Relationship between loneliness and mental health in students

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Abstract

Purpose – *Previous cross-sectional research has examined the effect of loneliness on mental health. The purpose of this paper is to examine longitudinal relationships in students.*

Design/methodology/approach – *A total of 454 British undergraduate students completed measures of loneliness and mental health at four time points.*

Findings – *After controlling for demographics and baseline mental health, greater loneliness predicted greater anxiety, stress, depression and general mental health over time. There was no evidence that mental health problems increased loneliness over time. There was no relationship with alcohol problems. Baseline loneliness predicted greater eating disorder risk at follow-up and vice versa.*

Research limitations/implications – *This study is limited by a relatively small and heavily female sample.*

Practical implications – *Social and psychological interventions to reduce loneliness in university settings may improve mental health.*

Social implications – *Universities should consider organising social activities to mitigate feelings of loneliness in students.*

Originality/value – *This study adds to the literature as a longitudinal analysis showing that loneliness exacerbates poor mental health over time. This also adds to the literature for students specifically, and suggests a possible bi-directional relationship between eating disorders and loneliness for the first time.*

Keywords *Anxiety, Mental health, Eating disorders, Loneliness, Depression*

Paper type *Research paper*

Introduction

Loneliness can be defined as "an individual's subjective perception of deficiencies in his or her network of social relationships" (Russell *et al.*, 1984, p. 1313). There is therefore a difference between objective social isolation and the feeling of loneliness: it is possible to have limited social contact but not feel lonely and to have regular social contact but feel lonely (Hawkley and Cacioppo, 2010). This relates to the cognitive discrepancy model of loneliness: in adolescents the difference between desired social activity and actual social activity has been found to predict loneliness (Russell *et al.*, 2012). Studies have shown that levels of frequent loneliness vary between European countries, in the UK such feelings are reported by 6.3 per cent of those under age 30, 5.5 per cent of those age 30-59 and 7.4 per cent of those age 60 plus (Yang and Victor, 2011). Other findings have shown highest rates of loneliness in young and older adults (Victor and Yang, 2012).

A small body of literature has examined how loneliness is related to mental health problems. Victor and Yang (2012) found that depression was related to loneliness in all age groups. Cacioppo *et al.* (2006) found a bi-directional relationship over time between loneliness and depression in middle aged and older adults. One recent review suggested that there were links with depression, stress and alcohol problems (Mushtaq *et al.*, 2014). A cross-sectional survey from the UK found that whilst loneliness was associated with a broad range of mental health problems, there were particularly strong relationships with depression, phobias and obsessive compulsive disorder (Meltzer *et al.*, 2013).

Starting university may be a high risk time for mental health problems; studies in the USA estimate that nearly half of students meet criteria for a psychiatric disorder (Blanco *et al.*, 2008).

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Studies in the UK suggest a deterioration in student mental health over time with 9 per cent of students developing depression and 20 per cent developing anxiety (Andrews and Wilding, 2004). A number of factors which exacerbate mental health problems in this population have been examined in particular the impact of financial difficulties (see Richardson *et al.*, 2013 for a review).

University may also be a time of considerable loneliness due to young age, leaving the family home and having to develop new friendships at university. A considerable body of literature has examined correlates and predictors of loneliness in students such as internet addiction (Bozoglan *et al.*, 2013; Ceyhan and Ceyhan, 2008). However, and somewhat surprisingly, there has been little research on the relationship between loneliness and mental health in this population: a study of Malaysian students which found that mental health was more strongly predicted by loneliness than by personality or demographic variables (Md Nordin *et al.*, 2009). A further issue is that the vast majority of research with or without student populations is cross-sectional in nature, thus making it hard to ascertain the specific causal relationships between loneliness and poor mental health. The present investigation therefore aimed to use a longitudinal study to examine the relationship in a student population.

Methods

Design

A prospective survey design was used, following up a non-clinical sample at four time points over 12-14 months. This study used data from an existing study comprising two cohorts over time (Richardson *et al.*, 2015). Data were collected between June 2012 and January 2014 as follows. Time 1 was between February-June 2012 for the first cohort and October-December 2012 for the second cohort. Time 2 was August-September 2012 for the first cohort and February 2013 for the second cohort. Time 3 was November-December 2012 for the first cohort and May-July 2013 for the second cohort. Time 4 was February 2013 for the first cohort and November 2013-January 2014 for the second cohort. This spread over time was due to needing to assess two cohorts from different years at four time points across a year.

Standardised measures

The following standardised measure were used, Cronbach's α is given in the current sample at baseline.

