

## Social and Vocational Skills Training Reduces Self-reported Anxiety and Depression Among Young Adults on the Autism Spectrum

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**Abstract** Those with autism spectrum disorders (ASD) frequently experience high levels of anxiety and depression. These psychological factors may be related to some of the core challenges seen among those with ASD, including social difficulties. We examined whether a social and vocational skills intervention program for adolescents and young adults on the autism spectrum would yield a broader impact that partially alleviated these psychological factors. Following the intervention program participants reported significantly lower depression and anxiety. Responses on a measure of peer relationships were also improved post-intervention, although this did not reach significance. Although preliminary, our findings demonstrate the broader, positive impact that such programs may have.

**Keywords** Asperger’s syndrome · Vocational support · Social skills, anxiety, depression, peer relationships

Those on the autism spectrum (e.g., Asperger’s syndrome, autism, pervasive developmental disorder – not otherwise specified) often experience high levels of stress, co-morbid anxiety disorders (Brereton et al. 2006; Goodwin et al. 2007; Leyfer et al. 2006), and depression (Brereton et al. 2006; Leyfer et al. 2006; Sterling et al. 2008; Stewart et al. 2006; Vickerstaff et al. 2007). For this

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population these psychological factors may be inter-related to some of the core challenges seen among those with autism spectrum disorders (ASD) such as the need for consistency, repetition, and routine, difficulties in communication, and social challenges.

There is growing evidence that difficulties with anxiety are a common feature of autism spectrum disorders (Kuusikko et al. 2008). Characteristics of ASD, such as fear of change and uncertainty may cause anxiety (Stewart et al. 2006). Recent evidence indicates that anxiety increases from toddlerhood to childhood, and then again in older adulthood among those with ASD (Davis et al. 2011). In relation to social challenges and anxiety, Kuusikko et al. (2008) found that children and adolescents on the high functioning end of the autism spectrum ( $n=54$ ) reported more social anxiety symptoms than a matched control group ( $n=305$ ). Participants with ASD also reported an increase in social anxiety as they grew older whereas the control group reported a decrease. Kim et al. (2000) found that children with ASD with anxiety and mood problems also had poorer relationships with others, including peers compared to a control group. Gillott et al. (2006) found higher levels of general anxiety and social anxiety in children with autism as compared to a typically developing control group, and a control group with specific language impairment. Whether factors such as anxiety impair the individual's ability to interact with others effectively, or whether social interaction difficulties lead to increased anxiety remains unclear and could be bidirectional (White and Roberson-Nay 2009). Certainly social skills, relationships with peers, and anxiety are closely intertwined. Treating anxiety and depression could therefore improve other symptoms seen in ASD (Kelly et al. 2008).

Research on depression among those with ASD is currently limited (Hedley and Young 2006), and more work is needed to fully understand the presentation of depression in ASD. Like anxiety, depressive symptoms may present differently in this population and might be masked by characteristics associated with ASD such as social withdrawal, neutral facial expression, and self-injurious behavior. Among those who are higher functioning, depression may partly stem from increased awareness and insight into their own challenges and behavior (Attwood 2008; Sterling et al. 2008). Recognizing that peers are frequently socializing together and forming mutually rewarding relationships could undermine feelings of competence and self-esteem. In relation to this, Vickerstaff et al. (2007) found that high IQ predicted low self-perceived social competence among children on the autism spectrum, and those who saw themselves as less socially competent reported higher levels of depression. Also, those who perceived themselves as more dissimilar to others reported higher rates of depression (Hedley and Young 2006).

Social challenges may lead to rejection and isolation from peers. Those with ASD are often victims of bullying and harassment by their peers (Attwood 2008), which during adolescence could be particularly damaging. Certainly the consequences of victimization have been firmly established in the literature, and have been linked with severe emotional problems (e.g., Kaltiala-Heino 2010; Kim and Leventhal 2008), and suicidal thoughts (Shtayermman 2007). According to Fitzgerald (2007) individuals with Asperger's syndrome may have a much greater risk of suicide than has previously been recognized, which highlights the urgency to develop effective interventions that impact these challenges.

