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Predictors of sustainable work participation of young adults with developmental disorders



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ABSTRACT

For individuals with autism spectrum disorders (ASD) and attention deficit hyperactivity disorder (ADHD) work participation is a challenge, as shown by their low employment rates. The aim of this study was to investigate which factors predict work participation, finding work as well as maintaining employment, of young adults with ASD as well as ADD. We obtained data on 563 individuals with ASD and/or ADD, aged 15–27 years. The follow-up period ranged from 1.25 to 2.75 years. Being male (for ADD), living independently (for ASD), expecting to be able to work fulltime (for ASD and ADD), high perceived support from parents and perceived positive attitude of parents regarding work (for ASD and ADD) and perceived positive attitude of social environment (for ADD) predicted finding work by the young adult, while being male (for ADD) and higher age (for ASD and ADD) and positive attitude of social environment regarding work (for ASD) predicted maintaining employment. Both personal and social factors predict work outcome and should be taken into account when supporting individuals with DD in their transition to work.

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1. Introduction

Developmental disorders (DD) are common and increasing, with autism spectrum disorders (ASD) and attention deficit hyperactivity disorders (ADHD) showing the most significant and successive increases over time (Boyle et al., 2011). In the last decade, the prevalence rate of ASD has increased considerably to 11% (Manning-Courtney et al., 2013; Tchaconas & Adesman, 2013); for ADHD prevalence rates of 3% to 12% are reported, with a 33% increase in prevalence from 1997–1999 to 2006–2008 (Al-Yagon et al., 2013; Boyle et al., 2011; De Graaf et al., 2008; Willcutt, 2012). Moreover, ASD and ADHD seem to be the two most disabling conditions among developmental disorders. However, in the past decade a discussion has risen whether ASD and ADHD are two different disorders, as in the DSM-IV, or whether they are two different dimensions of the same developmental disorder. Several studies reported a considerable prevalence of ADHD symptoms, i.e. inattention and hyperactivity, in individuals with ASD (Fombonne, Simmons, Ford, Meltzer, & Goodman, 2001; Gillberg & Billstedt, 2000; Lecavalier, 2006; Sverd, 2003). Furthermore, many individuals with ADHD share autistic traits and experience difficulty in social interaction, considered a significant element of ASD (Gjervan, Torgersen, Nordahl, & Rasmussen, 2012; Reiersen, Constantino, Grimmer, Martin, & Todd, 2008; Ronald, Edelson, Asherson, & Saudino, 2010).

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It is well-established that individuals diagnosed with ASD as well as ADHD suffer from problems in daily life functioning and that this hampers their work participation (Barkley, Fischer, Smallish, & Fletcher, 2006; Boeltzig, Timmons, & Butterworth, 2008; Burke, Andersen, Bowen, Howard, & Allen, 2010; Cimera & Cowan, 2009; De Graaf et al., 2008; Frazier, Youngstrom, Glutting, & Watkins, 2007; Gjervan et al., 2012; Halmoy, Fasmer, Gillberg, & Haavik, 2009; Kuriyan et al., 2013).

1.1. Autism spectrum disorders and employment

Individuals with ASD experience impairments in social and communicative skills that limit their work functioning, leading to underutilization of skills and a limited range of work experiences (Burke et al., 2010; Cimera & Cowan, 2009). Among people with ASD, research showed employment rates from less than 10% to 50% (Billstedt, Gillberg, & Gillberg, 2005; Engstrom, Ekstrom, & Emilsson, 2003; Shattuck et al., 2012; Wagner, Newman, Cameto, Garza, & Levine, 2005). These employment rates are considerably lower than the employment rate in the general population which exceeds 65% in most developed countries (Lysaght, Ouellette-Kuntz, & Lin, 2012). Furthermore, individuals with ASD represent a significant percentage of the young adults claiming disability benefits; data of the Dutch Social Security Institute suggest that about 15% of the young disabled applying for a social security benefit has ASD (UWV, 2011). Moreover, individuals with ASD experienced unemployment and underemployment more often, worked far fewer hours than most of the other disability groups and the majority of jobs were unskilled and poorly paid (Burke et al., 2010; Cimera & Cowan, 2009; Eaves & Ho, 2008; Howlin, Alcock, & Burkin, 2005; Taylor & Seltzer, 2011). When studying results of studies which examined variables related to employment among persons with autism, personal as well as social factors were reported. Limited cognitive ability, lack of drive, limited functional independence, low parental support and institutionalization were found to hinder individuals with autism in their work outcomes (Holwerda, van der Klink, Groothoff, & Brouwer, 2012). However, limited cognitive ability was the only strong personal predictor consistently found for work outcome for individuals with ASD.

