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Exploring the role of protective factors in the development of suicidal ideation and behaviour.

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Acknowledgments

Foreword

This foreword has been included in order to provide context for the circumstances which have led to the changes to my original intended project which was interrupted in March 2020 as a result of the COVID- 19 pandemic.

Due to the restrictions relating to the pandemic, I was unable to continue recruitment within schools for the original project (see Appendix 2.2), and so it therefore had to be abandoned. As a result of these changes, and in line with guidance provided by the University of Glasgow, I chose to conduct a new analysis using an existing data set. The data provided for this study came from an existing study of young adults recruited for the Scottish Wellbeing Study in 2018, which my project supervisor, Professor Rory O'Connor was involved in.   The major research project included in this thesis is therefore a secondary data study.

Chapter 1: Systematic Review

Resilience as a protective factor against self-harm: A systematic review

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Abstract

Background: Self-harm is a major public health concern. There is a growing interest in the factors which may protect against self-harm, including resilience. However, little is known about the nature and extent of the resilience and self-harm relationship.

Aims: The aims of this study were to systematically review and synthesise the findings from clinical and non-clinical studies that have investigated the association between resilience and self-harm.

Methods: An electronic database search was performed using Medline, EMBASE, PsycINFO, and CINAHL on 31st January and again on 1st May 2020, using key word derivations of self-harm and resilience. Inclusion and exclusion criteria were applied to the search. The National Institute of Health 'Quality Assessment Tool' checklist was used to assess the quality of the included papers.

Results: In total, there were 19 studies identified for review. Assessment of quality reflected variation across studies, including cross-sectional designs and heterogeneous methods to assess both self-harm and resilience meaning that it was difficult to compare findings across studies. Cross sectional studies suggest that low resilience is inversely related to self-harm across different populations however, the paucity of longitudinal studies makes it difficult to establish the causal relationship between resilience and self-harm.

Conclusion: Overall, the cross-sectional research evidence suggests that low resilience is a risk factor for self-harm. Preliminary longitudinal studies also suggest that

resilience is a longitudinal risk factor for self-harm.   Limitations of the extant evidence

base and implications for clinical practice are discussed.

Keywords: Resilience, self-harm

Introduction

Self-harm is a major public health concern and a key predictor of suicide (Hawton et al., 2012). There is considerable disagreement in the literature about how best to conceptualise and define self-harm and associated behaviours (Kapur et al., 2013). Research sometimes differentiates between self-harm with suicidal intent (i.e. suicidal attempt) and non-suicidal self-harm (NSSH) whereas often, no distinction is made and this inconsistency has prevented the accurate assessment of the prevalence of self-harm (Muelhekamp et al., 2012). Suicidal intent is considered a complex phenomenon to measure (Cooper et al., 2005) and researchers have suggested that self-harm and suicidal behaviours exist on a continuum (Kapur et al., 2013, O'Connor et al., 2018). Regardless of definition, research suggests that approximately 50% of those who die by suicide have self-harmed previously (Hawton et al., 2012). It has been suggested that if we can intervene with those who have a history of self-harm, it may be possible to prevent at least some further suicide deaths (O'Connor, 2011) and this has become a focus of national strategies for suicide prevention (Scottish Government, 2018). For the purpose of this review, self-harm is defined as "any act of self-poisoning or self-injury carried out by a person, irrespective of their motivation" (National Institute for Health and Care Excellence, 2013), with this definition including suicide attempt.

The identification of risk factors is already central to much research in the field of self-harm with the evidence suggesting that an individual's risk of engaging in self-harm may be determined by accumulative exposure to social and family difficulties, lifestyle factors, childhood adversity, personality, current mental health, and exposure to

negative life events (Hawton et al., 2012). Although the National Institute of Health and Care Excellence (NICE) guidelines for the management of self-harm highlights the importance of assessing both risk and protective factors (NICE, 2013), the evidence base is considered inadequate (O'Connor & Nock, 2014). However, one such factor which has received increasing interest in the literature is resilience, and a body of research in recent years has focused on its protective role in maintaining mental health and wellbeing (Ayed et al., 2019).

