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Brief Report: Influence of gender and age on parent reported subjective well-being in children with and without autism

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ABSTRACT

Autism spectrum disorders (ASD) are associated with reduced Subjective well-being (SWB). To examine the influence of gender and age on well-being we collected parent reported SWB in children with or without ASD (total n = 1030), aged 8–14 years. Parents reported lower SWB for children with ASD compared to TD children. Gender did not influence SWB, in both ASD and TD groups. Age had no main effect on SWB, but in typically developing children SWB decreased with age while it increased with age in children with ASD. Thus, the difference in SWB between ASD and TD children became smaller throughout development. These findings may reflect different social developmental processes in TD and ASD during early adolescence.

1. Introduction

Autism Spectrum Disorder (ASD) is a neurodevelopmental disorder characterized by qualitative impairments in social interaction, communication, and repetitive, stereotyped behavior (APA, 2013). Research progress has been made in understanding the prevalence, etiology, symptom expressions, and other psychopathological domains of ASD. However, the subjective well-being (SWB) of individuals with ASD has been studied less frequently and the findings are often inconsistent. We aim to investigate general predictors of SWB in two large samples of children with and without ASD.

SWB can be used to define an individual's health status that is not merely the absence of disease (Waters et al., 2009). People with high SWB are more successful in their work, social relationships, and health (Lyubomirsky, Sheldon, & Schkade, 2005). SWB is highly valued in daily life: a cross-national survey ranked SWB first in terms of importance among 20 given values (e.g., love, wealth, health) (Kim-Prieto, Diener, Tamir, Scollon, & Diener, 2005).

For typically developing children, general demographic factors, such as gender and age have been shown to have little influence on SWB (Huebner, 1991; McCullough et al., 2000; Proctor et al., 2009). The relative stability of SWB across age cohorts might be due to an individual's ability to adapt to their life conditions as they get older (Diener, Suh, Lucas, & Smith, 2013). Modest gender differences are attributed to females being more likely to report higher levels of both pleasant and

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unpleasant affect compared to males (Fujita, Diener, & Sandvik, 1991; Lucas & Gohm, 2000; Seligman, 2002). Thus, gender differences might exist in the variance, but not in mean SWB scores.

Research on ASD primarily focuses on Quality of life (QoL) rather than SWB. QoL is a multidimensional concept, which shares the emotional well-being component with SWB, but also incorporates an individual's social, material well-being, and development and activity (Felce & Perry, 1995). Age was shown to be negatively correlated to QoL in children with ASD based on parental reports (Kuhlthau et al., 2010). However, it is noted that parents usually significantly underestimate their children's QoL compared to children's self-report (Sheldrick, Neger, Shipman, & Perrin, 2012; Shipman, Sheldrick, & Perrin, 2011; Tavernor & Barron, 2013).

Gender differences in SWB found for people with ASD were contradictory, with one study showing that males have better psychological health and social relationships related QoL than females (Kamio, Inada, & Koyama, 2013), while other studies addressing broader QoL domains reported no gender difference (Kuhlthau et al., 2010; Renty & Roeyers, 2006). In children with ASD (Kamp-Becker & Schröder, 2011; Kuhlthau et al., 2010).

While children with ASD tend to have lower QoL than typically developing children (Van Heijst & Geurts, 2015) there is little direct evidence showing differences in SWB between these two groups. The existing literature on ASD is limited due to small sample sizes with imbalanced gender proportions, a focus on QoL or health related QoL, highlighting general functioning rather than well-being (Kamp-Becker & Schröder, 2011; Shipman et al., 2011; Tavernor & Barron, 2013; Waters et al., 2009), and an absence of studies on the effects of general demographic factors such as gender and age.