It is unclear why those on the autism spectrum have such high rates of comorbid disorders (Leyfer et al. 2006). Various genetic, neurobiological, developmental and environmental risk factors have been implicated. What is clear is that quality of life and long term outcomes could be jeopardized by coexisting psychiatric conditions (Sterling et al. 2008). As children grow older, social interactions become more complex and therefore more challenging for those with ASD whose differences may become increasingly apparent (White and Roberson-Nay 2009). Designing interventions focused on adolescent and young adult age ranges seems particularly crucial.

Given the interrelationships between anxiety, depression, and social challenges it seems that interventions that focus on improving social skills could potentially yield a broader impact that helps alleviate these other psychological factors. Effective program interventions for those with autism spectrum disorders (ASD) are relatively scarce, particularly those aimed at adolescents and young adults for whom few services exist post high-school transition (Turner-Brown et al. 2009). Further, empirical evaluations of interventions are seriously lacking despite the greater demand for evidence-based best practice (Simpson 2005). As the need for programs for adolescents and young adults continues to increase with rising ASD prevalence rates (Matson and Kozlowski 2011; Waterhouse 2008), higher standards will be placed on programs to demonstrate effectiveness.

This paper reports on a social and vocational skills program specifically designed to address the needs of adolescents and young adults with ASD. Our previous work (Hillier et al. 2007) focused on the impact of our program model on empathy, attitudes towards peers, and characteristics of autism as measured by the Autism Spectrum Quotient (Baron-Cohen et al. 2001). This paper builds on this previous work with a focus on reducing feelings of anxiety and depression as these are such prevalent and disabling symptoms for those on the autism spectrum. Few previous studies have examined the broader outcomes for social skills interventions, such as a reduction in anxiety and depression, despite the prevalence of these comorbid conditions among those with ASD. In addition, although our evaluation is preliminary we include a large group of participants ( $n=49$ ), which contrasts with much of the previous work in this area where participant numbers are typically small. However, our work on this program is primarily as an intervention program, not as a research project.

## Method

### Participants

Forty nine young adults on the autism spectrum participated in this program evaluation. This pool was combined across nine separate groups of the Aspirations social and vocational skills program, with between 5 and 7 participants in each group. Four of the groups were based at one university under the guidance of TF and JS, the remaining five groups took place at a second university under the guidance of AH. Data collection took place between 2005 and 2009. There were 7 females and 42 males aged between 18 and 28 years with an average age of 21 years. Most participants were Caucasian with one African American, one Hispanic, and three participants of Asian descent.

To be eligible for the program participants had to be between 18 and 30 years of age, and were required to provide proof of a prior DSM-IV based diagnosis of an autism spectrum disorder (ASD) by an appropriate professional (e.g. clinical psychologist, psychiatrist), and have no severe behavioral challenges. Forty-two had a diagnosis of AS, six had a diagnosis of high functioning autism, and one had a diagnosis of PDD-NOS. Participants were considered to be “high functioning” in that they were able to fully participate in the group discussion including following and contributing to the conversation, and did not exhibit behavioral challenges. For those whom had IQ data available ( $n=28$ ), average full-scale IQ scores were 99.39 with a range from 75–135.

Group members were recruited via brochures describing the program sent to targeted referral sources including clinicians serving the ASD population, and local, and regional organizations who serve those with ASD and other developmental disabilities. Participants of previous programs run at the universities for those with ASD were also sent flyers. In addition, the program was advertised on our own university websites. Interested participants and / or their families then contacted the authors either by email or telephone to obtain further details. Prior to the groups beginning participants completed an enrollment form which served as an initial screening for appropriateness for the program. They also provided detailed developmental histories including past and current evaluation information, neuropsychological reports, and participated in an intake interview with their parent(s) / guardian(s). Participants paid \$150 to participate in the program. Scholarships were available for those who couldn't afford the fee so that no-one was excluded on financial grounds. Written informed consent was obtained from all participants in accordance with the regulations of the two universities' Institutional Review Boards.

