

Schools-Based Interventions for Reducing Stigmatization of Acquired Brain Injury: The Role of Interpersonal Contact and Visible Impairment

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Abstract

The purpose of this study was to determine the effectiveness of contact versus education interventions for adolescents in reducing stigmatizing attitudes toward people with acquired brain injury (ABI), and whether visibility of ABI affects the intervention outcome. 408 students (age range = 14–17 years) from 13 schools in the Mid-West of Ireland were randomly allocated to one of the three interventions: Education only, Contact (Visible Disability), or Contact (“Invisible” Disability). Stigmatizing attitudes were measured before and after intervention. Results suggest that a Contact intervention was more effective in reducing stigmatizing attitudes in terms of social restrictiveness, benevolence, and community mental health beliefs than education alone. Visibility of ABI impacted the effectiveness of the contact intervention on Community Mental Health beliefs only. Contact with a person with ABI is thus more effective in promoting positive attitudes than ABI education alone, while the presence of visible impairment was not found to increase this intervention effect.

Keywords: Acquired brain injury; Stigma; Adolescents; Intervention

Introduction

Acquired brain injuries (ABIs), defined as any injury occurring to the brain post-natally, are a significant public health problem in adolescence (Ilie, Boak, Adlaf, Ashbridge, & Cusimono, 2013). ABI can occur through traumatic means—where there is direct insult to the head, such as in road traffic accidents or falls—or through non-traumatic means, occurring as a result of an internal process such as stroke, hemorrhage, or infection. ABI affects ~200 per 100,000 people and the effects can range from very observable disability to what has been termed “invisible” disability (Rutland-Brown, Langlois, Thomas, & Xi, 2006), that is, a disability that lacks visible markers such as the use of a wheelchair, and thus is not perceptible to the eye. Post-acute Neuropsychological rehabilitation can be influenced by a broad number of factors, of which prejudicial attitudes or stigma toward people with ABI can be a significant obstacle to a number of neuropsychological rehabilitation goals, particularly community reintegration (Martelli, Zasler, & Tiernan, 2012).

Social stigma is conceived of as the co-occurrence of labeling, stereotyping, separation, loss of status, and discrimination within a context where power—and power differentials—can be exercised (Link & Phelan, 2001). Stigma significantly impacts quality of life and is associated with prejudicial attitudes, active discrimination and self-stigmatisation, in which stereotypes applied to the individual by others are internalized and result in diminished self-esteem and self-efficacy (Watson, Corrigan, Larson, & Sells, 2007). It is not surprising then that belonging to a socially stigmatized group is found to be associated with a higher incidence of mental health difficulties and substance misuse (Major & O'Brien, 2005), reduced participation in social opportunities (Corrigan & Watson, 2002), and decreased functional help-seeking (Kleim et al., 2008).

Despite some notable exceptions in the literature (e.g., Linden, Hanna, & Redpath, 2007; Linden, Rauch, & Crothers, 2005; McClure, 2011; described below), ABI has been largely overlooked in stigma research. The contemporary move toward

deinstitutionalization and community inclusion has seen care and post-acute neurorehabilitation increasingly provided in community-based settings. However, this increases the likelihood that people with ABI may become exposed to social stigma; the effects of which, in terms of stigma-related mental health difficulties and obstacles to neurorehabilitative progress, could be significant for people with ABI (Major & O'Brien, 2005) and their family members (Phelan et al., 2011).

Although medically classified as a physical disability, ABI can result in long-term difficulties in the cognitive, emotional, behavioral, and social spheres as well as the physical, with the result that it may more closely resemble mental health difficulties to members of the public (Linden & Crothers, 2006). It has been reported that physical disabilities and mental health difficulties result in differing attitudes: while people with physical disabilities are found to be less likely to be employed and to evoke more sympathy and offers of help from members of the public, people with mental health difficulties tend to evoke more disapproving attitudes, and receive fewer accommodations for their difficulties (Corrigan & Watson, 2002). This discrepancy is believed to be attribution-based, with a common public perception that a mental health condition is under the individual's own control to a greater extent than a physical disability (Corrigan & Watson, 2002).

Several additional factors are found to influence stigmatizing attitudes: a study of 325 adult participants found attitudes varied according to the ABI etiology and perceived level of blame for the occurrence of the ABI (Linden et al., 2007). Those individuals perceived as in some way to blame for their ABI were found to evoke more prejudiced attitudes from members of the public than those who were seen as "blameless." The gender of the perceiver has also been found to influence the attitudes held toward stigmatized groups, with females generally found to hold more positive attitudes than males in relation to mental health difficulties (Corrigan & Watson, 2007) and ABI (Linden et al., 2007); although the converse was found in one study of students aged 17–18 years in relation to ABI (Linden et al., 2005). It is not clear why gender influences attitudes (Linden & Crothers, 2006); however, it may be related to cultural gender roles being enacted.

Age has also been found to be an important factor in attitude formation and intervention: the "Impressionable Years" hypothesis (Krosnick & Alwyn, 1989; von Hippel & Henry, 2012) suggests that late adolescence is a critical period that shapes and crystallises attitudes, with adolescents aged 14–18 years generally found to be more open to receiving new information and forming new attitudes on the basis of it than adults (von Hippel & Henry, 2012). As such, attitude intervention at this age may be more effective than at other life stages.

