J Autism Dev Disord (2013) 43:2816–2829
DOI 10.1007/s10803-013-1829-4

ORIGINAL PAPER

The Effects of a Multi-Component Higher-Functioning Autism Anti-Stigma Program on Adolescent Boys

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Published online: 26 April 2013
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Abstract A six-session higher-functioning autism anti-stigma program incorporating descriptive, explanatory and directive information was delivered to adolescent boys and the impact upon knowledge, attitudes and behavioural intentions towards peers with autism was evaluated. Participants were seventh-, eighth- and ninth-grade students (N = 395) from regular classes in a mainstream school. Two-eighth-grade classes were randomly allocated to the intervention condition and all remaining students were either allocated to the no-intervention peer or no-intervention non-peer condition. The anti-stigma program improved the knowledge and attitudes, but not the behavioural intentions of participants towards their peers with autism. Knowledge and attitudinal changes were maintained at follow-up. There were no spill-over effects of the program to non-targeted students. These results provide some preliminary evidence for the effectiveness of multi-session anti-stigma programs incorporating combined information for adolescent students in inclusive educational environments.

Keywords Higher-functioning autism · Knowledge · Attitudes · Behavioural intentions · Peers

Introduction

Contemporary educational philosophy with regard to children with special needs places a high value on education that is as close as possible to that of non-disabled children (Kasari et al. 1999). Recent public awareness of this philosophy has led to a surge in the number of children with autism spectrum disorders (ASDs) being educated in inclusive settings such that integration into mainstream educational environments is now considered the norm (Campbell et al. 2003). This is especially the case for those non-intellectually disabled children with Autism Spectrum Disorder, (previously referred to as Asperger's Disorder or higher-functioning autism: HFA) who display no cognitive impairments (Ferraioli and Harris 2011).[1] However, since the emergence of this trend, there has been some concern over the degree to which typically developing children accept their HFA peers (Swaim and Morgan 2001). While some prior research has suggested that typically-developing children report positive attitudes towards their disabled peers in an inclusive educational setting (McDonald et al. 1987), these observations were relative to the attitudes of peers in non-inclusive educational environments. Indeed, more recent research has found that typically developing peers may hold pejorative views toward their disabled peers regardless of the inclusivity of setting (Campbell et al. 2004; Harrower and Dunlap 2001). Further, Gray (1993, 2002a) has suggested that the stigma associated with HFA may even be worse than that associated with other mental health conditions, since odd or disruptive behaviour coupled with a lack of any physical abnormalities can result in peers attributing personal blame to either the children or their parents.

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[1] There remains considerable debate over the differentiation of Asperger's Disorder and autism in higher functioning individuals and whether they are the same or two separate and distinct disorders (Attwood 2006). Given the ongoing nature of this debate, the present study will defer to the ubiquitous term HFA in reference to those at the higher functioning end of the autism spectrum.

The present study investigates factors which may reduce the stigmatisation of HFA students in inclusive educational environments. In particular, the study examines the effect of a multi-session HFA anti-stigma program using descriptive, explanatory, and directive information on the knowledge, attitudes and behavioural intentions of typically-developing adolescents towards their HFA peers in a mainstream school.

Youth Mental Health Anti-Stigma Initiatives

There have been widespread calls to address the stigma associated with ASDs (Campbell 2006; Ling et al. 2010; Swaim and Morgan 2001). However, given that the trend to include children with HFA in mainstream school environments is only recent, there have been far fewer anti-stigma interventions developed and evaluated for HFA than for other mental health conditions. Those that have been established generally based their methods upon those outlined in the mental health anti-stigma literature. This literature has identified three forms of intervention which target children without mental health conditions: education, contact, and a combination of the two. These interventions have focussed on changing the knowledge, attitudes, and/or behavioural intentions of those without mental health conditions towards their peers with mental health conditions. Educational interventions have been found to produce small, short-term changes in the attitudes of adolescents towards their peers with mental health conditions (Essler et al. 2006; Watson et al. 2004). However, positive personal contact with persons experiencing mental health conditions has been reported to be a more successful anti-stigma intervention and the combination of education with positive personal contact has been found to be more effective than each of the interventions alone (Chan et al. 2009; Corrigan et al. 2001; Pinfold et al. 2003, 2005; Schulze et al. 2003; Wallach 2004). Further, it has been suggested that school-based anti-stigma programs are particularly effective (Crisp et al. 2000; Townley 2002). Corrigan et al. (2005) argue that adolescents are one of the best targets for such programs, since it is during this development period that foundations are laid for adult attitudes and beliefs, which if positive, could prevent stigmatising behaviour in the future.

Despite the substantial development in school-based mental health anti-stigma initiatives, a variety of criticisms remain. In their review of the literature, Schachter et al. (2008) found few examples of reliable and valid interventions due to the failure on the part of many studies to use randomised controlled trials, employ appropriate control groups and/or adequately control (by design or analysis) both across and within study groups for confounding pre-, on- or non-study influences. Furthermore, Schachter et al. (2008) noted that nearly all studies were short-term evaluations of brief or single opportunity interventions which were conducted under naturalistic conditions (e.g. classrooms). That is, they note that there is a dearth of research on interventions implemented over a number of sessions, weeks, months or semesters. Nonetheless, Schachter et al. (2008) do conclude that the research to date has provided some preliminary evidence for the effectiveness of school-based anti-stigma interventions and has offered enough suggestive evidence to inform future research. They suggest this should take the form of multiple-session school-based interventions which are implemented repeatedly both within and over the school years as early as possible and which employ direct contact with individuals experiencing mental health difficulties.

Youth HFA Anti-Stigma Initiatives

The existing literature on youth HFA anti-stigma initiatives has examined the effect on typically-developing children of three types of information provision: (1) descriptive information, which emphasises the degree of similarity between HFA children and their peers; (2) explanatory information, which emphasises the lack of control those with HFA have over their disorder; and (3) directive information, which provides instruction and guidance on how to respond to children with HFA (Campbell 2006).