- Three-Item Loneliness Scale (Hughes *et al.*, 2004): designed as a brief measure of loneliness for large surveys ($\alpha = 0.84$). This asks participants to rate how they "feel about different aspects of their life" with questions such as "How often do you feel left out?" This measure was used due to conciseness as a number of questionnaires were administered, but also because it has a high correlation of 0.82 with the longer 20-item UCLA Loneliness scale (Russell *et al.*, 1980).
- Seven-Item Generalized Anxiety Disorder Questionnaire (GAD-7) (Spitzer *et al.*, 2006): a measure to detect GAD, but has also been used as a measure of anxiety in the general population (Löwe *et al.*, 2008) ($\alpha = 0.91$).
- Clinical Outcomes Routine Evaluation General Population Version (CORE-GP) (Evans *et al.*, 2005): a 14-item measure of well-being and general mental health ($\alpha = 0.90$).
- Alcohol Use Disorder Identification Test (AUDIT) (Saunders *et al.*, 1993): a ten-item measure of alcohol use abuse and dependence ($\alpha = 0.87$).
- Centre for Epidemiological Studies Depression Scale (CES-D) (Radloff, 1977): a 20-item questionnaire designed to measure depression in epidemiological research ($\alpha = 0.95$).
- Perceived Stress Scale (PSS) (Cohen *et al.*, 1983): a ten-item measure of perceived stress ($\alpha = 0.90$).
- Eating Attitudes Test (EAT) (Garner *et al.*, 1982): a 26-item measure of attitudes towards food and weight suggestive of risk for eating disorder ($\alpha = 0.93$).

Participants and procedure

Ethical approval was granted by the University of Southampton. Participants were first year British undergraduates recruited from across the UK via students unions. International students were excluded. The research was advertised as a "Student Mental Health Survey" looking at factors related to mental health in students. Participants were entered into a lottery for vouchers for taking part. Respondents completed a baseline questionnaire online, and were then invited to complete additional online questionnaires at three further time points. For the purposes of this paper, participants who provided data at only one time point were excluded. This left 454 participants. All completed baseline, 90.1 per cent ($n = 409$) completed time 2, 60.4 per cent ($n = 274$) time 3 and 53.5 per cent ($n = 243$) time 4. The sample was 77.9 per cent ($n = 352$) female and 22.1 per cent ($n = 100$) male. Ethnicity was 89.6 per cent ($n = 405$) white. Ages ranged from 17 to 57 (mean = 19.9 years). This compares to a UK undergraduate average of 56.2 per cent female, 75.7 per cent white ethnicity and 44.8 per cent aged 18 or under (Higher Education Statistics Agency, 2016).

In terms of completing follow-up measures, two χ^2 analyses showed that there was no difference in number of time points completed depending on gender: $\chi^2 = 1.05$, $p > 0.05$, or ethnicity: $\chi^2 = 8.20$, $p > 0.05$. A multiple analysis of variance showed no difference in baseline loneliness or mental health measures depending on number of time points completed: Wilks' Lambda $F = 1.02$ (14,826), $p > 0.05$.

Statistical analyses

Where there were missing values on individual items from standardised measures these were substituted by the mode. Total scores which were therefore continuous scales were used for the analysis. All measures were normally distributed except for the EAT which had abnormal kurtosis. Pearson correlation was used to determine whether loneliness correlated with the measures at time 2, 3 and 4. Where there was a significant correlation, linear hierarchical multiple regression was used to see for each measure at each time point separately, whether baseline loneliness predicted scores on the measure at follow-up after controlling for age, gender and ethnicity. A regression then looked at whether baseline scores on all the measures together predicted loneliness at follow-up after controlling for the same demographics and baseline loneliness.

Results

Baseline correlations

Baseline loneliness correlated with the EAT (Eating Attitudes) at T2 ($r = 0.41$, $p < 0.001$), T3 ($r = 0.31$, $p < 0.001$) and T4 ($r = 0.26$, $p < 0.001$). Also with AUDIT (Alcohol Problems) T2 ($r = 0.12$, $p < 0.01$), but not at T3 ($r = 0.05$, $p > 0.05$) or T4 ($r = -0.02$, $p > 0.05$). Baseline loneliness correlated with CORE-GP (Global Mental Health) at T2 ($r = 0.53$, $p < 0.001$), T3 ($r = 0.47$, $p < 0.001$) and T4 ($r = 0.38$, $p < 0.001$) and GAD (General Anxiety) at T2 ($r = 0.41$, $p < 0.001$), T3 ($r = 0.40$, $p < 0.001$) and T4 ($r = 0.34$, $p < 0.001$). Finally baseline loneliness correlated with the CES-D (Depression) at T2 ($r = 0.51$, $p < 0.001$), T3 ($r = 0.48$, $p < 0.001$) and T4 ($r = 0.42$, $p < 0.001$) and the PSS (Stress) at T2 ($r = 0.48$, $p < 0.001$), T3 ($r = 0.44$, $p < 0.001$) and T4 ($r = 0.42$, $p < 0.001$).