A number of investigations have studied how stigmatizing attitudes might best be reduced (see Collins, Wong, Cerully, Schultz, & Eberhart, 2012; Livingston, Milne, Fang, & Amari, 2012; Corrigan & Shapiro, 2010, for recent reviews); however, none of these has examined ABI. Three methods of intervention for reducing stigmatizing attitudes are well documented in the mental health field (Corrigan & Penn, 1999). The first of these, *Protest*, involves emphatic refuting of negative or stereotypical representations; however, as this does not actively encourage positive attitudes, this approach is not highly effective when applied on its own (Corrigan & Penn, 1999). *Education* involves the formal provision of information regarding the stigmatized group, and is found to reduce stigmatizing attitudes by allowing the public to make informed judgments. The final approach, *Contact*, involves providing the public with some direct contact with a member of the stigmatized group, who may implicitly refute the stereotypical expectations held by the public. This intervention has been found to increase positive attitudes toward the stigmatized group as a whole (Corrigan & Penn, 1999). The effectiveness of these three interventions with ABI has not yet been examined; however, a study on the stigmatization of mental health (Corrigan et al., 2001) found that a 10-min presentation by an individual who described their history of mental health difficulties resulted in a greater reduction in stigmatizing attitudes among college students than did an educational presentation by a professional. A protest intervention did not yield any significant differences (Corrigan et al., 2001).

The visibility of a disability has been found to influence the public's understanding and acceptance of disability, which is commensurate with Goffman's (1963) theory of "discredited" and "discreditable" stigma. According to this theory, "discredited" stigma is considered as that in which the individual's "differentness" is immediately apparent to the public, while "discreditable" stigma involves a difference which is unobvious and can potentially be hidden. Whereas the former prohibits the individual from going unnoticed as "different," the latter presents the person with the decision of whether to conceal or disclose their "differentness" to others. In ABI, disability can be either visible (or discredited, such as the use of a wheelchair or a noticeable cranial scar) or hidden (and discreditable, for example, poor memory or language difficulties), which may accordingly result in differing attitudes. There is a neural corollary to this issue in so far as the visibility or invisibility of the person's differentness is associated with differences in neural aspects of information processing in members of the public. For example, there are dissociable roles for anteromedial and dorsolateral prefrontal cortex circuits in the activation and inhibition of stereotypic attitudes toward visibly different people (Knutson, Mah, Manly, & Grafman, 2007). Moreover, regulation of the initial negative emotion toward people with an obvious visual difference (stigmatized targets) tends to be associated with a unique activity profile in the anterior cingulate and ventrolateral prefrontal cortex when compared with activity arising from viewing images of people where difference was not immediately apparent (Krendl, Kensinger, & Ambady, 2011). This distinction between visible and invisible markers of stigma is therefore important to consider when planning any form of attitude intervention for use with people with ABI.

Despite the variety of presentations of ABI, it is often conceived as a visible disability. Indeed, a study of 16 members of the public in Northern Ireland found that most participants tended to believe there would be a physical marker, such as the use of a wheelchair or ataxic movements, which would communicate the presence of ABI (Linden & Boylan, 2010), while some thought there may be a behavioral indication, such as social distancing, or rapid changes in mood which would indicate the presence of a disability (Linden & Boylan, 2010). This finding highlights poor public understanding around the range of effects of ABI, which could potentially result in people without apparent physical impairment being misperceived by members of the public.

The results of one study on the effect of visible markers of ABI on the attributional tendencies of members of the public (McClure, Devlin, McDowall, & Wade, 2006) suggest that those with hidden disabilities do not receive the empathic understanding afforded to those with a visible marker; while compassion for those with markers of ABI may be stigmatizing when behaviors are attributed to the ABI alone, disregarding other personal or external factors (McClure et al, 2006; McClure, 2011). This is particularly relevant when considering ambiguous behaviors such as fatigue or aggressive behavior, both of which are common outcomes of ABI but which may also be attributable to other factors such as age or personality (McClure, 2011). Where there is a visible marker, they are more likely to be attributed to the ABI—whether correctly or incorrectly—while being more commonly attributed to personal factors in those without a visible marker (McClure, 2011). It should be noted, however, that a meta-analysis of 23 mental health studies showed that, while discriminatory behaviors are significantly and positively correlated with prejudiced attitudes, they show little correlation with stereotypes (Dovidio & Gaertner, 1996). Therefore, altering the attributions may not directly reduce discriminatory behaviors unless the actual prejudicial attitudes are altered.

Given the effects that a visible marker of disability appears to have on public understanding of and attitudes toward disabilities and ABI, it is likely that such markers, or their absence, might also affect the outcomes of a Contact intervention for members of the public. This study investigated two factors. The first intervention hypothesis, based on the existing literature, was that a Contact intervention would be more effective at improving positive attitudes and decreasing stigmatizing attitudes toward people with ABI as a whole than the provision of an Education intervention alone. The second intervention hypothesis was that the presence of a visible marker of disability would result in more positive attitudes subsequent to a Contact intervention, when compared with scores of those who receive a Contact intervention from a person with an “invisible” disability.

Method

Design

Each participating school was randomly allocated to one of the three intervention conditions: Education, Contact (Visible disability), or Contact (“Invisible” Disability). This was conducted by sequentially allocating each responding school to conditions 1–3 in turn; however, it should be noted that the inclusion in the study of a wheelchair-user rendered some considerations for accessibility necessary. Every effort was made to retain random assignment, however, and comparison of the frequencies of some variables across intervention group demonstrates that groups are comparable (see Table 1).