## Procedure

### *Program Model*

The Aspirations program model has been previously described (Hillier et al. 2007), and therefore will only be briefly overviewed here. The Aspirations program consisted of eight one-hour weekly meetings with small groups of between five to seven participants. The curriculum had a discussion based format and was focused on improving social and vocational skills. Topics in the curriculum were planned around a specific objective based on the needs of those in the autism community which have been described in the literature (Cederlund et al. 2008; Demurie et al. 2011; Eaves and Ho 2008; Lord 2010; Stichter et al. 2010). The curriculum covered: Introductions (week 1), Social Communication (week 2), Relationships (week 3), Social event (going out for pizza; week 4), Independent Living (week 5), Independence and College (week 6), Employment (week 7), Conclusion and Review (week 8).

The sessions were designed to be directed by the group members with the group facilitators simply guiding the discussion and ensuring participants remained on topic. Group facilitators were program staff (AH, TF and / or JS) and a graduate or undergraduate university student. Participants sat in a semi-circle to facilitate

discussion. Group members learned and gained greater understanding by sharing personal experiences and listening to those of others, by giving each other advice, and by creating problem solving strategies as a group. Each session began with a group facilitator introducing the topic for that session and areas to be covered. Each session ended with a review of what had been covered and by asking the group members what they had learned that session.

### *Evaluation*

Participants completed questionnaires 2-3 weeks before and at the end of their participation in the Aspirations program. Questionnaires included a measure of depression which questioned participants' feelings of sadness, pessimism, guilt etc. (BDI-II: Beck Depression Inventory; Beck et al. 1996). The BDI has shown high levels of internal consistency with an alpha coefficient of .86 (Beck and Steer 1984). Participants also completed a measure of anxiety where they responded to self-descriptive statements such as "I feel nervous and restless," "I feel secure," "I get in a state of tension or turmoil as I think over my recent concerns and interests," "I feel pleasant," "I feel inadequate" etc. (STAI: State-Trait Anxiety Inventory; Spielberger et al. 1983). Responses were on a scale of "almost never," "sometimes," "often," or "almost always". The STAI is a widely used measure of anxiety which has shown good reliability with test re-test correlation coefficients ranging from .65 to .86 (Spielberger et al. 1983). We also chose this test as it requires simple responses, is quick to administer (only has 20 questions), and is at a sixth grade reading level.

Thirdly, the Index of Peer Relations (IPR: Hudson 1992) was used as a measure of attitudes and feelings towards peers. This was measure was introduced after two of our nine groups had already been completed, therefore, only 36 participants completed this measure. This measure questioned how the participant viewed and evaluated those in their peer group, and whether they were accepted and liked by their peer group. Participants rated their peer relations (e.g. "I get along well with my peers," "My peers treat me badly," "My peers really seem to respect me," "My peers don't seem to even notice me" etc.) on a scale of 1 to 7 with 1 representing 'none of the time' and 7 representing 'all of the time'. The IPR has demonstrated excellent reliability and validity (Hudson et al. 1990), with reliability alpha coefficients of over .90 and support for the construct, discriminant, and factorial validity of the IPR (Klein et al. 1990).

It took around 30 min to complete the questionnaires. Not all participants completed all the questionnaires depending on their motivation. This resulted in three participants not completing the STAI and three participants choosing not to complete the BDI. Two additional participants had multiple missing responses on the BDI and that measure was excluded. There were no age or gender differences among those who chose not to complete one or more of the measures. Responses on the questionnaires were compared pre and post participation in the Aspirations program. We hypothesized that our program model and curriculum, as well as the experience of meeting and making connections with others on the autism spectrum, would facilitate a reduction in feelings of depression and anxiety, as well as more positive attitudes towards peers.

## Results

Responses on the questionnaires were compared pre and post participation in the Aspirations program. Data was analyzed non-parametrically due to the type of data (Wilcoxon signed ranks test), and hypotheses were two-tailed. Results are summarized in Table 1.