1.2. Attention deficit disorders and employment

For people with ADHD employment rate estimates ranged between 22 and 54% (Barkley et al., 2006; Gjervan et al., 2012; Halmoy et al., 2009). Individuals with ADHD also represent a significant percentage of the young adults claiming disability benefits (Gjervan et al., 2012; Halmoy et al., 2009). The Dutch Social Security Institute reported that 8% of the young disabled applying for a social security benefit was diagnosed with ADHD (UWV, 2011). Moreover, young adults with ADHD, who are employed, often attain lower status employment, earn lower wages, work part-time more often and experience more unstable employment situations compared to those without (Barkley et al., 2006; Gjervan et al., 2012; Halmoy et al., 2009; Kuriyan et al., 2013).

Prospective longitudinal studies regarding ADHD and employment identified mostly factors related to diagnosis and treatment (Barkley et al., 2006; Gjervan et al., 2012; Halmoy et al., 2009; Hechtman, 1999; Kuriyan et al., 2013; Paternite, Loney, Salisbury, & Whaley, 1999). Few studies took personal factors, as education (Kuriyan et al., 2013) and IQ (Hechtman, 1999), and social factors, as parental involvement in school (Liptak, Kennedy, & Dosa, 2011), socioeconomic status and family adversity (Hechtman, 1999) into account. However, personal and social factors are frequently mentioned by professionals working with these individuals as important predictors for work outcome.

1.3. Sustainable employment

Despite the poor employment outcomes noted above and the high and increasing number of disability claimants in different countries, part of these young adults diagnosed with ASD or ADHD are able to participate in work. As work participation is considered to be an increasingly important health outcome (WHO, 2001) and is associated with benefits which include learning of new skills, development of social relationships and being able to contribute to society (Carter & Lunsford, 2005; Stephens, Collins, & Dodder, 2005), it is important to stimulate young people with disabilities to be active in work. To be able to increase the work participation among individuals with DD, it is important to know which factors influence work outcome in this group and whether these factors are comparable for individuals with ASD and those with ADHD.

Moreover, these prospective longitudinal studies mentioned above, assessed occupational outcomes as unemployment status (Paternite et al., 1999), number of jobs held (Barkley et al., 2006), percentage of job loss (Barkley et al., 2006) or occupational status (Hansen, Weiss, & Last, 1999; Kuriyan et al., 2013; Liptak et al., 2011; Taylor & Seltzer, 2011). None of these focused on sustainable work participation. Sustainable work participation includes finding and maintaining employment over a period of time. As those working with ASD or ADHD often have difficulty maintaining employment (Biederman et al., 2008; Kuriyan et al., 2013; Shattuck et al., 2012) and factors predicting finding work may differ from factors influencing maintaining employment, it is important to take sustainable work participation into account as well.

Therefore, the aim of this study was to investigate which personal and social factors predict work participation, finding work as well as maintaining employment, of young adults with DD, and to examine whether the results for the subgroups of ASD and ADD converge or diverge.

2. Methods

2.1. Sampling and procedure

This study is part of a cohort study called ‘Young Disabled at Work’ examining factors that predict work participation among young adolescents aged 15–27 years applying for a disability benefit at the Dutch Social Security Institute (SSI). In the Netherlands, the SSI is responsible for all work-ability assessments under social security regulations and provides a disability benefit to young adults with any disability who are not able to earn minimum wage independently. Participants eligible for the present study were recruited using registry data from the local SSI offices in the three northern regions in the Netherlands (Groningen, Friesland, Drenthe). For this study only participants with autism spectrum disorders (ASD) and attention deficit disorders (ADD) were included. Diagnosis was based on the insurance physician’s (IP) indication of the primary and/or secondary diagnosis code (CAS code) responsible for the claimant’s disability. This CAS-classification system has been derived from the ICD-10 and developed for use in occupational health and social security in the Netherlands (Ouwehand & Wouters, 1997). Other primary or secondary diagnoses, in addition to autism spectrum disorders and attention deficit disorders were coded as co-morbid conditions. As the literature has shown that individuals with ASD without intellectual disability were more likely to be employed than individuals with ASD and intellectual disability (Taylor & Seltzer, 2011) and that a higher IQ facilitates a positive work outcome (Billstedt, Gillberg, & Gillberg, 2011; Cederlund, Hagberg, Billstedt, Gillberg, & Gillberg, 2008; Eaves & Ho, 2008; Farley et al., 2009; Howlin, 2000; Howlin, Goode, Hutton, & Rutter, 2004), we also took intellectual disability (ID) into account. ID was based on the IP’s classification of diagnosis.