For the first intervention hypothesis, an independent groups design was utilized to investigate the effectiveness of two attitude interventions—Education and Contact—on stigmatizing attitudes toward people with ABI. For the second intervention hypothesis, an independent group design was also employed, with comparison of the two sub-categories of the Contact condition, Visible Disability, and “Invisible” Disability.

Participants

Four hundred and eight participants took part in this study. These were transition year students from 13 secondary schools in the Republic of Ireland. Class teachers anonymously administered the initial questionnaires to all students who obtained signed

Table 1. Age, gender, and familiarity with disability of participants in each intervention

Intervention group	Male %/ female %	Mean age (<i>SD</i>)	Does not know someone with ABI (%)	Does not know someone with mental health difficulty (%)	Does not know someone with Intellectual Disability (%)	Does not know someone with Physical Disability (%)
Education	40.5/59.5	15.5 (.58)	73.8	53.2	50.8	54
Contact						
All	38.3/61.7	15.5 (.52)	77.7	55.3	49.3	58.2
Visible disability	38.9/61.1	15.5 (.52)	76.1	57.5	46.9	51.3
Invisible disability	37.9/62.1	15.5 (.52)	78.7	53.8	50.9	62.7

Table 2. Age of participants (mean and standard deviation) and frequencies of gender in each school

	1	2	3	4	5	6	7	8	9	10	11	12	13
<i>n</i>	35	34	29	88	10	28	45	12	37	9	17	27	37
Mean age (<i>SD</i>)	15.29 (.46)	15.26 (.45)	15.38 (.49)	15.44 (.52)	15.60 (.52)	15.50 (.64)	15.58 (.62)	15.33 (.49)	15.70 (.52)	15.56 (.53)	15.29 (.47)	15.74 (.53)	15.62 (.49)
Male (%)	23 (65.7)	18 (52.9)	0 (0)	0 (0)	6 (60)/4 (40)	0 (0)/28 (100)	18 (40)/27 (60)	1 (8.3)	20 (54.1)	9 (100)/0 (0)	0 (0)/17 (100)	27 (100)/0 (0)	37 (100)/0 (0)
female (%)	12 (34.3)	16 (47.1)	29 (100)	88 (100)				11 (91.7)	17 (45.9)				

parental consent, had an adequate level of English fluency to complete the questionnaire, and who were not likely to be distressed by the task. No additional exclusion criteria were applied as the researchers did not wish to obtain additional personal details for participants. Despite administration to approximately even numbers of males and females, the final sample consisted of 159 males and 249 females. Participants had an average age of 15.5 years (age range = 14–17 years). The gender distributions and mean age for each school are given in Table 2.

23.5% of participants stated that they knew someone with ABI; 45.3% knew a person with a mental health disorder; 50.2% knew someone with an intellectual disability; and 43.1% reported knowing someone with a physical disability. Eleven percent of participants reported having received a presentation on ABI previously.

Transition year students were chosen as the participant group based on the aforementioned “Impressionable Years” hypothesis of attitude formation (Krosnick & Alwin, 1989; von Hippel & Henry, 2012), which suggests that late adolescence is a critical period that shapes and crystallizes attitudes, which tend to then persist through early adulthood.

Measures

The authors were not aware of any existing psychometrically-sound scale that specifically measures stigmatizing attitudes toward individuals with ABI; thus it was necessary to adapt an existing measure for use with ABI. A measure of stigmatizing attitudes for use with mental health difficulties, The Community Attitudes Towards Mental Illness Scale (CAMI; Taylor & Dear, 1981), has previously been adapted and used in the ABI field (Linden et al., 2005), and was selected for use in this study also. For the purposes of the current study, keywords pertaining to mental health were replaced with the relevant word for brain injury; this was done with the consent of the primary author of the CAMI (S.M. Taylor, personal communication, October 2011). The CAMI is a 40-item questionnaire which measures stigmatizing attitudes according to four stigma factors which have been identified through factor analysis (Taylor & Dear, 1981): Authoritarianism, Benevolence, Social Restrictiveness and Community Mental Health Ideology (CMHI). Each of the 40 items on the questionnaire is rated on a five-point Likert scale, with 10 items for each of the four subscales. Five of the items for each scale are reverse scored. The range of potential scores for each of the subscales is 10–50, with a higher score indicating a higher level of the measured attitude.

Authoritarianism involves the perceived difference between the stigmatized person and the “normal” group; the need for custodial care; and the attribution of the cause of the problem. Benevolence addresses whether society should bear responsibility for the care of the group; positive, sympathetic attitudes, and willingness to engage with members of the group; and anti-custodial attitudes. Social Restrictiveness looks at whether the group is perceived as dangerous, responsible or “normal,” as well as whether they should be avoided. Finally, CMHI measures perceptions of the therapeutic value of the community, the effect of support facilities on the community, the danger posed to residents by members of the group, and acceptance of the values of deinstitutionalized care. Each of these scales in the original CAMI has been found to have acceptable reliability coefficients: Authoritarianism, $\alpha = 0.68$; Benevolence, $\alpha = 0.76$; Social Restrictiveness, $\alpha = 0.80$; CMHI, $\alpha = 0.88$ (Taylor & Dear, 1981). These were found to be somewhat lower in the current study: Authoritarianism, $\alpha = 0.50$; Benevolence, $\alpha = 0.66$; Social Restrictiveness, $\alpha = 0.74$; and CMHI, $\alpha = 0.82$. As a result, it was decided not to include the Authoritarianism scale in the analyses, as the internal consistency was unacceptably low.

