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The impact of contact on adolescents' mental health literacy and stigma: The SchoolSpace Cluster Randomised Controlled Trial

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Stigma, Adolescence, Intergroup contact, School intervention, Mental disorder

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ABSTRACT

Objectives: To investigate whether intergroup contact in addition to education is more effective than education alone in reducing stigma of mental illness in adolescents.

Design: A pragmatic cluster randomised controlled trial compared education alone with education plus contact. Blocking was used to randomly stratify classes within schools to condition. Random allocation was concealed, generated by a computer algorithm, and undertaken after pre-test. Data was collected at pre-test and two week follow-up. Analysis use an intention-to-treat basis.

Setting: Secondary schools in Birmingham, UK.

Participants: All students in year 8 (age 12-13) were approached to take part.

Interventions: A one day educational programme in each school led by mental health professional staff. Students in the 'contact' condition received an interactive session with a young person with lived experience of mental illness.

Outcomes: The primary outcome was students' attitudinal stigma of mental illness. Secondary outcomes included knowledge-based stigma, mental health literacy, emotional wellbeing and resilience, and help-seeking attitudes.

Results: Participants were recruited between 1st May 2011 and 30th April 2012. 769 participants completed the pre-test and were randomised to condition. 657 (85%) provided follow-up data. At two week follow-up attitudinal stigma improved in both conditions with no significant effect of condition (95%CI -0.40, 0.22, p=0.5, d=0.01). Significant improvements were found in the education alone condition compared to the contact and education condition for the secondary outcomes of knowledge-based stigma, mental health literacy, emotional wellbeing and resilience, and help-seeking attitudes.

Conclusion: Contact was found to reduce the impact of the intervention for a number of outcomes. Caution is advised before employing intergroup contact with younger student age groups. The education intervention appeared to be successful in reducing stigma, promoting mental health knowledge, and increasing mental health literacy, as well as improving emotional wellbeing and resilience. A larger trial is needed to confirm these results.

Trial registration; ISRCTN: 07406026.

ARTICLE SUMMARY; STRENGTHS AND LIMITATIONS OF THIS STUDY

- Although intergroup contact is a popular method to reduce the stigma of mental illness, this is the first study utilising a robust randomised controlled trial design to investigate intergroup contact combined with education compared to education alone.
- Much of the existing research concentrates on age groups ranging from mid to late adolescence, however development of stigmatising attitudes and behaviours occurs in childhood and early adolescence, so it is vital that interventions for these age groups are investigated.
- Schools were chosen to represent the diversity of the UK school system in order to increase generalizability.
- Fidelity of implementation of the intervention was assessed for each condition within each school; facilitators demonstrated a high level of fidelity to the intervention implementation, and similar levels of engagement were observed across conditions.
- Acceptability of the intervention was also assessed in one school, with students reporting that the intervention was well recieved.

INTRODUCTION

A majority of young people who develop mental health difficulties report experiencing stigma from their peers (1). The UK 'Time to Change' programme describes a number of far reaching consequences of this stigma, with young people who experience mental health difficulties reporting that stigma had stopped them going to school (40%), socialising with friends (54%), caused them to give up on their ambitions and dreams (27%) , or had led them to consider suicide (26%; 2). These negative attitudes and a lack of knowledge or 'mental health literacy' (3) also act as a barrier to help-seeking in the event of mental distress (4, 5). Intergroup contact theory suggests that interaction between different groups reduces conflict, prejudice, and discrimination (6). Corrigan and Penn's (7) review suggests that a combination of contact and education may offer the best opportunity for reducing stigmatising attitudes, and contact has become a successful component in anti-stigma campaigns such as Time to Change (8). A recent meta-analysis comparing interventions which utilise contact to those which have utilised education alone however, found that in adolescent populations, education alone may be a better strategy (9). The three studies which have *directly* compared contact and education with education alone however, found contact following education significantly reduced stigma compared to education alone (10-12). Importantly, these studies also focused on mid to late adolescent age ranges, although arguably stigmatising attitudes begin to form in younger populations (13-15). The most effective strategy to recommend therefore remains an important and unanswered question. School-based programmes which aim to reduce stigma and increase mental health literacy may additionally improve participants mental health and well-being (4), and contact may help engagement with intervention programmes as adolescents report that they would value hearing personal experiences when being taught about mental health (16). Despite this, research which has utilised contact as a means to reduce stigma has not investigated mental health and well-being outcomes. This cluster RCT aimed to test the hypothesis that intergroup contact in addition to education is more effective than education alone in reducing stigma, improving mental health literacy, and promoting well-being in young adolescents.

METHOD

Design

A pragmatic cluster randomised controlled trial was undertaken in six secondary schools in Birmingham, UK. The study was granted ethical approval by The University of Birmingham ethics committee in June 2010 (reference number ERN_10-0397). The full project protocol is described in Chisholm et al. (17). The intervention was designed and reported in accordance with CONSORT guidelines (18).

Participants

Schools in Birmingham, UK, were approached based on specified criteria in order to represent the diversity of the UK school system and the socio-economic and socio-cultural strata of Birmingham (see box one). Once a school had consented to take part in the research, opt-out consent letters were sent to parents or guardians of students in the participating year group allowing at least two weeks for parents to withdraw their child from the research. Schools were recruited and the intervention implemented between April 2011 and April 2012.

Box One: Criteria used to select schools

Criteria	Defined by
Type of school	Independent (fee-paying), grammar (exam-entry), comprehensive (open-access)
Socio-economic profile of school	Percentage of pupils with free school meals
Intake profile of school	Ethnicity, gender, and percentage of pupils with English as a second language
Geographic location of school	North, east, south, and west Birmingham, UK

Randomisation

Classes rather than schools were randomised in order to maintain power. Random allocation was concealed, generated by a computer algorithm, and undertaken after pre-test. Each class within a school was given an identification number which was then emailed to an independent researcher at Birmingham and Solihull Mental Health Foundation Trust Research and Innovation who undertook the randomisation. Blocking was used to randomly stratify classes equally to condition within each school. Classes randomised to the contact

plus education condition received an educational topic day covering mental health themes including an interactive session led by a young person with experience of living with a mental disorder. Classes randomised to the education alone condition received the same intervention day with a short presentation on the history of mental illness in place of the 'lived experience' contact session. Condition allocation was concealed from the statistician in charge of devising the analysis (DJ). Condition allocation could not be masked from participants, teachers, and intervention leads.

Procedure

Two to three weeks prior to the intervention day, students with parental consent were invited to complete the study measures during their class registration period. Students indicated assent by checking a box on the front of the questionnaire after information about the research project was read out by the class teacher, stating that the survey was voluntary, and that students could choose not to complete any questions or subsections of the survey. Participants were also informed that there was a prize draw for a £25 voucher. Participants generated a code (19) on the front of their questionnaire, which was used to match individual's responses over time and to the condition that the participant was randomised.

The authors (KC, PP, and ET) developed the intervention utilising results from local surveys and focus groups, in collaboration with teachers and service-users. Additional educational resources evolved from the work of O'Reilly (2004) and the Staffordshire Changes Young People's mental health programme. Intergroup contact modules for the intervention were designed in collaboration with current and past users of mental health services. The young person with lived experience of mental illness worked with the class throughout the morning but did not reveal that they lived with a mental illness. Half way through the day, after discussing the prevalence of mental illness in the Stigma and Myths module, it was disclosed to the class that one of the people leading the intervention had experienced a mental illness (see box two). For the 20 minute Contact Session the young person with experience of mental illness then discussed what it is like to live with a mental illness and answered questions from the class. The young person then continued to work with the class for the rest of the day on the afternoon intervention modules.

Interventions followed the same lesson plans with the exception of a 20 minute 'contact module' in the contact condition and a 20 minute 'history of mental health module' in the education condition (see box two). Intervention lesson plans are available from the first author.

Box Two: Intervention Lesson Plans

Module	Length	Contact and education	Education alone
1. Being 'Normal'	~ 25 minutes	☑	☑
2. Stress and Anxiety	~ 60 minutes	☑	☑
3. Depression	~ 20 minutes	☑	☑
4. Psychosis	~ 45 minutes	☑	☑
5. Stigma and Myths	~ 10 minutes	☑	☑
6. Contact Session	~ 20 minutes	☑	x
7. The History of Mental Illness	~ 20 minutes	x	☑
8. The Mental Health Scale and Me	~ 25 minutes	☑	☑
9. Different Ways of Thinking; thoughts, feelings, and behaviours	~ 20 minutes	☑	☑
10. Drama Workshop	~ 60 minutes	☑	☑
11. Going Over the Day	~ 10 minutes	☑	☑

The intervention days were led by experienced clinical and research staff from Birmingham and Solihull Mental Health Foundation Trust (BSMHFT) along with other trained volunteers, some of whom had experience of mental illness. The intervention days were co-ordinated by KC, PP, and ET, and overseen by MB.

Outcomes

Primary outcome:

Stigma of mental illness: Attitudes regarding future behaviour

The Reported & Intended Behaviour Scale (RIBS; 20) assesses attitudes towards future intended behaviour related to the stigma of mental illness. The RIBS takes approximately 1-2 minutes to complete and rates participants' current and past experiences (e.g. 'Are you currently living with, or have you ever lived with, someone with a mental health problem?'), as well as their future willingness to have contact with individuals who are experiencing mental illness (e.g. 'In the future I would be willing to live with someone with a mental health problem'). Only the later questions generate the participant's final score. Scores on the RIBS range from 4 to 20, with higher scores indicating more positive attitudes relating to intended future behaviour towards individuals with mental disorders. Within adult groups

the RIBS has a test-retest reliability of 0.75, and Cronbach's alpha for items 5-8 (those which generate the participants final score) is 0.85.

Secondary outcomes:

Stigma-related knowledge of mental illness

Knowledge of mental illness was assessed using the Mental Health Knowledge Scale (MAKS; 21). The MAKS assesses six areas of stigma-related knowledge: help-seeking, recognition, support, employment, treatment, and recovery, and takes 1-2 minutes to complete, with higher scores indicating a higher level of knowledge. The MAKS has a test-retest reliability of 0.71 and has been extensively reviewed by experts. Scores on the MAKS range from 12 to 60, and higher scores indicated a higher level of stigma-related mental health knowledge.

Mental health literacy

Two vignettes were used to assess mental health literacy, specifically identification of mental illnesses, developed by Jorm et al. (3). Participants were asked 'In the above story do you think John/Peter has…' and chose from answers 'depression', 'anxiety', 'psychosis or schizophrenia', 'drug addiction', or 'no mental health problems'. A score of 1 was given if participants correctly identified the mental disorder from each vignette.

Emotional well-being

The Strengths and Difficulties Questionnaire (SDQ; 22) was used to assess emotional well-being and mental health. The SDQ assesses mental health and vulnerabilities on five subscales (conduct problems, hyperactivity-inattention, emotional symptoms, peer problems, and pro-social behaviour) and produces a total difficulties score. The SDQ has been validated for use with adolescents age 11 – 16 with a Cronbach's alpha of 0.82 for the total difficulties scale. Scores range from 0-40 and higher scores on the SDQ indicate lower levels of mental health.

Resilience

Resilience was measured using a 15 item (23) version of Wagnild and Young's (24) Resilience Scale, which assesses the personal competence component of resilience (e.g. 'My belief in myself gets me through hard times'). The scale has reported Cronbach's alphas of between 0.72 – 0.94 and has been used previously with adolescent populations (23, 25).

Scores range from 15-105, and higher scores on the resilience scale indicate a higher level of resilience.

Help-seeking

Attitudes to help-seeking were assessed by responses on a 7 point scale to the question 'In the next 12 months if you were to experience a mental illness, how likely are you to seek help?' Higher scores indicate a greater willingness to help-seek.

Acceptability

Acceptability of the intervention, including method of delivery and content, was assessed in one school (school 2) by author KC. Two weeks post-intervention students who had attended the intervention day (either condition) took part in two short group interviews (Benner; 1994) of 5-6 participants. Interviews were recorded and transcribed verbatim. The interview schedule can be seen in Box Three.