Swaim and Morgan (2001) examined the effect of an intervention using explanatory information on typically-developing children's attitudes and behavioural intentions towards a peer with HFA behaviours. Following Weiner's attribution theory (Weiner and Graham 1984), the authors sought to determine whether children's attitudes towards their HFA peers would be more positive if they viewed the disorder as being beyond their peer's control. They found that explanatory information provided via a short video showing a boy with HFA behaviours had no significant positive effect on typically-developing children's attitudes or behavioural intentions. However, the study failed to include a manipulation check to determine if the information provided to participants actually led them to 'understand' that the disorder was out of the child's control. Furthermore, the video used to depict a child with HFA and provide explanatory information of the disorder was of short duration (2 min and 15 s in length), and thus possibly too short to accurately inform participants about HFA. Finally, it is also conceivable that a video representation of HFA behaviour may not evoke the same response in participants as real-life observations or interactions.

Extending Swaim and Morgan's (2001) study, Campbell et al. (2004) examined the combined effects of descriptive and explanatory information on peers' attitudes and behavioural intentions towards a child with HFA. Their

results revealed that compared with descriptive information alone, the combination of descriptive and explanatory information resulted in (1) improved third- and fourth-graders' but not fifth-graders' attitudes towards the child with HFA, and (2) improved behavioural intentions for all participants; however, girls were more responsive to information than boys. The authors explain the grade differences by proposing that the younger participants were more susceptible to the influence of an adult providing the voice-over message than were the older participants. They suggest that since fifth-graders are entering adolescence, they are more likely to be influenced by peers rather than adults. If this was indeed the case, then an adolescent voice over may have been more effective. Whilst Campbell et al.'s (2004) intervention proved more successful than Swaim and Morgan's (2001), it still failed to address the limitations in their study such as including a manipulation check for the information provided, increasing the length of the video and/or intervention presented or including a real-life interaction with an individual with HFA.

Campbell (2007) sought to address the grade discrepancy found in Campbell et al. (2004) by using a same-aged student to deliver information regarding HFA. He found that the combination of descriptive and explanatory information resulted in improved knowledge for all participants compared to descriptive information alone. Furthermore, combined information indirectly improved the attitudes of participants who had previously heard of autism, and the social behavioural intentions of all participants via increased perceived similarity. Campbell (2007) also improved on his earlier (Campbell et al. 2004) research and that of others (Swaim and Morgan 2001) by including a manipulation check for message type. However, he still failed to address the other limitations of previous studies. Moreover, Campbell's (2007) sample included an over-representation of females and as such may have skewed the results because girls are more likely to respond positively towards individuals with disabilities than boys (Campbell 2006; Rosenbaum, Armstrong and King 1988). Furthermore, neither Campbell's 2007 study nor the studies upon which it was based (Swaim and Morgan 2001; Campbell et al. 2004) included pre-test or follow-up measures of all variables, and thus it is unknown whether the results were directly related to the interventions delivered or if they were lasting.

Directive information has also been used in attempts to facilitate the inclusion of HFA students in mainstream schools (Lisser and Westbay 2001). However, to date, there have been no empirically tested studies using directive information. This is despite the fact that Campbell (2006) has posited that a persuasive message that includes descriptive, explanatory and directive information may prove to be the most effective message in altering children's attitudes towards their peers with HFA.

Overall, although the literature suggests that there is some preliminary evidence for the effectiveness of school-based HFA anti-stigma programs, there remain several gaps in the research to date. First, unlike the mental health anti-stigma literature, there is little research on interventions which incorporate face-to-face contact with an individual experiencing HFA. Instead, interventions have tended to use videos depicting children with HFA. However, as previously observed, it remains unknown whether such videos elicit the same response as physical contact. Second, there appears to be a scarcity of research on multi-session interventions, which may result in longer-lasting effects than single-session interventions. Third, the research in the area is lacking examples of studies using pre-test measures to determine the true effects of interventions, and follow-up measures to assess maintenance of change. Fourth, despite literature suggesting that adolescents are one of the best targets for anti-stigma programs, few researchers have addressed this age group. Finally, the efficacy of directive information as a means for augmenting knowledge, attitude and behavioural change has not yet been documented in the literature.

The Present Study

The present study aimed to address the gaps in the HFA anti-stigma literature by evaluating the effects of a multi-session HFA anti-stigma program using descriptive, explanatory and directive information. Similar to previous research, the targets for change were the knowledge, attitudes and behavioural intentions of adolescent boys towards their HFA peers in a mainstream school. The intervention combined education with both direct and video contact with individuals experiencing HFA. The study used pre-, post- and follow-up-measures of knowledge, attitudes and behavioural intentions. In addition, the study sought to extend the current literature by including online reflection and discussion activities in the program due to their demonstrated efficacy in education interventions (Nguyen et al. 2004), and by measuring whether the effects of HFA anti-stigma programs can 'spill-over' to non-targeted students (Leach and Byrne 1986; Rydell et al. 2005).

Based on the literature, the following hypotheses were proposed:

1. Following the HFA anti-stigma program, those individuals in the intervention condition will have more knowledge about HFA, more positive attitudes towards their peers with HFA, and improved behavioural intentions to engage with their peers with HFA.
2. Following the HFA anti-stigma program, there will be some spill-over effects, such that the same grade peers in the no-intervention peer condition will have more knowledge about HFA, more positive attitudes towards

their peers with HFA, and improved behavioural intentions to engage with their peers with HFA, but these changes will occur to a lesser extent than for those in the intervention condition.

3. Following the HFA anti-stigma program, there will be no change in knowledge about HFA, attitudes towards peers with HFA, or behavioural intentions to engage with peers with HFA for the different grade non-peers in the no-intervention non-peer condition.
4. Observed changes in knowledge about HFA, attitudes towards peers with HFA, and behavioural intentions to engage with peers with HFA will be sustained until the following school term for all conditions: (school terms in Australia average 10 weeks and are separated by school holidays of 2 weeks during the calendar year).