Recruitment started at January 1, 2009 and ended at December 31, 2009 and took place at the beginning of the application process. This process generally lasts for several weeks, with the majority of final decisions taking place within two months (58.9%). The follow-up started in the quarter following the final decision of the SSI regarding the disability benefit. Because the inclusion period lasted one year, the follow-up period per individual ranged from one year and three months to two years and nine months and ended at September 30, 2011 for all participants. All twenty-one IPs employed by the SSI in the three regions participated in the study. During the claim assessment they were asked to fill out a registration form, on which the primary diagnosis and co-morbid conditions of the claimant were filled out. If the claimant was not seen by the IP, he or she was excluded, because no information about medical condition and disability were available. Written consent was provided by all subjects and the Medical Ethics Committee of the University Medical Center Groningen, the Netherlands, approved recruitment, consent and field procedures prior to the study.

2.2. Measures

2.2.1. Dependent factors

The outcome measures, finding work and maintaining employment, were derived from the POLIS register data. The POLIS registry is a database, in which all Dutch workers are included that have earned any wage (from regular, supported or sheltered jobs) in the period concerned. Only paid work – for any number of hours – was included. In the period from December 2008 until September 2011 wage earning in the preceding month was assessed every quarter (twelve measurements). Using these data, we constructed two work outcome measures. Finding work was defined as work at any point during the follow-up. Maintaining employment in this study was defined as work for at least six consecutive months during the follow-up. Only wage earning following disability assessment was taken into account.

2.2.2. Demographics, independent personal and social factors

Demographics (age and gender) were derived from SSI registers and diagnoses from the register forms filled in by the IPs. Preceding the disability assessment the participants were approached to fill out a questionnaire on personal and social factors. Because of the limited cognitive ability of part of the sample, it was not possible to use existing questionnaires. Therefore a questionnaire was developed using themes from the literature and items from other questionnaires which were adapted to be easily comprehensible. If needed, respondents could ask for help from parents or mentors when filling out the questionnaire.

The following five personal factors were included: educational level, self-esteem, self-knowledge, motivation and expectations regarding future work level.

Educational level was assessed by the question “Which education did you follow after primary school?” and divided into three educational groups: (1) Special secondary education/practical education (low), (2) Secondary education/vocational training (middle), and (3) High school/higher education (high).

Self-esteem was measured with six items, e.g. “I often feel insecure” and “I regularly worry about things”, with response options true (0)/not true (1) (GGD Flevoland, 2003). This measure is used by all Dutch Community Health Centres for their assessment of youth public health in the municipalities. The Cronbach’s alpha coefficient was .701. The sum of all items was dichotomized into low self-esteem (scores 0–3) and high self-esteem (scores 4–6).

Self-knowledge was also measured with six items, e.g. “I know which work I can perform well” and “I know my strengths and weaknesses”, with response options agree (1)/neutral (0)/do not agree (0). This measure was used before

in a study regarding the pathway to work for young people with conduct disorders (De Vos, 2008). The Cronbach's alpha coefficient was .968. The sum of all items was dichotomized into poor self-knowledge (scores 0–3) and good self-knowledge (scores 4–6).

Motivation was measured with ten self-constructed items, e.g. "I like to earn (my own) money" and "I like to develop my skills", with response options true (1)/not true (0). The themes of the items were derived from another study regarding predictors for return to work (Brouwer et al., 2011). The Cronbach's alpha coefficient was .723. The sum of all items was dichotomized into low motivation (scores 0–7) and high motivation (scores 8–10).

Expectations of young disabled regarding work was measured with one self-constructed question "Do you think you are able to work in regular employment?" with response options yes, completely/yes, partly/no.

The following five social factors were included: living situation, perceived support from parents, perceived support in general, attitude of parent and attitude social environment regarding work for the young adult with DD.

Living situation was based on the respondent's response on two questions "What is your living situation?" with response options Parental home/Own place/Student home/Sheltered home/Institution or Hospital/Other and "Who is living there with you?". These questions were adapted from the 'Tracking Adolescents' Individual Lives' Survey' (TRAILS) questionnaire T4Youth based on the National Monitor Youth Health in the Netherlands (RIVM, 2005). Subsequently four mutually exclusive groups were constructed: (1) living independently with or without partner, (2) living with parents/family/foster family, (3) living in a supported/sheltered home, and (4) other living situations.