Box Three. Semi-structured interview schedule

Focal points for group interview	
1.	Was there anything on the course that you thought was particularly good or useful?
2.	Was there anything that you thought should have been on the course that wasn't?
3.	Are there any ways in which the course could be made better?

Fidelity of implementation

A day's training and workshop notes were provided for all individuals facilitating the intervention to ensure fidelity of implementation. Additionally, one class per condition, per school was assessed for fidelity between conditions and schools with a pre-developed checklist which measured pace and timing of the intervention, engagement of students, and group work.

Analysis

An intra-cluster correlation coefficient of 0.037 (Aberdeen University: Health Services Research Unit) was assumed and a cluster size of approximately 30 students per class, suggesting that 738 participants would be needed to detect a cohen's d effect size of 0.3.

To investigate the primary research question of the impact of contact on adolescents' stigma, data was analysed with generalised equation estimates (GEE) in SPSS, Version 20. In

accordance with CONSORT guidelines unadjusted analysis was employed as the primary analysis. In order to account for the clustered nature of the RCT, school and condition (contact and education or education alone) were included as covariates, as well as baseline measure scores. The GEE was also used to accommodate the fact that data on which class each participant was in was not collected, meaning that the analysis was unable to account for this aspect of the clustering. Outcomes were transformed if skewed. Where data was ordinal an ordinal logistic GEE was used. An adjusted analysis was also employed, with gender, ethnicity, previous contact, and whether the participant reported having been diagnosed with a mental health disorder, added as additional factors. Intention to treat analysis was used. The trial is registered with ISCRTN Registry, number ISRCTN07406026.

Additionally, to assess any change in participants' scores pre to post-intervention t-tests or marginal homogeneity tests (where data was ordinal) were employed.

Role of the funding source

The funder of the study had no role in study design, data collection, data analysis, data interpretation, or writing of the report. The corresponding author had full access to all the data in the study and had final responsibility for the decision to submit for publication.

RESULTS

Participants were recruited between 1st May 2011 and 30th April 2012. Six schools and 31 classes (range from 4-7 classes per school, see table 1) took part in the intervention. Demographic characteristics of participating schools can be seen in Table 1.

Table 1: Demographic characteristics* of schools

	School Type	Students aged 5 - 15	Classes per year group	Students with English second language	Students with free school meals	Ethnicity			
						South Asian	White	Black	Other
1	Mixed comprehensive school	1288	7	9%	22%	9%	79%	4%	8%
2	Girls only grammar school	668	4	23%	6%	45%	35%	10%	10%
3	Mixed comprehensive school	798	6	18%	54%	8%	65%	14%	13%
4	Boys only comprehensive school	611	5	26%	30%	35%	47%	6%	12%
5	Girls only comprehensive school	635	4	78%	48%	71%	3%	19%	7%
6	Boys only grammar school	622	5	23%	4%	28%	59%	4%	9%

*Data available from Birmingham City Council, accessed 2009

657 participants aged 11-13 (mean: 12.21, SD: 0.58) took part in the trial. Baseline characteristics of participants can be seen in table 4. Baseline and two week means, standard deviations, medians, and significance of improvement between baseline and two weeks can be seen in table 5. A summary of the effect between conditions at two weeks can be seen in table 6, for both the primary unadjusted analysis, and the adjusted analysis which used gender, ethnicity, previous contact, and whether the participant reported having been diagnosed with a mental health disorder, added as additional factors. The CONSORT diagram is presented in figure 1.

The unadjusted GEE, 0.09, 95% CI (-0.40, 0.22), p=0.5, cohen's d=0.01, found no significant effect of condition on participants attitudinal-based stigma at two week follow-up. Contrary to the hypothesis, participants knowledge-based stigma in the education alone condition improved significantly more than participants in the contact and education condition, -0.65, 95% CI (-1.13, -0.17), p=0.008, d=0.05. Similar results were found for mental health literacy, with an ordinal logistic GEE finding that participants in the education alone condition displaying greater improvement two weeks post-intervention compared to participants in the contact and education condition, -0.30, 95% CI (-0.44, -0.16), p<0.001, d=0.12.

A square root transformation was employed for emotional well-being baseline and 2 week data. The unadjusted GEE revealed that at two weeks post intervention participants in the

education alone condition had greater improvements in levels of emotional wellbeing compared to participants in the contact and education condition, 0.10, 95% CI (0.01, 0.18), p=0.02, d=0.05. Similarly, an ordinal logistic GEE found that participants in the education alone condition displayed greater improvements in their willingness to help-seek compared to participants in the contact and education condition, -0.26, 95% CI (-0.52, -0.00), p=0.05, d=0.02. Finally, resilience data was reverse coded and a square root transformation was used on baseline and two week data. The unadjusted GEE found no significant difference in resilience between conditions was observed at follow up, 0.19, 95% CI (-0.15, 0.52), p=0.3, d=0.05.

T-tests and marginal homogeneity tests were employed to assess significance of change in participants' scores pre to post-intervention. Participants' attitudinal-based stigma improved from baseline to two weeks follow-up (see table 5 for means). These improvements were found to be significant for both the contact and education condition, t(255)=-3.84, 95% CI (-0.99, -0.32), p<0.001, Pearson's r=0.23, and the education alone condition, t(193)=-3.62, 95% CI (-1.21, -0.36), p<0.001, r=0.25. Knowledge-based stigma also improved significantly for participants in the contact and education condition, t(195)=-8.91, 95% CI (-3.90, -2.49), p<0.001, r=0.54, and the education alone condition, t(169)=-9.50, 95% CI (-4.52, -2.96), p<0.001, r=0.59. In the contact and education condition improvement in mental health literacy scores was not found to be significant, z=-1.03, p=0.3, r=0.05. Conversely, participants in the education alone condition demonstrated a significant improvement in mental health literacy at two week follow-up, z=-2.49, p=0.01, r=0.13.

Participants emotional well-being scores improved significantly for the contact and education condition, t(194)=2.31, 95% CI (0.02, 0.19), p=0.02, r=0.16, as well the education-alone condition, t(165)=4.81, 95% CI (0.12, 0.29), p<0.001, r=0.35. Participants' resilience scores improved significantly in the education-alone condition, t(157)=2.87, 95% CI (0.07, 0.39), p=0.005, r=0.22. In the contact and education condition resilience scores decreased, but not significantly; t(152)=0.86, 95% CI (-0.11, 0.28), p=0.4, r=0.07. For help-seeking, no significant change pre to post intervention was found for the contact and education condition, z=-0.92, p=0.4, r=0.05, or the education alone condition, z=-1.24, p=0.2, r=0.07.

Participants reported finding the intervention highly acceptable. In particular, the use of intergroup contact, interactive methods of delivery, and expert and friendly presenters were praised. Areas suggested for improvement were ensuring language and explanations were clear and age appropriate, making sure time was allowed for class discussion, more information on help-seeking avenues, and more information on violence in mental illness. Quotes are presented in Table 2 and highlight participant views.

Table 2: Quotes highlighting participants' feedback on the intervention

Positive elements	
Intergroup contact	"The talk with Camilla was the most helpful thing because it was like, you probably like, you probably weren't ever going to talk to a mental um person like someone who's actually been there, done that kind of thing. So you probably won't get the chance and like if like it was good cos then you knew what people go through" "A stereotype of a crazy person, um someone with a mental illness is someone who's crazy, speaks nonsense, but she looked really normal. So that just goes to show that people with mental illnesses are normal, but in their own way"
Presenters	"They were very like straight to the point and they didn't over exaggerate it either" "They were chatty, they didn't just read off the board, they spoke to you like not in a boring way just didn't waffle" "They didn't scare you but they made you understand"
Interactive elements	"I liked the videos because they were effective and they actually showed you what people can do" "I liked the true and false one where you had to see where, cos you were still learning then, but like without having to just sit there. it gets you more interactive so you feel like you're actually taking part in that" "I liked the drama as well because it was like um it was almost like, cos we were doing stress and I think Mika, cos I was Mika in one of them, Mika was stressed, so you kind of like, you learnt what stress is actually like"
Areas for improvement	
Language and explanations	"In the end, they kind of kept saying what is normal and I couldn't really put my finger on it – is everyone normal? Is no-one normal? And it really like made my brain fuzzy, it's really hard to think straight. I did find it useful, it was just really difficult" "I didn't find it, the drama bit boring because it was really funny watching it, like everyone in the class watching, but the bit afterwards because it, it used words that I didn't understand like 'bodily language'"
Time for discussion and questions	"I found that we just got loaded on with information more than discussed it"
Help-seeking	"More on what you could do if you like did have mental illness because you could see a doctor or you could er go on this website to get help but they didn't really tell us anything else that we could do"
Violence	"What triggers them to be dangerous?"

Facilitators demonstrated a high level of fidelity of implementation to the intervention, measured by the pre-developed checklist which assessed pace and timing of the intervention, engagement of students, and group work. All presentation slides were covered and presenters moved at approximately equal speed through intervention modules (table 3). The majority of students in each school appeared to be engaged in the intervention, participating in group activities and joining in with group discussions.

Table 3: Fidelity of implementation observation checklist

Checklist item	Condition	Session observed	Outcome
Timing from first slide to class exercise	Contact	First module	10-12 minutes
	Education	Second module	10-26 minutes
Time allocated to first exercise	Contact	First module	8-13 minutes
	Education	Second module	5-10 minutes
Are any slides skipped?	Contact	First module	No, in all observed classes
	Education	Second module	No, in all observed classes
Are pupils asked if they have questions?	Contact	First module	Yes, in all observed classes
	Education	Second module	Yes, in all observed classes
Are the majority of students engaging in class?	Contact	First module	Yes, in all observed classes
	Education	Second module	Yes, in all observed classes
Size of group for first exercise	Contact	First module	2-7
	Education	Second module	3-5
Does a facilitator visit each group during exercise?	Contact	First module	Yes, in all observed classes
	Education	Second module	Yes, in all observed classes
Do all groups manage to finish exercise in allocated time?	Contact	First module	Yes in 4 observed classes, no in 2 observed classes
	Education	Second module	Yes, in all observed classes

Table 4: Baseline characteristics between conditions

Condition		Total N	Gender		Ethnicity						Current mental health diagnosis		Previous contact	
			Male	Missing	White	Asian	Black	Mixed ethnicity	Other ethnicity	Missing	Yes	Missing	Yes	Missing
Contact and education	**N**	354	171	0	149	141	29	23	9	3	10	7	92	8
	%	100	48.30	0	42.10	39.80	8.20	6.50	2.50	0.80	2.80	2	26	2.30
Education only	**N**	303	144	0	119	127	19	27	8	3	4	4	77	5
	%	100	47.50	0	39.30	41.90	6.30	8.90	2.60	1	1.30	1.30	25.40	1.70

Table 5: Significance of change; baseline-2 weeks

		Pre		2 weeks		t / z value	95%CI	P value
		Mean (SD)	Median	Mean (SD)	Median			
RIBS	**C&E**	13.28 (3.71)	13	13.81 (3.96)	14	-3.84	-0.99, -0.32	<0.001
	E	13.10 (4.29)	14	13.85 (3.83)	14	-3.62	-1.21, -0.36	<0.001
MAKS	**C&E**	39.92 (3.86)	40	42.98 (5.77)	43	-8.91	-3.90, -2.49	<0.001
	E	40.25 (4.04)	40	43.28 (5.83)	44	-9.50	-4.52, -2.96	<0.001
Vignettes	**C&E**	1.19 (0.74)	1	1.23 (0.77)	1	-1.03	-	0.3
	E	1.18 (0.72)	1	1.32 (0.73)	1	-2.49	-	0.01
SDQ	**C&E**	9.69 (5.63)	9	9.15 (5.90)	8	2.31	0.02, 0.19	0.02
	E	9.72 (5.57)	9	8.87 (5.87)	8	4.81	0.12, 0.29	<0.001
Help-seeking	**C&E**	5.41 (1.71)	6	5.51 (1.67)	6	-0.92	-	0.4
	E	5.35 (1.71)	6	5.48 (1.62)	6	-1.24	-	0.2
Resilience	**C&E**	83.88 (13.38)	86	82.50 (15.75)	86	0.86	-0.11, 0.28	0.4
	E	82.80 (13.79)	85	83.34 (15.47)	85	2.87	0.07, 0.39	0.005

