



Minerva Access is the Institutional Repository of The University of Melbourne

Author/s:

Hedley, D;Uljarević, M;Bury, SM;Dissanayake, C

Title:

Predictors of mental health and well-being in employed adults with autism spectrum disorder at 12-month follow-up

Date:

2019-03-01

Citation:

Hedley, D., Uljarević, M., Bury, S. M. & Dissanayake, C. (2019). Predictors of mental health and well-being in employed adults with autism spectrum disorder at 12-month follow-up. *Autism Research*, 12 (3), pp.482-494. <https://doi.org/10.1002/aur.2064>.

Persistent Link:

<https://hdl.handle.net/11343/285361>

Hedley Darren (Orcid ID: 0000-0002-6256-7104)
Dissanayake Cheryl (Orcid ID: 0000-0002-8771-4027)

RUNNING HEAD: PREDICTORS OF MENTAL HEALTH AND WELL-BEING

1

Predictors of Mental Health and Well-being in Employed Adults with Autism Spectrum
Disorder at 12-month Follow-up

Darren Hedley¹

Mirko Uljarević²

Simon M. Bury¹

Cheryl Dissanayake¹

¹Olga Tennison Autism Research Centre, La Trobe University, Melbourne, VIC, Australia

²Stanford Autism Center, Stanford University, Stanford, CA, USA

Correspondence concerning this article should be addressed to:

Darren Hedley, PhD

Olga Tennison Autism Research Centre, School of Psychology and Public Health

La Trobe University, Melbourne, Victoria 3086, Australia

Phone: +61 03 9479 3704 Email: D.Hedley@latrobe.edu.au

This is the author manuscript accepted for publication and has undergone full peer review but has not been through the copyediting, typesetting, pagination and proofreading process, which may lead to differences between this version and the Version of Record. Please cite this article as doi: [10.1002/aur.2064](https://doi.org/10.1002/aur.2064)

Author Manuscript

Acknowledgements

We thank the individuals who participated in this study and all of the staff from DXC Technology who provided access to participants and supported data collection. We also thank Professor Timothy Bartram, Associate Professor Amanda Richdale, Dr Simon Moss, and Dr Jennifer Spoor for their guidance, and Alex Aulich, Alex Haschek, and Mathilda Wilmot for assistance with data collection and recruitment. This research was funded by DXC Technology and the Australian Government Department of Human Services and Department of Defence. The funders had no role in the study design, data collection, analysis, data interpretation, or writing of the report.

Author contributions

DH, MU, and CD conceived of the study. DH completed the literature review, recruited participants, collected the data, completed the data analysis and interpretation, and prepared the tables. DH led the writing of the manuscript with edits and contributions from all authors. All authors reviewed and approved the final submitted version.

Conflict of Interest Statement

DH and SB were supported by funding from DXC Technology and the Australian Government Department of Human Services and Department of Defence. The authors declare no other actual or potential conflict of interest.

Abstract

People with Autism Spectrum Disorder (ASD) commonly experience poor outcomes in adulthood. Previous research on adult outcomes has focused on negative aspects of health and well-being, while positive well-being remains understudied. The current study charted 12-month change in daily living skills, job satisfaction, depression, anxiety, and positive well-being in 36 (32 male) newly employed adults with ASD aged 18 to 57 years who were participating in a supported employment program. There was a small increase in daily living skills, and a slight decrease in job satisfaction, with all other measures remaining stable over time. Regression analyses revealed that, controlling for baseline depression, positive well-being negatively predicted depression at follow-up. No significant predictors of anxiety were identified. Social support and depression at baseline were associated with positive well-being at follow-up; however, they were no longer significant predictors after the effects of baseline positive well-being were taken into account. The findings provide evidence that positive well-being may buffer against depression in people with ASD. Our finding of stability of mental health and well-being measures over time indicates more research is required to uncover the mechanisms underpinning mental health and well-being outcomes in employed adults with ASD.

Keywords: Anxiety; Autism spectrum disorder; Depression; Employment; Mental health; Well-being

Lay Summary: People with autism commonly experience poor outcomes in adulthood. We studied mental health and well-being in newly employed adults with autism who were participating in a supported employment program. Apart from a slight increase in daily living skills and a slight decrease in job satisfaction, other measures of mental health and well-being remained stable over time. Our findings suggest that positive well-being may protect against symptoms of depression in people with autism.

Predictors of Mental Health and Well-being in Employed Adults with Autism Spectrum Disorder at 12-month Follow-up

Individuals with Autism Spectrum Disorder (ASD) are recognised as having generally poor outcomes in adulthood (Howlin, 2000, 2013; Kirby, Baranek, & Fox, 2016; Levy & Perry, 2011; Magiati, Tay, & Howlin, 2014). This is evidenced by a range of indices of negative well-being including social isolation and lack of participation (Howlin, 2000, 2013; Howlin, Moss, Savage, & Rutter, 2013), high incidence of co-morbid mental health problems (Croen et al., 2015; Eaves & Ho, 2008; Hofvander et al., 2009; Hudson, Hall, & Harkness, 2018; Simonoff et al., 2008; Uljarević et al., 2017; van Steensel, Bogels, & Perrin, 2011), including suicidal ideation and behavior (Cassidy et al., 2014; Hedley & Uljarević, 2018; Hedley, Uljarević, Foley, Richdale, & Trollor, 2018; Hirvikoski et al., 2016; Zahid & Upthegrove, 2017), and increased risk of premature mortality (Hirvikoski et al., 2016). In addition, high rates of unemployment and underutilisation of skills and qualifications in the employment context have been consistently reported (Eaves & Ho, 2008; Holwerda, van der Klink, Groothoff, & Brouwer, 2012; Roux, Shattuck, Rast, Rava, & Anderson, 2015; Shattuck et al., 2012), and a significant portion of adults with ASD remain dependent on family or other support services (Howlin, Goode, Hutton, & Rutter, 2004). In many cases, outcomes may be worse in individuals with ASD without co-morbid intellectual disability as they receive lower levels of support compared to individuals with co-morbid intellectual disability (Cimera & Cowan, 2009; Howlin, 2000).

Although the majority of research on health and well-being in ASD has focused on the negative aspects such as poor mental and physical health, it is important to note that *well-*

being is a multifaceted construct which, in addition to the noted negative aspects, also encompasses positive aspects of cognitive, emotional, and psychological well-being (Keyes, Shmotkin, & Ryff, 2002). Consistent with Tennant et al. (2007; see also Waterman, 1993), *positive well-being* can be understood to encompass the hedonic experience of subjective happiness and life satisfaction, and the eudaimonic perspective of psychological functioning and self-realization. On the other hand, *negative mental health* refers to limitations to both hedonic and eudaimonic well-being (Keyes et al., 2002; Tennant et al., 2007; Waterman, 1993). Measures of positive well-being focus on the three (i.e., emotional, cognitive, psychological) components of well-being and, unlike assessments of negative mental-health, tend to be worded positively (Tennant et al., 2007). Negative and positive facets of well-being should be considered separately, as indicated by empirical evidence showing distinct predictors and different impacts on functioning (Jahoda, 1958; Keyes, 2005; Keyes et al., 2002; Ryff & Keyes, 1995; Teismann, Brailovskaia, et al., 2018; Westerhof & Keyes, 2010). Importantly, a wealth of research on non-clinical populations has demonstrated that positive well-being is essential for effective functioning, allowing individuals to better cope with life stress, to be productive, and to experience positive relationships (Huppert, 2009; Tennant et al., 2007). Furthermore, positive well-being in the typically developing population may foster resilience and buffer against negative mental health and other poor outcomes (Teismann, Brailovskaia, et al., 2018; Teismann, Forkmann, et al., 2018; Wilhelm, Wedgwood, Parker, Geerligs, & Hadzi-Pavlovic, 2010). However, with the exception of the recent population based study from the United Kingdom which reported that children with ASD exhibit relatively high levels of traits and behaviors indicative of positive well-being, such as self-

esteem and happiness (McChesney & Toseeb, 2018), positive well-being remains understudied in ASD.