Methods

Participants

Participants were 395 boys (146 seventh-, 112 eighth-, and 137 ninth-graders) from regular classes in an independent catholic school in a predominantly middle-class suburb of a large metropolitan area. The all-boys school was selected because research has found that almost five times as many boys as girls are diagnosed with Autism Spectum Disorders (Baio 2012), and because a significant minority (5–10 % as estimated by the school's 'Targeted Programs' coordinator) of students enrolled in each grade at the school have HFA, which is greater than the estimated prevalence reported in the literature (Baron-Cohen et al. 2009). Participants were recruited through parent and student informed consent forms sent home with all students in the targeted year-groups. A total of 17 % of students declined to participate. Two-eighth-grade classes were randomly allocated to the intervention condition ($n = 46$). The remaining eighth-grade classes were allocated to the no-intervention peer condition ($n = 66$) which was used as a test for spill-over effects. All of the seventh- and ninth-grade classes were allocated to the no-intervention non-peer condition ($n = 283$) which was used as a control condition. Due to the author's specific interest in assessing non-autistic student's perceptions of their HFA peers, those classes containing a significant proportion of identifiable students with HFA were not eligible for random allocation to the intervention condition. However, these classes were eligible for allocation to either the no-intervention peer condition, or the no-intervention non-peer condition, depending upon the grade of the students. All participants received community service hours (a Social Justice Curriculum requirement of Catholic School's education) for their participation.

Procedure

After providing written consent, all participants completed measures in a 20-min interval during roll-call as a pre-test of knowledge, attitudes and behavioural intentions. One week following this, those classes who had been allocated to the intervention condition began an autism anti-stigma program designed by the authors, entitled 'Understanding Our Peers'. The program consisted of six weekly 50-min sessions run by the first-named author during alternate school periods. Each of the intervention classes attended these sessions separately and classes were not combined for any sessions. Following each session, participants were asked to complete an online reflection and contribute to an online discussion on the schools web-based extranet. For a detailed session-by-session outline of the program, see Appendix. It should be noted that two participants dropped out of the intervention following session one of the program. All participants in the no-intervention peer and no-intervention non-peer conditions attended their regular classes during the periods when the program was being administered. One week following and one term following the completion of the program, all participants again completed the measures in a 20-min interval during roll-call as a post test and follow-up test of knowledge, attitudes and behavioural intentions.

Measures

The Autism Knowledge Questionnaire (AKQ)

The AKQ is a 10-item multiple-choice measure designed by the authors which addresses the key learning points of the intervention (e.g. "someone with autism may stand too close because they…?"). For each item, participants are instructed to circle the most correct answer from four possible options. The multiple-choice measure yields a total score out of 10. The measure was piloted with a group of 15 adolescent boys prior to the commencement of the study to ascertain its reliability, readability and time for completion. Appropriate adjustments were made based upon item analysis and written feedback. The AKQ was used as a measure of participants' knowledge of HFA. The AKQ is available from the corresponding author upon request.

Adjective Checklist (ACL)

The ACL (Siperstein 1980; Siperstein and Bak 1977) is a self-report measure of cognitive attitudes which has been used extensively in research examining school students' attitudes towards children with disabilities. The measure lists 32 adjectives; 16 which are positive (e.g. "smart") and 16 which are negative (e.g. "dumb"). Participants were

instructed to circle all adjectives that describe their autistic peers. The ACL is scored by subtracting the total number of negative adjectives endorsed from the total number of positive adjectives endorsed and adding a constant of 20. The ACL has been found to have moderate to high internal consistency with Cronbach's alpha's ranging from .81 to .91 (Siperstein 1980; Swaim and Morgan 2001). The Cronbach's alphas for the current sample were .88 at pre-test, .87 at post test and .86 at follow-up. The ACL has also demonstrated construct validity as evidenced by significant Pearson correlations with measures of behavioural intentions (.76 for the Foley Scale, .67 for the Activity Preference List, .35 for the Selman's Friendship Activity Scale, .46 for the Shared Activities Questionnaire; Siperstein 2006). The ACL was used as a measure of participants' attitudes towards their HFA peers.

Shared Activities Questionnaire (SAQ)

The SAQ is a 24-item self-report scale developed to assess the behavioural intentions of primary school students to engage in social, academic and recreational activities with a target child or target children (Morgan et al. 1996). A modified version of the SAQ has been validated for adolescents (Campbell 2008) and this version was used in the current study. The scale's items are grouped according to three domains: (1) social (e.g. "be good friends with [target child/ren] at school", (2) academic (e.g. "study spelling words with [target child/ren] at school", and (3) recreational (e.g. "go to the movies with [target child/ren]"). Participants were instructed to circle one of five answers indicating how they felt about sharing each activity with their peers with autism, ranging from 1 (no, definitely not), through to 5 (yes, definitely). The measure yields a total score and a score for each domain. The modified version of the SAQ has been shown to have high internal consistency, with Cronbach's alphas of .92 for the social domain, .92 for the academic domain and .94 for the recreational domain (Campbell 2007). The Cronbach's alphas for the total score for the current sample were .96 at pre-test, .97 at post test and .97 at follow-up. Morgan et al.'s (1996) three-factor structure was also confirmed for adolescents (Comparative Fit Index = .92; Root Mean-Square Error of Approximation = .79; Campbell 2008). The SAQ was used as a measure of participants' behavioural intentions towards their HFA peers.

Similarity Rating Form-Revised (SRF-R)

The original SRF was a three-item self-report scale developed to assess how similar participants think they are to a target or target children (e.g. "how much is/are [target child/ren] like you?") (Campbell 2005a). Campbell (2005a) found the scale had a Cronbach's alpha of .67 for middle school students. The SRF was revised by adding three additional items designed by the researchers in an attempt to increase its reliability. The Cronbach's alphas for the current sample were .75 at pre-test and .82 at post-test. Participants were instructed to circle the answer that indicates how similar or different they feel they or their classmates are to their peers with autism. The four answer choices ranged from 1 (very different), through to 4 (very much the same). The revised measure yields a total score that can range from six to twenty four. The SRF-R was used a check that the descriptive information used in the intervention resulted in an increase in perceived similarity between HFA children and their peers.

Perceived Responsibility Questionnaire (PRQ-R)

The PRQ was a four-item self-report measure developed to assess how much control participants think a target child or target children have over their behaviour (e.g. "[target child/ren] can control what he/they is/are doing") (Campbell 2005a). Campbell (2005a) found the scale had a Cronbach's alpha of .56 for middle school students. The PRQ was also revised by adding four additional items designed by the researchers to the existing scale in an attempt to increase its reliability. The PRQ-R Cronbach's alphas for the current sample were .75 at pre-test and .76 at post-test. Participants were instructed to circle the answer that indicates how true or false they believe a number of statements about their peers with autism to be. The four answer choices ranged from 1 (very false), through to 4 (very true). The revised measure yields a total score that can range from eight to thirty two. The PRQ-R was used as a check that the explanatory information used in the intervention resulted in a decrease in the perceived personal responsibility of HFA children's behaviours.