Procedure

Ethical approval to carry out the research was provided by the local Research Ethics Committee. Following this, appropriate service users who were representative of the two main groupings of ABI (visible disability and “invisible” disability) were chosen to carry out the Contact interventions. These individuals were considered suitable as they both had previous experience of delivering public presentations about their injuries and were engaged with awareness-raising initiatives within the region. They also both had traumatic ABI etiologies, this similarity in etiology was deemed important to prevent potential bias among participants against certain ABI causes (Linden et al., 2007). The Education intervention was developed by the Mid-West Clinical Neuropsychology Service and delivered by an Assistant Psychologist on the team.

Twenty-five local secondary schools were invited to participate; 14 (56%) agreed. Of these, one school took part as a pilot run to determine any potential flaws in the methodology, which were then amended as required. All participating schools were given parental consent forms and pre-intervention questionnaires for every student at least 1 week prior to the intervention, which were collected on the day of the intervention. Each school received a 20-min intervention (*Education*: a presentation giving factual information about the functions of the lobes of the brain, the etiologies, frequency and nature of ABI, and its effects on people who have sustained an ABI; or *Contact*: a presentation by a client about the etiology and nature of his ABI, his life before and after his ABI, and the repercussions of his injury and rehabilitation process), after which anonymised post-intervention questionnaires were administered separately by the Assistant Psychologist to all assenting students who had returned completed parental consent forms. All questionnaires were scored, matched pre- and post-intervention through discrete coded identifiers, and entered into SPSS.

Data Analysis

As the data were hierarchical in nature, multilevel modeling was considered. However, due to the differences in participant numbers among schools (range = 9–88), school-level comparisons were not felt to be statistically appropriate. To determine the necessity of measuring differences at school level, preliminary analyses were carried out. The pre-intervention scores were used for these analyses, to ensure any differences were pre-existing and not due to the discrete interventions.

Students of single-sex or co-educational schools were found to significantly differ on Social Restrictiveness scores only, with co-educational students scoring higher at 21.55 ($SD = 4.39$) than students of single-sex schools, who scored 20.06 ($SD = 3.94$), $t(406) = -3.61, p = .000$. The magnitude of the differences in the means was small ($\eta^2 = .03$). The size of the school was also found to significantly impact the Social Restrictiveness scores only, with schools with fewer than 400 ($M = 21.15, SD = 3.93$) or more than 801 ($M = 21.81, SD = 4.14$) students scoring higher on this scale than students from schools with 401–800 students ($M = 20.25, SD = 4.28$), $F(2,405) = 4.67, p = .01$. Post-hoc comparisons using the Tukey HSD test indicated that the only significant difference among groups was that between schools of 401–800 students, and schools with a population greater than 800 ($p = .01$).

Given that few significant differences were found to be present at the school level, and considering that pre-intervention scores used as covariates would reduce the influence of potentially confounding group differences, it was decided that multilevel modeling was not appropriate for the present data set.

Differences between means at induction to the study were computed by t -test and multivariate analysis of variance (MANOVA) as appropriate, and correlations by Spearman's rank-order correlations. The principal intervention research questions were analyzed by individual analyses of covariance (ANCOVA). Kolmogorov–Smirnov and Q–Q plots were used to evaluate deviations from normality, and checks were carried out to ensure that there was no violation of the assumptions of normality, linearity, homogeneity of variances, and homogeneity of regression slopes.

Results

Preliminary Analyses

The three scales included in the analyses showed some minor deviation from normality as would be expected: Benevolence (Kolmogorov–Smirnov = .075, $p = .00$); Social Restrictiveness (Kolmogorov–Smirnov = .070, $p = .00$); and CMHI (Kolmogorov–Smirnov = .101, $p = .00$). However, inspection of the Q–Q plots for each showed that the variables showed a good approximation to a normal distribution, and it was expected that ANCOVAs would be sufficiently robust to tolerate this modest deviation.

Significant correlations were found among each of the three dependent variables (see Table 3), with Benevolence and CMHI showing a strong positive relationship with each other, and negative relationships with Social Restrictiveness.

Pre-Intervention Stigmatizing Attitudes and Gender Differences

The pre-intervention scores showed that Benevolence and CMHI attitudes were both endorsed by a relatively high number of participants, mean = 38.41 ($SD = 4.07$); and 38.08 ($SD = 4.75$), respectively. Beliefs in relation to the need for Social Restrictiveness for people with ABI showed a lower mean score of 20.75 ($SD = 4.22$). A one-way between-group MANOVA was carried out to investigate gender differences in these three pre-intervention variables. A statistically significant difference was found between males and females on the combined dependent variables [$F(3,404) = 9.36, p = .00$; Wilks' Lambda = .94; partial $\eta^2 = .07$]. When the results for the dependent variables were looked at separately, all three continued to reach statistical

Table 3. Correlations among the three employed subscales of the CAMI following intervention

	Post social restrictiveness	Post CMHI
Post benevolence	–.658*	.685*
Post social restrictiveness		–.713*

Note: *Significant at $p < .01$.