* Significance of change for the Reported & Intended Behaviour Scale (RIBS), Mental Health Knowledge Scale (MAKS), mental health literacy (vignettes), The Strengths and Difficulties Questionnaire (SDQ), help-seeking, and resilience

Table 6: Effect of condition at 2 weeks, unadjusted and adjusted GEEs

Measure	Contact and education		Education alone		Model	Treatment effect for contact plus education	95%CI	P value
	Mean (SD)	Median	Mean (SD)	Median				
RIBS	13.81 (3.96)	14	13.85 (3.83)	14	**Unadjusted**	-0.09	-0.40, 0.22	0.5
					Adjusted	-0.07	-0.41, 0.28	0.7
MAKS	42.98 (5.77)	43	43.28 (5.83)	44	**Unadjusted**	-0.65	-1.13, -0.17	0.008
					Adjusted	-0.72	-1.28, -0.16	0.01
Vignettes	1.23 (0.77)	1	1.32 (0.73)	1	**Unadjusted**	-0.30	-0.44, -0.16	<0.001
					Adjusted	-0.35	-0.47, -0.23	<0.001
SDQ	9.15 (5.90)	8	8.87 (5.87)	8	**Unadjusted**	0.10	-0.01, 0.18	0.02
					Adjusted	0.11	0.02, 0.19	0.01
Help-seeking	5.51 (1.67)	6	5.48 (1.62)	6	**Unadjusted**	-0.26	-0.52, -0.00	0.05
					Adjusted	-0.20	-0.41, 0.01	0.07
Resilience	82.50 (15.75)	86	83.34 (15.47)	85	**Unadjusted**	0.19	-0.15, 0.52	0.3
					Adjusted	0.16	-0.16, 0.48	0.3

* Effect of condition at 2 weeks for the Reported & Intended Behaviour Scale (RIBS), Mental Health Knowledge Scale (MAKS), mental health literacy (vignettes), The Strengths and Difficulties Questionnaire (SDQ), help-seeking, and resilience

DISCUSSION

The current study found that for an educational intervention within a young adolescent population, contrary to study hypothesis, intergroup contact did not add value to education alone in improving attitudinal stigma of mental illness. Similar results to these were found for the secondary outcome of resilience, with intergroup contact adding no value to education alone. For secondary outcome measures of knowledge-based stigma, mental health literacy, emotional well-being and help-seeking attitudes results were even more striking, with participants scores in the education alone condition improving significantly more than those in the contact and education condition.

The results are in line with the findings of a recent meta-analysis from Corrigan and colleagues (9) which compared education alone interventions to contact interventions and suggested that within adolescent populations education alone interventions held more promise for the reduction of stigma. On the other hand, the findings conflict with the only three previous studies which investigated education and contact compared to education alone in adolescent populations (10-12). There are several possible reasons for the absence of gains from contact in this trial. The majority of research into the relationship between intergroup contact and stigma has been conducted within adult populations, and it was from this research that Corrigan and Penn (7) based their original proposition that contact combined with education is likely to be the best method for reducing stigma. Due to the rapid nature of brain changes throughout adolescence (26, 27) there may be a large discrepancy in level of maturation between adolescents who differ in age even by a year or two. Though only a few years' age gap separates the young adolescents who took part in the present study from the slightly older adolescents of Meise et al. (10), Chan et al. (12) and Husek (11), this developmental difference may have had an impact on participants' response to contact. Pinto-Foltz et al. (28) suggest that adolescents may conceptualise the term 'mental illness' in a different way to adult or older populations. For example, young adolescents may lack an internal reference system for mental illness, or have a framework of mental illness which is somewhat undifferentiated. If this is the case then contact may serve more to confuse than to clarify, as mental illness in 'reality' often does not conform neatly into diagnostic categories and comorbidity is common (e.g. 29). Alternatively, adolescents may have an internal framework for mental illness, but it may be a negative or fearful framework. Adolescents' conception of mental health may be influenced to a large part by media representations of mental illness (e.g. 30) leading to a framework which encapsulates many negative extremes of mental illness. If the contact used in the intervention was successful in normalising mental illness then fear of developing an illness may have increased leading to cognitive avoidance strategies (31) in participants as a defence

mechanism against anxiety. Participants may have distanced themselves from the topic of mental illness, increasing their desire for social distance, and leading to a decreased engagement in the educational elements of the intervention and a diminished impact on outcome variables. One further hypothesis is that the contact module with its element of surprise had an amplified impact on students, leading to this section of the intervention being recalled over and above other modules. The contact module occurred midway through the day, and may have been particularly attention grabbing, effectively wiping much of the educational elements of the intervention. Increased engagement in the contact module may have left participants with less attentional capacity to process other information presented, leading to decreased levels of improvement on the research measures when compared to the education alone condition. This account is in line with themes discussed in the focus groups investigating the acceptability of the intervention, in which participants reported engaging with and valuing the intergroup contact elements of the intervention. It is possible that the introduction of the contact was too sudden, and that contact may have had a more positive impact if introduced in a different manner, for example after more time to consolidate the educational aspect of the intervention. If correct, this would suggest that it was not the contact per se which reduced the impact of the intervention, but the timing and manner in which the contact was introduced.

There are a number of implications regarding the use of intergroup contact with young adolescent populations which are important for mental health policy and anti-stigma campaigns targeting children and young people. The students participating in the current research had just a single morning session of mental health education directly prior to the contact element of the intervention, with no time in between to process the information they had received. If young adolescents do lack an internal reference system for mental illness it may be that they require more extensive mental health education prior to experiencing intergroup contact compared to older adolescents or adults. Chan et al. (12), for example found that video-based contact was more effective than education alone only when the video was presented after the educational component of the intervention, but not before. Although contact in the present intervention followed an educational component, it may be that due to the participants' relatively young developmental stage the quantity of education given prior to contact (approximately 3 hours) was insufficient. Similarly, if the engaging experience of contact reduced attentional capacity for other intervention modules then contact may still prove to be an effective technique for reducing stigma in young people if additional time is given for participants to process the information they have received before the introduction of intergroup contact. Additionally, it is felt that adolescents may also need more time and discussion *after* the presentation of contact to consolidate and process the information they

have received. Tolomiczenko et al. (32) for example, found that video-based contact was only successful in reducing the stigma of high school students when accompanied by discussion of the film afterwards. Video-based contact unaccompanied by discussion was found to lead to increased levels of stigma. Further research is needed to investigate these possibilities. The current research suggests however, that it would be premature to implement large scale dissemination of contact as a means to reduce stigma in young adolescent populations. When conducting interventions it is important to consider any potential, unintended, negative outcomes which may result from the research. One important implication suggested by the present research which should be considered for future studies and interventions involving intergroup contact is impact on well-being. Although this is, to the authors' knowledge, the first research reporting on the use of intergroup contact in an intervention for young adolescents, previous research has investigated contact in older adolescent groups and adult populations. With the exception of help-seeking intentions however, well-being outcomes have rarely been considered.

Previous research has been criticised for only representing specific school types (e.g. fee paying single gender schools; 33). For the SchoolSpace Trial, intervention schools were chosen to represent the diversity of the UK school system in order to increase generalizability. Schools therefore, may not have represented a homogenous group, despite being analysed in this way. To maintain power, classes were randomised within schools to each condition, rather than entire schools, which may have allowed a degree of cross contamination between conditions, and magnified intra-class correlations. This means that effect sizes between conditions may have been diluted, and the difference in impact between the contact and education condition and the education alone condition may be even more pronounced than suggested by the present research. The analysis design accounted for clustering by including school and condition (contact and education or education alone) as covariates. Data on which class each participant was in was not collected, meaning that the analysis was unable to account for this aspect of the clustering. In addition, the sample size achieved was small to moderate, which will have impacted the power of the study. Fidelity of implementation of the intervention was assessed for each condition within each school; facilitators demonstrated a high level of fidelity to the intervention implementation, and similar levels of engagement were observed across conditions, representing a strength of the project. It is important to acknowledge that the research investigated two aspects of stigma, intended behaviour towards individuals diagnosed with a mental illness, and stigma-based knowledge. Other aspects of stigma such as perceptions of dangerousness, otherness, or unpredictability were not investigated, and may interact differently with the impact of contact.

The present research appears to demonstrate that short educational interventions provided in schools can be successful in reducing the stigma of mental illness, both attitudinal and knowledge-based, as well as improving mental health literacy and well-being outcomes. Contrary to study hypothesis, intergroup contact was not seen to add value, and appeared to reduce the impact of the intervention. This is important for those involved in developing mental health and educational policy aiming to reduce stigma and increase mental health literacy and wellbeing in young adolescent populations, though further research into this area is certainly warranted.

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Competing interests

We declare no competing interests.

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Contributors

KC is chief investigator on the project and drafted the manuscript. KC, PP, ET and MB contributed to the development and implementation of the intervention. KC, CT, PP, and MB contributed to the design of the study. MB, PP, and ET supervised KC's doctoral research, which included this project. DJ devised the statistical analyses. KC ran all other statistical analyses. All authors contributed to the editing of the manuscript and have read and approved the final manuscript.