Student Interaction Questionnaire (SIQ)

The SIQ is a 10-item multiple-choice measure designed by the authors which reviews the main strategies taught in the intervention for appropriately engaging with HFA children in different situations (e.g. "your autistic peer won't stop talking about a particular topic"). Each item of the measure represents a different situation where interaction with a child with HFA would likely occur. For each item, participants are instructed to rate the appropriateness of two different responses to the example interaction situation ensuring that one response was more appropriate than the other. The seven ratings are +3 (highly appropriate response), +2 (appropriate response), +1 (marginally appropriate response), 0 (neither appropriate nor inappropriate), −1 (marginally inappropriate response), −2 (inappropriate response), and -3 (highly inappropriate response). The items are marked according to whether the participant rates the more appropriate response as higher than the less appropriate response. The measure yields a total score out of 10. The measure was piloted with a group of

15 adolescent boys prior to the commencement of the study to ascertain its reliability, readability and time for completion. Appropriate adjustments were made based upon item analysis and written feedback. The SIQ was used as a check that the directive information used in the intervention resulted in an increase in participants' understanding of how to interact with children with HFA. The SIQ is available from the corresponding author upon request.

Data Analysis

The manipulation checks were analysed using paired samples t-tests to determine if the various types of information used in the intervention resulted in the expected changes on the associated measures. One-way ANOVA's were conducted to determine if there were any significant differences between conditions on the key variables for change at pre-test. A 3 (time: pre-test, post-test, follow-up) × 3 (condition: intervention, no-intervention peer, no-intervention non-peer) mixed design ANOVA with time as the within-subjects factor and condition as the between-subjects factor was the initial analysis for the results of all hypotheses. Main effects and all possible interactions were assessed to determine the outcome of the intervention on each of the key variables for change. Given significant interaction effects, follow-up analyses were undertaken. Specifically, one-way ANOVA's were conducted to determine whether there were any differences between conditions at each time point. If significant, Tukey HSD post hoc comparisons were undertaken to determine which conditions differed at which time points. Repeated measures ANOVA's were conducted to determine whether there were any differences across time for each condition. If significant, paired samples t-tests were undertaken to determine which time points differed for which condition. Unexpectedly, a large number of participants failed to complete all of the online activities within the program so one-way ANOVA's were conducted to determine if there were any significant differences between no, low and high online activity users on the key variables for change at post-test and follow-up. Effect sizes were calculated for all significant effects. An alpha level of .05 was used for all statistical tests, except where adjustments to control the type 1 error rate are specified. In cases where the assumption of sphericity was violated, Greenhouse-Geisser adjustments were made.

Results

For all data, the assumption of normality was met, enabling the use of parametric analyses.

Manipulation Checks

Descriptive Information

The paired samples t-test revealed that participants in the intervention condition rated their peers with HFA as significantly more similar to themselves and the rest of their classmates at post-test ($M = 17.47$, $SD = 3.37$) than at pre-test ($M = 11.72$, $SD = 2.95$), $t(42) = -8.8$, $p < .001$, $d = 1.34$, indicating that the descriptive information manipulation was effective.

Explanatory Information

The paired samples t-test revealed that participants in the intervention condition rated their peers with HFA as having significantly less personal responsibility for their behaviour at post-test ($M = 15.00$, $SD = 3.77$) than at pre-test ($M = 12.60$, $SD = 3.43$), $t(42) = 3.51$, $p = .001$, $d = .53$, indicating that the explanatory information manipulation was effective.

Directive Information

The paired samples t-test revealed that participants in the intervention condition were able to correctly differentiate between more appropriate and inappropriate responses to interactions with their HFA peers at post-test ($M = 5.84$, $SD = 2.13$) than at pre-test ($M = 8.05$, $SD = 1.75$), $t(42) = -5.9$, $p < .001$, $d = .90$, indicating that the directive information manipulation was effective.

Taken together, these results indicate that the 6-session HFA anti-stigma program successfully targeted the key variables for change.

Intervention Effects on Key Variables for Change

Table 1. presents the means and standard deviations for participants' scores on the AKQ, ACL and SAQ at pre-test, post-test and follow-up. Preliminary analyses indicated no significant differences between conditions at pre-test on knowledge, $F(2, 316) = .07$, $p = .93$, attitudes $F(2, 303) = 2.38$, $p = .09$, or behavioural intentions, $F(2, 313) = 2.17$, $p = .12$.

Knowledge About HFA

The mixed design ANOVA resulted in a significant main effect for time, $F(2, 410) = 48.80$, $p < .001$, $\eta p2 = .19$, a significant main effect for condition, $F(2, 205) = 34.62$, $p < .001$, $\eta p2 = .25$, and a significant time x condition interaction, $F(4, 410) = 42.51$, $p < .001$, $\eta p2 = .19$. Follow-up one-way ANOVA's revealed significant differences

between conditions at post-test, $F(2, 337) = 69.73$, $p < .001$, $\eta p2 = .29$, and at follow-up, $F(2, 380) = 36.47$, $p < .001$, $\eta p2 = .16$. Post-hoc comparisons using the Tukey HSD test indicated that participants in the intervention condition ($M = 7.62$, $SD = 2.27$) had significantly more knowledge about HFA at post-test than did those in the no-intervention peer condition ($M = 4.53$, $SD = 1.94$), $p < .001$, and those in the no-intervention non-peer condition ($M = 3.95$, $SD = 1.69$), $p < .001$. Participants in the intervention condition ($M = 7.35$, $SD = 2.07$) also had significantly more knowledge about HFA at follow-up than those in the no-intervention peer condition ($M = 4.65$, $SD = 1.89$), $p < .001$, and those in the no-intervention non-peer condition ($M = 4.41$, $SD = 1.88$), $p < .001$.