The first purpose of this study was to estimate SWB in two large samples of children, one with ASD and one with typical development. We expected SWB to be lower in children with ASD compared to typically developing children. The second aim was to determine to what extent the factors gender and age are associated with SWB in both children with and without ASD. We hypothesized that SWB would not differ by either age or gender in either of the two groups of children and explored the interaction effect between age and gender. SWB was measured with a straight forward question about the happiness of children. In our earlier work (Bartels & Boomsma, 2009) we have shown that all aspects of SWB correlate highly and that they all load on one underlying common factor. Meta-analytic analyses also show that happiness is part of the wellbeing construct (Bartels, 2015) and the first genetic variants have recently been detected using a mix of measures (Okbay et al., 2016).

2. Methods

2.1. Participants

In this study two large samples of children (ages 8–14 years old), one with and one without ASD, were used to investigate the SWB based on parental reports. The participants were 515 typically developing children (367 boys and 148 girls) and 515 children with ASD (368 boys and 147 girls). Data on typically developing children were derived from the Netherlands Twin Register (NTR), established by the Vrije Universiteit in Amsterdam (Bartels et al., 2007; Boomsma et al., 2006; van Beijsterveldt et al., 2013). Data on children with ASD were derived from the Netherlands Autism Register (NAR). The Netherlands Autism Register (NAR) is a longitudinal register, including approximately 2000 individuals with autism. The NAR was established by the Dutch Association for Autism (Nederlandse Vereniging voor Autisme; NVA) in collaboration with the Vrije Universiteit Amsterdam (VU), and aims to follow the course of development of individuals with autism over time, providing data for scientific research but also helping people with autism to protect their interests and improve their quality of life. All participants with ASD have a clinical diagnosis of ASD provided by a qualified clinician, independently from this study (Wierda, Begeer, Martijn & Wijnker-Holmes, 2015), and were selected based on availability. Children in the typically developing group were registered with NTR at birth. We randomly selected one child per family, amounting to 1995 children, who were matching as closely as possible on age (8–14 years) and gender to the 515 children in the ASD group. As shown in Table 1, there was no difference between the TD and ASD groups in Age, $F(1226) = 0.4$, ns, or Gender, $\chi 2 = 9.5$, ns. The protocol of this study was approved by the ethics committee of the VU University Medical Center (2013/15). Written informed consent to participate in our study was obtained from a parent or a guardian, and participants where possible.

The cognitive ability in typically developmental children was presented by CITO-elementary test (Eindtoets Basisonderwijs, 2002, www.cito.nl), a standardized Dutch educational achievement test. This test is usually carried out among children in their final class of elementary school (approximately 12 years old). The CITO scores are moderately to highly correlated with IQ performance (Bartels, Rietveld, Van Baal, & Boomsma, 2002). The cognitive functioning in children with ASD was collected by parental estimations. In the ASD sample, parents reported normal IQ scores (>70) in 90% of the cases. The TD sample was recruited among children in mainstream schools. Education levels of both fathers and mothers was higher in the ASD compared to the TD group.

2.2. Materials and procedure

2.2.1. Subjective well-being (SWB)

In both groups, SWB was measured as part of larger projects, including longitudinal surveys on a range of topics (More information on both registers: Netherlands Autism Register: https://www.nederlandsautismeregister.nl/english/, Netherlands Twin Register: http://www.tweelingenregister.org/en/). SWB was measured with parental proxy-reports by responding to a question, 'Which statement describes your child best?' According to their children's experience, parents

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Table 1
Demographic characteristics of the participants.

	TD ($N = 515$)	ASD ($N = 515$)	Group comparison (p)
Age			
Mean (*SD*)	11.60 (1.26)	11.54 (1.41)	*ns*
Range	9–14	8–14	
Sex			
Male	367 (71.3%)	368 (71.5%)	*ns*
Female	148 (28.7%)	147 (28.5%)	
Education of Mother[a]			
Lower education	17 (4%)	1 (1%)	<0.01
Lower middle education	300 (66%)	106 (50%)	
Higher middle education	107 (23%)	73 (35%)	
Higher education	25 (6%)	29 (14%)	
Missing	5 (1%)	0 (0%)	
Education of Father[a]			
Lower education	5 (1%)	0 (0%)	<0.01
Lower middle education	274 (60%)	106 (53%)	
Higher middle education	105 (23%)	65 (32%)	
Higher education	52 (12%)	30 (15%)	
Missing	18 (4%)	0 (0%)	
Family structure			
Number of children living at home	1,78 (0.77) (range 0–5)	n/a	
Living with both biological parents	456 (89%)	391 (77%)	
Family members with ASD			
Yes	n/a	65%	
Brother with ASD		12.8%	
Sister with ASD		5.1%	
Follows or has followed treatment	n/a	80%	
Social skills training		40%	
Physiotherapy		35%	
Speechtherapy		30%	
Psychoeducation		30%	