Data Sharing Statement

Data from the study is available via the corresponding author

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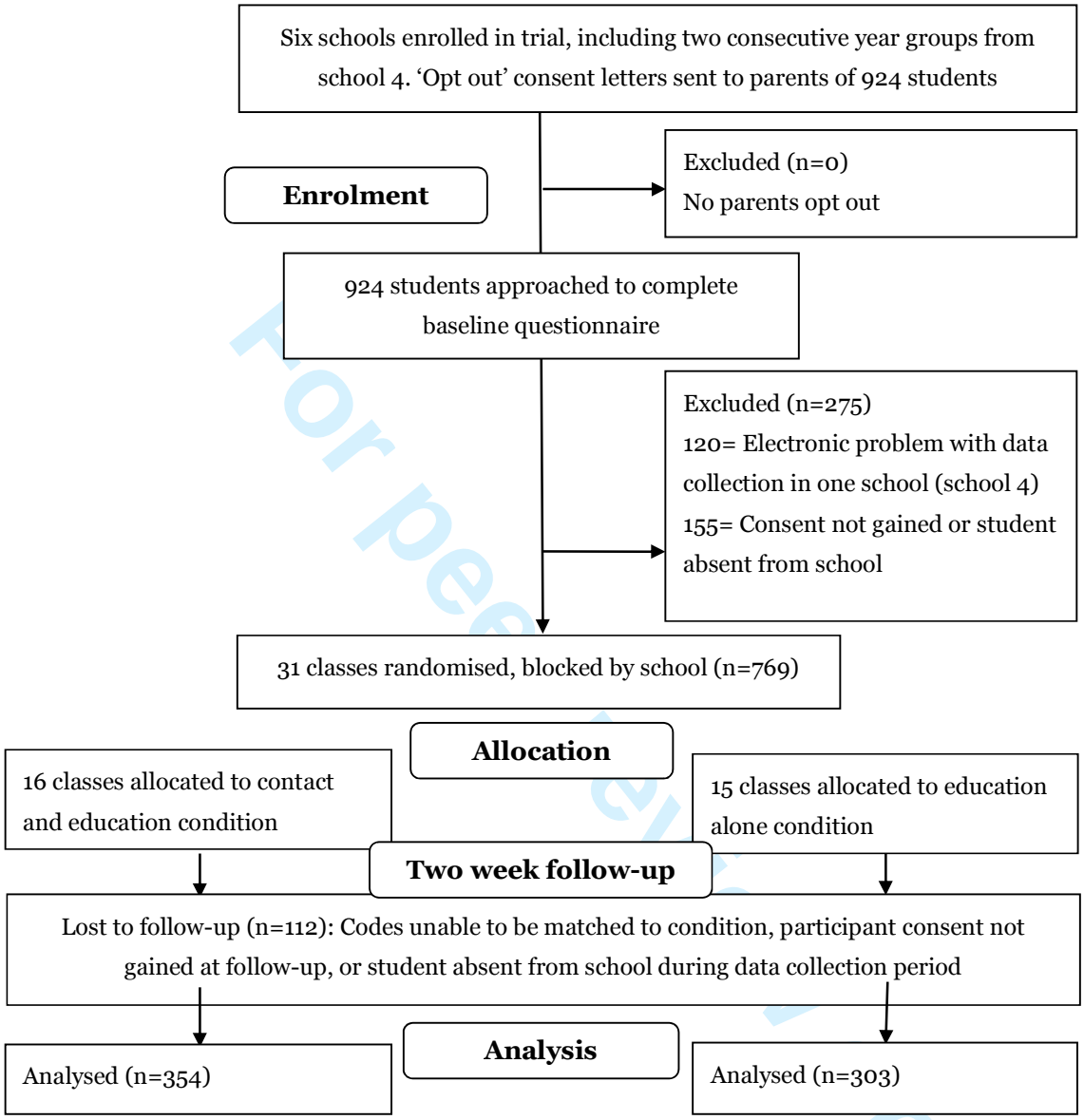
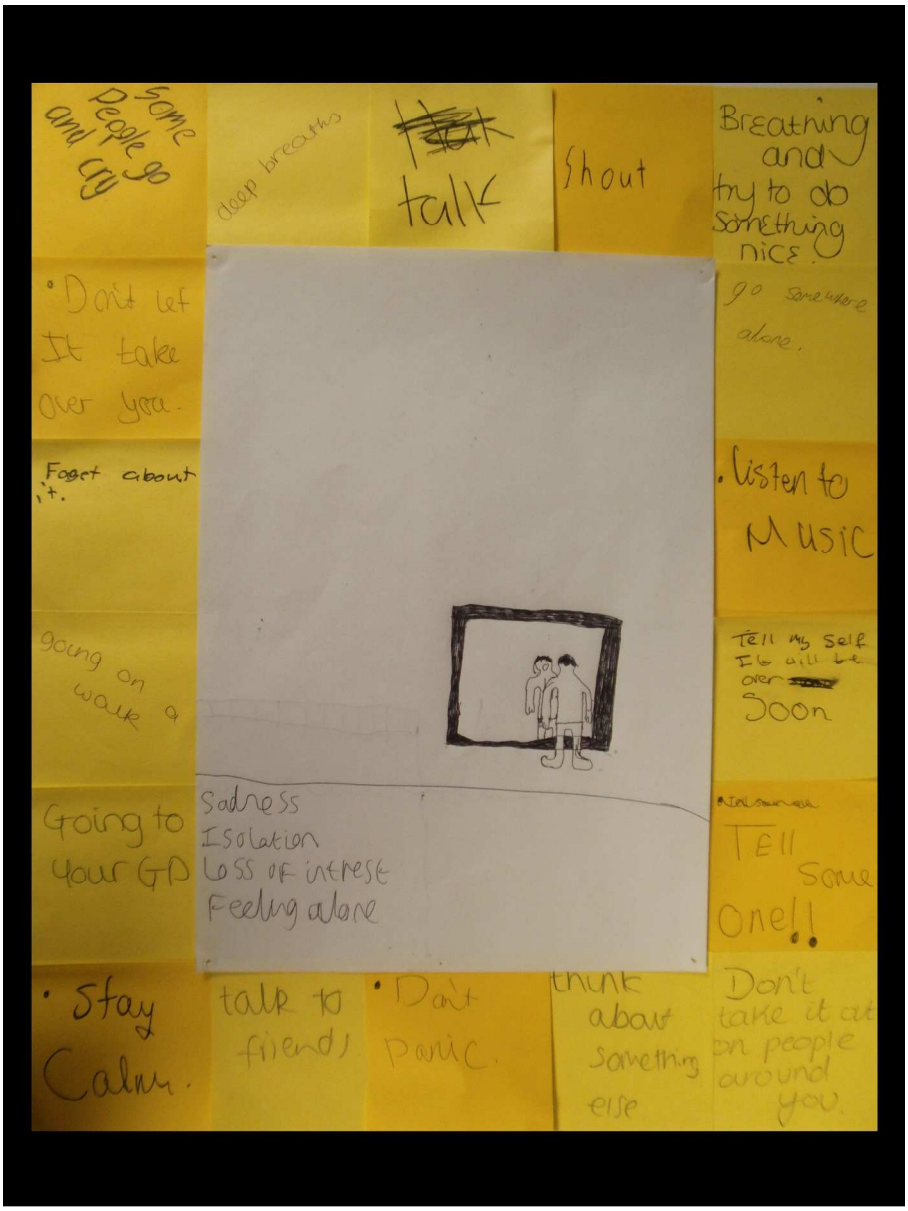


Figure 1: Participant enrolment, allocation, follow-up, and analysis for main trial



346x462mm (300 x 300 DPI)

Appendix:

Appendix A: CONSORT checklist (Schultz et al. 2010; Moher et al. 2010)

Section/Topic	Item No	Checklist item	
Title and abstract			
	1a	Identification as a randomised trial in the title	1
	1b	Structured summary of trial design, methods, results, and conclusions (for specific guidance see CONSORT for abstracts)	2
Introduction			
Background and objectives	2a	Scientific background and explanation of rationale	3
	2b	Specific objectives or hypotheses	3
Methods			
Trial design	3a	Description of trial design (such as parallel, factorial) including allocation ratio	4
	3b	Important changes to methods after trial commencement (such as eligibility criteria), with reasons	n/a
Participants	4a	Eligibility criteria for participants	4
	4b	Settings and locations where the data were collected	4
Interventions	5	The interventions for each group with sufficient details to allow replication, including how and when they were actually administered	5-6
Outcomes	6a	Completely defined pre-specified primary and secondary outcome measures, including how and when they were assessed	5-8
	6b	Any changes to trial outcomes after the trial commenced, with reasons	n/a
Sample size	7a	How sample size was determined	8
	7b	When applicable, explanation of any interim analyses and stopping guidelines	n/a
Randomisation:			
Sequence generation	8a	Method used to generate the random allocation sequence	4-5
	8b	Type of randomisation; details of any restriction (such as blocking and block size)	4-5
Allocation concealment mechanism	9	Mechanism used to implement the random allocation sequence (such as sequentially numbered containers), describing any steps taken to conceal the sequence until interventions were assigned	4-5
Implementation	10	Who generated the random allocation sequence, who enrolled participants, and who assigned participants to interventions	4-5

Blinding	11a	If done, who was blinded after assignment to interventions (for example, participants, care providers, those assessing outcomes) and how	4-5
	11b	If relevant, description of the similarity of interventions	5-6
Statistical methods	12a	Statistical methods used to compare groups for primary and secondary outcomes	8-9
	12b	Methods for additional analyses, such as subgroup analyses and adjusted analyses	8-9
Results			
Participant flow (a diagram is strongly recommended)	13a	For each group, the numbers of participants who were randomly assigned, received intended treatment, and were analysed for the primary outcome	10
	13b	For each group, losses and exclusions after randomisation, together with reasons	10
Recruitment	14a	Dates defining the periods of recruitment and follow-up	4
	14b	Why the trial ended or was stopped	4
Baseline data	15	A table showing baseline demographic and clinical characteristics for each group	15
Numbers analysed	16	For each group, number of participants (denominator) included in each analysis and whether the analysis was by original assigned groups	9, 15
Outcomes and estimation	17a	For each primary and secondary outcome, results for each group, and the estimated effect size and its precision (such as 95% confidence interval)	11 - 16
	17b	For binary outcomes, presentation of both absolute and relative effect sizes is recommended	n/a
Ancillary analyses	18	Results of any other analyses performed, including subgroup analyses and adjusted analyses, distinguishing pre-specified from exploratory	11-16
Harms	19	All important harms or unintended effects in each group (for specific guidance see CONSORT for harms)	n/a
Discussion			
Limitations	20	Trial limitations, addressing sources of potential bias, imprecision, and, if relevant, multiplicity of analyses	19
Generalisability	21	Generalisability (external validity, applicability) of the trial findings	19
Interpretation	22	Interpretation consistent with results, balancing benefits and harms, and considering other relevant evidence	17-19
Other information			
Registration	23	Registration number and name of trial registry	2

Protocol	24	Where the full trial protocol can be accessed, if available	4
Funding	25	Sources of funding and other support (such as supply of drugs), role of funders	9

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The impact of contact on adolescents' mental health literacy and stigma: The SchoolSpace Cluster Randomised Controlled Trial

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The impact of contact on adolescents' mental health literacy and stigma: The SchoolSpace Cluster Randomised Controlled Trial

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Stigma, Adolescence, Intergroup contact, School intervention, Mental disorder

Word count: 4670

ABSTRACT

Objectives: To investigate whether intergroup contact in addition to education is more effective than education alone in reducing stigma of mental illness in adolescents.

Design: A pragmatic cluster randomised controlled trial compared education alone with education plus contact. Blocking was used to randomly stratify classes within schools to condition. Random allocation was concealed, generated by a computer algorithm, and undertaken after pre-test. Data was collected at pre-test and two week follow-up. Analysis use an intention-to-treat basis.

Setting: Secondary schools in Birmingham, UK.

Participants: All students in year 8 (age 12-13) were approached to take part.

Interventions: A one day educational programme in each school led by mental health professional staff. Students in the 'contact' condition received an interactive session with a young person with lived experience of mental illness.

Outcomes: The primary outcome was students' attitudinal stigma of mental illness. Secondary outcomes included knowledge-based stigma, mental health literacy, emotional wellbeing and resilience, and help-seeking attitudes.

Results: Participants were recruited between 1st May 2011 and 30th April 2012. 769 participants completed the pre-test and were randomised to condition. 657 (85%) provided follow-up data. At two week follow-up attitudinal stigma improved in both conditions with no significant effect of condition (95%CI -0.40, 0.22, p=0.5, d=0.01). Significant improvements were found in the education alone condition compared to the contact and education condition for the secondary outcomes of knowledge-based stigma, mental health literacy, emotional wellbeing and resilience, and help-seeking attitudes.

Conclusion: Contact was found to reduce the impact of the intervention for a number of outcomes. Caution is advised before employing intergroup contact with younger student age groups. The education intervention appeared to be successful in reducing stigma, promoting mental health knowledge, and increasing mental health literacy, as well as improving emotional wellbeing and resilience. A larger trial is needed to confirm these results.

Trial registration; ISRCTN: 07406026.

ARTICLE SUMMARY; STRENGTHS AND LIMITATIONS OF THIS STUDY

- Although intergroup contact is a popular method to reduce the stigma of mental illness, this is the first study utilising a robust randomised controlled trial design to investigate intergroup contact combined with education compared to education alone.
- Much of the existing research concentrates on age groups ranging from mid to late adolescence, however development of stigmatising attitudes and behaviours occurs in childhood and early adolescence, so it is vital that interventions for these age groups are investigated.
- Schools were chosen to represent the diversity of the UK school system in order to increase generalizability.
- Just two aspects of stigma were investigated; knowledge and attitude based stigma. Other aspects of stigma such as perceptions of dangerousness, otherness, or unpredictability were not investigated, and may interact differently with the impact of contact.
- Students reported that the intervention was well received and highly acceptable, however acceptability of the intervention was assessed in just one school.

INTRODUCTION

A majority of young people who develop mental health difficulties report experiencing stigma from their peers (1). The UK's 'Time to Change' programme is a large scale national anti-stigma programme, which aims to reduce the stigma of mental illness by facilitating intergroup contact between the general public and individuals who experience mental disorders. Research from Time to Change describes the far reaching consequences of stigma, with young people who experience mental disorders reporting that stigma had stopped them going to school (40%), socialising with friends (54%), or had led them to consider suicide (26%; 2).