Follow-up repeated measures ANOVA's revealed significant differences between the pre-test, post-test and follow-up times for the intervention condition, $F(2, 54) = 51.81$, $p < .001$, $\eta p2 = .83$ but not for the no-intervention peer condition, $F(2, 68) = 2.65$, $p = .08$, or the no-intervention non-peer condition, $F(2, 288) = 2.74$, $p = .06$. Paired samples t-tests using an adjusted alpha of .02 (.05/3) indicated that participants in the intervention condition had significantly more knowledge about HFA at post-test ($M = 7.54$, $SD = 2.29$) than at pre-test ($M = 4.27$, $SD = 1.39$), $t(36) = -8.02$, $p < .001$, $d = 1.32$, and at follow-up ($M = 7.25$, $SD = 2.08$) than at pre-test ($M = 4.16$, $SD = 1.35$), $t(31) = -9.35$, $p < .001$, $d = 1.65$. No significant differences in knowledge were found between post-test ($M = 8.00$, $SD = 1.98$) and follow-up ($M = 7.54$, $SD = 2.29$), $t(29) = 1.18$, $p = .25$ for the intervention condition. Taken together, these results indicate that the six-session HFA anti-stigma program had an effect on participants' knowledge of HFA but had no effect on same grade or different grade non-participants' knowledge of HFA. Specifically, individuals who attended the program had more knowledge about HFA after the program than before it, and this knowledge was maintained until the following school term. No such changes were found for individuals who did not attend the program, indicating that there were no spill-over effects of knowledge to non-targeted students. Comparatively, those individuals who attended the program had more knowledge about HFA immediately after and one term after the program than their peers in the same grade and their non-peers in different grades.

Attitudes Towards Peers with HFA

The mixed design ANOVA resulted in a significant main effect for time, $F(2, 392) = 4.34$, $p = .01$, $\eta p2 = .02$, a non-significant main effect for condition, $F(2, 196) = .24$, $p = .79$, and a significant time x condition interaction, $F(4, 392) = 3.15$, $p = .01$, $\eta p2 = .03$. Follow-up one-way ANOVA's revealed no significant differences between conditions at post-test, $F(2, 328) = .79$, $p = .46$, or follow-up, $F(2, 370) = .46$, $p = .63$. However, this lack of difference between conditions may be attributed to the fact that at baseline/pre-test, the intervention group had slightly poorer attitudes toward HFA peers than did the comparison groups, thus attenuating between-condition significance. This was born out by within-group analyses, with follow-up repeated measures ANOVA's revealed significant differences between the pre-test, post-test and follow-up times for the intervention condition, $F(2, 52) = 5.47$, $p = .01$, $\eta p2 = .17$ but not for the no-intervention peer condition, $F(2, 60) = 1.57$, $p = .22$, or the no-intervention non-peer condition, $F(2, 280) = 2.00$, $p = .14$. Paired samples t-tests using an adjusted alpha of .02 (.05/3) indicated that participants in the intervention condition had significantly more positive attitudes towards their peers with HFA at post-test ($M = 22.42$, $SD = 4.08$) than at pre-test ($M = 19.31$, $SD = 4.07$), $t(34) = -4.03$,

Table 1 Means and standard deviations of AKQ, ACL and SAQ for all conditions at pre-test, post-test and follow-up

	Intervention (N = 46)		No-intervention peer (N = 66)		No-intervention non-peer (N = 283)	
	M	SD	M	SD	M	SD
Autism knowledge questionnaire						
Pre-test	4.32	1.33	4.17	1.90	3.97	1.57
Post-test	7.93	2.02	4.71	2.18	4.06	1.66
Follow-up	7.43	2.04	4.77	1.88	4.31	1.85
Adjective checklist						
Pre-test	18.89	4.27	21.77	5.99	20.99	4.64
Post-test	22.41	4.29	21.71	5.29	21.72	5.06
Follow-up	21.41	5.98	20.39	4.15	21.74	5.50
Shared activities questionnaire						
Pre-test	70.43	20.64	72.81	20.93	77.24	19.68
Post-test	72.25	21.77	70.55	21.31	73.50	21.51
Follow-up	69.64	20.41	69.09	22.79	73.54	21.25

$p < .001, d = .68$, and at follow-up ($M = 21.58, SD = 5.66$) than at pre-test ($M = 19.19$, $SD = 4.11$), $t(30) = -2.62$ $p = 01, d = .47$. No significant differences in attitudes were found between post-test ($M = 22.60, SD = 4.17$) and follow-up ($M = 21.40$, $SD = 5.75$), $t(29) = 1.04$, $p = .31$ for the intervention condition. Taken together, these results indicate that the six-session HFA anti-stigma program had an effect on participants' attitudes towards their peers with HFA but had no effect on same-grade or different grade non-participants' attitudes towards their peers with HFA. Specifically, individuals who attended the HFA anti-stigma program had more positive attitudes towards their peers with HFA after the program than before it, and these attitudes were maintained until the following school term. No such changes were found for individuals who did not attend the program, indicating that there were no spill-over effects of attitudes to non-targeted students. However, comparatively, those individuals who attended the program did not have more positive attitudes towards their peers with HFA immediately after or one term after the program than their peers in the same grade and their non-peers in different grades.

Behavioural Intentions Towards Peers With HFA

The mixed design ANOVA resulted in a non-significant main effect for time, $F(2,402) = 1.51$, $p = .22$, a non-significant main effect for condition, $F(2,201) = .99$, $p = .37$, and a non-significant interaction between time and condition, $F(4, 402) = .62$, $p = .65$. These results indicate that the six-session HFA anti-stigma program had no effect on participants' or non-participants' intentions to engage with their HFA peers.

Online Activity Usage Effects

The one-way ANOVA's revealed no significant difference between no, low and high online activity users' knowledge at post-test $F(2, 36) = 2.37$, $p = .11$, but a significant difference between their knowledge at follow-up, $F(2, 31) = 5.14$, $p = .01$, $\eta p2 = .25$. Post-hoc comparisons using the Tukey HSD test indicated that high online activity users ($M = 9.00$, $SD = 1.26$) had significantly more knowledge about HFA at follow-up than those who used no online activities ($M = 6.44, SD = 1.82$), $p = .02$. It should be noted that no significant differences were found between no, low and high activity users' knowledge at pre-test, $F(2, 42) = 1.35$, $p = .27$, and thus it is not the case that high online activity users had more knowledge about HFA at baseline. No significant difference was found between no, low and high online activity users 'attitudes at post-test $F(2, 36) = 1.16, p = .33$, or follow-up, $F(2, 31) = .06, p = .95$. No significant difference was found between no, low and high online activity users' behavioural intentions at post-test, $F(2, 35) = .02$, $p = .98$ or follow-up, $F(2, 31) = .12$, $p = .89$. Taken together, these results indicate that participants who completed all or nearly all of the online activities within the six-session HFA anti-stigma program had more knowledge about HFA one term following the program than those who completed none of the online activities. However, there were no differences between the various online activity users' attitudes or behavioural intentions towards their HFA peers following the program.