Perceived support from parents was measured by five self-constructed items, e.g. "My parents help me with problems" and "My parents support me when I am down", with response options true (1)/not true (0). These items were pilot-tested by 47 young adults with disabilities working in sheltered workshops and supported employment. The Cronbach's alpha coefficient was .784. The sum of all items was dichotomized in low perceived support (scores 0–3) and high perceived support (scores 4–5).

Perceived support in general was measured by six items, e.g. 'I have people to talk to' and "There are people I can always rely on", with response options true (1)/not true (0). The Cronbach's alpha coefficient was .442. These items were adapted from the POLS Youth questionnaire (Permanent Study of Living Situation), which is a population based study, conducted every two years to gain understanding of the health and living situation of young people from 12 to 29 years of age in the Netherlands (Statistics Netherlands, 2005). The sum of all items was dichotomized in low perceived support (scores 0–4) and high perceived support (scores 5–6).

Attitude of parents regarding work for young adult with DD was measured by one question "How important is it for your parents that you will find or retain work?" with response options very important/important/not important/I don't know/other". This measure was used before in a study regarding the pathway to work for young people with conduct disorders (De Vos, 2008). These responses were dichotomized into 'parent considers work important' and 'parent considers work not important or attitude is unknown'.

Attitude of social environment regarding work for young adult with DD was measured by one question "How important is it for your environment that you will find or retain work?" with response options very important/important/not important/I don't know/other. This measure was used before in a study regarding the pathway to work for young people with conduct disorders (De Vos, 2008). These responses were dichotomized into 'environment considers work important' and 'environment considers work not important or attitude is unknown'.

2.2.3. Statistical analyses

Cox regression (survival) analyses were conducted in order to examine which factors predicted work-outcome. Separate analyses were conducted for finding work and maintaining employment. Subgroup analyses were conducted for the group with ASD and those with ADD separately. In the Cox regression, we entered the independent factors to the model simultaneously and performed a backward regression analysis. Interactions between intellectual disability (ID) (yes/no) and all the potential predictors were tested to examine whether predictors would differ for individuals with and without ID. An alpha of 0.05 was used for statistical tests in both models for the complete sample. For the subgroup analysis an alpha of 0.10 was used, because the number of cases in both groups was limited, especially with regard to maintaining employment. Because we had a considerable number of missing values for the personal and social covariates, we imputed missing data for these factors. Data were imputed using chained imputations (van Buuren, 2007) with an imputation model consisting of all the personal and social potential predictors regressed on the following factors for which we had complete data: age, gender, diagnosis (ASD or ADHD or both), co-morbid developmental disability (yes/no), the factors indicating finding work and maintaining employment and the Nelson–Aalen estimator for the cumulative baseline hazard of the outcome (White & Royston, 2009). The multiple imputations (MI) were done separately for finding work and maintaining employment using the same imputation model except for the Nelson–Aalen estimators for the two separate work outcomes. Traceplots of means and sd's of imputed factors were checked for convergence. After we had observed convergence from the traceplots, we applied Rubin's rules to derive regression coefficients for our potential predictors. In this process, we also examined whether the number of imputations influenced the results and found that results were stable after 50 imputations, which was used in the final analyses. Finally, complete case analyses were compared with the results from the imputed datasets to examine whether unexpected or extreme differences occurred. All analyses were conducted in STATA 12.1.

3. Results

3.1. Description of the sample

The sample consisted of 879 individuals. We excluded 61 individuals from the analysis, because they already worked at baseline and thus were not at risk to enter into employment. Of the applicants with DD included in the study ($n = 818$), 68.8 percent filled in the baseline questionnaire ($n = 563$). These respondents did not differ from non-respondents with regard to age, gender and education, but did differ regarding living situation; respondents were more likely to live in residential placement or sheltered accommodation.

The cases included in the analysis consisted of 401 men (71.2%) and 162 women (28.8%), with a mean age of 19.4 years (SD 2.4), of whom 62 were younger than 18 years of age. Of the sample, 48.8% was still in the transition from school to work when applying for a disability benefit. Of the subjects, 31.6% found work in the 18 months following claim assessment ($n = 178$), of whom 60.7% dropped out ($n = 108$) and 39.3% ($n = 70$) worked for at least six months. Most of the subjects had a middle educational background (53.4%) and the majority lived with parents or family (71.7%). Most individuals had an autism spectrum disorder (49.4%; $n = 278$), 30.9% had ADHD ($n = 174$) and 19.7% had both diagnoses ($n = 111$). One hundred and thirty-nine subjects (24.7%) had two or more developmental disorders. Of the subjects, 62.7% had a poor self-knowledge; 81.1% were highly motivated. The majority of subjects experienced high perceived support from parents (73.6%) and their social environment (82.3%) (Tables 1 and 2).