Participants reported significantly reduced anxiety after their participation in the Aspirations program compared to before with lower scores on the State-Trait Anxiety Inventory (STAI; Spielberger et al. 1983). The STAI consists of a four point rating scale, and this finding indicates that the participants were shifting their responses on the scale toward reporting fewer feelings of anxiety after participating in our program, although the effect size was small (Cohen's  $d=0.21$ ). Also, there was large variance in the responses between participants. Pre-intervention scores ranged from a low of 31 to a high of 131 (high score = more anxiety), and post-intervention scores ranged from 25 to 114. Of the 47 participants who completed this measure 33, or 70%, reported reduced anxiety.

Participants also reported significantly reduced depression after participating in our program compared to before with lower scores on the Beck Depression Inventory-II; (Beck et al. 1996). Again, the effect size small (Cohen's  $d=0.24$ ). As with the STAI, there was a wide variation in scores with pre-intervention scores ranging from a low of 0 to a high of 39 (high score = more depression), and post-intervention scores ranged from 0 to 43. Of the 44 participants who completed this measure 34, or 77%, reported reduced depression.

Responses on the Peer Relations Index (Hudson 1992) were higher post-Aspirations compared to pre-Aspirations indicating improvement in attitudes and feelings toward peers, although this did not reach significance. Here again we saw a wide spread of scores with pre-intervention scores ranging from a low of 37 to a high of 174 (high score = more positive peer relations), and post-intervention scores ranged from 50 to 173. Of the 36 participants who completed this measure 21, or 58%, reported improved peer relationships following participation in Aspirations.

## Discussion

This preliminary investigation found that participating in our social and vocational skills program intervention significantly reduced feelings of depression and anxiety among adolescents and young adults on the autism spectrum. Although the effect sizes indicated that changes were small, this initial work is encouraging, particularly

**Table 1** Summary of results comparing responses pre and post participation in the Aspirations program

	N	Mean pre score ( $\pm$ SD)	Mean post score ( $\pm$ SD)	z	p
Depression	44	14 (13.0)	11 (12.4)	3.69	0.001
Anxiety	47	74 (26.9)	68 (30.0)	2.87	0.004
Peer Relations	36	127 (31.9)	132 (30.0)	1.48	0.138 - ns

given the short duration of our intervention (8-weeks). Our findings demonstrate the broader impact that such programs may have, which few have previously investigated. The outcomes also demonstrate the value of interventions for this population, particularly post-high school where there is currently a great need. However, given the inter-relationships between anxiety, depression, peer acceptance / rejection, and social skills (e.g., Attwood 2008; Kim et al. 2000; Vickerstaff et al. 2007), it is perhaps not surprising that improving understanding of social interactions and relationships has the outcome of decreasing feelings of depression and anxiety. Improved insight in to the world of employment and future possible pathways covered in our curriculum might also have contributed to the reduction in depression and anxiety seen among our participants.

Scores on the Index of Peer Relations (Hudson 1992) were higher following program participation but the change did not reach significance. Fewer participants completed this measure ( $n=36$ ) than our other measures as it was only introduced after the first two of our nine groups had been completed. The smaller numbers may have been a factor in not reaching significance on this measure. Also, this measure questioned participants' attitudes regarding peer relationships and feelings towards peers, how they viewed and evaluated those in their peer group, and whether they were accepted and liked by their peer group. At first glance, it would be expected that our program curriculum would result in a significant positive change in these areas. However, given the topics covered in our curriculum, it is probable that through participation in the program participants developed insight and awareness of their own social behavior including their challenges, errors and social faux pas. Therefore, a lack of significant improvement on this measure could actually reflect increased knowledge and understanding, as has been previously suggested (Posavac and Carey 1992). This could be clarified in future by interviewing participants and gaining a more thorough evaluation of their attitudes towards peers and perceived social skills. Interestingly, previous work has shown that positive peer relationships were unrelated to anxiety / depression in a large sample of children on the autism spectrum (Kelly et al. 2008). In relation to our findings, this supports the notion that significant reductions in anxiety and depression can be demonstrated without noting a significant change in attitudes towards peers. Our previous work with the Aspirations program also did not yield a significant change in peer relations (Hillier et al. 2007).