While it is clear that well-being outcomes in ASD are suboptimal, predictors of both positive and negative aspects of well-being remain poorly characterized, impacting our ability to provide adequate support or to develop effective mental health interventions. In addition, it is currently not clear how different facets of well-being interact. As noted above, positive well-being has been suggested to serve as a resilience factor against poor mental health; however, it remains unknown whether it serves a similar function in people with ASD. Therefore, it is important to move beyond research focused solely on psychopathology and investigate the role of positive well-being in improved outcomes in ASD.

Predictors of Mental Health and Well-being

The presence and severity of ASD traits and social support are two factors shown to be related to well-being across both ASD and non-ASD clinical and normative samples. Although children with ASD in the study by McChesney and Toseeb (2018) showed relatively high levels of positive well-being, overall levels were lower than for children without ASD. Furthermore, children with ASD who fared worse in terms of positive well-being had more behavioral, communication, and social problems, suggesting symptom severity may have impacted well-being. Furthermore, ASD trait severity has been found to predict elements of negative mental health in adults with ASD, including anxiety and depression (Hedley, Uljarević, Foley, et al., 2018; Uljarević et al., 2018; cf. Uljarević et al., 2017). Using the Autism Spectrum Quotient (AQ), a self-reported instrument for the assessment of ASD traits in adults with normal intelligence (Baron-Cohen, Wheelwright,

Skinner, Martin, & Clubley, 2001), trait severity has also been identified as a predictor of negative mental health, including suicidal behavior (Pelton & Cassidy, 2017), poor coping and lower quality of life (Pisula, Danielewicz, Kawa, & Pisula, 2015), depression (Salehzadeh, Nasiri, Barin, & Roshan, 2017), and social anxiety (Lampert & Zlomke, 2014) in non-ASD populations.

Another key predictor of mental health and well-being is social support. In adults with ASD, social support has been identified as a protective factor against depression and suicidal ideation (Hedley, Uljarević, Foley, et al., 2018; Hedley, Uljarević, Wilmot, Richdale, & Dissanayake, 2017), and is a significant predictor of state and trait anxiety (Harkry, 2017). In non-ASD populations, social support has been shown to predict life satisfaction (Strizović & Mratinković, 2016) and positive well-being (Wilhelm et al., 2010), improves long-term depression trajectories (Heinz et al., 2018), and provides a protective effect during crisis (Henderson, 1981). In adults with physical disabilities, perceived quality of social support is associated with depression and anxiety (negatively) and positive well-being (positively) (Tough, Siegrist, & Fekete, 2017).

A further factor that might be an important contributor to mental health and well-being outcomes in people with ASD, but remains largely unexplored, is employment status. Below, we review relevant literature on the relationship between employment and health and well-being in the general and ASD populations.

Employment, Mental Health and Well-being

Employment represents a milestone in human development, providing opportunities to expand social networks, develop financial independence, and to give life meaning. The

association between employment and better mental health and well-being outcomes is well established in the general population (Backhans & Hemmingsson, 2012; Creed & Macintyre, 2001; Feather & O'Brien, 1986; Heinz et al., 2018; Helliwell & Huang, 2014; McKee-Ryan, Song, Wanberg, & Kinicki, 2005; Murphy & Athanasou, 1999; Paul & Moser, 2009; Voßemer et al., 2018; Wanberg, 2012; Wulfgramm, 2014), with meaningful employment identified as a protective factor against depression and other forms of psychological distress (van der Noordt, IJzelenberg, Droomers, & Proper, 2014). However, employment may not be associated with improved mental health outcomes in people with ASD. For example, Bishop Fitzpatrick et al. (2016) used latent class analysis to characterize patterns of quality of life and a range of well-being outcomes, including employment, in 180 adults with ASD. They found that although participants assigned to the 'greater independence group' met more normative outcomes, including employment, than either the 'greater dependence' or 'good physical and mental health' groups, they were significantly more likely to experience poor mental health outcomes.

Relatedly, job satisfaction has been shown to be related to health and well-being in the general population (Daniels & Harris, 2000; Dubin, 1956; Faragher, Cass, & Cooper, 2005; Near, Rice, & Hunt, 1978; Rice, Near, & Hunt, 1980; Steiner & Truxillo, 1987; Weaver, 1978). Job satisfaction is strongly associated with burnout, self-esteem, depression, and anxiety (Faragher et al., 2005), and predicts job performance and turnover (Daniels & Harris, 2000; Wright & Bonett, 2007; Wright & Cropanzano, 2000). In one of the only studies examining job satisfaction in people with ASD, Harkry (2017) reported significant negative correlations between job satisfaction and anxiety. Although people with ASD are

amongst the most disadvantaged in terms of employment, experiencing significantly higher levels of un- and underemployment compared to people with and without other disabilities (Eaves & Ho, 2008; Holwerda et al., 2012; Roux et al., 2015; Shattuck et al., 2012), surprisingly few empirical studies have examined the relationship between job satisfaction and mental health and well-being in this population.

Three studies have examined changes in quality of life indices over time in employed adults with ASD. García-Villamizar, Wehman, and Navarro (2002) reported significant improvements in quality of life amongst 25 individuals with ASD participating in a community-based supported employment program, but no improvements were found for 26 individuals working in a sheltered workshop. However, these results should be interpreted with caution due to poor sample characterization and matching as well as measurement and reporting issues such as, for example, overall change on the primary measure was small (< 5 points). Furthermore, despite the average length of employment being 30 months, follow-up data were collected at 5-years without reporting any post-intervention or other interim data. Katz, Dejak, and Gal (2015) reported a small increase on the competency sub-scale of a quality of life measure over 9-months in 26 adults with ASD working within a supported work placement program in Israel; no other significant changes were identified on the measure. In an Israeli Defence Force (IDF) supported employment program, a small but statistically significant increase in quality of life scores was reported for 21 young adults with ASD following 6-months integration into a military unit (Gal, Selanikyo, Erez, & Katz, 2015). However, the majority of domains on a personal well-being index failed to show significant improvements over the same time period in a sub-sample of 11 individuals.