Note. ns: not significant; *n/a*: not available.
[a] Parental education was available for 209 mothers and 201 fathers in the ASD sample.

chose the answer based on a 5-point Likert scale: '5. always or almost always happy,' '4. more happy than unhappy,' '3. equally happy and unhappy,' '2. more unhappy than happy,' or '1. always or almost always unhappy'.

2.2.2. Ethical approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

2.2.3. Informed consent

Informed consent was obtained from all individual participants included in the study.

3. Results

A multiple regression analysis, including Group in the first step, adding age and gender, and the interaction terms Group * Age, Group * Gender in the subsequent steps as predictor variables and parental-reported SWB as the dependent variable, indicated that Group accounted for a significant amount of variance on SWB, $b = -0.61$, $\Delta R2 = 0.36$, $p < 0.001$. Age and Gender showed no effect. Adding the interaction terms in the final model indicated a significant effect of Group * Age, $b = 0.70$, $\Delta R2 = 0.01$, $p < 0.01$, but not of Group * Gender. The differential effect of age in ASD versus TD is shown in Fig. 1. Because in typically developing children, SWB decreased with age while it increased with age in children with ASD, the difference between SWB became smaller as children were older. Controlling for parental education did not affect these results (Group: $b = -0.59$, $\Delta R2 = 0.35$, $p < 0.001$, Group * Age: $b = 0.82$, $\Delta R2 = 0.01$, $p < 0.01$) (Table 2).

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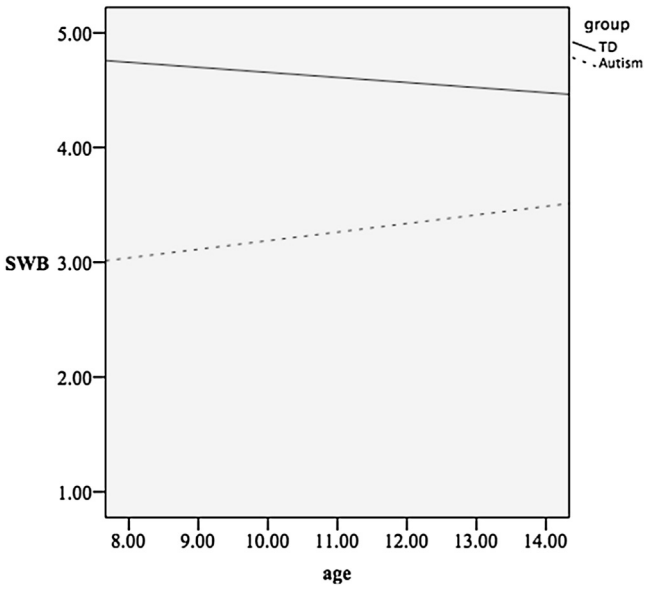

Fig. 1. The effects of age on SWB in typically developing children and children with autism.

4. Discussion

The present study showed in a large sample that children with ASD have lower SWB than typically developing children. In both groups of children, there were no main effects of either age or gender on SWB. However, in typically developing children SWB decreased in older compared to younger children but increased with age in children with ASD. Therefore, the difference in SWB between ASD or TD children became smaller throughout development.