Table 4. Pre- and postintervention scores (mean and SD) for the subscales of the CAMI

	Preintervention ($n = 408$)	Postintervention ($n = 408$)	Posteducation ($n = 126$)	Postcontact ($n = 282$)
Benevolence	38.41 (4.07)	38.94 (3.87)	37.48 (4.01)	39.60 (3.62)
Social restrictiveness	20.75 (4.22)	19.76 (4.38)	22.00 (4.33)	18.77 (4.03)
CMHI	38.08 (4.75)	39.85 (4.58)	37.80 (4.97)	40.76 (4.08)

significance: Benevolence: [$F(1,406) = 10.74, p = .001$; partial $\eta^2 = .03$]; Social Restrictiveness: [$F(1,406) = 28.157, p = .00$; partial $\eta^2 = .07$]; and CMHI: [$F(1,406) = 12.86, p = .00$; partial $\eta^2 = .03$]. An inspection of the mean scores indicated that females reported higher levels of Benevolence ($M = 38.93, SD = 3.88$) and CMHI ($M = 38.74, SD = 4.36$) than males (Benevolence: $M = 37.59, SD = 4.23$; CMHI: $M = 37.04, SD = 5.16$), while males endorsed the need for higher levels of Social Restrictiveness for people with ABI ($M = 22.09, SD = 4.32$) than females ($M = 19.90, SD = 3.92$).

Effect of Interventions on Stigmatizing Attitudes

Paired samples t -tests were conducted to investigate the impact of receiving any of the interventions on adolescents' attitudes toward people with ABI. There were statistically significant differences between the pre- and post-intervention scores for all three of the subscales of the CAMI, with an increase in Benevolence [$t(407) = -3.05, p = .002$; η^2 statistic = .02] and CMHI [$t(407) = -9.55, p = .000$; η^2 statistic = .22], and a decrease in Social Restrictiveness [$t(407) = 5.57, p = .000$; η^2 statistic = .08]. The means and standard deviations are presented in Table 4.

A one-way between-group MANOVA was carried out to investigate gender differences in the three dependent variables post-intervention. A statistically significant difference was found between males and females on the combined dependent variables: [$F(3,404) = 12.50, p = .00$; Wilks' Lambda = 0.92; partial $\eta^2 = .09$]. When the results for the dependent variables were looked at separately, all three continued to reach statistical significance: Benevolence [$F(1,406) = 7.72, p = .006$; partial $\eta^2 = .02$]; Social Restrictiveness [$F(1,406) = 32.58, p = .00$; partial $\eta^2 = .07$], and CMHI [$F(1,406) = 23.28, p = .00$; partial $\eta^2 = .05$]. An inspection of the adjusted mean scores indicated that females reported higher levels of Benevolence ($M = 39.37, SE = .24$) and CMHI ($M = 40.70, SE = 0.28$) than males (Benevolence: $M = 38.23, SE = 0.30$; CMHI: $M = 38.52, SE = 0.35$), while males reported higher levels of Social Restrictiveness ($M = 21.26, SE = 0.34$) than females ($M = 18.81, SE = 0.27$). Thus the gender differences seen prior to intervention remained present after intervention.

Effect of Familiarity with Individuals with ABI and Other Disabilities

Whether the participant reported having a family member, friend or "other" who had an ABI, or did not know anyone with an ABI, this did not affect scores pre- or post-intervention [Pre: $F(4,401) = 1.42, p = .15$; Wilks' Lambda = 0.96] [Post: $F(4,401) = 1.66, p = .07$; Wilks' Lambda = 0.95]. Similarly, knowing someone with a physical disability did not affect scores pre- or post-intervention [Pre: $F(3,402) = 1.21, p = .29$; Wilks' Lambda = 0.97] [Post: $F(3,402) = 1.39, p = .19$; Wilks' Lambda = 0.97].

Familiarity with a person with a mental health difficulty, however, did significantly affect scores pre-intervention [$F(4,401) = 2.31, p = .007$; partial $\eta^2 = .02$]. When the variables were looked at separately, it was found that knowing a person with mental health difficulties impacted scores on Benevolence [$F(3,404) = 7.20, p = .00$; partial $\eta^2 = .05$] and Social Restrictiveness [$F(3,404) = 3.99, p = .008$; partial $\eta^2 = .03$], but not CMHI [$F(3,404) = 2.57, p = .05$; partial $\eta^2 = .02$]. Benevolence was found to be highest in participants who reported having a family member with a mental health difficulty, and lowest in those who did not know anyone with mental health difficulties, while the reverse was true for Social Restrictiveness. Knowing someone with a mental health difficulty similarly affected post-intervention scores [$F(3,402) = 3.29, p = .001$; partial $\eta^2 = .02$]. When the variables were looked at separately, it was found that knowing a person with mental health difficulties impacted scores on Benevolence [$F(3,404) = 8.07, p = .00$; partial $\eta^2 = .06$], Social Restrictiveness [$F(3,404) = 6.13, p = .00$; partial $\eta^2 = .04$], and CMHI [$F(3,404) = 6.06, p = .00$; partial $\eta^2 = .04$]. Individuals with a family member with mental health difficulties scored highest on Benevolence and CMHI, and lowest on Social Restrictiveness, while participants who did not have

any acquaintance with mental health difficulties scored lower than others on Benevolence and CMHI, and higher on Social Restrictiveness.