Discussion

This study examined the effect of a six-session HFA anti-stigma program using descriptive, explanatory and directive information on the knowledge, attitudes and behavioural intentions of typically-developing adolescent boys towards their HFA peers in a mainstream school. Overall, the results indicated that an intervention of this type and length can have an impact on the knowledge and attitudes, but not on the behavioural intentions of adolescent boys towards their HFA peers.

The specific results as they pertain to the experimental predictions are as follows. First, as predicted, following the anti-stigma program, individuals in the intervention condition had more knowledge about HFA and more positive attitudes towards their HFA peers. However, contrary to prediction, there were no associated improvements to their behavioural intentions to engage with their HFA peers. Second, contrary to prediction, following the anti-stigma program, the same grade peers in the no-intervention condition did not have more knowledge about HFA, more positive attitudes towards their peers with HFA or improved behavioural intentions towards their peers with HFA. This suggests there were no spill-over effects of the intervention to non-targeted students. Third, as predicted, for the different grade non-peers in the no-intervention condition, there was no change in knowledge about HFA, attitudes towards peers with HFA, or behavioural intentions to engage with peers with HFA. Fourth, as predicted, the observed changes in the knowledge and attitudes of individuals in the intervention condition were sustained at the next assessment during the following school term.

Although not predicted, it was observed that online activity usage affected the degree to which participants' knowledge of HFA improved over time. Participants who engaged in high online activity usage had more knowledge one term following the anti-stigma program than those who engaged in no online activity usage. Online activity usage did not affect the degree to which participants' attitudes or behavioural intentions towards their HFA peers improved over time.

Of particular note is the difference in the magnitude of the effects of the HFA anti-stigma program on the variables for

change. Comparatively, the effect of the program on participants' knowledge was considerably larger (i.e. effect sizes ranging from $\eta p2 = .16$ to $\eta p2 = .83$ and from $d = 1.32$ to $d = 1.65$) than the effect on participants' attitudes (i.e. effect sizes ranging from $\eta p2 = .02$ to $\eta p2 = .17$ and from $d = .47$ to $d = .68$). Although the attitudinal differences between conditions at pre-test suggested relatively poorer attitudes in the intervention condition, this difference was not significant. However, the relatively small attitudinal effect sizes observed may account for the failure of the intervention to produce a significantly different attitudinal score between conditions at post-test and follow-up in that the magnitude of change required was greater.

The results of this study are consistent with those that have found some efficacy for school-based mental health anti-stigma interventions using a combination of education and positive personal contact (e.g. Chan et al. 2009; Corrigan et al. 2001; Pinfold et al. 2003, 2005; Schulze et al. 2003; Wallach 2004). Furthermore, the results are also consistent with those that have found some efficacy for HFA anti-stigma programs utilising a combination of information types (e.g. Campbell et al. 2004; Campbell 2007). The present study improved upon both the methodology and intervention of like previous research and as such reported enhanced outcomes. For example, while Campbell (2007) found no direct effect of the intervention on adolescents' attitudes, the current study did report attitudinal improvement, albeit a relatively small effect. It is possible that the design improvements of the current study (e.g. including physical contact with an individual with HFA and using multiple intervention sessions) are responsible for the discrepancy between the two studies' attitudinal results.

The results of this study are inconsistent with Leach and Byrne's (1986) finding that the effects of a secondary school behaviour reinforcement program had some positive spill-over effects to non-targeted students. The finding of the current study that there were no spill-over effects of knowledge, attitudes or behavioural intentions to non-targeted students following the six-session HFA anti-stigma program may be reflective of the insensitivity of the measures used to detect such changes. It is also possible that change in knowledge and attitudes is highly dependent on who transmits the information about HFA, with a student peer being viewed as a less credible source than either an adult presenter or a person with HFA themselves.

The finding that online activity usage affected participants' knowledge over time is consistent with the results of studies which have found that internet-based programs can moderately improve outcomes in educational interventions (Nguyen et al. 2004). However, the finding that online activity usage did not affect participants' attitudes or behavioural intentions over time is inconsistent with such research. A plausible explanation for why there was no effect of online activity usage on participants' attitudes or behavioural intentions towards their HFA peers may relate to the extent of engagement with the online activities, although there was no direct evaluation of this within the study. In contrast, it is unsurprising that there was a difference in knowledge between high and non-online activity users since the online reflection questions were knowledge-based. Given that the difference between user-types was evident only at follow-up, it is plausible to suggest that while the effects of the anti-stigma program decay over time for those who do not use the online activities, they remain stable for those who do.

With respect to the failure to observe predicted changes in behavioural intentions, there are a number of plausible explanations. First, given Ajzen's (1991) which posits that intention to engage in a given behaviour is causally linked to one's attitude towards that behaviour, the observed change in attitudes should have contributed to a change in behavioural intentions. However, given that the attitudinal change found in this study was relatively small, it may be that it was not sufficiently powerful to generate discernible changes in behavioural intentions. Since research provides little support for a direct relation between knowledge and behavioural intention (Li et al. 2008; Wakefield and Chaloupka 2000), it is unsurprising that the large knowledge effect alone was insufficient to cause a change in participants' behavioural intentions. Second, the gender of participants—namely, all males—may have been a factor countervailing the anticipated effect on behavioural intentions. For example, the fact that the program presenter and guest speakers were female may have impacted negatively upon their status as authority figures for an adolescent male audience (Carli 1999). Further, research has indicated that males are less likely than females to respond positively to people with disabilities (Rosenbaum et al. 1988). Third, time may have played a role in detecting effects. It is possible that changes in behavioural intentions could have occurred immediately after certain sessions but then decayed rapidly. The post-test measure occurred 1 month after the guest-speaker session and thus, it is possible that any behavioural intentions that did occur due to this session had eroded. Fourth, the measurement tool utilised to detect behavioural intentions may have been inappropriate for the specific cohort to whom it was administered. Despite validation of the modified SAQ for use with adolescents, the questions asked may have been incongruent with the age-, gender-and culture-specific social norms of Australian males in seventh-, eighth- and ninth-grade.