While our data should be interpreted with care, as our measure of SWB was a modest one, the lower general level of parent reported SWB in children with ASD compared to typically developing children was consistent with earlier studies on QoL (Ikeda, Hinckson, & Kraegeloh, 2014; The WHOQOL Group, 1995; Van Heijst & Geurts, 2015). ASD symptoms, including impairments in psychosocial and emotional functioning are likely explanations for these findings, as these have been link directly to limitations in daily life functioning (Kuhlthau et al., 2010). The current study is the first to identify demographic predictors of SWB in children by using large samples.

Surprisingly, parents reported that children with ASD tended to feel increasingly happy, while typically developing children appeared to feel increasing unhappy as they age (though it should be noted that average scores were still higher in the TD compared to the ASD group, see Fig. 1). According to the age range of our current sample (i.e. ages 8–14 years old), a substantial part of children in both groups are in the process of transferring from childhood to adolescence. When transforming from childhood to early adolescence, large scale changes occur in physical growth, endocrine system, brain and

Table 2
Hierarchical multiple regression analysis with the entered predictive variables of SWB in typically developing children and children with autism.

	Participants ($N = 1030$)		
	b	β	ΔR^2
Step 1			0.36^{***}
Group	−1.29	-0.60^{***}	
Step 2			0.00
Group	−1.29	-0.60^{***}	
Age	0.02	0.03	
Step 3			0.00
Group	−1.29	-0.60^{***}	
Age	0.03	0.03	
Sex	0.01	0.00	
Step 4			0.01^{***}
Group	−2.76	-1.29^{***}	
Age	−0.04	−0.06	
Sex	0.01	0.00	
Group × Age	0.13	0.70^{**}	
Group × Sex	−0.01	0.00	

Note. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

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central nervous system, social roles, and family and school transitions (Compas, 1987), which challenges children to cope with these developmental tasks. The positive effect of age on SWB in ASD children was unexpected given the suggested difficulties of children with ASD transitioning to adolescence (Taylor & Seltzer, 2013).

A possible explanation for this finding is that SWB in children with ASD might be less affected by developmental challenges of early adolescence, which is typically related to changes in social relations with parents and peers, and flexibility in adapting to more complex and intimate social interactions. Instead, children with ASD may be struggling relatively more at an earlier age. Indeed, an age related *decrease* in QoL found among younger children with ASD (2–12 years) which may reflect this early struggle (Kuhlthau et al., 2010). In contrast, our 8–14-year-old early adolescents with ASD may increasingly be coping with their limitations. Possibly, they adjust to living with their diagnosis, and the people in their social environment, including parents, siblings, friends and teachers, adapt to their limitations and talents. However, it should also be noted that half of the Kuhlthau et al. sample was intellectually disabled, whereas we primarily included ASD children without intellectual delays. Finally, delayed onset of puberty in ASD may be involved, but currently only anecdotal evidence exists for this suggestion,

There are several methodological limitations to this study. Firstly, the measurement of SWB was based on parental proxy-reports, which have been shown to significantly predict children's selfreport on QoL (Sheldrick, Neger, Shipman, & Perrin, 2012), but parents of children with ASD usually underestimate QoL (Sheldrick et al., 2012; Shipman et al., 2011; Tavernor & Barron, 2013). Including self-reported SWB will be much needed in future research. In addition, while the direct link between SWB and IQ is currently unclear (see Li & Kanazawa, 2016), the cognitive abilities of the two groups of children were estimated using parental estimations of IQ or children's academic performance at school rather than a standard examination. Using a standard IQ test for both groups would have given more reliable outcomes. Furthermore, no information on school context was collected in the present study while school conditions, social relationships, and self-fulfillment were found to have major influences on SWB of children (Konu, Lintonen, & Rimpelä, 2002). Despite the aforementioned limitations, the current study still informs further research. As expected, compared to typically developing children, children with ASD do have do have significantly lower SWB, but this difference is smaller in older children entering adolescence.

Our findings imply that one could and should include SWB measures as an indicator when exploring the developmental outcomes of the people with ASD. The effect of life experience on the functioning of individuals with ASD should not be underestimated, despite their atypical pace of development. Individuals with ASD are generally keen to adapt and develop throughout their live, which may continue to positively impact their wellbeing and quality of life.