Knowing a person with an intellectual disability also affected pre- and post-intervention scores [Pre: $F(3,402) = 2.73$, $p = .003$; Wilks' Lambda = 0.94] [Post: $F(3,402) = 3.56$, $p = .00$; Wilks' Lambda = 0.9]. When the variables were looked at individually, it was found that knowing someone with an intellectual disability significantly affected Benevolence scores pre-intervention [$F(3,404) = 7.73$, $p = .00$; partial $\eta^2 = .05$], and influenced two variables post-intervention when a Bonferroni adjusted alpha level of 0.017 was applied: [Benevolence: $F(3,404) = 9.59$, $p = .00$; partial $\eta^2 = .07$; CMHI: $F(3,404) = 5.10$, $p = .002$; partial $\eta^2 = .04$]. Investigation of the means showed that people who reported not knowing anyone with an intellectual disability yielded the lowest scores on both scales, with those who reported having a family member with an intellectual disability yielding the highest scores.

Intervention Hypothesis 1

The effect of education versus contact intervention on stigmatizing attitudes toward people with ABI. Of the 408 adolescents who participated in this study, 282 (69.1%) received a Contact Intervention and 126 (30.9%) received an Education intervention. The mean age, as well as the frequencies of gender and familiarity with disability, was found to be comparable across intervention groups, see Table 1.

An investigation of the means (see Table 4) shows that an Education intervention actually resulted in a slight decrease in Benevolence and CMHI, and an increase in Social Restrictiveness, while a Contact intervention had the reverse effect on each scale.

Three one-way between-group ANCOVAs were conducted to compare the effectiveness of a Contact intervention and an Education intervention in increasing positive attitudes toward people with ABI and decreasing negative attitudes. Each of the three employed subscales of the CAMI in turn was used as a dependent variable, with the pre-intervention scores for the corresponding scale used as a covariate.

For the Benevolence scale, after adjusting for pre-intervention scores, a significant difference was found between the two groups on post-intervention Benevolence [$F(1,405) = 33.19$, $p = .00$, partial $\eta^2 = .08$]. This is a moderate effect size according to Cohen (1988), indicating that the intervention type accounted for 8% of the variance in post-intervention Benevolence scores. Investigation of the adjusted means showed that those in the Contact group showed post-intervention mean Benevolence scores of 39.51, while scores for those in the Education group were 37.67. There was also a strong relationship between the pre- and post-intervention scores, as indicated by a partial η^2 value of .37.

After adjusting for pre-intervention scores, a significant difference was also found between the two groups on post-intervention Social Restrictiveness [$F(1,405) = 30.56$, $p = .00$, partial $\eta^2 = .07$]. This is a moderate effect size, indicating that the intervention type accounted for 7% of the variance in post-intervention Benevolence scores. Investigation of the adjusted means showed that those in the Contact group showed post-intervention mean Social Restrictiveness scores of 19.16, while scores for those in the Education group were 21.11. There was also a strong relationship between the pre- and post-intervention scores, as indicated by a partial η^2 value of .40.

After adjusting for pre-intervention scores, a significant difference was found between the two groups on post-intervention CMHI scores [$F(1,405) = 22.88$, $p = .00$, partial $\eta^2 = .05$]. This is a moderate effect size, indicating that the intervention type accounted for 5% of the variance in post-intervention CMHI. Investigation of the adjusted means showed that those in the Contact group showed a post-intervention mean CMHI score of 40.38, while the mean score for those in the Education group was 38.66. There was also a strong relationship between the pre- and post-intervention scores, as indicated by a partial η^2 value of .44.

As significant gender differences were found in pre-intervention scores, a series of two-way ANCOVAs were carried out to determine whether the efficacy of an intervention was impacted by the gender of the participant. After adjusting for pre-intervention scores, no significant interaction effects were found for Benevolence [$F(1,403) = .492$, $p = .483$], Social Restrictiveness [$F(1,403) = .477$, $p = .490$], or CMHI [$F(1,403) = 1.413$, $p = .235$]. However, a significant main effect for gender was found for Social Restrictiveness [$F(1,403) = 10.951$, $p = .001$, partial $\eta^2 = .026$], with males (adjusted $M = 20.862$, $SE = .277$) scoring higher than females (adjusted $M = 19.683$, $SE = .220$). A significant main effect for gender was also found for CMHI [$F(1,403) = 12.757$, $p = .000$; partial $\eta^2 = .031$], with females (adjusted $M = 40.023$, $SE = 0.224$) scoring higher than males (adjusted $M = 38.739$, $SE = 0.279$).

Intervention Hypothesis 2

The effect of visibility of an ABI on the effectiveness of a contact intervention. For the second intervention hypothesis, the two subgroups in the Contact condition were compared. A total of 113 participants were included in the Visible Disability group,

while the “Invisible” Disability group had 169 participants. Three one-way between-group ANCOVAs were conducted to compare the effectiveness of a Contact intervention from a person with a visible disability in increasing positive attitudes toward people with ABI and decreasing negative attitudes, to that of an intervention from a person with an “Invisible” disability. The three retained scales of the CAMI were each used as a dependent variable in turn, with the pre-intervention scores for the corresponding scale used as a covariate.

For the Benevolence scale, after adjusting for pre-intervention scores, there was no significant difference between the two groups on post-intervention scores [$F(1,279) = .04, p = .85, \text{partial } \eta^2 = .00$].

After adjusting for pre-intervention scores, no significant difference was found between the two groups on post-intervention Social Restrictiveness scores [$F(1,279) = .02, p = .9, \text{partial } \eta^2 = .00$].