Finally, in a qualitative study on data collected at a single time point, Hedley, Cai et al. (2018) identified positive health and well-being outcomes following transition to supported employment in nine adults with ASD which included reported improvements in self-esteem, sense of purpose in life, mood, financial independence, social relationships, and opportunities for socialising.

As can be seen from the literature to date, only a small number of studies have examined aspects of health and well-being in employed individuals with ASD, and these have been limited by methodological issues. It is therefore important to consider health and well-being in employed individuals with ASD, along with potential associations with job related factors (e.g., job satisfaction).

Current Study

The aim in the current study was to chart 12-month change in job satisfaction, mental health and well-being in newly employed adults with ASD who were participating in a supported employment program, and to identify potential predictors of negative mental health and positive well-being. The program was based within several Australian government departments, where participants were employed by information and communications technology (ICT) company DXC Technology, and worked in small teams within the ICT sector. Job roles included software testing, data analytics, and cyber security; teams were provided with technical support as well as support to assist their integration into the workforce (more details of the program can be found in the Appendix; see also Hedley, Cai, et al., 2018; Hedley, Uljarević, & Hedley, 2017). Based on the reviewed literature, it was predicted that ASD trait severity, perceived social support, and job satisfaction at baseline

(T1) would be significant predictors of symptoms of anxiety, depression, and positive well-being, at follow-up (T2). Given significant relationships between depression, anxiety, and positive well-being in typical (Headey, Kelley, & Wearing, 1993) and ASD (Uljarević et al., 2017) populations, T1 depression and anxiety were also examined as potential predictors of T2 positive well-being. Conversely, T1 positive well-being was examined as a potential predictor of T2 depression and anxiety.

Methods

Participants

Forty-three adults (39 male) with ASD aged 18–57 years (T1: $M_{\text{age}} = 27.50$, $SD = 9.63$ years) participated in the study. A further three individuals enrolled in the program declined to participate in the research. Each participant provided a letter from a medical doctor confirming their diagnosis in order to establish their eligibility for the supported employment program. Follow-up (T2) data were available for 36 (32 male; $M_{\text{age}} = 28.11$, $SD = 10.28$, range 18–57 years) participants. Thus follow-up data were available for 83% of the participants who provided baseline data, and 78% of the total number of individuals ($n = 46$) enrolled in the program. Included and excluded participants did not differ significantly on demographic variables including age, $t(41) = .934$, $p > .05$, ASD traits, $t(40) = -.102$, $p > .05$, or daily living skills, $t(40) = -1.45$, $p > .05$.

Procedure

The research was approved by the relevant human research ethics committees, with informed consent obtained from all participants. All applicants in the employment program were invited to participate in the research study. Applicants were contacted by the first author

or a research assistant to discuss the study and answer questions shortly after applying for the employment program. Those who expressed interest in the study were sent the survey link via Qualtrics survey platform (Qualtrics, 2017), which included all relevant measures including the study information and consent forms. Participants could complete the surveys at work or at home. Data were collected across four sites, with T1 data collected after participants had completed 4-weeks of on-boarding and orientation. Due to staggered start dates for each site, T1 data were collected in October 2015, in March and October 2016, and March 2017. Follow-up (T2) data were collected 12-months later. The identity of study applicants was kept confidential from the employing organization. All surveys included an option to opt-out, and participants who opted out or did not complete surveys were not sent subsequent invitations.

Measures

Waisman Activities of Daily Living (W-ADL) (Maenner et al., 2013) is a 17-item scale designed to assess daily living skills in individuals with developmental disability, including ASD. The W-ADL is strongly associated with IQ (Maenner et al., 2013), and was used in the present study to indicate level of functioning. Items are rated from 0–2 (range 0–34), with higher scores indicating greater independence. Cronbach’s alpha for the current sample was .88–.89.

Abridged Version of the Autism Spectrum Quotient (AQ-Short) (Hoekstra et al., 2011) is a 28 item measure designed to assess ASD trait severity, returning similar psychometric properties to the original 50-item version (Baron-Cohen et al., 2001). In the present study, the AQ-Short was used to provide a continuous assessment of ASD traits.

Respondents answer statements on a 4-point Likert scale, from 1–4 (range 28–112). Higher scores indicating increased ASD trait severity, and a cut-off point >65 provides sensitivity and specificity to clinical diagnosis of .97 and .82, respectively (Hoekstra et al., 2011).

Cronbach's alpha in the current sample was .82–.83.

Interpersonal Support Evaluation List-12 (ISEL-12) (Cohen & Hoberman, 1983; Cohen, Mermelstein, Kamarck, & Hoberman, 1985) is a 12-item measure that assesses perceived social support. It provides a total score and three subscales (Appraisal, Belonging, and Tangible Support). Items are rated on a 4-point Likert-type scale ranging from 0–3 (range 0–36). Cronbach's alpha for the total score in the present study was .89–.90.

Minnesota Satisfaction Questionnaire–Short Form (MSQ-SF) is a 20-item self-report measure of job satisfaction, which has been used with employees with disabilities (Weiss, Dawis, England, & Lofquist, 1967, 1977). Respondents indicate how satisfied they are with particular aspects of their job. Items are rated on a 5-point Likert-type scale ranging from 1–5. The MSQ-SF provides a General Satisfaction score (20–100) and two factor scales consisting of Intrinsic Satisfaction (job task; score range 12–60) and Extrinsic Satisfaction (working conditions; score range 6–30). Cronbach's alpha for the total score in the present sample was .92–.93.

Patient Health Questionnaire-9 (PHQ-9) (Kroenke & Spitzer, 2002; Kroenke, Spitzer, & Williams, 2001; Kroenke et al., 2009) is a nine item questionnaire used to detect major and subthreshold depressive disorder. Respondents rate how much problems have affected them on a 4-point Likert scale (range 0–27). Higher scores indicate a greater degree of depressive symptoms. A cut-off score of ≥ 10 strongly indicates clinical caseness for

depression in clinical and normative samples, returning reasonable sensitivity (.70–1.00) and good specificity (.95–.98) (Kroenke et al., 2009). Cronbach's alpha in the current sample was .84–.89.

DSM-5 Dimensional Anxiety Scale (DSM-5 DAS) (Beesdo-Baum et al., 2012; Knappe et al., 2013; Lebeau et al., 2012) is a 10-item self-report measure of anxiety symptoms. Respondents rate the degree to which anxiety symptoms have affected them on a 5-point Likert scale (range 0–36), with higher scores indicating greater severity. Scores > 14 are indicative of clinically significant levels of anxiety (Beesdo-Baum et al., 2012). Cronbach's alpha in the current sample was .91–.95.

Warwick-Edinburgh Mental Well-being Scale (WEMWBS) (Tennant et al., 2007) is a 14-item scale of mental well-being that covers subjective well-being and psychological functioning. All items are worded positively and address aspects of positive mental health and well-being. The scale is completed using a 5-point Likert scale; item scores are summed to derive a total score (range 14–70), with higher scores indicating higher levels of positive mental well-being. Cronbach's alpha in the current sample was .85–.92.