The findings of this study should be interpreted in light of a number of limitations. First, the generalizability of the results is restricted by the sample of participants, who were males aged between 13 and 16, from predominantly middle-class backgrounds. Future research should seek to determine whether the same or different effects can be found for adolescent girls and for students in senior high-school grades. Second, it is unknown whether the self-report responses of participants in the current study are reflective of actual

attitudes or behavioural intentions, as the study did not seek to observe these variables in a naturalistic setting. Future studies should compare questionnaire responses with the actual behaviour of respondents in the school environment. With respect to behavioural intentions, the lack of significant results may also reflect the need for a greater period of time to develop friendships between individuals with HFA and their normally developing peers. Future studies would benefit from a more longitudinal framework for the observation of actual behavioural change. Third, participants in the study may have lacked incentive to complete the online component of the program diligently, and thus it is unknown whether this would have improved the effects of the intervention on *all* three dependent variables. Future research should seek to provide participants with sufficient motivation to complete the program's online activities in a timely manner. Fourth, the experimental design of the study did not allow for measurement of the effect of the program presenter's and guest speaker's gender (both female) on the dependent variables. Thus, it is unknown whether this was an intervening variable in the study. Although the effect of information provided by male versus female parents on peers' cognitive and behavioural attitudes towards an autistic child has been examined (Morton and Campbell 2008), no such comparison has been made for professionals or individuals with HFA. Future research should include conditions for both male and female presenters/guest speakers in order to determine whether the gender of the presenter/guest speaker has a discernible effect on participants. Fifth, the last program session and the post-test measures were administered following a school-holiday break. Given that there were no measures administered prior to the break, it is unknown whether there was a decay effect. Future studies should include regular measurement of the dependent variables throughout the program to determine whether there are any significant effects on the variables at particular intervals and whether they decay over time.

A final limitation related to the pragmatic difficulties of the randomisation process. The participating school allocates students to classes predominantly according to academic ability, referred to as 'streaming'. Students with HFA commonly have areas of academic difficulty, which results in their disproportionate allocation. The decision to exclude one of the classes from the randomisation process due to a higher proportion of HFA students (relative to the remaining classes) means that the randomisation may be better referred to as a 'pseudo-randomisation' process. The implication is that the intervention groups and the peer control groups may have been less comparable, given that some of the participants (in the class with a higher proportion of HFA peers) may have developed attitudes, behaviours and knowledge with respect to HFA as a result of their exposure to such peers. This was an unavoidable limitation in an ecologically valid research study, however future research should seek to ensure that either true randomisation occurs, or otherwise that measures are taken to account for potential population differences.

Given that neither the present study nor previous studies have found a direct effect of HFA anti-stigma interventions on adolescent behavioural intentions, future research should seek to address this gap. Further, since this study is the first to empirically evaluate the efficacy of directive information as a means for augmenting knowledge, attitude and behavioural change, future research should also compare the combined effects of descriptive, explanatory and directive information with the combined effects of descriptive and explanatory information only. This would ascertain whether there is any significant benefit to including directive information in HFA anti-stigma interventions. While it has been argued that anti-stigma programs should commence at an earlier stage of mainstream education (Schachter et al. 2008), continued efforts to ameliorate the distress that many HFA students experience in high school is warranted, given that it is at this stage of their educational experience that they experience the greatest confluence of social demands and their social skills difficulties.

In conclusion, the results of the current study provide some preliminary evidence for the effectiveness of multi-component HFA anti-stigma programs for adolescent students in mainstream schools. In particular, the findings of this study indicate that multi-session programs which incorporate a combination of descriptive, explanatory and directive information can improve the knowledge and attitudes of adolescent boys towards their HFA peers. Furthermore, these changes can be sustained for at least one school term. These research findings represent a significant contribution to the literature on reducing the stigmatisation of HFA students in inclusive educational environments. That is, based upon the results of this study, it would seem reasonable to suggest that multi-session programs incorporating combined information (via face-to-face and online education; and both direct and video contact with individuals experiencing HFA) should be used with adolescent boys when attempting to facilitate their acceptance of their HFA peers in mainstream schools. Since it is likely that children with HFA will continue to be educated in mainstream educational settings, it is important that research continues in this area in order to establish the most effective means of reducing the stigmatisation of these students.

Acknowledgments The authors extend appreciation to the parents, students and teachers of Edmund Rice College, Wollongong for their participation in this study. Special recognition must go to Dr Leonie Miller for her guidance regarding data analysis and interpretation and to Mr Greg Carey for his continued support and assistance during this project.

Appendix

See Table 2.