The CMHI scale showed a significant difference between the two groups on post-intervention scores after adjusting for pre-intervention scores [$F(1,279) = 5.04, p = .03, \text{partial } \eta^2 = .02$]. This is a small effect size according to Cohen (1988), indicating that the visibility of the disability of the presenter accounted for 2% of the variance in post-intervention CMHI scores. Investigation of the adjusted means showed that those in the Visible Disability group showed post-intervention mean CMHI scores of 41.25, while scores for those in the “Invisible” Disability group were 40.44.

Participants had been asked to indicate on a Likert scale how likely they would have been to guess their speaker had an ABI had they passed them in the street, ranging from 1 = “very likely” and 5 = “very unlikely.” An independent samples *t*-test was carried out to determine whether the visibility of the ABI affected this; a significant relationship was found between the visibility and the likelihood of guessing the person had an ABI [$t(270) = -17.22, p = .00$]. The effect size was large ($\eta^2 = .52$), with a mean rating of 2.79 ($SD = 1.07$) for the visible ABI speaker, and 4.79 ($SD = .68$) for the “invisible” ABI. This suggests that, although the visibility of the ABI does not impact the efficacy of attitude interventions, it does affect whether participants believe they would recognize the presence of an ABI in an everyday situation.

Discussion

This is the largest study to date to investigate attempts to change stigmatizing attitudes in adolescents toward people with ABI. The findings of this study provide important up-to-date information relating to the attitudes a large sample of adolescents generally hold toward people with ABI, and how these can be effectively addressed in school settings.

Pre-Existing Attitudes Toward People with ABI

The transition year students tended to report stronger benevolence and beliefs about the therapeutic value of the community for persons with ABI, and lower levels of social distance and perceptions of dangerousness. This indicates a prevalence of positive over negative attitudes among this age group, which is commensurate with social cognitive models of bias and aging (von Hippel & Henry, 2012).

Males tended to report stronger negative attitudes and weaker positive attitudes than females both before and after intervention, which suggests a robust gender effect, and which may mandate different approaches to tackling these beliefs for young males. Future studies may usefully investigate this gender difference and whether this is culturally embedded or due to more firmly held and difficult to alter beliefs.

The provision of an intervention was found to result in some changes to each of the stigmatizing attitudes measured, indicating that adolescents’ attitudes are susceptible to change. However, investigation of the means showed that, while failing to reach statistical significance, an Education intervention actually produced slight overall increases in negative attitudes, and decreases in positive attitudes. This is concerning and may suggest that receiving details of the many potential manifestations of an ABI in an impersonal manner (i.e., a formal presentation) may actually increase stigmatizing attitudes somewhat. It is not clear why this is the case, but it is possible that the effects of ABI may appear more concerning to students when described in this manner than when seen in an individual context. Further studies may usefully investigate why this is the case, as well as whether these changes persist in the long-term.

The Influence of Familiarity with Disability

Commensurate with previous research, knowing somebody with an ABI or a physical disability did not influence attitudes toward people with an ABI. In contrast, participants who knew someone with a mental health or intellectual disability tended to have stronger benevolent attitudes and beliefs about the therapeutic benefits of the community, and to report less socially restrictive attitudes. Similar findings have been reported in relation to mental health (Corrigan, Edwards, Green, Diwan, & Penn, 2001). This may indicate that the participants saw a closer similarity between ABI and intellectual or mental health difficulties.

The Effect of Education versus Contact Intervention on Stigmatizing Attitudes Toward People with ABI

In terms of the nature of the interventions, results suggest that a Contact intervention is more effective in increasing positive attitudes and decreasing negative attitudes than an Education-only intervention. This is in line with the existing adult mental health literature (e.g., Corrigan et al., 2001) which has found direct contact to yield strong positive changes in attitudes and subsequent processing of information about group members. It is likely that contact with a person with ABI brings about a state of cognitive dissonance in which the participant is compelled to reconcile their stereotypes with the reality with which they are presented, which in turn may alter the individual's views of people with ABI as a whole. Indeed, the inclusion of a Contact element has been referred to as valuable experiential learning, wherein participants can apply the received information to an actual personal experience *in vivo* (Pinfold et al., 2003).

The Effect of Visibility of an ABI on the Efficacy of a Contact Intervention

The second hypothesis that the visibility of the ABI would increase the effectiveness of the Contact intervention was supported for the CMHI scale only in this study, with both Contact interventions resulting in similar improvements in benevolence and social restrictiveness. Participants who received an intervention from the speaker with a Visible Disability afterwards showed stronger beliefs about the therapeutic value of the community for people with ABI. This may be due to the predicted positive impact of visible markers of disability on attitudes, or to a perceived greater need for pragmatic community support and inclusion for this individual than for the "Invisible" Disability speaker. Additionally, there may be an information processing explanation. Some recent neuroimaging research (Krendl et al., 2011) suggests that in the initial two seconds of implicit stigma regulation when people are faced with a stigmatized person, there is significant neural activity controlling unwanted thoughts of prejudice (Knutson et al., 2007). This is generally taken to suggest that when faced with an initially obvious trigger for stigma reduction (e.g., a wheelchair user), a shift in the nature of processing occurs, whereas with stigmatized individuals without an obvious marker, processing may continue commensurate with more cognitively effortful emotion regulation processing, and be associated with an initial implicit bias (Krendl et al., 2011).

The finding that visibility did not influence levels of benevolence or social restrictiveness may indicate that the apparentness of the ABI, or its physical impairments, plays rather a minor role, if any, in challenging stereotypes. It may be that students are not likely to discriminate—whether negatively or positively—between people with ABI based on their physical appearance and/or ability. However, it should be considered that students rated themselves as far less likely to have guessed the presence of an ABI in the "Invisible" Disability speaker, and so meeting such a person in a real-world setting is unlikely to result in changed attitudes if the participant is unaware of the presence of an ABI.