3.2. Predictors of finding work

The results of the survival analyses are presented in Table 3. Six factors remained in the final model predicting finding work in individuals with DD, three personal and three social factors.

Table 1
Personal characteristics of respondents with developmental disorders.

	Total N (%)	No work N (%)	Finding work ^a N (%)	Maintaining employment N (%)
Work outcome	563 (100%)	385 (68.4%)	108 (19.2%)	70 (12.4%)
Gender (data SSI)				
Male	401 (100%)	261 (65.1%)	81 (20.2%)	59 (14.7%)
Female	162 (100%)	124 (76.5%)	27 (16.7%)	11 (6.8%)
Age (data SSI)				
15–20 years	437 (100%)	303 (69.3%)	86 (19.7%)	48 (11.0%)
21–27 years	126 (100%)	82 (65.1%)	22 (17.5%)	22 (17.5%)
Type developmental disorders (data SSI)				
Autism spectrum disorder	278 (100%)	193 (69.4%)	46 (16.5%)	39 (14.0%)
Attention deficit disorder	174 (100%)	110 (63.2%)	44 (25.3%)	20 (11.5%)
Both ASD and ADD	111 (100%)	82 (73.9%)	18 (16.2%)	11 (9.9%)
Number of developmental disorders (data SSI)				
One developmental disorder	424 (100%)	286 (67.5%)	82 (19.3%)	56 (13.2%)
Two or more developmental disorders	139 (100%)	99 (71.2%)	26 (18.7%)	14 (10.1%)
Highest education ^b ($n = 537$)				
Low	184 (100%)	126 (68.5%)	35 (19.0%)	23 (12.5%)
Middle	287 (100%)	191 (66.6%)	58 (20.2%)	38 (13.2%)
High	66 (100%)	47 (71.2%)	12 (18.2%)	7 (10.6%)
Living arrangements ^b ($n = 515$)				
Living independently (with or without partner)	48 (100%)	29 (60.4%)	12 (25.0%)	7 (14.6%)
Living with parents/family/foster family	369 (100%)	242 (65.6%)	74 (20.1%)	53 (14.4%)
Residential placement/sheltered accommodation	71 (100%)	57 (80.3%)	7 (9.9%)	7 (9.9%)
Other living situation	27 (100%)	19 (70.4%)	7 (25.9%)	1 (3.7%)
Expectations future work level ^b ($n = 563$)				
Completely able to work in competitive employment	74 (100%)	29 (39.2%)	30 (40.5%)	15 (20.3%)
Partly able to work in competitive employment	218 (100%)	149 (68.3%)	42 (19.3%)	27 (12.4%)
Not able to work in competitive employment	184 (100%)	142 (77.2%)	19 (10.3%)	23 (12.5%)
Unknown	87 (100%)	65 (74.7%)	17 (19.5%)	5 (5.7%)
Self-esteem ^b ($n = 488$)				
Low self-esteem	216 (100%)	143 (66.2%)	45 (20.8%)	28 (13.0%)
High self-esteem	272 (100%)	187 (68.8%)	50 (18.4%)	35 (12.9%)
Self-knowledge ^b ($n = 496$)				
Poor self-knowledge	311 (100%)	216 (69.5%)	51 (16.4%)	44 (14.1%)
Good self-knowledge	185 (100%)	118 (63.8%)	46 (24.9%)	21 (11.4%)
Motivation ^b ($n = 492$)				
Low motivation	93 (100%)	69 (74.2%)	15 (16.1%)	9 (9.7%)
High motivation	399 (100%)	258 (64.7%)	84 (21.1%)	57 (14.3%)

^a Individuals finding work but not maintaining employment for at least 6 months are described in this column.

^b Self-report by individuals with DD.

Table 2
Social characteristics of respondents with developmental disorders.

Social factors	Total N (%)	No work N (%)	Finding work ^a N (%)	Maintaining employment N (%)
Perceived support from parents ^b (n = 497)				
Low perceived support	131 (100%)	80 (61.1%)	36 (27.5%)	15 (11.5%)
High perceived support	366 (100%)	255 (69.7%)	61 (16.7%)	50 (13.7%)
Perceived support in general ^b (n = 462)				
Low perceived support	82 (100%)	57 (69.5%)	17 (20.7%)	8 (9.8%)
High perceived support	380 (100%)	254 (66.8%)	75 (19.7%)	51 (13.4%)
Attitude of parents regarding work ^b (n = 501)				
Considers work important	391 (100%)	249 (63.7%)	84 (21.5%)	58 (14.8%)
Considers work not important or unknown	110 (100%)	90 (81.8%)	14 (12.7%)	6 (5.5%)
Attitude of social environment regarding work ^b (n = 498)				
Considers work important	291 (100%)	182 (62.5%)	60 (20.6%)	49 (16.8%)
Considers work not important or unknown	207 (100%)	152 (73.4%)	39 (18.8%)	16 (7.7%)

^a Individuals finding work but not maintaining employment for at least 6 months are described in this column.