Data Cleaning and Analysis Strategy

Tests of normality revealed the PHQ-9 and DSM-5 DAS were positively skewed, and the WALD was negatively skewed. Subsequent analyses were performed with 2000 resamples bootstrapping to provide more robust statistics with statistical significance determined by 95% bias corrected and accelerated confidence intervals (Efron & Tibshirani, 1993; Tabachnick & Fidell, 2007). Cohen's *d* effect size for repeated measures, including 95% confidence intervals for *d*, were reported where relevant (Morris & DeShon, 2002).

All statistical analyses were completed using SPSS version 25.0 (IBM Corp., 2017). Changes in study variables (T1) to follow-up (T2) were analyzed using bootstrapped paired-samples *t*-tests. Correlational analysis was used to explore the pattern of the relationships between the study variables and identify variables for model entry. Separate regression models were then run to identify factors contributing to T2 depression (PHQ-9), anxiety (DSM-5 DAS), and positive well-being (WEMWBS). Predictor variables were assessed for multicollinearity by examining the variance inflation factor ($VIF < 10$) and the tolerance statistic ($1/VIF > .2$) (Bowerman & O'Connell, 1990; Menard, 1995). Multicollinearity for all predictors was well within these parameters ($VIF = 1.00\text{--}2.30$, tolerance = .434–1.00). To check residuals for bias, casewise diagnostics were also reviewed (Field, 2018). Two models each had 1 case (2.78%) and one model had 2 cases (5.5%) with standardized residuals greater than ± 2 , with only 1 case overall exceeding ± 2.5 (standardized residual = 2.57). This suggested the models were reliable and unlikely to be unduly affected by any subset of cases (Field, 2018).

Results

Descriptive Statistics

Descriptive statistics and T1–T2 bootstrapped paired-samples *t*-tests for each measure are presented in Table 1. Bootstrapped results indicated a small but significant increase in daily living skills from baseline to follow-up, and a small decline in job satisfaction. No further statistically significant differences between time points were identified for any of the other measures.

[Enter Table 1 about here]

Correlations

Table 2 provides correlations between all study variables (T1, T2). Significant p -values (*) and bootstrapped confidence intervals (bolded) are both provided; for the predictor variables p -values and bootstrapped significance results were in agreement. Age was first examined as a potential control variable. Although age was correlated with daily living skills and ASD traits, it was not found to be significantly correlated with any of the dependent variables (i.e., depression, anxiety, well-being) and was therefore not considered for further analysis. To identify predictors for model entry, significant correlations for the hypothesized variables were reviewed for depression (T2), anxiety (T2), and well-being (T2). Social support (T1) and positive well-being (T1) were both significantly correlated with depression (T2) and anxiety (T2). Significant correlates for positive well-being (T2) were ASD traits (T1), social support (T1), and depression (T1). All correlations were in the expected directions.

[Enter Table 2 about here]

Regression Analyses

Full regression models predicting positive well-being and negative mental health are presented in Table 3. Linear multiple regression models using 2000 bootstrapped samples (due to non-normal distributions) were used, and only predictors that significantly correlated with the dependent variable were examined. Where appropriate, the AQ-Short was entered in the first step and hypothesized predictors were entered in the next step. For all dependent variables, T1 data were entered in the final step to control for the effects of the baseline levels of the measure.

We examined the predictors of negative mental health first. For depression (T2), social support (T1) and positive well-being (T1) were entered at Step 1, and depression (T1) was entered at Step 2. The first step accounted for 45.8% of the variance, $F(2, 33) = 13.92, p < .001$, with positive well-being (T1) significantly and negatively predicting depressive scores (T2). The second step accounted for an additional 10.7% ($p = .009$) of variance, with the total model accounting for 56.5% of the variance, $F(3, 32) = 13.83, p < .001$. In the final model, positive well-being (T1) remained an independent significant predictor of depression (T2), even when controlling for baseline depression scores.

Next, to examine predictors of anxiety (T2), social support (T1) and positive well-being (T1) were entered at Step 1 and anxiety (T1) was entered at Step 2. The first step accounted for 34.5% of the variance, $F(2, 33) = 8.67, p = .001$; however neither variable independently predicted anxiety scores (T2). The second step accounted for an additional 14.2% ($p = .005$) of variance, with the total model accounting for 48.7% of the variance, $F(3, 32) = 10.12, p < .001$. In the final model, only baseline anxiety (T1) significantly predicted anxiety (T2) at follow-up.

We then examined the predictors of positive mental health (T2). ASD traits (T1) were entered at Step 1, and social support (T1) and depression (T1) were entered in Step 2. Baseline positive well-being (T1) was added to the model in Step 3. The first step accounted for 12% of the variance, $F(1, 34) = 4.64, p = .038$, with ASD traits significantly and negatively predicting positive well-being at this step. The second step accounted for an additional 37.2% ($p < .001$) of variance, with the total model accounting for 49.2% of the variance, $F(3, 32) = 10.33, p < .001$. Bootstrapped results indicated that both social support

(positively) and depression (negatively) were unique predictors of positive well-being at this step. Baseline positive well-being (T1) was entered in the final step; however this step accounted for only 4.6% ($p = .09$) of additional variance. The final model accounted for 53.8% of the overall variance, $F(4, 31) = 9.02, p < .001$. However, none of the predictors uniquely contributed to the variance in positive well-being (T2) once baseline levels were controlled for, with all bootstrapped confidence intervals crossing zero.

[Enter Table 3 about here]

Discussion

Within the general population, being employed has consistently been linked to better mental health and well-being (Backhans & Hemmingsson, 2012; Creed & Macintyre, 2001; Feather & O'Brien, 1986; Heinz et al., 2018; McKee-Ryan et al., 2005; Murphy & Athanasou, 1999; Paul & Moser, 2009; Voßemer et al., 2018; Wanberg, 2012), with greater benefits associated with higher levels of job satisfaction (Faragher et al., 2005). As long-term outcomes in terms of mental health and well-being in employed adults with ASD is poorly understood, we monitored changes in mental health and well-being over time in newly employed adults with ASD, a population rarely represented in previous research. The aims were to a) chart any changes in mental health and well-being over their first 12-months of employment and b) identify significant predictors of mental health and well-being outcomes amongst the study participants.

Apart from a small increase in daily living skills, and slight decrease in job satisfaction, participants' ratings on the main measures of depression, anxiety and positive well-being remained stable over time. The finding of a slight decrease in job satisfaction over

time in newly employed individuals is consistent with previous research in the general population, which suggests that job satisfaction peaks following entry into an organization and subsequently decreases (e.g., Boswell, Shipp, Payne, & Culbertson, 2009). These findings are consistent with previous research within an ASD sample (Harkry, 2017), where no improvements were found across similar constructs. Of interest, however, is that participants enrolled in the same program reported via qualitative interviews that supported employment led to benefits across aspects such as self-esteem and sense of purpose in life, that are consistent with improved positive aspects of well-being (Hedley, Cai, et al., 2018). Nonetheless, these benefits were not captured in the current study using standardized tools. These results suggest that although tangible improvements may be reported in specific areas of positive well-being, these improvements may not necessarily transfer to the broader construct of well-being as measured here.