Linear regression: baseline loneliness and follow-up mental health

Table I displays the results for the final regression models for baseline loneliness predicting follow-up mental health. After demographics and baseline scores were taken into account, baseline loneliness significantly predicted greater EAT scores at T3 ($\beta = 0.11$, $p < 0.05$) and CES-D at T4 ($\beta = 0.14$, $p < 0.05$). Also PSS at time 2 ($\beta = 0.14$, $p < 0.01$), T3 ($\beta = 0.14$, $p < 0.05$) and T4 ($\beta = 0.14$, $p < 0.05$), CORE-GP at T2 ($\beta = 0.11$, $p < 0.05$) and GAD-7 at T3 ($\beta = 0.15$, $p < 0.01$).

Linear regression: baseline mental health and follow-up loneliness

Linear regression was used to see whether baseline measures predicted follow-up loneliness after controlling for baseline loneliness and demographic variables. The model significantly predicted loneliness at T2: $F(15,354) = 22.77$, $p < 0.001$, $R^2 = 0.49$ and at T3: $F(15,231) = 12.61$, $p < 0.001$,

Table I Final regression models of baseline loneliness predicting follow-up mental health

	EAT (Eating Attitudes)			CES-D (Depression)			PSS (Stress)			AUDIT (Alcohol Abuse)
	T2	T3	T4	T2	T3	T4	T2	T3	T4	T2
Overall model										
n	394	260	229	383	255	219	368	248	219	399
F	162.7***	43.8***	56.8***	46.3***	27.9***	14.7***	36.5***	21.2***	14.7***	123.3***
R^2	0.79	0.61	0.7	0.53	0.51	0.39	0.47	0.25	0.39	0.74
Individual predictors (β)										
Baseline loneliness	0.01	*0.11**	–0.02	0.03	0.03	*0.14**	*0.14***	*0.14**	*0.14**	0.04
Gender: female	–0.3	–0.08	–0.04	–0.02	–0.08	–0.06	*–0.1**	*–0.14***	–0.06	0.02
Age: 17-19 vs 20-29	0.01	–0.03	–0.01	0.02	0.02	0.08	0.01	0.0	0.08	0.01
Age: 17-19 vs 30+	0.0	0.0	–0.01	0.03	0.05	0.06	*0.08**	0.07	0.06	0.0
Ethnicity: white vs other	–0.02	0.02	–0.01	0.05	0.02	*0.11**	0.05	0.03	*0.11**	0.02
Ethnicity: white vs mixed	–0.01	0.02	–0.06	0.05	–0.02	0.0	0.02	0.04	0.0	0.0
Ethnicity: white vs Asian	0.01	0.02	–0.01	0.0	–0.02	–0.05	–0.02	–0.05	–0.05	0.0
Ethnicity: white vs black	–0.02	–0.02	–0.01	0.01	–0.06	–0.09	0.01	–0.03	–0.09	0.0
Baseline score	*0.88****	*0.73****	*0.84****	*0.69****	*0.68****	*0.49****	*0.58****	*0.06****	*0.49****	*0.85****

	CORE-GP (Global Mental Health)			GAD-7 (Anxiety)	
	T2	T3	T4	T2	T3	T4
Overall model						
n	400	271	233	377	249	221
F	53.9***	24.4***	13.8***	40.4***	26.2***	12.2***
R^2	0.55	0.46	0.36	0.50	0.50	0.34
Individual predictors (β)						
Baseline loneliness	*0.11**	0.08	0.03	0.1	*0.15***	0.12
Gender: female	0.0	–0.03	0.0	–0.07	*–0.11**	–0.09
Age: 17-19 vs 20-29	–0.04	–0.02	0.01	–0.01	–0.02	0.04
Age: 17-19 vs 30+	0.01	0.0	0.03	0.07	0.02	0.02
Ethnicity: white vs other	*0.07**	0.04	0.03	0.06	0.02	0.06
Ethnicity: white vs mixed	0.01	–0.05	–0.03	0.02	–0.03	–0.06
Ethnicity: white vs Asian	–0.03	–0.05	–0.03	–0.01	–0.04	–0.03
Ethnicity: white vs black	0.03	–0.04	–0.09	0.01	–0.04	–0.07
Baseline score	*0.67****	*0.62****	*0.56****	*0.63***	*0.59****	*0.48****

Notes: Dummy/reference variables are shown in brackets. *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$

$R^2 = 0.45$, although no mental health measures were significant individual predictors. The model also significantly predicted loneliness at T4: $F(15,199) = 9.64$, $p < 0.001$, $R^2 = 0.42$, with higher baseline EAT being a significant individual predictor ($\beta = 0.22$, $p < 0.01$).