^b Self-report by individuals with DD.

Gender, living situation and expectations regarding future work level were found as personal predictors for finding work. The Hazard Ratios (HR) indicate the size of the effect. Males were 1.62 times more likely (HR = 1.62, 95%CI 1.12–2.36), and individuals living independently were 2.43 times more likely (HR = 2.43, 95%CI 1.21–4.89) to find work compared to their counterparts. In addition, participants who expected to be able to work fulltime (HR = 2.88, 95%CI 1.87–4.46) were more likely to find work than those expecting not to be able to work.

Perceived support from parents and attitude of parents regarding work by young adults with DD were found as social factors predicting finding work. Individuals who experienced high parental support were less likely to find work than individuals with a low perceived support from parents (HR = 0.67, 95%CI 0.47–0.95), whereas those whose parents considered work important for their young adult (HR = 1.99, 95%CI 1.19–3.31) were more likely to find work compared to their counterparts.

In the subgroup analysis for individuals with ASD, living situation, expectations regarding future work level and motivation were found as predictors for finding work. Individuals with ASD living independently (HR = 5.57, 90%CI 2.25–13.75) or living with parents or family (HR = 2.30, 90%CI 1.13–4.66), those expecting to be able to work fulltime (HR = 2.96, 90%CI 1.78–4.93) and those who were highly motivated (HR = 2.18, 90%CI 1.15–4.14) were more likely to find work compared to their counterparts.

In the subgroup analysis for individuals with ADD, gender, expectations regarding future work level and attitude of social environment regarding work were found as predictors for finding work. Males (HR = 2.92, 90%CI 1.67–5.10), those expecting to be able to work fulltime (HR = 2.41, 90%CI 1.30–4.47) and those whose social environment considered work important (HR = 1.80, 90%CI 1.10–2.98) were more likely to find work compared to their counterparts.

No significant interactions between the presence of intellectual disability and the potential predictors were found.

3.3. Predictors of maintaining employment

Three factors remained in the final model predicting maintaining employment in individuals with DD, two personal and one social factor (see Table 3). Being male (HR = 2.30, 95%CI 1.20–4.38) and higher age (HR = 1.10, 95%CI 1.01–1.20) were the two personal factors predicting maintaining employment. Positive attitude of social environment regarding work (HR = 2.45, 95%CI 1.40–4.32) were the two social factors predicting maintaining employment.

In the subgroup analysis for individuals with ASD, living situation (HR = 4.22, 90%CI 1.08–16.47) and positive attitude of social environment regarding work (HR = 2.50, 90%CI 1.33–4.70) were the two factors predicting maintaining employment. In the subgroup analysis for individuals with ADD, gender (HR = 5.26, 90%CI 1.54–17.93) was the only factor predicting maintaining employment.

No significant interactions between the presence of intellectual disability and the potential predictors were found.

3.4. Comparisons with complete case analyses

Cox regression analyses on complete cases using all potential predictors (Method Enter) yielded coefficients of the same relative magnitude and direction as compared to the multiple imputation (MI) Cox regression analyses with all potential predictors for finding and maintaining employment. The largest deviation was seen for attitude of parents regarding work, which was not related to maintaining employment in the complete case analysis (HR 0.99 95%CI: 0.35–2.80), whereas it was positively (although not statistically significantly) related in the MI analysis (HR 1.87, 95%CI: 0.71–4.91).

Table 3
Results final model of STATA multivariate survival analysis ($p < 0.05$) for work outcome with a backwards regression procedure.^a