It was expected, based on previously mentioned findings that physical and mental health difficulties evoke differing public attitudes, that ABIs which manifest primarily in physical or cognitive effects would similarly produce different attitudes. The finding that previous familiarity with a person with a physical disability did not influence attitudes may suggest that participants did not tend to compare ABI with a physical disability, even when the symptoms were predominantly physical. This may indicate a greater understanding of the complexity of ABI than that was expected in adolescents who had received little or no information on ABI previously. These findings suggest that an attitude intervention can be provided by individuals with very different ABIs, with relatively equal effectiveness.

However, while participants may not have held significantly different attitudes toward each of the two speakers, it is not known whether they would be likely to engage with both individuals in the same manner in a real-world setting. Stigmatizing attitudes, although highly correlated with active discrimination, are not always predictive of same (Dovidio & Gaertner, 1996); as such, an individual may report a positive attitude but still be likely to behave in a stigmatizing manner in certain situations. Indeed, benevolence, although a positive attitude, has been associated with increased avoidance of the stigmatized group in one study (Corrigan et al. 2001).

Methodological Considerations

This study has some limitations, which should be taken into account in considering the results. The participants involved were from a very specific group, namely 14- to 17-year-old secondary school students from a defined geographical region. While this group were chosen in light of the Impressionable Years hypothesis of attitude formation, further investigation is required using participants of different ages and educational levels, as well as from a wider region. Although secondary schools in Ireland are increasingly multicultural, Caucasian Irish remains the predominant group, and consequently results may not be generalizable to a broader ethnic population.

As schools were randomly allocated to interventions, this study used pre-existing groups of participants. However, every effort was made to account for potential differences between these groups, through using several different schools for each condition, investigating the differences in pre-intervention attitudes at the group level, and using covariates to control for same.

It would have increased the utility of the findings of this study to incorporate a control group of students who did not receive any intervention. However, this was not deemed possible as the completion of pre- and postmeasures required significant input from participating schools; a no intervention control was deemed to be unreasonable in the absence of any input to schools by the researchers. The use of two intervention groups for comparison, along with the employment of preintervention measures as covariates while no substitute for a no intervention control group, was the most robust and acceptable method in this challenging context of interventional work.

The use of an attitude measure for mental health was necessary as there is no similar measure in existence for ABI; however, despite best efforts to preserve the meanings of the original questionnaire while adapting it for ABI, it was found that the Cronbach's alpha levels for each of the four subscales were slightly reduced, resulting in the omission of one scale with unacceptably low internal consistency. While the above psychometric approach was undertaken in terms of increasing the validity of the scale for use in this study, it should be borne in mind that this measure was not subjected to full psychometric validation for use in relation to ABI; a validation study may usefully be carried out to determine the validity of the measure for this population.

It is also important to note that the use of a single self-report measure, with inherent responding biases, is not ideal, and the inclusion of an additional method (e.g., an experimental observational analysis of student behavior) would have increased the utility of the findings of this study. Time constraints rendered the use of multiple measures impractical for this study; however, future studies may build upon the current study by applying such an approach.

Despite the afore-mentioned limitations, this study has yielded important information regarding adolescents' attitudes to people with ABI, as well as effective methods to alter such attitudes. Whether these effects would be maintained long-term is beyond the scope of this study; however, similar studies in the mental health field have demonstrated that, although attitudes do not remain at the same level as immediately after the intervention, they remain more positive than baseline at 6-month follow-up (Pinfold et al., 2003). Future studies may usefully investigate the durability of these improved attitudes in the longer term. In addition to this, future studies should investigate whether attitude change has a parallel effect on actual behaviors, that is, whether reducing stigmatization actually reduces discrimination. This is important in determining the wider social impact of such attitude interventions.

It has also been found that similar results are found whether participants voluntarily engage in contact with a member of the stigmatized group (e.g., through selected voluntary work) or inadvertently engage in it such as through a presentation provided in school (Link & Cullen, 1986); further investigation of this effect in relation to ABI may yield important information pertaining to the potential flexibility of the provision of attitude interventions.

In consideration of the findings detailed above, it would be advisable in future studies to consider the inclusion of familiarity with a person with a mental health difficulty or intellectual disability, and participant gender, as additional covariates along with pre-intervention scores. This study has usefully identified these factors as impacting on attitudes and the efficacy of attitude interventions: future research may look further at the nature of these effects as part of the research design to determine the true impact of each intervention without the potentially confounding effects of these variables.

Conclusion

This large-scale study has provided important information regarding stigmatizing attitudes held by adolescents toward people with ABI, and how these may be improved in the community in which the person with ABI resides. Community integration is a key goal in neurorehabilitation; this is reflected in the increasing prioritization of community-based supports and services. However, given the known effects of stigma on quality of life, mental health, and community inclusion, the provision of attitude interventions within existing community groups, such as schools, is a helpful means to ensure that they remain cost- and time-effective, and so optimal outcomes may be obtained without placing undue burden on neuropsychological rehabilitation service providers. Through effective anti-stigmatization interventions delivered by persons with ABI, neuropsychological rehabilitation, and in particular community integration for individuals with ABI may be positively enhanced.

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Conflict of Interest

None declared.

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