Intergroup contact theory suggests that interaction between different groups reduces conflict, prejudice, and discrimination (3). Contact interventions involve individuals with experience living with a mental illness speaking about those experiences to members of the general population. Interventions may target stigma of a particular disorder (e.g. depression), or may be more generic ('mental illness'). Contact is often combined with education programmes but can also act as a stand-alone intervention. Griffiths et al.'s (4) meta-analysis found that both education interventions and contact interventions are effective in reducing stigma, but stated that there were very few randomised controlled trials which utilised contact. Corrigan and Penn (5) suggest a combination of contact and education may offer the best opportunity for reducing stigmatising attitudes, and contact has become a successful component in anti-stigma campaigns (6). A recent meta-analysis comparing interventions which utilise contact alone or contact plus education, to those which have utilised education alone however, found that in adolescent populations, education alone may be a better strategy (7). The three studies which have *directly* compared contact and education with education alone however, found contact following education significantly reduced stigma compared to education alone (8-10). Importantly, these studies also focused on mid to late adolescent age ranges. Targeting younger adolescent populations has a number of potential benefits. Stigmatising attitudes begin to form in childhood and early adolescence (11-13) meaning interventions targetted at these age groups may have a more preventative role than those targeted at older individuals. Similarly, stigma, and a lack of knowledge or 'mental health literacy' (14), has also been linked to a chronic delay in help-seeking (15-18), with only a minority of young people experiencing a diagnosable mental disorder accessing professional help (16, 19). As prevalence for the development of many mental disorders peeks in adolescence and early adulthood (20), targeting stigma earlier may help to reduce this delay.

Contact interventions aiming to improve stigma and literacy have not generally investigated mental health and well-being outcomes. There is emerging evidence however that school-based programmes which aim to reduce stigma and increase literacy may additionally improve participants' mental health and resilience (17). Resilience can be considered as factors which may protect against the development of a mental illness, such as personal disposition, family cohesion, and social support (21). Programmes which promote mental health and resilience tend to show greater impact than those which aim to reduce mental illness (22). Mental health literacy programmes which have a focus on increasing help-seeking and understanding of resilience skills such as self-esteem may play into this (17). Contact may additionally help engagement with programmes as adolescents report that they would value hearing personal experiences when being taught about mental health (23).

This cluster RCT aimed firstly, to test the hypothesis that contact in addition to education is more effective than education alone in reducing stigma, improving mental health literacy, and promoting well-being in young adolescents, and secondly, to assess the feasibility of conducting contact-based intervention research in an adolescent population, the ability of the facilitators to conduct the intervention with fidelity, and the acceptability of the contact element of the intervention to adolescent groups.

METHOD

Design

A pragmatic cluster randomised controlled trial was undertaken in six secondary schools in Birmingham, UK. The study was granted ethical approval by The University of Birmingham ethics committee in June 2010 (reference number ERN_10-0397). The full project protocol is described in Chisholm et al. (24). The intervention was designed and reported in accordance with CONSORT guidelines (25).

Participants

Schools in Birmingham, UK, were approached based on specified criteria in order to represent the diversity of the UK school system and the socio-economic and socio-cultural strata of Birmingham (see table 1). Once a school had consented to take part in the research, consent letters were sent to parents or guardians of all students in the participating year group. Schools were recruited and the intervention implemented between April 2011 and April 2012.

Table 1: Criteria used to select schools

Criteria	Defined by
Type of school	Independent (fee-paying), grammar (exam-entry), comprehensive (open-access)
Socio-economic profile of school	Percentage of pupils with free school meals
Intake profile of school	Ethnicity, gender, and percentage of pupils with English as a second language
Geographic location of school	North, east, south, and west Birmingham, UK

Randomisation

Classes rather than schools were randomised in order to maintain power. Random allocation was concealed, generated by a computer algorithm, and undertaken after pre-test. Each class within a school was given an identification number which was then emailed to an independent researcher at Birmingham and Solihull Mental Health Foundation Trust who undertook the randomisation. Blocking was used to randomly stratify classes equally to condition within each school. Condition allocation was concealed from the statistician in charge of devising the analysis (DJ). Condition allocation could not be masked from participants, teachers, and intervention leads.

Procedure

Two weeks prior to the intervention day, students with parental consent were invited to complete the self-report study measures during their class registration. Students indicated assent by checking a box and generated a code (26) on their questionnaire, which was used to match individual's responses over time and to the condition that the participant was randomised. Participants completed the same questionnaire two weeks post-intervention, again during class registration. In two schools participants also completed study measures at 6 month follow-up (see online supplementary table 1-4).

The Intervention

The authors (KC, PP, and ET) developed the intervention utilising results from local surveys and focus groups, in collaboration with teachers and service-users. Additional resources evolved from the work of O'Reilly (27) and the Staffordshire Changes Young People's mental health programme. Contact modules for the intervention were designed in collaboration with

current and past users of mental health services. The young person with experience of mental illness or 'Contact Volunteer' worked with the class throughout the morning but did not reveal that they lived with a mental illness. Half way through the day it was disclosed to the class that one of the people leading the intervention had experienced a mental illness. This was done so that the participants would be able to spend the morning getting to know the individuals without preconceptions based on the knowledge that they had a diagnosis. For the 20 minute Contact Session the Contact Volunteer then discussed what it is like to live with a mental illness and answered questions from the class. The length of time for the formal contact presentation was decided upon after discussion with the Contact Volunteers. The volunteer then continued to work with the class for the rest of the day and to discuss their experiences and answer questions in a less formal manner.

The majority of Contact Volunteers were recruited via the Early Intervention in Psychosis Service. Other individuals were recruited via the Youthspace Programme (www.youthspace.me) and service-user research groups from the Mental Health Research Network. Individuals had a range of different experiences and diagnoses including psychosis, depression, anxiety disorders, and borderline personality disorder. The most prevalent experience was of psychosis.

Interventions followed the same lesson plans with the exception of a 20 minute 'contact module' in the contact condition and a 20 minute 'history of mental health module' in the education condition (see table 2).

Table 2: Intervention Lesson Plans

Module	Length	Contact and education	Education alone
1. Being 'Normal'	~ 25 minutes	☑	☑
2. Stress and Anxiety	~ 60 minutes	☑	☑
3. Depression	~ 20 minutes	☑	☑
4. Psychosis	~ 45 minutes	☑	☑
5. Stigma and Myths	~ 10 minutes	☑	☑
6. Contact Session	~ 20 minutes	☑	x
7. The History of Mental Illness	~ 20 minutes	x	☑
8. The Mental Health Scale and Me	~ 25 minutes	☑	☑
9. Different Ways of Thinking; thoughts, feelings, and behaviours	~ 20 minutes	☑	☑
10. Drama Workshop	~ 60 minutes	☑	☑

11. Going Over the Day	~ 10 minutes	☑	☑

Interventions were led by staff from Birmingham and Solihull Mental Health Foundation NHS Trust along with other trained volunteers, some of whom had experience of mental illness. The intervention days were co-ordinated by KC, PP, and ET, and overseen by MB.

Outcomes

Primary outcome:

Stigma of mental illness

The Reported & Intended Behaviour Scale (RIBS; 28) takes approximately 1-2 minutes to complete and generates a score based on willingness to have contact with individuals who are experiencing mental illness ('In the future I would be willing to live with someone with a mental health problem'). Scores on the RIBS range from 4 to 20, with higher scores indicating more positive attitudes. Within adult groups the RIBS has a test-retest reliability of 0.75, and a Cronbach's alpha of 0.85.

Secondary outcomes:

Knowledge of mental illness

Knowledge-based stigma was assessed using the Mental Health Knowledge Schedule (MAKS; 29). The MAKS assesses six domains of stigma-related knowledge: help-seeking, recognition, support, employment, treatment, and recovery, and takes 1-2 minutes to complete. Scores range from 12-60. Higher scores indicate a higher level of knowledge. The MAKS has a test-retest reliability of 0.71 and has been extensively reviewed by experts. The MAKS Cronbach's alpha is moderate at 0.65. This is largely due to the fact that the MAKS is not intended to function as a scale; individuals may have different levels of knowledge based on different domains. Two vignettes were used to assess mental health literacy, specifically identification of mental illnesses, developed by Jorm et al. (14). Participants were asked 'In the above story do you think John/Peter has…' and chose from answers 'depression', 'anxiety', 'psychosis or schizophrenia', 'drug addiction', or 'no mental health problems'. A score of 1 was given if the correct mental disorder was identified.

Emotional well-being

The Strengths and Difficulties Questionnaire (SDQ; 30) was used to assess mental health. The SDQ assesses health and vulnerabilities on five subscales (conduct problems,

hyperactivity-inattention, emotional symptoms, peer problems, and pro-social behaviour) and produces a total difficulties score. The SDQ has been validated for use with adolescents age 11 – 16 with a Cronbach's alpha of 0.82 for the total difficulties scale. Scores range from 0-40 and higher scores indicate lower levels of mental health.

Resilience

Resilience was measured using a 15 item (31) version of The Resilience Scale (32), which assesses the personal competence component of resilience ('My belief in myself gets me through hard times'). The scale has reported Cronbach's alphas of between 0.72 – 0.94 and has been used previously with adolescent populations (31, 33). Scores range from 15-105. Higher scores indicate a higher level of resilience.

Help-seeking

Attitudes to help-seeking were assessed by responses on a 7 point scale to the question 'In the next 12 months if you were to experience a mental illness, how likely are you to seek help?' Higher scores indicate a greater willingness to help-seek.

Acceptability

Acceptability of the intervention, including method of delivery and content, was assessed in one school (school 2) by author KC. Two weeks post-intervention, students who had attended the intervention day took part in two short group interviews (Benner; 1994) of 5-6 participants. Interviews were recorded and transcribed verbatim. The interview schedule can be seen in table 3.

Table 3. Semi-structured interview schedule

Focal points for group interview	
1.	Was there anything on the course that you thought was particularly good or useful?
2.	Was there anything that you thought should have been on the course that wasn't?
3.	Are there any ways in which the course could be made better?

Fidelity of implementation

A day's training was provided for all individuals facilitating the intervention. One class per condition, per school, was assessed for fidelity between conditions and schools by KC with a pre-developed checklist which measured pace and timing of the intervention, engagement of students, and group work.

Analysis

An intra-class correlation coefficient (ICC) of 0.037 (Aberdeen University: Health Services Research Unit) was assumed and a cluster size of approximately 30 students per class, suggesting that 738 participants would be needed to detect a Cohen's d effect size of 0.3. The rationale behind aiming to detect an effect size of 0.3 was that previous research in school based studies has often found relatively small effect sizes (7), which nonetheless may be meaningful in population-based samples.

To investigate the primary research question data was analysed with generalised equation estimates (GEE) in SPSS, Version 20. In accordance with CONSORT guidelines unadjusted analysis was employed as the primary analysis. In order to account for the clustered nature of the RCT, school and condition were included as covariates, as well as baseline measure scores. The GEE was also used to accommodate the fact that data on which class each participant was in was not collected, meaning that the analysis was unable to account for this aspect of the clustering. Outcomes were transformed if skewed. Where data was ordinal an ordinal logistic GEE was used. An adjusted analysis was also employed, with gender, ethnicity, previous contact, and whether the participant reported having been diagnosed with a mental health disorder added as additional factors. Intention to treat analysis was used.

To assess any change in participants' scores pre to post-intervention t-tests or marginal homogeneity tests (where data was ordinal) were employed. Cronbach's alphas were computed for all measures. An analysis of percentage of items left unanswered for each item from each questionnaire assessed acceptability of the measures. The ICC was calculated on the baseline RIBS scores. The method used was the one based on the analysis of variance, with the confidence interval being calculated using Searle's method (adjusted for unequally sized clusters), as given in (34).

RESULTS

Participants were recruited between 1st May 2011 and 30th April 2012. Six schools and 31 classes took part in the intervention. Demographic characteristics of schools can be seen in table 4.