Perspective SSI and individuals DD Variables	Finding work (yes/no)										Maintaining employment (yes/no)													
	ASD and ADD				ASD ^b				ADD ^b				ASD and ADD				ASD ^b				ADD ^b			
	HR	95%CI Lower	95%CI Upper	<i>p</i>	HR	90%CI Lower	90%CI Upper	<i>p</i>	HR	90%CI Lower	90%CI Upper	<i>p</i>	HR	95%CI Lower	95%CI Upper	<i>p</i> -value	HR	90%CI Lower	90%CI Upper	<i>p</i>	HR	90%CI Lower	90%CI Upper	<i>p</i>
Gender (male)	1.62	1.12	2.36	0.011					2.92	1.67	5.10	0.002	2.30	1.20	4.38	0.012					5.26	1.54	17.93	0.026
Age													1.10	1.01	1.20	0.034								
Personal variables																								
Living arrangements (ref Residential placement/sheltered accommodation)																								
Living independently (with or without partner)	2.43	1.21	4.89	0.013	5.57	2.25	13.75	0.002									4.22	1.08	16.47	0.082				
Living with parents/family/foster family	1.65	0.94	2.88	0.079	2.30	1.13	4.66	0.053									2.50	0.92	6.80	0.131				
Expectations regarding future work level (ref not able to work)																								
Fulltime in a regular job	2.88	1.87	4.46	0.000	2.96	1.78	4.93	0.000	2.41	1.30	4.47	0.019												
Part-time in a regular job	1.18	0.79	1.76	0.424	1.30	0.80	2.12	0.374	1.06	0.61	1.85	0.856												
Self-esteem																								
Self-knowledge					2.18	1.15	4.14	0.045																
Social variables																								
Perceived support from parents (high)	0.67	0.47	0.95	0.024																				
Perceived support in general (high)																								
Parents consider work important (yes)	1.99	1.19	3.31	0.008																				
Environment considers work important (yes)									1.80	1.10	2.98	0.051	2.45	1.40	4.32	0.002	2.50	1.33	4.70	0.017				

^a Because of the considerable number of missing values for the covariates, missing data for these variables were imputed.

^b Because of the small sample sizes of the subgroups with ASD and ADD, especially with regard to maintaining employment, and the subsequent limited power, an alpha of 0.10 was used for the subgroup analyses.

4. Discussion and conclusion

In this study we found that several factors predicted finding and maintaining work, one of which overlapped for both outcomes, whereas most only predicted one of the outcomes. Being male was the only factor predicting both finding and maintaining work and this applied to the total sample as well as the sample with ADD, but not the ASD-sample. Living independently, expectations to be able to work fulltime and lower perceived parental support and positive attitude of parents regarding work were only related to finding work, whereas higher age and positive attitude of environment regarding work predicted maintaining employment.

In contrast to the premise stated in the introduction, that ASD and ADHD may represent two dimensions of the same developmental disorder, our results suggest that although the disorders may have traits in common and may even result in the same limited vocational outcomes, the factors influencing this work outcome for ASD and ADD differ. Living situation and motivation appeared to be only influential for individuals with ASD, while gender only influenced work outcome for individuals with ADD.

Previous studies also found that men were more likely to participate in work compared to women (Benz, Doren, & Yovanoff, 1998; Coutinho, Oswald, & Best, 2006). In our sample 37% of the men were working compared to 28% of the women. In our subgroup analyses, we found gender only predicting work outcome for individuals with ADD, not for those with ASD. As the symptoms of the disorder may be expressed differently in women and men, this may cause a different developmental path for both genders. Several studies mentioned that self-esteem in young women with disabilities is often lower than in their male counterparts, influencing poorer employment outcomes (Benz et al., 1998; Fulton & Sabornie, 1994). This is confirmed by our study: 32% of the women had high self-esteem compared to 48% of the men ($p = 0.001$). This might also be the reason that more females in our study (44%) expected not to be able to work than men (34%). Another hypothesis is that girls may receive another kind of support from their parents, who may want to protect their girls, being afraid the many stimuli in the work place may be detrimental to their daughters health. Moreover, more women with disabilities than men are married and experience early parenting responsibilities, perhaps preventing many of them to be engaged in employment (Benz et al., 1998; Coutinho et al., 2006; Fulton & Sabornie, 1994; Wagner, 1992). This is corroborated by our study results that showed that significantly more women than men were living with partner and may have had children. Finally, literature suggests that the disadvantage of young women with disabilities on the labour market may also result from the lack of appropriate services they receive during their education (Benz et al., 1998; Fulton & Sabornie, 1994; Wagner, 1992). Women may need different services and vocational training for the transition into independent adulthood (Fulton & Sabornie, 1994; Wagner, 1992).

Results showed that expectations concerning work outcomes of individuals with DD themselves, for the complete sample as well as for the separate groups of individuals with ASD or ADD, were a strong predictor of finding work. When individuals expected themselves to be able to work fulltime, they were more likely to find work than individuals who did not expect themselves to be able to work. These expectations may be realistic and therefore predict work outcome. But, it might also be that optimistic expectations stimulate the individual to search for and find work. Once employed other, e.g. work-related, factors may influence the effect of expectations on maintaining employment. This is in accordance with the finding, that individuals with ADHD had a greater job instability than their peers, because of being fired, being laid off or quitting because of dislike (Kuriyan et al., 2013).