Conflict of interest

Sander Begeer declares that he has no conflict of interest; Yujie MA declares that she has no conflict of interest; Hans M. Koot declares that he has no conflict of interest; Marlies Wierda declares that she has no conflict of interest; C. E. M. (Toos) van Beijsterveldt declares that she has no conflict of interest; Dorret I. Boomsma declares that she has no conflict of interest; Meike Bartels declares that she has no conflict of interest.

References

American Psychiatric Association. APA (2013). *Diagnostic and statistical manual of mental disorders*. Arlington: American Psychiatric Publishing5.
Bartels, M., Rietveld, M. J. H., Van Baal, G. C. M., & Boomsma, D. I. (2002). Heritability of educational achievement in 12-year-olds and the overlap with cognitive ability. *Twin Research*, *5*, 544–553.
Bartels, M., van Beijsterveldt, C. E. M., Derks, E. M., Stroet, T. M., Polderman, T. J. C., Hudziak, J. J., & Boomsma, D. I. (2007). Young Netherlands Twin Register (Y-NTR): A longitudinal multiple informant study of problem behavior. *Twin Research and Human Genetics*, *10*, 3–11.
Bartels, M. (2015). Genetics of wellbeing and its components satisfaction with life, happiness, and quality of life: A review and meta-analysis of heritability studies. *Behavior Genetics*, *45*, 137–156.
Boomsma, D. I., de Geus, E. J. C., Vink, J. M., Stubbe, J. H., Distel, M. A., Hottenga, J.-J., . . . Willemsen, G. (2006). Netherlands twin register: From twins to twin families. *Twin Research and Human Genetics*, *9*, 849–857.
Compas, B. (1987). Stress and life events during childhood and adolescence. *Clinical Psychology Review*, *7*, 275–302.
Diener, E., Suh, E. M., Lucas, R. E., & Smith, H. L. (2013). Subjective well-being: Three decades of progress. *Psychological Bulletin*, *125*, 276–302.
Felce, D., & Perry, J. (1995). Quality of life: Its definition and measurement. *Research in Developmental Disabilities*, *16*, 51–74.
Fujita, F., Diener, E., & Sandvik, E. (1991). Gender differences in negative affect and well-being: The case for emotional intensity. *Journal of Personality and Social Psychology*, *61*, 427–434 Retrieved from http://psycnet.apa.org/journals/psp/61/3/427/.
Huebner, E. S. (1991). Correlates of life satisfaction in children. *School Psychology Quarterly*, *6*, 103–111.
Ikeda, E., Hinckson, E., & Kraegeloh, C. (2014). Assessment of quality of life in children and youth with autism spectrum disorder: A critical review. *Quality of Life Research*, *23*, 1069–1085.
Kamio, Y., Inada, N., & Koyama, T. (2013). A nationwide survey on quality of life and associated factors of adults with high-functioning autism spectrum disorders. *Autism*, *17*, 15–26.
Kamp-Becker, I., & Schröder, J. (2011). Health-related quality of life in children and adolescents with autism spectrum disorder. *Zeitschrift für Kinder-und Jugendpsychiatrie und Psychotherapie*, *39*, 123–131.
Kim-Prieto, C., Diener, E., Tamir, M., Scollon, C., & Diener, M. (2005). integrating the diverse definitions of happiness: A time-sequential framework of subjective well-being. *Journal of Happiness Studies*, *6*, 261–300.
Konu, A., Lintonen, T., & Rimpelä, M. (2002). Factors associated with schoolchildren's general subjective well-being. *Health Education Research*, *17*(2), 155–165 Retrieved from http://her.oxfordjournals.org/content/17/2/155.short.
Kuhlthau, K., Orlich, F., Hall, T. A., Sikora, D., Kovacs, E. A., Delahaye, J., & Clemons, T. E. (2010). Health-related quality of life in children with autism spectrum disorders: Results from the autism treatment network. *Journal of Autism and Developmental Disorders*, *40*, 721–729. http://dx.doi.org/10.1007/s10803-009-0921-2.
Li, N. P., & Kanazawa, S. (2016). Country roads, take me home . . . to my friends: How intelligence, population density, and friendship affect modern happiness. *British Journal of Psychology*, *107*, 675–697.

