not perfect and could be improved too. Psychologists and pedagogues must remain up to date with scientific research in the field of mental health problems and they also need to receive in-service training regularly.

In addition, this study rules out the idea that gender influences recognition of ASD. Existing differences in ASD prevalence may simply be a true reflection of current ASD prevalence rates. Although many previous studies have provided evidence for either

biological or sociocultural differences of ASD which cause a recognition bias, no evidence of this was found in this study. However, we conclude that it is still unclear why gender differences in ASD prevalence amongst young children are so large and further research is needed to investigate this issue.

The original BePPs study examined the influence of multiple variables on HCPs' ability to recognize symptoms of mental health problems and builds upon previous research in this under-researched field. However, it was not within the scope of the original study to examine potential differences between the various types of HCPs. The current study was the first to make that distinction and sheds some, much needed, light on this relevant topic. However, the current study included only three of many specializations available in the original data. For the future, it would be interesting to include all specializations to gain a wider picture of HCPs' ability to recognize symptoms of ASD and other mental health problems. In addition, it would be useful to add general practitioners to the sample. They, most often, act as gatekeepers to mental health services (Rickwood, Deane, & Wilson, 2007), so they are also important take into account in the research of influential factors on the recognition of ASD.

Future research should also include vignettes that address comorbidity since comorbidity of other mental health problems is very common in children with ASD. This would ensure that vignettes are a truer reflection of real life cases of ASD. The current study did not address cases of comorbidity, which implies that symptoms of ASD may be even harder to recognize than results shown here since symptoms of other disorders often complicate the recognition of ASD.

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Appendix

Examples of Vignettes with ASD Presented to HCPs

Problem type:	Autism
Number of symptoms:	Few
Ethnicity:	Moroccan
Gender:	Male
Age:	Child
SES:	High

Ahmed has just turned 3 years old and is the oldest of three children in a nuclear family of Moroccan descent. The family originally lived in Krimpen aan den IJssel where Ahmed's parents were both raised, but moved to Tilburg a year ago for work. Ahmed's dad is a GP and his mum is a housewife. Ahmed currently goes to preschool for 3 days a week. The teacher there is worried about his language development because it is delayed in comparison to the other children of his age. He hardly speaks unless he is spoken to and even then he has clear difficulty pronouncing simple words, which makes him difficult to understand. Ahmed often sits alone in the playroom absentmindedly imitating the sounds of the other children.

Problem type:	Autism
Number of symptoms:	Few
Ethnicity:	Moroccan
Gender:	Female
Age:	Child
SES:	High

Najat has just turned 3 years old and is the oldest of three children in a nuclear family of Moroccan descent. The family originally lived in Krimpen aan den IJssel where Najat's parents were both raised, but moved to Tilburg a year ago for work. Najat's dad is a GP and her mum is a housewife. Najat currently goes to preschool for 3 days a week. The teacher there is worried about her language development because it is delayed in comparison to the other children of her age. She hardly speaks unless she is spoken to and even then she has clear difficulty pronouncing simple words, which makes her difficult to understand. Najat often sits alone in the playroom absentmindedly imitating the sounds of the other children.