Discussion

This study aimed to examine longitudinal relationships between loneliness and mental health in university students. There were a number of cross-sectional relationships with greater loneliness linked to greater severity of problems on all the measures employed: eating disorder symptoms, alcohol abuse problems, general mental health, general anxiety, depression and stress. These findings are in line with other cross-sectional studies (Md Nordin *et al.*, 2009; Meltzer *et al.*, 2013). Longitudinally, greater loneliness at baseline predicted increased levels of depression, anxiety, poorer global mental health and heightened risk of an eating disorder. Relationships appeared to be especially strong for stress with significant relationships at all time points. These relationships held after demographics and baseline mental health were controlled for, suggesting that loneliness may have exacerbated existing mental health difficulties or led to a direct deterioration of mental health over time. There was no longitudinal relationship with alcohol consumption. Previous studies in this area have shown mixed results with loneliness linked with both more drinking (Sadava and Thompson, 1986) and less drinking (Kim, 1999).

Thus in terms of determining directions of causality, the results suggest that for general mental health, stress, depression and anxiety, loneliness induces or exacerbates symptoms of poor mental health over time.

As to whether baseline mental health predicted changes in loneliness over time, there was little evidence of this, save for baseline eating attitudes predicting increased loneliness at time 4. The relationship appears to be bi-directional. This is consistent with a mutual feedback cycle whereby those who are at risk of an eating disorder are more likely to be lonely, and this loneliness then further exacerbates eating disorder symptoms. These findings back up previous theoretical assertions of a relationship between the two (Levine, 2012).

This study is limited by the predominantly female and white sample; it is unclear why the sample is more heavily female and white than the general UK student population. There is also a relatively small sample; however, the sample size is sufficient for multiple regression if a formula of minimum sample size of $n \geqslant 104 +$ number of predictors is used. It is to be noted that owing to the number of regressions completed an increased risk of a type I error is present. It is also important to note that the EAT was not normally distributed and as such does not meet some of the assumptions on which regression analysis is predicated, although regression analysis is often robust with respect to such violation (Fox, 1984). There were high levels of drop-out and the reason for such drop-out is not known though loneliness, mental health and demographic variables did not have an impact. A longer follow-up would have been useful but was not plausible due to this level of drop-out.

As the demographics of student populations change with the globalisation and expansion of higher education, it may be important to look at different sub-groups within this. A number of such groups within the student population may be at greater risk of loneliness – international students may also have been interesting to include as nearly two-thirds in one study reported feeling lonely (Sawir *et al.*, 2008) while social class background may also be related to the ease with which students make the transition from home to the university. More research is called for in both these areas.

The current study has employed a pragmatic quickly completed measure of loneliness and does not enter into a debate as to whether loneliness itself is best conceptualised as a state or trait (see Peplau and Perlman, 1982; de Jong Gierveld, 1998; Bekhet *et al.*, 2008 for wider discussion of the concept). However, given the observed empirical associations between the baseline measure of loneliness employed here and the mental health of the respondents at subsequent time points, we would argue that this is a moot point for the validity of the findings. It may of course be of some relevance when considering suitable intervention or prevention.

Our conclusion is that this study provides evidence that loneliness exacerbates mental health problems in students. Further research is of course needed to confirm these findings and identify the specific psychological mechanisms involved. These findings have important implications for

the provision of mental health services on campus and specifically for those newly arrived. A previous meta-analysis (Masi *et al.*, 2011) identified a number of interventions for loneliness such as enhancing social support, social skills training and increasing opportunities for social contact, but found that targeting maladaptive social cognitions were the most effective. Thought needs to be given to how such interventions, adapted for a university setting, may serve to also benefit students' mental health. Efforts to address student mental health within an institution may well proceed more efficiently by the provision of social support within students' own departments, for example through mentoring schemes provided by other students and from staff or tutor input. Different initiatives within different departments may also warranted and student's unions may have a valuable role in encouraging students into activities such as society which might help mitigate feelings of loneliness. Perhaps simply discussing the effect of loneliness on mental health in universities may in itself help students feel less isolated.

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