Despite stability in mental health and well-being over their 12-month period of employment, as a group, the findings reported here provide important insights into potential correlates and predictors of negative and positive well-being of the employees with ASD. First, the correlational analyses revealed that baseline social support and positive well-being were significantly associated with depression at follow-up. With the inclusion of all predictors in the regression models, baseline positive well-being was found to negatively predict depression at follow-up, even when controlling for baseline depression. These results are consistent with research in the general population (Teismann, Brailovskaia, et al., 2018; Teismann, Forkmann, et al., 2018; Wilhelm et al., 2010) that shows well-being functions as a buffer or protective factor against depression. With the dearth of positive well-being research

amongst the ASD population, this finding reveals the potential for positive well-being to function as a resilience factor against depression, and potentially other associated negative mental health outcomes, for individuals with ASD. Turning to anxiety, while baseline social support and positive well-being were both negatively correlated with anxiety at follow-up, neither was identified as a significant independent predictor of anxiety at the 12-month follow-up.

These results are consistent with other research suggestive of a complex relationship between positive well-being, anxiety, and depression. Headey et al. (1993) examined the relationships between life satisfaction, positive affect, anxiety, and depression in a quality of life study across two time points. They concluded that a multi-dimensional model better accounted for the relationships between variables: while life satisfaction and depression were strongly negatively correlated, the relationship between life satisfaction and anxiety was less pronounced. The potential for positive well-being to functioning as a buffer against depression in this study, as well as the broader benefits of positive well-being reported in the general population (e.g., managing stress, positive relationships) (Huppert, 2009; Tennant et al., 2007), suggests that positive well-being should be cultivated within the employment context.

When examining well-being as an outcome variable, correlational analyses initially showed that perceived social support was positively associated with positive well-being at baseline and follow-up. However, regression results failed to identify social support as a significant predictor of positive well-being at follow-up when controlling for baseline (well-being) scores. While the association between social support and well-being in the typical

population is well replicated (Turner, 1981; Wilhelm et al., 2010), and there is growing evidence that social support may be an important protective factor against poor negative mental health outcomes (e.g., depression, suicidal ideation) in people with ASD (Hedley, Uljarević, Foley, et al., 2018; Hedley et al., 2017), our results do not strongly support this interpretation in the present sample. More research into the role of social support in improving mental health and well-being in people with ASD is therefore needed.

Although our baseline finding for ASD traits is consistent with previous studies that have failed to identify a relationship between ASD traits and depression (Hedley et al., 2017; Hedley, Uljarević, Wilmot, Richdale, & Dissanayake, 2018), or anxiety (Uljarević et al., 2017), it is important to note that a number of cross-sectional studies have identified significant relationships between these factors amongst ASD (Hedley, Uljarević, Foley, et al., 2018; Uljarević et al., 2018) and non-ASD (Lamport & Zlomke, 2014; Salehzadeh et al., 2017) populations. Findings from our study and those of others suggests the relationship between ASD traits and psychopathology is complex and likely non-linear, and highlights the importance of longitudinal study designs to fully characterize the role of ASD trait severity in the development and maintenance of psychopathology (Tebartz van Elst, Pick, Biscaldi, Fangmeier, & Riedel, 2013). Interestingly, baseline ASD traits were found to be negatively correlated with positive well-being at follow-up; however, once entered into the regression models with other predictors, ASD traits did not emerge as a significant predictor of positive well-being. Our findings suggest that ASD traits may operate relatively independently from both negative mental health and positive well-being. This conclusion is supported by the

studies identified above and, furthermore, indicates that other factors aside from self-reported ASD traits are more important in terms of mental health and well-being outcomes.

Finally, we predicted that job satisfaction would be significantly related to the mental health and well-being variables. Although correlational analyses revealed a significant positive relationship between baseline job satisfaction and baseline positive well-being, and job satisfaction at follow-up was significantly and positively associated with social support and positive well-being (both at baseline and follow-up), baseline job satisfaction was not significantly correlated with any of the main outcome variables at follow-up. This result is inconsistent with literature from the general population, which suggests a stronger relationship between job satisfaction and mental health and well-being (Dubin, 1956; Faragher et al., 2005). It is important to note that different authors have formalized directionality of the relationship between job satisfaction and well-being in different ways. There is some evidence in the general population of a causal relationship between psychological well-being and job performance (Daniels & Harris, 2000); however, others argue that job satisfaction influences (i.e., is predictive of) employee health and well-being (Faragher et al., 2005), or quality of life (depending on the relative importance of work in the individual's life) (Rice et al., 1980; Steiner & Truxillo, 1987). This suggests directions for future research where job satisfaction might be formalized as a dependent variable. Based on the correlations reported in the present study, both social support and positive well-being could be examined as potential predictors of job satisfaction. More work is needed to examine the role of job satisfaction in the mental health and well-being of employed adults with ASD.

Our findings need to be interpreted with respect to some limitations. First, as recruitment was limited to individuals who were participating in the employment program, the sample was relatively small and not representative of the general ASD population. Participants in this study represented only a select group of individuals with ASD who were successful, not only in the recruitment process, but also in maintaining their employment for 12-months. Furthermore, 10 individuals in the program either chose not to participate in the research ($n = 3$), or did not provide follow-up data ($n = 7$). Nevertheless, the availability of data from two time-points, which allowed us to identify potential predictors of mental health and well-being, is a significant strength of the study. Second, although we have selected measures that have a strong evidence base in clinical and general populations, or which have been shown to perform well psychometrically in adults with ASD (Hedley, Uljarević, Foley, et al., 2018), it is generally acknowledged that there is a lack of validated instruments to assess mental health difficulties in ASD (Uljarević et al., 2017; Wigham, Barton, Parr, & Rodgers, 2017). Third, we did not include a comparative sample of adults with ASD engaged in open (i.e., unsupported) employment. It is possible that, without workplace supports, the trajectory of employed adults with ASD is poor (e.g., Baldwin, Costley, & Warren, 2014), a hypothesis that we were unable to test in the present study. The identification of predictors of mental health and well-being in a larger, population based sample of employed adults with ASD using a longitudinal design, is a worthy avenue for future research. Furthermore, the potential impact of supported versus open employment versus no employment, on mental health and well-being in this population will also be important to determine the potential contribution of supported work environments to mental health and well-being outcomes in

people with ASD. Moreover, a larger study with more time-points would also allow for the development and testing of more complex theoretical models using additional analyses such as mediational techniques. While this approach was beyond the scope of the present study due to the aforementioned limitations, it provides a direction for future research. Finally, the present study focused on defined aspects of positive and negative well-being, as conceptualized by the measures used. Given the overlap between these domains and standard quality of life measures, we did not include quality of life as a separate outcome measure. Nonetheless, several aspects of quality of life, such as general stress, physical health, or more specific employment related indices of well-being will be important to assess in future research (e.g., see Dagenais-Desmarais & Savoie, 2012).

Despite the noted limitations, our study provides evidence of the potential buffering or protective role of positive well-being against depression in people with ASD. We also found tentative support for social support and depression as potential protective and risk factors in positive well-being; however, this finding was not strongly supported once baseline well-being was factored in the regression models. Further research will be needed to confirm or reject this hypothesis.