Table 4: Demographic characteristics* of schools

	School Type	Students aged 5 - 15	Classes per year group	Students with English second language	Students with free school meals	Ethnicity South Asian	White	Black	Other
1	Mixed comprehensive school	1288	7	9%	22%	9%	79%	4%	8%
2	Girls only grammar school	668	4	23%	6%	45%	35%	10%	10%
3	Mixed comprehensive school	798	6	18%	54%	8%	65%	14%	13%
4	Boys only comprehensive school	611	5	26%	30%	35%	47%	6%	12%
5	Girls only comprehensive school	635	4	78%	48%	71%	3%	19%	7%
6	Boys only grammar school	622	5	23%	4%	28%	59%	4%	9%

*Data available from Birmingham City Council, accessed 2009

769 participants provided data at baseline. Of these 112 were absent for the intervention day or were lost to follow-up. 657 participants aged 11-13 (mean: 12.21, SD: 0.58) took part in the trial. Baseline characteristics of participants can be seen in table 5. Baseline and two week means, standard deviations, medians, and significance of improvement between baseline and two weeks can be seen in table 6. A summary of the effect between conditions at two weeks can be seen in table 7, for the primary unadjusted analysis and the adjusted analysis which used gender, ethnicity, previous contact, and whether the participant reported having been diagnosed with a mental illness, added as additional factors. The CONSORT diagram is presented in figure 1.

Table 5: Baseline characteristics between conditions

Condition		Total N	Gender		Ethnicity						Current mental health diagnosis		Previous contact	
			Male	Missing	White	Asian	Black	Mixed ethnicity	Other ethnicity	Missing	Yes	Missing	Yes	Missing
Contact and education	**N**	354	171	0	149	141	29	23	9	3	10	7	92	8
	%	100	48.30	0	42.10	39.80	8.20	6.50	2.50	0.80	2.80	2	26	2.30
Education only	**N**	303	144	0	119	127	19	27	8	3	4	4	77	5
	%	100	47.50	0	39.30	41.90	6.30	8.90	2.60	1	1.30	1.30	25.40	1.70

Table 6: Significance of change; baseline-2 weeks

		Pre		2 weeks		t / z value	95%CI	P value
		Mean (SD)	Median	Mean (SD)	Median			
RIBS	**C&E**	13.28 (3.71)	13	13.81 (3.96)	14	-3.84	-0.99, -0.32	<0.001
	E	13.10 (4.29)	14	13.85 (3.83)	14	-3.62	-1.21, -0.36	<0.001
MAKS	**C&E**	39.92 (3.86)	40	42.98 (5.77)	43	-8.91	-3.90, -2.49	<0.001
	E	40.25 (4.04)	40	43.28 (5.83)	44	-9.50	-4.52, -2.96	<0.001
Vignettes	**C&E**	1.19 (0.74)	1	1.23 (0.77)	1	-1.03	-	0.3
	E	1.18 (0.72)	1	1.32 (0.73)	1	-2.49	-	0.01
SDQ	**C&E**	9.69 (5.63)	9	9.15 (5.90)	8	2.31	0.02, 0.19	0.02
	E	9.72 (5.57)	9	8.87 (5.87)	8	4.81	0.12, 0.29	<0.001
Help-seeking	**C&E**	5.41 (1.71)	6	5.51 (1.67)	6	-0.92	-	0.4
	E	5.35 (1.71)	6	5.48 (1.62)	6	-1.24	-	0.2
Resilience	**C&E**	83.88 (13.38)	86	82.50 (15.75)	86	0.86	-0.11, 0.28	0.4
	E	82.80 (13.79)	85	83.34 (15.47)	85	2.87	0.07, 0.39	0.005

* Significance of change for the Reported & Intended Behaviour Scale (RIBS), Mental Health Knowledge Schedule (MAKS), mental health literacy (vignettes), The Strengths and Difficulties Questionnaire (SDQ), help-seeking, and resilience

Table 7: Effect of condition at 2 weeks, unadjusted and adjusted GEEs

Measure	Contact and education		Education alone		Model	Treatment effect for contact plus education	95%CI	P value
	Mean (SD)	Median	Mean (SD)	Median				
RIBS	13.81 (3.96)	14	13.85 (3.83)	14	**Unadjusted**	-0.09	-0.40, 0.22	0.5
					Adjusted	-0.07	-0.41, 0.28	0.7
MAKS	42.98 (5.77)	43	43.28 (5.83)	44	**Unadjusted**	-0.65	-1.13, -0.17	0.008
					Adjusted	-0.72	-1.28, -0.16	0.01
Vignettes	1.23 (0.77)	1	1.32 (0.73)	1	**Unadjusted**	-0.30	-0.44, -0.16	<0.001
					Adjusted	-0.35	-0.47, -0.23	<0.001
SDQ	9.15 (5.90)	8	8.87 (5.87)	8	**Unadjusted**	0.10	-0.01, 0.18	0.02
					Adjusted	0.11	0.02, 0.19	0.01
Help-seeking	5.51 (1.67)	6	5.48 (1.62)	6	**Unadjusted**	-0.26	-0.52, -0.00	0.05
					Adjusted	-0.20	-0.41, 0.01	0.07
Resilience	82.50 (15.75)	86	83.34 (15.47)	85	**Unadjusted**	0.19	-0.15, 0.52	0.3
					Adjusted	0.16	-0.16, 0.48	0.3

* Effect of condition at 2 weeks for the Reported & Intended Behaviour Scale (RIBS), Mental Health Knowledge Schedule (MAKS), mental health literacy (vignettes), The Strengths and Difficulties Questionnaire (SDQ), help-seeking, and resilience

The unadjusted GEE, 0.09, 95%CI(-0.40, 0.22), p=0.5, Cohen's d=0.01, found no significant effect of condition on participants attitudinal-based stigma at two week follow-up. Contrary to the hypothesis, participants knowledge-based stigma in the education alone condition improved significantly more than participants in the contact and education condition, -0.65, 95%CI(-1.13, -0.17), p=0.008, d=0.05. Similarly, an ordinal logistic GEE found that participants in the education alone condition displayed greater improvement in mental health literacy two weeks post-intervention compared to participants in the contact and education condition, -0.30, 95%CI(-0.44, -0.16), p<0.001, d=0.12.

A square root transformation was employed for emotional well-being baseline and follow-up data. The unadjusted GEE revealed that post-intervention participants in the education alone condition had greater improvements in levels of emotional wellbeing compared to participants in the contact and education condition, 0.10, 95%CI(0.01, 0.18), p=0.02, d=0.05. Similarly, an ordinal logistic GEE found that participants in the education alone condition displayed greater improvements in their willingness to help-seek compared to participants in the contact and education condition, -0.26, 95%CI(-0.52, -0.00), p=0.05, d=0.02. Finally, resilience data was reverse coded and a square root transformation was used on baseline and follow-up data. The unadjusted GEE found no significant difference in improvement between conditions at follow-up, 0.19, 95%CI(-0.15, 0.52), p=0.3, d=0.05.

T-tests and marginal homogeneity tests were employed to assess significance of change in participants' scores pre to post-intervention. Participants' attitudinal-based stigma improved from baseline to follow-up (see table 6 for means). These improvements were found to be significant for both the contact and education condition, t(255)=-3.84, 95%CI(-0.99, -0.32), p<0.001, Pearson's r=0.23, and the education alone condition, t(193)=-3.62, 95%CI(-1.21, -0.36), p<0.001, r=0.25. Knowledge-based stigma also improved significantly for participants in the contact and education condition, t(195)=-8.91, 95%CI(-3.90, -2.49), p<0.001, r=0.54, and the education alone condition, t(169)=-9.50, 95%CI(-4.52, -2.96), p<0.001, r=0.59. In the contact and education condition improvement in mental health literacy scores was not significant, z=-1.03, p=0.3, r=0.05. Conversely, participants in the education alone condition demonstrated a significant improvement in mental health literacy at follow-up, z=-2.49, p=0.01, r=0.13.

Participants emotional well-being scores improved significantly for the contact and education condition, t(194)=2.31, 95%CI(0.02, 0.19), p=0.02, r=0.16, as well the education-alone condition, t(165)=4.81, 95%CI(0.12, 0.29), p<0.001, r=0.35. Participants' resilience scores improved significantly in the education alone condition, t(157)=2.87, 95%CI(0.07, 0.39), p=0.005, r=0.22. In the contact and education condition resilience scores decreased,

but not significantly; t(152)=0.86, 95%CI(-0.11, 0.28), p=0.4, r=0.07. For help-seeking, no significant change pre to post-intervention was found for the contact and education condition, z=-0.92, p=0.4, r=0.05, or the education alone condition, z=-1.24, p=0.2, r=0.07.

Participants reported finding the intervention highly acceptable. In particular, the use of contact, interactive methods of delivery, and expert and friendly presenters were praised. Areas suggested for improvement were ensuring language and explanations were clear and age appropriate, making sure time was allowed for class discussion, more information on help-seeking avenues, and more information on violence in mental illness. Quotes are presented in Table 8 and highlight participant views.

For the primary outcome an ICC of 0.10, 95%CI(0.04, 0.26) was found. Cronbach's alphas in the present sample were 0.86 for the RIBS, 0.24 for the MAKS, 0.72 for the SDQ, and 0.89 for the Resilience scale. The items missing analysis revealed a high level of acceptability for the measures used with no items standing out as being left unanswered by the majority of participants. Percentage of items left unanswered by participants for the RIBS ranged from 0% (In the future, I would be willing to work with someone with a mental health problem) to 0.7% (In the future, I would be willing to continue a relationship with a friend who developed a mental health problem), for the MAKS from 0.8% (Most people with mental health problems want to have paid employment) to 5.1% (Drug addiction is a type of mental illness), for the SDQ from 0.4% (I usually share with others) to 6.9% (I get on better with adults than with people my own age), and for the resilience scale from 0.5% (When I make plans I follow through with them) to 5.7% (I usually take things in my stride).

Table 8: Quotes highlighting participants' feedback on the intervention

Positive elements	
Intergroup contact	"The talk with Camilla was the most helpful thing because it was like, you probably like, you probably weren't ever going to talk to a mental um person like someone who's actually been there, done that kind of thing. So you probably won't get the chance and like if like it was good cos then you knew what people go through" "A stereotype of a crazy person, um someone with a mental illness is someone who's crazy, speaks nonsense, but she looked really normal. So that just goes to show that people with mental illnesses are normal, but in their own way"
Presenters	"They were very like straight to the point and they didn't over exaggerate it either" "They were chatty, they didn't just read off the board, they spoke to you like not in a boring way just didn't waffle" "They didn't scare you but they made you understand"
Interactive elements	"I liked the videos because they were effective and they actually showed you what people can do" "I liked the true and false one where you had to see where, cos you were still learning then, but like without having to just sit there. it gets you more interactive so you feel like you're actually taking part in that" "I liked the drama as well because it was like um it was almost like, cos we were doing stress and I think Mika, cos I was Mika in one of them, Mika was stressed, so you kind of like, you learnt what stress is actually like"
Areas for improvement	
Language and explanations	"In the end, they kind of kept saying what is normal and I couldn't really put my finger on it – is everyone normal? Is no-one normal? And it really like made my brain fuzzy, it's really hard to think straight. I did find it useful, it was just really difficult" "I didn't find it, the drama bit boring because it was really funny watching it, like everyone in the class watching, but the bit afterwards because it, it used words that I didn't understand like 'bodily language'"
Time for discussion and questions	"I found that we just got loaded on with information more than discussed it"
Help-seeking	"More on what you could do if you like did have mental illness because you could see a doctor or you could er go on this website to get help but they didn't really tell us anything else that we could do"
Violence	"What triggers them to be dangerous?"

Facilitators demonstrated a high level of fidelity to the intervention, measured by a pre-developed checklist. All presentation slides were covered and presenters moved at approximately equal speed through intervention modules (table 9). The majority of students in each school appeared to be engaged in the intervention, participating in group activities and joining in with group discussions.