Table 2 Session-by-session outline of the 'Understanding Our Peers' program

	Session					
	One	Two	Three	Four	Five	Six
Goal	To introduce students to the impairments in higher-functioning autism	To improve student knowledge of higher-functioning autism	To encourage students to recognise the uncontrollability of higher-functioning autism and the similarities between themselves and their higher-functioning autistic peers	To improve students' ability to interact with individuals with higher-functioning autism	To improve student knowledge and understanding of higher-functioning autism through presentations from guest speakers	To review key learning outcomes
Learning outcome/s	Students learn about the perceptual perspective-taking, cognitive perspective-taking and affective perspective taking impairments in higher-functioning autism	Students learn about the core symptoms of higher-functioning autism as related to the domains of socialisation, communication and behaviour. Students learn about the challenges faced by those with higher-functioning autism from the perspective of those with the disorder	Students learn about the causes of higher-functioning autism and discover the lack of control their higher-functioning autistic peers have over their disorder. Students will recognise that although they are different to their higher-functioning autistic peers, they are also alike in many ways	Students learn effective strategies for interacting with their peers with higher-functioning autism	Students learn about how higher-functioning autism affects the lives of those diagnosed from the perspective of an individual with the condition and a professional in the field	Students review what they have learnt throughout the program. Students reflect on their own personal experience of the program
In-session description	Students completed the SRF-R, PRQ-R and SIQ as pre-test manipulation checks. Student resource books were administered, the facilitator was introduced, group rules were brainstormed and a get-to-know you game was played. Students then participated in a number of activities from the lesson plan 'The Sixth Sense' (Gray 2002b). First, the five senses were brainstormed and students were informed that that a social (perspective-taking) sense also exists. A student volunteer was asked to describe what he could see from his seat and what the facilitator could and could not see from her seat to demonstrate perceptual perspective-taking. Second, a small object was hidden and a student volunteer was asked to leave the room, in which time the object was moved. Remaining class members were asked where the volunteer would look for the object when he returned to demonstrate cognitive perspective-taking. Third, students were asked to	Online activities were reviewed and difficulties were addressed. Students developed a brainstorming web on the meaning of autism. Student volunteers were selected to read aloud a fact sheet and cartoon on autism. A brief class discussion was held about whether the information provided confirmed or disconfirmed their thoughts about autism and incorrect assumptions were clarified. Students were referred to the Autism Society of America handout 'Growing up together: Teens with autism' (ASA 2004) provided in the appendix of their resource books for additional information. Students watched the 14-min video 'Intricate Minds: Understanding Classmates with Asperger Syndrome' (Coulter 2006) which presented an introduction to the disorder from the perspective of teenagers with the diagnosis. Students completed seven questions related to the video and a brief class discussion followed which reviewed the answers to the questions	Online activities were reviewed and difficulties were addressed. It was explained to students that there is a common misconception that people with higher-functioning autism have control over their disorder, and thus choose to be rude, misbehave or act peculiarly. Students watched the 5-min video 'Autism: National Autistic Society—Part 2 (socially awkward)' (NAS 2008a, b) accessed from http://www.youtube.com/watch?v=_WSQLXVtTQg which showed an adolescent boy with higher-functioning autism acting in a socially inappropriate manner. Students were asked to use the knowledge gained from the program so far to consider why the boy acted the way he did. Students completed a worksheet where they were asked to use their knowledge of higher-functioning autism to provide an alternative explanation to that provided for three different higher-functioning autistic students' inappropriate behaviour. A brief class discussion followed which reviewed possible explanations. Students then	Online activities were reviewed and difficulties were addressed. Students developed a brainstorming web on how to effectively interact with their higher-functioning autistic peers. Student volunteers were selected to read aloud excerpts from the books 'Can I tell you about Asperger Syndrome? A guide for friends and family' (Welton 2004) and 'How to talk to an autistic kid' (Stefanski 2011) which provided ideas about how to appropriately engage with higher-functioning autistic students from the perspective of those diagnosed. A brief class discussion was held about whether the suggestions from the book excerpts confirmed or disconfirmed their thoughts about how to interact with their higher-functioning autistic peers. Students were informed that they would be partaking in role-plays to develop skills for interacting with their higher-functioning autistic peers. Two student volunteers were selected to be involved	Online activities were reviewed and difficulties were addressed. Students were informed that they would be hearing from guest speakers in the session – a professional working in the field of autism and a female adolescent diagnosed with higher-functioning autism. Students were asked to consider how difficult it may be for an adolescent with the condition to speak in front of a large audience. The need for respect and the importance of confidentiality was emphasised. Students were instructed to write down any questions for the speakers in their resource books. The speakers were introduced and thanked for their time. Following the presentations, students were given the opportunity to ask the speakers any relevant questions	Online activities were reviewed and difficulties were addressed. Students brainstormed the key learning points of the intervention using the information provided and activities completed in their resource books. A mindfulness activity was used to encourage students to reflect on their own private experience of the program. Students were provided with the opportunity to share their experience with the class if they wished to. Students were asked to consider why it is important to care about their peers with higher-functioning autism. A brief class discussion followed which emphasised that because everyone faces challenges in life, having understanding and being sensitive to the challenges of others are vital skills. Students completed the SRF, PRQ and SIQ as post-test manipulation checks. Students were presented with certificates for completing the 'Understanding Our Peers' course and congratulated on their hard work

Table 2 continued

	Session					
	One	Two	Three	Four	Five	Six
	brainstorm feeling names and the cues one can use to determine how another is feeling to demonstrate affective perspective-taking. Fourth, students were informed that there are some people in the world who have difficulty taking the perspective of others, and that there are some people at their school who have this social sense impairment. Students brainstormed the challenges that may be faced by someone with a social sense impairment		participated in an activity adapted from the lesson plan 'Understanding Friends (Faherty 2005). The similarities and differences between the students and their high-functioning autistic peers were brainstormed, and at the conclusion of the activity, it was highlighted that the quality of the similarities is greater than the differences	in an example role-play with the facilitator whereby a non-autistic friend was required to protect his higher-functioning autistic peer from a bully. Students then separated into groups of three and acted out the three scenarios provided in their resource books. The facilitator observed one role-play from each group and provided feedback		
At-home online activity description						
Online reflection	Students were instructed to "reflect back to week one of the 'Understanding our Peers' program and write down three things you learnt from the session"	Students were instructed to "reflect back to week two of the 'Understanding our Peers' program and write down three things you learnt from the session"	Students were instructed to "reflect back to week three of the 'Understanding our Peers' program and write down three things you learnt from the session"	Students were instructed to "reflect back to week four of the 'Understanding our Peers' program and write down three things you learnt from the session"	Students were instructed to "reflect back to week five of the 'Understanding our Peers' program and write down three things you learnt from the session"	No online reflection
Online discussion	Students were instructed to imagine having a child that fails to develop normally and asked to reflect on how this would feel	Students were asked to reflect on whether the parents of children with higher-functioning autism should inform the school of their child's disorder, and to provide reasons for why or why not	Students were asked to watch the 5-min video 'Autism: National Autistic Society Anti-bullying Campaign' (NAS 2008a, b) on the bullying of children with high-functioning autism by accessing http://www.youtube.com/watch?v=1WLQjGpGUvc and to comment on the thoughts and feelings it evoked in them	Students were asked to reflect on whether children with higher-functioning autism should receive the same discipline at school as their peers, and to provide reasons for why or why not	Students were informed of the argument that having higher-functioning autism can be a great strength (e.g. blunt comments may be interpreted as a sign of honesty) and asked to reflect on whether this is a fair argument, noting any other autistic traits that could be interpreted as strengths	No online discussion

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