References

- Backhans, M. C., & Hemmingsson, T. (2012). Unemployment and mental health--who is (not) affected? *Eur J Public Health, 22*, 429-433.
- Baldwin, S., Costley, D., & Warren, A. (2014). Employment activities and experiences of adults with high-functioning autism and Asperger's Disorder. *J Autism Dev Disord, 44*, 2440-2449.
- Baron-Cohen, S., Wheelwright, S., Skinner, R., Martin, J., & Clubley, E. (2001). The autism-spectrum quotient (AQ): Evidence from Asperger syndrome/high-functioning autism, males and females, scientists and mathematicians. *J Autism Dev Disord, 31*, 5-17.
- Beesdo-Baum, K., Klotsche, J., Knappe, S., Craske, M. G., Lebeau, R. T., Hoyer, J., . . . Wittchen, H. U. (2012). Psychometric properties of the dimensional anxiety scales for DSM-V in an unselected sample of German treatment seeking patients. *Depress Anxiety, 29*, 1014-1024.
- Bishop-Fitzpatrick, L., Hong, J., Smith, L. E., Makuch, R. A., Greenberg, J. S., & Mailick, M. R. (2016). Characterizing objective quality of life and normative outcomes in adults with autism spectrum disorder: An exploratory latent class analysis. *J Autism Dev Disord, 46*, 2707-19.
- Boswell, W. R., Shipp, A. J., Payne, S. C., & Culbertson, S. S. (2009). Changes in newcomer job satisfaction over time: Examining the pattern of honeymoons and hangovers. *J Appl Psychol, 94*, 844-58.
- Bowerman, B. L., & O'Connell, R. T. (1990). *Linear statistical models; An applied approach* (Vol. 2). Belmont, CA: Duxbury.

- Cassidy, S., Bradley, P., Robinson, J., Allison, C., McHugh, M., & Baron-Cohen, S. (2014). Suicidal ideation and suicide plans or attempts in adults with Asperger's syndrome attending a specialist diagnostic clinic: A clinical cohort study. *Lancet Psychiatry, 1*, 142-147.
- Cimera, R. E., & Cowan, R. J. (2009). The costs of services and employment outcomes achieved by adults with autism in the US. *Autism, 13*, 285-302.
- Cohen, S., & Hoberman, H. M. (1983). Positive events and social supports as buffers of life change stress. *J Appl Soc Psychol, 13*, 99-125.
- Cohen, S., Mermelstein, R., Kamarck, T., & Hoberman, H. M. (1985). Measuring the functional components of social support. In I. G. Sarason & B. R. Sarason (Eds.), *Social support: Theory, research and applications* (pp. 73-94). Dordrecht: Springer Netherlands.
- Creed, P. A., & Macintyre, S. R. (2001). The relative effects of deprivation of the latent and manifest benefits of employment on the well-being of unemployed people. *J Occup Health Psychol, 6*, 324-331.
- Croen, L. A., Zerbo, O., Qian, Y., Massolo, M. L., Rich, S., Sidney, S., & Kripke, C. (2015). The health status of adults on the autism spectrum. *Autism, 19*, 814-823.
- Dagenais-Desmarais, V., & Savoie, A. (2012). What is psychological well-being, really? A grassroots approach from the organizational sciences. *J Happiness Stud, 13*, 659-684.
- Daniels, K., & Harris, C. (2000). Work, psychological well-being and performance. *Occup Med, 50*, 304-309.

- Dubin, R. (1956). Industrial workers' worlds: A study of the "central life interests" of industrial workers. *Soc Probl, 3*, 131-142.
- Eaves, L. C., & Ho, H. H. (2008). Young adult outcome of Autism Spectrum Disorders. *J Autism Dev Disord, 38*, 739-747.
- Efron, B., & Tibshirani, R. (1993). *An Introduction to the Bootstrap*. Boca Raton, FL: Chapman & Hall/CRC.
- Faragher, E. B., Cass, M., & Cooper, C. L. (2005). The relationship between job satisfaction and health: A meta-analysis. *Occup Environ Med, 62*, 105.
- Feather, N. T., & O'Brien, G. E. (1986). A longitudinal study of the effects of employment and unemployment on school-leavers. *J Occup Psychol, 59*, 121-144.
- Field, A. (2018). *Discovering statistics using IBM SPSS statistics* (Vol. 5). Thousand Oaks, CA: Sage Publications Inc.
- Gal, E., Selanikyo, E., Erez, A. B., & Katz, N. (2015). Integration in the vocational world: How does it affect quality of life and subjective well-being of young adults with ASD. *Int J Environ Res Public Health, 12*, 10820-10832.
- García-Villamizar, D., Wehman, P., & Navarro, M. D. (2002). Changes in the quality of autistic people's life that work in supported and sheltered employment. A 5-year follow-up study *J Vocat Rehabil, 17*, 309-312.
- Harkry, L. C. (2017). *The effects of employment on the mental health and executive functions of adults with autism spectrum disorder (Doctoral dissertation)*. Goldsmiths University of London, London, UK.

- Headey, B., Kelley, J., & Wearing, A. (1993). Dimensions of mental health: Life satisfaction, positive affect, anxiety and depression. *Soc Indic Res*, 29, 63-82.
- Hedley, D., Cai, R., Uljarević, M., Wilmot, M., Spoor, J. R., Richdale, A., & Dissanayake, C. (2018). Transition to work: Perspectives from the autism spectrum. *Autism*, 22, 528-541.
- Hedley, D., & Uljarević, M. (2018). Systematic review of suicide in Autism Spectrum Disorder: Current trends and implications. *Current Developmental Disorders Reports*, 5, 65-76.
- Hedley, D., Uljarević, M., Foley, K.-R., Richdale, A., & Trollor, J. (2018). Risk and protective factors underlying suicidal ideation in Autism Spectrum Disorder. *Depress Anxiety*, 35, 648-657.
- Hedley, D., Uljarević, M., & Hedley, D. F. E. (2017). Employment and living with Autism: Personal, social and economic impact. In S. Halder & L. C. Assaf (Eds.), *Inclusion, Disability and Culture: An Ethnographic Perspective Traversing Abilities and Challenges* (pp. 295-311). New York: Springer.
- Hedley, D., Uljarević, M., Wilmot, M., Richdale, A., & Dissanayake, C. (2017). Social support, depression and suicidal ideation in adults with Autism Spectrum Disorder. *J Autism Dev Disord*, 47, 3669-3677.
- Hedley, D., Uljarević, M., Wilmot, M., Richdale, A., & Dissanayake, C. (2018). Understanding depression and thoughts of self-harm in autism: A potential mechanism involving loneliness. *Res Autism Spectr Disord*, 46, 1-7.

Heinz, A. J., Meffert, B. N., Halvorson, M. A., Blonigen, D., Timko, C., & Cronkite, R.

(2018). Employment characteristics, work environment, and the course of depression over 23 years: Does employment help foster resilience? *Depress Anxiety*.

doi:10.1002/da.22782

Helliwell, J. F., & Huang, H. (2014). New measures of the costs of unemployment: Evidence from the subjective well-being of 3.3 million Americans. *Econ Inq*, 52, 1485-1502.