Table 9: Fidelity of implementation observation checklist

Checklist item	Condition	Session observed	Outcome
Timing from first slide to class exercise	Contact	First module	10-12 minutes
	Education	Second module	10-26 minutes
Time allocated to first exercise	Contact	First module	8-13 minutes
	Education	Second module	5-10 minutes
Are any slides skipped?	Contact	First module	No, in all observed classes
	Education	Second module	No, in all observed classes
Are pupils asked if they have questions?	Contact	First module	Yes, in all observed classes
	Education	Second module	Yes, in all observed classes
Are the majority of students engaging in class?	Contact	First module	Yes, in all observed classes
	Education	Second module	Yes, in all observed classes
Size of group for first exercise	Contact	First module	2-7
	Education	Second module	3-5
Does a facilitator visit each group during exercise?	Contact	First module	Yes, in all observed classes
	Education	Second module	Yes, in all observed classes
Do all groups manage to finish exercise in allocated time?	Contact	First module	Yes in 4 observed classes, no in 2 observed classes
	Education	Second module	Yes, in all observed classes

DISCUSSION

The current study found that for an educational intervention within a young adolescent population, contrary to study hypothesis, intergroup contact did not add value to education alone in improving attitudinal stigma of mental illness. Similar results to these were found for the secondary outcome of resilience, with intergroup contact adding no value to education alone. For secondary outcome measures of knowledge, emotional well-being and help-seeking participants scores in the education alone condition improved significantly more than those in the contact and education condition.

The results are in line with the findings of a meta-analysis from Corrigan and colleagues (7) which compared education alone interventions to contact interventions and suggested that within adolescent populations education interventions held more promise for the reduction of stigma. On the other hand, the findings conflict with the only three previous studies which investigated education and contact compared to education alone in adolescent populations (8-10). There are several possible reasons for the absence of gains from contact in this trial. The majority of research into the relationship between contact and stigma has been conducted within adult populations. Due to the rapid nature of brain changes throughout adolescence (35, 36) there may be a large discrepancy in level of maturation between adolescents who differ in age even by a year or two. Though only a few years' age gap separates the young adolescents who took part in the present study from the slightly older adolescents of Meise et al. (8), Chan et al. (10) and Husek (9), this developmental difference may have had an impact on participants' response to contact. Pinto-Foltz et al. (37) suggest that adolescents may conceptualise the term 'mental illness' in a different way to older populations. For example, young adolescents may lack an internal reference system for mental illness, or have a framework of mental illness which is somewhat undifferentiated. If this is the case then contact may serve more to confuse than to clarify, as mental illness in 'reality' often does not conform neatly into diagnostic categories and comorbidity is common (38). Alternatively, adolescents may have an internal framework for mental illness, but it may be a negative or fearful framework. Adolescents' conception of mental health may be influenced by media representations of mental illness (39) leading to a framework which encapsulates many negative extremes of mental illness. If the contact used in the intervention was successful in normalising mental illness then fear of developing an illness may have increased leading to cognitive avoidance strategies (40) in participants as a defence mechanism against anxiety. Participants may have distanced themselves from the topic of mental illness, increasing their desire for social distance, and leading to a decreased engagement in the educational elements of the intervention and a diminished impact on outcome variables.

One further hypothesis is that the contact module with its element of surprise had an amplified impact on students, leading to this section of the intervention being recalled over and above other modules. The contact module occurred midway through the day, and may have been particularly attention grabbing, effectively wiping much of the educational elements of the intervention. Increased engagement in the contact module may have left participants with less attentional capacity to process other information presented, leading to decreased levels of improvement on the research measures when compared to the education alone condition. This account is in line with themes discussed in the focus groups investigating the acceptability of the intervention, in which participants reported engaging with and valuing the contact. It is possible that the introduction of the contact was too sudden, and that contact may have had a more positive impact if introduced in a different manner, for example after more time to consolidate the educational aspect of the intervention. If correct, this would suggest that it was not the contact per se which reduced the impact of the intervention, but the timing and manner in which the contact was introduced. Rusch et al. (2005) outline a number of factors which are advantageous if contact is to be successful including equal status and co-operative interaction between group members as well as institutional support. The current intervention had support from the senior management within the schools, and co-operative interaction was reached by the inclusion of group activities and discussions in which both students and 'contact volunteers' took part. Rusch et al.'s criteria of 'equal status' was however not entirely possible as the school environment naturally lends itself to a division of status between teacher and student. Rusch et al. also discuss the need for members of the stigmatised group to disconfirm stereotypes only mildly, and suggest that individuals who disconfirm a stereotype too strongly may not have the desired effect of reducing stigma. Instead, participants may decide that the individual represents an 'exception to the rule'. Some of the young people who shared their experiences with the students were partially recovered. This may have led participants to define them differently on a conceptual level to 'mentally ill' and reduced the overall impact of the contact.

There are a number of implications regarding the use of intergroup contact with young adolescent populations which are important for mental health policy and anti-stigma campaigns. The students participating in the current research had just a single morning session of mental health education directly prior to the contact element of the intervention, with no time in between to process the information they had received. If young adolescents do lack an internal reference system for mental illness it may be that they require more extensive mental health education prior to experiencing contact compared to adults (10). Although contact in the present intervention followed an educational component, it may be

that due to the participants' relatively young developmental stage the quantity of education given prior to contact (approximately 3 hours) was insufficient. Similarly, if the engaging experience of contact reduced attentional capacity for other intervention modules then contact may still prove to be an effective technique for reducing stigma in young people if additional time is given for participants to process the information they have received before the introduction of intergroup contact. Additionally, it is felt that adolescents may also need more time and discussion *after* the presentation of contact to consolidate and process the information they have received (41). To investigate this possibility future research could occur over a number of sessions over several days, allowing for the consolidation of educational elements of the intervention before introducing contact elements. The current research suggests however, that it would be premature to implement large scale dissemination of contact as a means to reduce stigma in adolescent populations.

There is little previous research which examines the use of contact as a means to address well-being in adolescents. Where research has examined this question it has usually been in relation to attitudes to help-seeking, with some authors reporting that the use of contact improved attitudes (42), and others that no significant improvements were observed (43). An interesting outcome of the present research is that mental health improved despite the fact that much of the intervention dealt with topics unrelated explicitly to the promotion of mental health. Previous interventions aiming to improve mental health have had some success (22) although others have reported flat results (44). Mental health literacy topics have a direct relevance to the promotion of mental health, through the raising of awareness of mental health subjects, resilience or coping mechanisms (17), and may prove to be a successful technique for increasing well-being in adolescents.

Previous research has been criticised for only representing specific school types (e.g. fee paying single gender schools; 45). For the SchoolSpace Trial, intervention schools were chosen to represent the diversity of the UK school system in order to increase generalizability. Schools therefore, may not have represented a homogenous group, despite being analysed in this way. It is also important to note that the acceptability of the intervention was assessed in just one school, and that these results may therefore not generalise to other schools which took part in the study. To maintain power, classes were randomised within schools to each condition, rather than entire schools, which may have allowed a degree of cross contamination between conditions, and magnified intra-class correlations. This means that effect sizes between conditions may have been diluted. The analysis design accounted for clustering by including school and condition (contact and education or education alone) as covariates. Data on which class each participant was in was not collected, meaning that the analysis was unable to account for this aspect of the

clustering. In addition, the sample size achieved was small to moderate, which will have impacted the power of the study. Two of the studies measures, the RIBS and the MAKS, were not validated for use with adolescent populations. The Cronbach's alpha for the RIBS in the present sample was high, and an items missing analysis found that the measure was highly acceptable to participants. The Cronbach's alpha was low for the MAKS. Lower Cronbach's alphas have also been found with adult samples (29). The authors of the MAKS suggest this is because individuals have different levels of knowledge based on the different domains that the MAKS covers. These differences are likely to be even more pronounced in adolescent samples, resulting in a low Cronbach's alpha. The items missing analysis of the MAKS found that the measure was acceptable to participants, with very few participants skipping items on the measure. It is important to acknowledge that the research investigated two aspects of stigma, intended behaviour towards individuals diagnosed with a mental illness, and stigma-based knowledge. Other aspects of stigma such as perceptions of dangerousness, otherness, or unpredictability were not investigated, and may interact differently with the impact of contact. Fidelity of implementation of the intervention was assessed for each condition within each school; facilitators demonstrated a high level of fidelity to the intervention implementation, and similar levels of engagement were observed across conditions, representing a strength of the project.

The present research appears to demonstrate that short educational interventions provided in schools can be successful in reducing the stigma of mental illness, as well as improving mental health literacy and well-being outcomes. Contrary to study hypothesis, intergroup contact was not seen to add value. This is important for those involved in developing mental health and educational policy aiming to reduce stigma and increase mental health literacy and wellbeing in adolescent populations, although further research into this area is certainly warranted.

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Competing interests

We declare no competing interests.

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Contributors

KC is chief investigator on the project and drafted the manuscript. KC, PP, ET and MB contributed to the development and implementation of the intervention. KC, CT, PP, and MB contributed to the design of the study. MB, PP, and ET supervised KC's doctoral research, which included this project. DJ devised the statistical analyses. KC ran all other statistical analyses. All authors contributed to the editing of the manuscript and have read and approved the final manuscript.

Data available

No additional data available.

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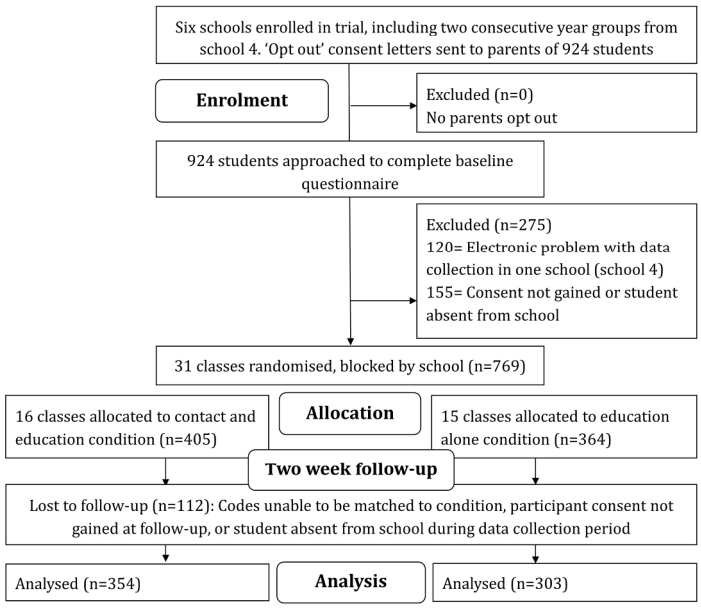

Figure 1: Participant enrolment, allocation, follow-up, and analysis for main trial
225x169mm (300 x 300 DPI)

ONLINE SUPPLEMENT: The impact of contact on adolescents' mental health literacy and stigma: The SchoolSpace Cluster Randomised Controlled Trial

SIX MONTH DATA RESULTS

270 participants (mean age:12.21, SD:0.40) from two of the six schools included in the randomised controlled trail additionally took part in a 6 month follow-up. Demographic characteristics of participating schools can be seen in Table 1. Baseline characteristics of participants can be seen in table 2. Baseline and two week means, standard deviations, medians, and significance of improvement between baseline and two weeks can be seen in table 3. A summary of the effect between conditions at two weeks can be seen in table 4, for both the primary unadjusted analysis, and the adjusted analysis which used gender, ethnicity, previous contact, and whether the participant reported having been diagnosed with a mental health disorder, added as additional factors.