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Lucas, R. E., & Gohm, C. L. (2000). Age and sex differences in subjective well-being across cultures. In E. Diener, & E. M. Suh (Eds.), *Culture and subjective well-being* (pp. 291–318).Cambridge, MA: MIT Press.
Lyubomirsky, S., Sheldon, K. M., & Schkade, D. (2005). Pursuing happiness: The architecture of sustainable change. *Review of General Psychology*, *9*(2), 111–131.
McCullough, G., Huebner, E. S., & Laughlin, J. E. (2000). Life events, self-concept, and adolescents' positive subjective well-being. *Psychology in the Schools*, *37*, 281–290.
Okbay, A., Baselmans, B. M., De Neve, J. E., Turley, P., Nivard, M. G., Fontana, M. A., . . . Gratten, J. (2016). Genetic variants associated with subjective well-being, depressive symptoms and neuroticism identified through genome-wide analyses. *Nature Genetics*, *48*, 624–633.
Proctor, C., Linley, P., & Maltby, J. (2009). Youth life satisfaction: A review of the literature. *Journal of Happiness Studies*, *10*, 583–630.
Renty, J. O., & Roeyers, H. (2006). Quality of life in high-functioning adults with autism spectrum disorder: The predictive value of disability and support characteristics. *Autism: The International Journal of Research and Practice*, *10*, 511–524.
Seligman, M. (2002). *Using the new positive psychology to realize your potential for lasting fulfillment: Authentic happiness*. New York: Free Press.
Sheldrick, R. C., Neger, E. N., Shipman, D., & Perrin, E. C. (2012). Quality of life of adolescents with autism spectrum disorders: Concordance among adolescents' self-reports, parents' reports, and parents' proxy reports. *Quality of Life Research: An International Journal of Quality of Life Aspects of Treatment, Care and Rehabilitation*, *21*, 53–57.
Shipman, D. L., Sheldrick, R. C., & Perrin, E. C. (2011). Quality of life in adolescents with autism spectrum disorders: Reliability and validity of self-reports. *Journal of Developmental and Behavioral Pediatrics*, *32*, 85–89.
Tavernor, L., & Barron, E. (2013). Finding out what matters: Validity of quality of life measurement in young people with ASD. *Child: Care, Health and Development*, *39*, 592–601.
Taylor, J. L., & Seltzer, M. M. (2013). Transition to adulthood. In F. R. Volkmar (Ed.), *Encyclopedia of autism spectrum disorders* (pp. 68–73).New York, NY: Springer New York.
The WHOQOL Group (1995). The world health organization quality of life assessment (WHOQOL): Position paper from the World Health Organization. *Social Science & Medicine*, *41*, 1403–1409.
Van Heijst, B. F., & Geurts, H. M. (2015). Quality of life in autism across the lifespan: A meta-analysis. *Autism*, *19*, 158–167.
Waters, E., Davis, E., Ronen, G. M., Rosenbaum, P., Livingston, M., & Saigal, S. (2009). Quality of life instruments for children and adolescents with neurodisabilities: How to choose the appropriate instrument. *Developmental Medicine and Child Neurology*, *51*, 660–669.
Wierda, M., Begeer, S., Martijn, F., & Wijnker-Holmes, B. (2015). *Nederlands autisme register rapportage 2015. [Netherlands autism register report 2015].* Bilthoven: NVA.
van Beijsterveldt, C. E. M., Groen-Blokhuis, M., Hottenga, J. J., Franic, S., Hudziak, J. J., Lamb, D., . . . Boomsma, D. I. (2013). The young Netherlands twin register (YNTR): Longitudinal twin and family studies in over 70,000 children. *Twin Research and Human Genetics*, *16*, 252–267.

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