Henderson, S. (1981). Social relationships, adversity and neurosis: an analysis of prospective observations. *Br J Psychiatry*, 138, 391-398.

Hirvikoski, T., Mittendorfer-Rutz, E., Boman, M., Larsson, H., Lichtenstein, P., & Bölte, S.

(2016). Premature mortality in autism spectrum disorder. *Br J Psychiatry*, 208, 232-238.

Hoekstra, R. A., Vinkhuyzen, A. A., Wheelwright, S., Bartels, M., Boomsma, D. I., Baron-Cohen, S., . . . van der Sluis, S. (2011). The construction and validation of an abridged version of the autism-spectrum quotient (AQ-Short). *J Autism Dev Disord*, 41, 589-596.

Hofvander, B., Delorme, R., Chaste, P., Nydén, A., Wentz, E., Ståhlberg, O., . . . Leboyer, M. (2009). Psychiatric and psychosocial problems in adults with normal-intelligence autism spectrum disorders. *BMC Psychiatry*, 9, 1-9.

Holwerda, A., van der Klink, J. J. L., Groothoff, J. W., & Brouwer, S. (2012). Predictors for work participation in individuals with an autism spectrum disorder: A systematic review. *J Occup Rehabil*, 22, 333-352.

- Howlin, P. (2000). Outcome in adult life for more able individuals with autism or Asperger syndrome. *Autism, 4*, 63-83.
- Howlin, P. (2013). Social disadvantage and exclusion: Adults with Autism lag far behind in employment prospects. *J Am Acad Child Adolesc Psychiatry, 52*, 897-899.
- Howlin, P., Goode, S., Hutton, J., & Rutter, M. (2004). Adult outcome for children with autism. *J Child Psychol Psychiatry, 45*, 212-229.
- Howlin, P., Moss, P., Savage, S., & Rutter, M. (2013). Social outcomes in mid- to later adulthood among individuals diagnosed with autism and average nonverbal IQ as children. *J Am Acad Child Adolesc Psychiatry, 52*, 572-581.
- Hudson, C. C., Hall, L., & Harkness, K. L. (2018). Prevalence of depressive disorders in individuals with Autism Spectrum Disorder: A meta-analysis. *J Abnorm Child Psychol*. doi:10.1007/s10802-018-0402-1
- Huppert, F. A. (2009). Psychological well-being: Evidence regarding its causes and consequences. *Appl Psychol Health Well-Being, 1*, 137-164.
- IBM Corp. (2017). IBM SPSS statistics for windows (Version 25.0) [Computer Program]. Armonk, NY: IBM Corp.
- Jahoda, M. (1958). *Joint commission on mental health and illness monograph series: Current concepts of positive mental health* (Vol. 1). New York, NY: Basic Books.
- Katz, N., Dejak, I., & Gal, E. (2015). Work performance evaluation and QoL of adults with High Functioning Autism Spectrum Disorders (HFASD). *Work, 51*, 887-892.
- Keyes, C. L. (2005). Mental illness and/or mental health? Investigating axioms of the complete state model of health. *J Consult Clin Psychol, 73*, 539-548.

- Keyes, C. L., Shmotkin, D., & Ryff, C. D. (2002). Optimizing well-being: the empirical encounter of two traditions. *J Pers Soc Psychol*, *82*, 1007-1022.
- Kirby, A. V., Baranek, G. T., & Fox, L. (2016). Longitudinal predictors of outcomes for adults with Autism Spectrum Disorder: Systematic review. *OTJR: Occupation, Participation and Health*, *36*, 55-64.
- Knappe, S., Klotsche, J., Strobel, A., Lebeau, R. T., Craske, M. G., Wittchen, H. U., & Beesdo-Baum, K. (2013). Dimensional anxiety scales for DSM-5: sensitivity to clinical severity. *Eur Psychiatry*, *28*, 448-456.
- Kroenke, K., & Spitzer, R. L. (2002). The PHQ-9: A new depression diagnostic and severity measure. *Psychiatric Annals*, *32*, 509-515.
- Kroenke, K., Spitzer, R. L., & Williams, J. B. (2001). The PHQ-9: validity of a brief depression severity measure. *J Gen Intern Med*, *16*, 606-613.
- Kroenke, K., Strine, T. W., Spitzer, R. L., Williams, J. B., Berry, J. T., & Mokdad, A. H. (2009). The PHQ-8 as a measure of current depression in the general population. *J Affect Disord*, *114*, 163-173.
- Lamport, D., & Zlomke, K. R. (2014). The broader autism phenotype, social interaction anxiety, and loneliness: Implications for social functioning. *Current Psychology*, *33*, 246-255.
- Lebeau, R. T., Glenn, D. E., Hanover, L. N., Beesdo-Baum, K., Wittchen, H. U., & Craske, M. G. (2012). A dimensional approach to measuring anxiety for DSM-5. *Int J Methods Psychiatr Res*, *21*, 258-272.

- Levy, A., & Perry, A. (2011). Outcomes in adolescents and adults with autism: A review of the literature. *Res Autism Spectr Disord*, *5*, 1271-1282.
- Maenner, M. J., Smith, L. E., Hong, J., Makuch, R., Greenberg, J. S., & Mailick, M. R. (2013). Evaluation of an activities of daily living scale for adolescents and adults with developmental disabilities. *Disabil Health J*, *6*, 8-17.
- Magiati, I., Tay, X. W., & Howlin, P. (2014). Cognitive, language, social and behavioural outcomes in adults with autism spectrum disorders: a systematic review of longitudinal follow-up studies in adulthood. *Clin Psychol Rev*, *34*, 73-86.
- McChesney, G., & Toseeb, U. (2018). Happiness, self-esteem, and prosociality in children with and without autism spectrum disorder: Evidence from a UK population cohort study. *Autism Res*. doi:10.1002/aur.1957
- McKee-Ryan, F., Song, Z., Wanberg, C. R., & Kinicki, A. J. (2005). Psychological and physical well-being during unemployment: a meta-analytic study. *J Appl Psychol*, *90*, 53-76.
- Menard, S. (1995). *Applied logistic regression analysis*. Thousand Oaks, CA: Sage.
- Morris, S. B., & DeShon, R. P. (2002). Combining effect size estimates in meta-analysis with repeated measures and independent-groups designs. *Psychol Methods*, *7*, 105-125.
- Murphy, G. C., & Athanasou, J. A. (1999). The effect of unemployment on mental health. *J Occup Organ Psychol*, *72*, 83-99.
- Near, J. P., Rice, R. W., & Hunt, R. G. (1978). Work and extra-work correlates of life and job satisfaction. *Acad Manag J*, *21*, 248-264.