Aside from our program curriculum and the specific topics covered, a number of other features of our program model may have partially contributed to our positive outcomes. For example, many of our participants had never met anyone else with an autism spectrum diagnosis. Having the opportunity to discuss daily challenges and struggles with others who see and experience things in a similar way seemed to be very reassuring. Simply being accepted by a group of individuals was a relatively unique experience for many in the program. Program staff strived to ensure that an atmosphere of acceptance and equality was established and it was clear that being disrespectful to others in the program would be unacceptable. Some of the group members made friends with others in the group, exchanged phone numbers and email addresses, and even arranged to meet up outside of the sessions. All of these factors may have contributed to the reduction in depression and anxiety among our participants. As mentioned above, future work could include more detailed

interviews with participants, as well as other observers such as parents and teachers, to attempt to tease these factors apart.

Although we found a significant reduction in anxiety and depression through program participation, the effect size was small. Further work is needed to confirm these positive outcomes, particularly with a longer intervention, perhaps of several months, as we believe this would have a greater effect. A further weakness of our investigation is that the lack of a randomized, controlled design makes it difficult to be certain that significant changes in the self-report measures would not have happened anyway, even without the intervention. As a follow-up a controlled trial would be essential. The control group could be those enrolled in an alternative program which would avoid the ethical concerns associated with a “no-intervention” control, and would also control for placebo effects that may occur from simply participating in any intervention program. Once we increase our numbers in the program, a further improvement would be to do a cross-site comparison to ascertain that the intervention can be implemented uniformly with the same outcomes. Additional future work could include conducting a follow-up to see if the positive results are maintained over time, perhaps after 6 and 12 months.

Utilizing self-report measures among those on the autism spectrum might also raise concerns given their difficulties with introspection and understanding their own mental states and emotions (Baron-Cohen 1997; Colle et al. 2007; Kleinhans et al. 2011). For example, Berthoz and Hill’s (2005) work on alexithymia found that those with ASD were able to reliably reflect and report on their own emotions using self-report measures, but showed greater difficulties in identifying, verbalizing and analyzing their emotions. These emotional insight difficulties should be considered when using self-report measures with those with ASD. Our results showed great variation in how participants responded to the measures resulting in large standard deviations in the data. It is possible that this variation would be less extreme in a typically developing control group. However, others have argued that self-report can be reliable and valid among this population (Sebastian et al. 2009). In future, similar measures completed by parents and / or teachers would provide an additional layer of supporting evidence.

Anecdotally, we received very positive feedback regarding the program from participants and their parents. Most of the participants said they enjoyed the program, that they had made friends, and had socialized with others from the program. This feedback was supported by parents. The group format allowed them to immediately practice skills with others and interact successfully. The attendance rates were very high, which is impressive considering the independence of our group where some transported themselves, and made their own decisions regarding whether or not to attend.

Practitioners offering interventions need to further respond to the call for accountability. Although our work on Aspirations is primarily as an intervention program not as a research project, we hope our approach will be useful for others who are seeking simple, effective ways to evaluate the efficacy of their programs. The large number of participants involved in this evaluation ( $n=49$ ) makes our work unique, and it is recognized that larger numbers are needed in this area (Rao et al. 2008). In addition, our focus on alleviating anxiety and depression through improvement of social and vocational skills is important given how pervasive and damaging these co-



morbid disorders can be. Although the evidence is increasing that difficulties with anxiety are a common feature of autism spectrum disorders (Kuusikko et al. 2008), few studies have focused on effective treatment for these difficulties (Chalfont et al. 2007). Research investigating how to reduce anxiety among those with ASD is important and needed (White and Roberson-Nay 2009), and it is timely to foster effective non-pharmaceutical approaches such as our Aspirations program.

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