Besides personal factors we found that several social factors are important predictors for finding and maintaining employment for individuals with DD. Other research has indicated that family members and friends influence the career of individuals with disabilities by role modelling and sharing information regarding their own occupations and their expectations for the individual (Eisenman, 2007). As described in the literature, parents play a major role in the transition to work for individuals with DD (Howlin, 2000; Howlin et al., 2004). Parents may stimulate their adolescent in finding work, but also be an intermediate in negotiating a job with an employer. Besides providing positive support, parents may also overprotect their child, being wary of detrimental effects of work for their young adult with DD. This may explain our counterintuitive results on parental support, i.e. lower perceived social support from parents has been found to be a predictor for finding work. When comparing the level of perceived support from parents with diagnosis and presence of intellectual disability, we found that diagnosis was not related to the level of perceived social support of parents, but intellectual disability was. Individuals with DD and an intellectual disability reported higher perceived support of parents, than individuals with DD, but no intellectual disability. As the literature has shown that individuals with ASD and intellectual disability were less likely to be employed than individuals with ASD without intellectual disability (Taylor & Seltzer, 2011), this may also explain our finding.

In contrast to the results for the complete sample, we did not find a parental influence on individuals with ASD or ADD in the subgroup analysis.

In our study we found that a positive attitude from the social environment (e.g. friends and neighbours) predicted maintaining employment for the complete sample as well as for individuals with ASD. In contrast, a positive attitude from the social environment predicted finding work for individuals with ADD. In literature it has been confirmed that friends and neighbours can also be a role model for individuals with DD in showing employment as a valued aspect of adulthood (Jennes-Coussens, Magill-Evans, & Koning, 2006). Furthermore, as the social network of working individuals with DD broadens (Ridley & Hunter, 2006), their social environment may also encourage them to maintain employment.

4.1. Strengths and limitations of the study

The strengths of this study are the size of our sample, the longitudinal design and the use of register data for work outcome, measured quarterly, allowing accurate assessment of work outcome during the follow-up for the complete sample.

However, some limitations must be taken into account as well. First, we did not know whether individuals that were still in education at the start of the study, finished their education during the follow-up and therefore some may not have been able to participate in work during the follow-up because of this. However, we know that more than half of the subjects (51.2%) had left school at the start of the study. We hypothesize that because of the generally low educational attainment of individuals with DD, the others will have left school during the follow-up and will have been available for the labour market as well.

Work outcome was measured quarterly, so we may not have captured work performed in the months in between. Individuals may have found work, but not maintained it until the following measurement. With regard to maintaining employment, individuals may have found work, lost their job, but found new work before the following measurement. In this case sustainability is suggested, but in reality transitions may have taken place. However, it seems reasonable that the vast majority of individuals did not find more than two subsequent jobs in six months, so the measurement error was presumably small.

Because of the limited cognitive ability of part of the sample, a questionnaire was developed using themes from the literature and items from other questionnaires which were adapted to be easily comprehensible. In general the Cronbach's alpha coefficients were adequate, ranging from .701 to .968. However, the Cronbach's alpha coefficient for perceived support in general was .442 even though these items were adapted from the population based survey POLS Youth (Permanent Study of Living Situation). We presume the low Cronbach's alpha is related to the difficulty individuals with DD generally have with social contacts (Holwerda et al., 2012; Howlin et al., 2004; Jennes-Coussens et al., 2006).

Finally, although we had a considerable sample size, only a relatively small number of individuals found and maintained employment. Therefore, we used an alpha of 0.10 in our subgroup analyses in order to increase our statistical power. However, this increased the probability of a type I error which might have resulted in false positive findings.

4.2. Conclusion

In conclusion, the results from our study indicate that both personal and social factors are important in predicting work outcome, and that predictors for finding work differ substantially from predictors for maintaining employment. Living situation and motivation appeared to be only influential for individuals with ASD, while gender only influenced work outcome for individuals with ADD. Besides socio-demographic characteristics (age, gender, living situation) we found that expectations regarding future work level by the DD – individuals themselves is an important predictor for finding work. As this factor is a modifiable factor, it is important for professionals to take the expectations of individuals with DD into account when supporting these individuals to find work. Especially negative expectations may hinder individuals to find work and professionals may encourage these individuals to focus on acquired skills and positive traits to enhance their chances to find work. As the social context of individuals with DD seem to play a major role in finding and maintaining work, we suggest they need to be taken into account as well by professionals working with individuals with DD in their transition to find work. Moreover, adequate support should be organized for the working individual with DD to be able to maintain employment.

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