- Paul, K. I., & Moser, K. (2009). Unemployment impairs mental health: Meta-analyses. *J Vocat Behav, 74*, 264-282.
- Pelton, M. K., & Cassidy, S. A. (2017). Are autistic traits associated with suicidality? A test of the interpersonal-psychological theory of suicide in a non-clinical young adult sample. *Autism Res, 10*, 1891-1904.
- Pisula, E., Danielewicz, D., Kawa, R., & Pisula, W. (2015). Autism spectrum quotient, coping with stress and quality of life in a non-clinical sample – an exploratory report. *Health and Quality of Life Outcomes, 13*, 173.
- Qualtrics. (2017). Qualtrics (version 2.16) [computer program]. Provo, UT: Qualtrics.
- Rice, R. W., Near, J. P., & Hunt, R. G. (1980). The job-satisfaction/life-satisfaction relationship: A review of empirical research. *Basic Appl Soc Psych, 1*, 37-64.
- Roux, A. M., Shattuck, P. T., Rast, J. E., Rava, J. A., & Anderson, K. A. (2015). *National Autism Indicators Report: Transition into Young Adulthood*. Philadelphia, PA: Life Course Outcomes Research Program, A. J. Drexel Autism Institute, Drexel University.
- Ryff, C. D., & Keyes, C. L. (1995). The structure of psychological well-being revisited. *J Pers Soc Psychol, 69*, 719-727.
- Salehzadeh, E. Z., Nasiri, M., Barin, S., & Roshan, R. (2017). The relationship between depression and broader autism phenotype in nonclinical population. *Zahedan J Res Med Sci, 19*, e11552.

Shattuck, P. T., Narendorf, S. C., Cooper, B., Sterzing, P. R., Wagner, M., & Taylor, J. L.

(2012). Postsecondary education and employment among youth with an autism spectrum disorder. *Pediatrics, 129*, 1042-1049.

Simonoff, E., Pickles, A., Charman, T., Chandler, S., Loucas, T., & Baird, G. (2008).

Psychiatric disorders in children with Autism Spectrum Disorders: Prevalence, comorbidity, and associated factors in a population-derived sample. *J Am Acad Child Adolesc Psychiatry, 47*, 921-929.

Steiner, D. D., & Truxillo, D. M. (1987). Another look at the job satisfaction-life satisfaction relationship: A test of the disaggregation hypothesis. *J Occup Behav, 8*, 71-77.

Strizović, I., & Mratinković, A. (2016). Differences between employed and unemployed people in satisfaction with life, subjective happiness, and latent and manifest benefits of work. *Primenjena Psihologija, 9*, 361-377.

Tabachnick, B. G., & Fidell, L. S. (2007). *Using Multivariate Statistics* (5th ed.). Needham Heights, MA: Allyn & Bacon.

Tebartz van Elst, L., Pick, M., Biscaldi, M., Fangmeier, T., & Riedel, A. (2013). High-functioning autism spectrum disorder as a basic disorder in adult psychiatry and psychotherapy: psychopathological presentation, clinical relevance and therapeutic concepts. *Eur Arch Psychiatry Clin Neurosci, 263 Suppl 2*, S189-196.

Teismann, T., Brailovskaia, J., Siegmann, P., Nyhuis, P., Wolter, M., & Willutzki, U. (2018).

Dual factor model of mental health: Co-occurrence of positive mental health and suicide ideation in inpatients and outpatients. *Psychiatry Res, 260*, 343-345.

- Teismann, T., Forkmann, T., Brailovskaia, J., Siegmann, P., Glaesmer, H., & Margraf, J. (2018). Positive mental health moderates the association between depression and suicide ideation: A longitudinal study. *Int J Clin Hlth Psychol, 18*, 1-7.
- Tennant, R., Hiller, L., Fishwick, R., Platt, S., Joseph, S., Weich, S., . . . Stewart-Brown, S. (2007). The Warwick-Edinburgh Mental Well-being Scale (WEMWBS): development and UK validation. *Health Qual Life Out, 5*, 63-63.
- Tough, H., Siegrist, J., & Fekete, C. (2017). Social relationships, mental health and wellbeing in physical disability: a systematic review. *BMC Public Health, 17*, 414.
- Turner, R. J. (1981). Social support as a contingency in psychological well-being. *J Health Soc Behav, 22*, 357-367.
- Uljarević, M., Hedley, D., Foley, K.-R., Magiati, I., Cai, R. Y., Dissanayake, C., . . . Trollor, J. (2018). Anxiety and depression from adolescence to old age in Autism Spectrum Disorder. *Manuscript submitted for publication*.
- Uljarević, M., Richdale, A. L., McConachie, H., Hedley, D., Cai, R. Y., Merrick, H., . . . Le Couteur, A. (2017). The Hospital Anxiety and Depression scale: Factor structure and psychometric properties in older adolescents and young adults with autism spectrum disorder. *Autism Res, 11*, 258-269.
- van der Noordt, M., IJzelenberg, H., Droomers, M., & Proper, K. I. (2014). Health effects of employment: A systematic review of prospective studies. *Occup Environ Med, 71*, 730-736.

- van Steensel, F. J., Bogels, S. M., & Perrin, S. (2011). Anxiety disorders in children and adolescents with autistic spectrum disorders: a meta-analysis. *Clin Child Fam Psychol Rev, 14*, 302-317.
- Voßemer, J., Gebel, M., Täht, K., Unt, M., Högberg, B., & Strandh, M. (2018). The effects of unemployment and insecure jobs on well-being and health: The moderating role of labor market policies. *Soc Indic Res, 138*, 1229-1257.
- Wanberg, C. R. (2012). The individual experience of unemployment. *Annu Rev Psychol, 63*, 369-396.
- Waterman, A. S. (1993). Two conceptions of happiness: Contrasts of personal expressiveness (eudaimonia) and hedonic enjoyment. *J Pers Soc Psych, 64*, 678-91.
- Weaver, C. N. (1978). Job satisfaction as a component of happiness among males and females. *Pers Psychol, 31*, 831-840.
- Weiss, D. J., Dawis, R. V., England, G. W., & Lofquist, L. H. (1967, 1977). *Manual for the Minnesota Satisfaction Questionnaire*. Minneapolis: University of Minnesota, Industrial Relations Center.
- Westerhof, G. J., & Keyes, C. L. (2010). Mental illness and mental health: The two continua model across the lifespan. *J Adult Dev, 17*, 110-119.
- Wigham, S., Barton, S., Parr, J. R., & Rodgers, J. (2017). A systematic review of the rates of depression in children and adults with high-functioning Autism Spectrum Disorder. *Journal of Mental Health Research in Intellectual Disabilities, 1-21*.
- Wilhelm, K., Wedgwood, L., Parker, G., Geerligs, L., & Hadzi-Pavlovic, D. (2010). Predicting mental health and well-being in adulthood. *J Nerv Ment Dis, 198*, 85-90.

Wright, T. A., & Bonett, D. G. (2007). Job satisfaction and psychological well-being as nonadditive predictors of workplace turnover. *J Manag*, *33*, 141-160.

Wright, T. A., & Cropanzano, R. (2000). Psychological well-being and job satisfaction as predictors of job performance. *J Occup Health Psychol*, *5*, 84-94.

Wulfgramm, M. (2014). Life satisfaction effects of unemployment in Europe: The moderating influence of labour market policy. *J Eur Soc Policy*, *24*, 258-272.

Zahid, S., & Upthegrove, R. (2017). Suicidality in Autistic Spectrum Disorders: A systematic review. *Crisis*, *38*, 237-246.