Table 1: Demographic characteristics* of schools

	School Type	Students aged 5 - 15	Classes per year group	Students with English second language	Students with free school meals	Ethnicity			
						South Asian	White	Black	Other
1	Mixed comprehensive school	1288	7	9%	22%	9%	79%	4%	8%
2	Girls only grammar school	668	4	23%	6%	45%	35%	10%	10%

*Data available from Birmingham City Council, accessed 2009

The unadjusted GEE found that participants in the education alone condition reported significantly higher scores than participants in the contact and education condition at six month follow-up, -0.69, 95%CI(-1.31, -0.06), p=0.03, d=0.06. Contrary to the hypothesis, participants knowledge-based stigma in the education alone condition improved significantly more than participants in the contact and education condition, -0.88, 95%CI(-.95, -0.81), p<0.001, d=0.08. An ordinal logistic GEE found that participants in the education alone condition were significantly better at identifying the vignettes compared to participants in the contact and education condition at six month follow-up, -0.44, 95%CI(-0.57, -0.32), p<0.001, d=0.12. A square root transformation was used on baseline and six month data for emotional well-being. At six months, no significant difference was observed between the contact and education condition and the education-alone condition, -0.10, 95%CI(-0.25, -0.04), p=0.2, d=0.002. In order that a parametric GEE could be conducted on resilience data, both baseline and 6 month data were reverse coded and a square root

transformation was used on the 6 month data. Participants in the contact and education condition displayed improved scores compared to the education-alone condition, this was found to be significant by the unadjusted, -0.40, 95%CI(-0.42, -0.37), p<0.001, d=0.28. Finally, attitudes to help-seeking scores from the one school who completed both baseline and six month questionnaires on help-seeking were too similar between baseline and 6 months for a GEE to be conducted.

T-tests and marginal homogeneity tests were employed to assess significance of change in participants' scores pre to post-intervention. Participants' attitudinal-based stigma improved from baseline to six month follow-up (see table 3 for means). These improvements were found to be significant for both the contact and education condition, t(68)=-3.34, 95%CI(-1.78, -0.45), p=0.001, r=0.38, and the education alone condition, t(63)=-4.78, 95%CI(-2.90, -1.19), p<0.001, r=0.52. Knowledge-based stigma also improved significantly for participants in the contact and education condition, t(61)=-7.39, 95%CI(-4.53, -2.60), p<0.001, r=0.69, and the education alone condition, t(56)=-7.20, 95%CI(-5.61, -3.17), p<0.001, r=0.69. In the contact and education condition improvement in mental health literacy scores was once again not found to be significant, z=-1.54, p=0.1, r=0.14. Again, participants in the education alone condition were found to show significant improvements in their mental health literacy, z=-2.29, p=0.02, r=0.21. Emotional well-being scores were not found to have improved significantly at six month follow-up for either the contact and education condition, t(53)=-0.98, 95%CI(-0.09, -0.26), p=0.3, r=0.13, or the education-alone condition, t(55)=-1.07, 95%CI(-0.08, -0.25), p=0.3, r=0.14. Resilience data was normally distributed at baseline, and negatively skewed at 6 months, so a Wilcoxon's signed rank test was employed to analyse the difference in scores pre to post intervention. Participants resilience scores did not change significantly in the contact and education condition, z=1.73, p=0.08, r=0.19, or the education-alone condition, z=-1.49, p=0.14, r=0.14. For help-seeking, participants' median scores in the contact and education condition remained at 6 pre to post intervention, with the mean decreasing from 5.83 (SD:1.26) to 5.74 (SD:1.31). Prior to the intervention no students reported that they would definitely not seek help if they developed a mental illness and 21 (37.5%) that they definitely would. Post intervention 1 (1.8%) reported they definitely would not seek help, and 19 (33.9%) that they definitely would. A test of marginal homogeneity was attempted but was unable to compute. In the education-alone condition participants' median scores decreased from 7 to 6, with the mean also decreasing from 5.82 (SD:1.60) to 5.69 (SD:1.50). Prior to the intervention 1 student (1.8%) reported that they would definitely not seek help if they developed a mental illness and 26 (46.4%) that they definitely would. Post intervention 1 (1.8%) reported they definitely would not seek help, and

22 (39.3%) that they definitely would. A test of marginal homogeneity was attempted but was unable to compute.

Table 2: Baseline characteristics between conditions; 6 month follow-up schools

Condition		Total N	Gender		Ethnicity				Current mental health diagnosis		Previous contact	
			Male	Missing	White	Asian	Other ethnicity	Missing	Yes	Missing	Yes	Missing
Contact and education	**N**	138	33	0	73	46	16	3	4	4	28	5
	%	100	23.90	0	52.90	33.30	11.60	2.20	2.90	2.90	20.30	3.60
Education only	**N**	132	41	0	67	41	21	3	3	3	27	3
	%	100	31.10	0	50.80	31.10	15.90	2.30	2.30	2.30	20.50	2.30

Table 3: Significance of change; baseline-6 months

		Pre		6 months		t / z value	95%CI	P value
		Mean (SD)	Median	Mean (SD)	Median			
RIBS	**C&E**	13.84 (2.89)	14	14.61 (3.56)	15	-3.34	-1.78, -0.45	.001
	E	13.37 (3.58)	14	14.81 (3.23)	15	-4.78	-2.90, -1.19	<0.001
MAKS	**C&E**	39.70 (4.09)	40	42.63 (4.41)	42	-7.39	-4.53, -2.60	<0.001
	E	39.60 (3.93)	39	42.99 (5.05)	43	-7.20	-5.61, -3.17	<0.001
Vignettes	**C&E**	1.25 (0.69)	1	1.39 (0.72)	2	-1.54	-	0.1
	E	1.25 (0.70)	1	1.48 (0.66)	2	-2.29	-	0.02
SDQ	**C&E**	10.33 (5.25)	9	9.58 (5.43)	8.5	-0.98	-0.09, -0.26	0.3
	E	9.95 (5.34)	9	9.57 (5.98)	9	0.29	-0.08, -0.25	0.3
Help-seeking	**C&E**	5.83 (1.26)	6	5.74 (1.31)	6	-	-	-
	E	5.82 (1.60)	7	5.69 (1.50)	6	-	-	-
Resilience	**C&E**	82.08 (10.90)	83	84.09 (12.05)	83.5	1.74	-	0.08
	E	82.29 (9.40)	82	80.62 (12.73)	82	-1.49	-	0.1

* Significance of change for the Reported & Intended Behaviour Scale (RIBS), Mental Health Knowledge Scale (MAKS), mental health literacy (vignettes), The Strengths and Difficulties Questionnaire (SDQ), help-seeking, and resilience

Table 4: Effect of condition at 6 months, unadjusted and adjusted GEEs

Measure	Contact and education			Education alone		Model	Treatment effect for C&E	95%CI	P value
	Mean (SD)	Median		Mean (SD)	Median				
RIBS	14.61 (3.56)	15		14.81 (3.23)	15	**Unadjusted**	-0.69	-1.31, -0.06	0.03
						Adjusted	-0.52	-1.18,0.14	0.1
MAKS	42.63 (4.41)	42		42.99 (5.05)	43	**Unadjusted**	-0.88	-.95, -0.81	<0.001
						Adjusted	-0.63	-.84, -.42	<0.001
Vignettes	1.39 (0.72)	2		1.48 (0.66)	2	**Unadjusted**	-0.44	-0.57, -0.32	<0.001
						Adjusted	-0.37	-0.42, -0.31	<0.001
SDQ	9.58 (5.43)	8.5		9.57 (5.98)	9	**Unadjusted**	-0.10	-0.25, -0.04	0.2
						Adjusted	-0.05	-0.20, 0.09	0.5
						Unadjusted	0.06	0.05, 0.07	<0.001
						Adjusted	0.56	0.03, 0.08	<0.001
Help-seeking	5.74 (1.31)	6		5.69 (1.50)	6	**Unadjusted**	-	-	-
						Adjusted	-	-	-
Resilience	84.09 (12.05)	83.5		80.62 (12.73)	82	**Unadjusted**	-0.40	-0.42, -0.37	<0.001
						Adjusted	-0.36	-0.44, -0.27	<0.001

* Effect of condition at 2 weeks for the Reported & Intended Behaviour Scale (RIBS), Mental Health Knowledge Scale (MAKS), mental health literacy (vignettes), The Strengths and Difficulties Questionnaire (SDQ), help-seeking, and resilience

CONSORT checklist (Schultz et al. 2010; Moher et al. 2010)

Section/Topic	Item No	Checklist item	
Title and abstract			
	1a	Identification as a randomised trial in the title	1
	1b	Structured summary of trial design, methods, results, and conclusions (for specific guidance see CONSORT for abstracts)	2
	1c*	How participants were allocated to interventions (eg random allocation, randomised, or randomly assigned), specifying that allocation was based on clusters	2
Introduction			
Background and objectives	2a	Scientific background and explanation of rationale	4-5
	2b*	Specific objectives and hypotheses and whether they pertain to the individual level, the cluster level, or both	5
Methods			
Trial design	3a	Description of trial design (such as parallel, factorial) including allocation ratio	5
	3b	Important changes to methods after trial commencement (such as eligibility criteria), with reasons	n/a
	3c*	Rationale for using a cluster design	6
Participants	4a*	Eligibility criteria for participants and clusters	5-6
	4b	Settings and locations where the data were collected	5
Interventions	5*	Precise details of the interventions intended for each group, whether they pertain to the individual level, the cluster level, or both, and how and when they were actually administered	6-7
Outcomes	6a*	Completely defined pre-specified primary and secondary outcome measures, including how and when they were assessed, and whether they pertain to the individual level, the cluster level, or both	6-9
	6b	Any changes to trial outcomes after the trial commenced, with reasons	n/a
Sample size	7a*	How sample size was determined (including method of calculation, number of clusters, cluster size, a coefficient of intracluster correlation (ICC or k), and an indication of its uncertainty)	10
	7b	When applicable, explanation of any interim analyses and stopping guidelines	n/a
Randomisation:			
Sequence	8a	Method used to generate the random allocation sequence	6

generation	8b	Type of randomisation; details of any restriction (such as blocking and block size)	6
Allocation concealment mechanism	9*	Mechanism used to implement the random allocation sequence (such as sequentially numbered containers), describing any steps taken to conceal the sequence until interventions were assigned and specifying that allocation was based on clusters rather than individuals	6
Implementation	10	Who generated the random allocation sequence, who enrolled participants, and who assigned participants to interventions	6
Blinding	11a	If done, who was blinded after assignment to interventions (for example, participants, care providers, those assessing outcomes) and how	6
	11b	If relevant, description of the similarity of interventions	6-7
Statistical methods	12a*	Statistical methods used to compare groups for primary and secondary outcomes and indicating how clustering was taken into account	10
	12b	Methods for additional analyses, such as subgroup analyses and adjusted analyses	10
Results			
Participant flow (a diagram is strongly recommended)	13a*	Flow of clusters and individual participants through each stage (a diagram is strongly recommended). Specifically, for each group report the numbers of clusters and participants randomly assigned, receiving intended treatment, completing the study protocol, and analysed for the primary outcome	10-11
	13b	For each group, losses and exclusions after randomisation, together with reasons	10-11
Recruitment	14a	Dates defining the periods of recruitment and follow-up	5
	14b	Why the trial ended or was stopped	5
Baseline data	15*	A table showing baseline demographic and clinical characteristics for each group for the individual and cluster levels as applicable	16
Numbers analysed	16	For each group, number of clusters and participants (denominator) included in each analysis and whether the analysis was by original assigned groups	11, 16
Outcomes and estimation	17a	For each primary and secondary outcome, results for each group, and the estimated effect size and its precision (such as 95% confidence interval) and a coefficient of intracluster correlation (ICC or k) for each primary outcome.	11 - 18
	17b	For binary outcomes, presentation of both absolute and relative	n/a

		effect sizes is recommended	
Ancillary analyses	18	Results of any other analyses performed, including subgroup analyses and adjusted analyses, distinguishing pre-specified from exploratory	11-18
Harms	19	All important harms or unintended effects in each group (for specific guidance see CONSORT for harms)	n/a
Discussion			
Limitations	20	Trial limitations, addressing sources of potential bias, imprecision, and, if relevant, multiplicity of analyses	21-22
Generalisability	21	Generalisability (external validity) to individuals and/or clusters (as relevant) of the trial findings	21
Interpretation	22	Interpretation consistent with results, balancing benefits and harms, and considering other relevant evidence	19-21
Other information			
Registration	23	Registration number and name of trial registry	2
Protocol	24	Where the full trial protocol can be accessed, if available	5
Funding	25	Sources of funding and other support (such as supply of drugs), role of funders	23

* Contains addition to CONSORT guidelines for cluster RCT