<u>What is Resilience?</u>

There is considerable debate around the precise definition of resilience (Bonnano, 2012). One of the more frequently used definitions is the ability to adapt in the face of adversity, and bouncing back from stressful life events and negative circumstances (Connor & Davidson, 2003).

In a systematic review of the conceptualisation of resilience in mental health research, Ayed and colleagues (2019) identified two broad understandings of resilience: as a stable personality trait or as a dynamic process. As a personality trait, resilience is considered to develop as a result of personal characteristics or social resources (Ayed et al., 2019). In a small number of studies the term "ego-resiliency" has been used to describe trait-like resilience, which is thought to tap into the capacity to flexibly adapt to varying contexts (Block, 2002).

Conversely, the conceptualisation of resilience as a process suggests that it evolves across contexts and it will emerge in different ways throughout an individual's lifespan (Rutter, 2012). Exponents of this view suggest that the capacity to build and demonstrate resilience is determined by the interaction of biological, psychological, social and cultural factors (Southwick & Charney, 2018).

Measuring Resilience

The variation in definition creates challenges for the measurement of resilience. In a review of the measures of resilience, Windle and colleagues (2011) found fifteen different measurement scales. They found that 60% (n=9) of the measures assessed resilience as personal characteristics, with only two of these measures providing a theoretical basis for their item selection; the 'Ego-Resiliency Scale (ER89)' (Block & Kremen, 1996) and the Psychological Resilience measure (Windle, et al., 2008). The Connor-Davidson resilience scale, the Brief Resilience Scale and the Resilience Scale for Adults received the highest quality ratings and exhibited the best psychometric properties (Windle, et al., 2011). Five of the measures reflected a multidimensional approach to resilience while others proposed a one-dimensional factor structure (i.e. high and low resilience).

Resilience and wellbeing

High levels of resilience are associated with positive health outcomes, including a number of positive emotions and the ability to regulate emotions (Southwick & Charney, 2018). Higher levels of resilience have also been associated with lower levels

of anxiety and psychological distress (Joyce et al., 2018) and researchers have found that resilience can moderate the impact of depression in individuals who have experienced trauma (Kukihara et al., 2014).

There has been an increasing interest in research on resilience in suicidality with research suggesting that resilience protects against suicidal ideation and behaviour (Sher, 2019) and has a moderating effect on risk factors for suicidal ideation (Wetherall et al., 2018a). While studies suggest that low resilience has been associated with increased likelihood of self-harm (Huang & Mossige, 2015) the evidence has not been systematically evaluated and the nature and extent of the relationship is unclear.

Aims

The aims of this study were to systematically review and synthesise the findings from clinical and non-clinical studies that have investigated the association between resilience and self-harm.

Method

Pre-registration of review protocol

This systematic review follows the Preferred Reporting Items for Systematic Reviews and Meta-analyses guidelines (PRISMA; Moher, et al. 2009). A review protocol was developed and registered on PROSPERO (registration number: CRD42020159601: accessible at https://www.crd.york.ac.uk/PROSPERO/display_record.php?RecordID=159601).

Searches of the Cochrane database and PROSPERO were completed prior to conducting the review to ensure there were no existing reviews on the selected subject. A systematic search was conducted on 31st January 2020 and an updated search was conducted on 1st May 2020 of the following databases: Medline (Ovid; all years, 1946-2020), EMBASE (Ovid; all years, 1946-2020), PsycINFO (EBSCO; all years, 1987-2020), CINAHL (EBSCO; all years,1987-2020) and Web of Science (all years, 1900-2020).

The following search terminology was applied for the purposes of this review based on other publications examining self-harm or resilience and using combinations of MeSH terms and text words: (self-harm* OR self harm* OR self-injur* OR self injur* OR self-mutilat* OR self mutilat* OR self-cut* OR self cut* OR self-poison* self poison* OR NSSI OR NSSH OR DSH OR parasuicid* OR suicid*) AND (resilien*) AND (quantitative). Search terms were combined using Boolean operators "AND" and "OR". The primary search methodology was kept broad to safeguard against relevant studies being excluded. There were no restrictions on publication period.

Initially, the first author screened all titles and abstracts of identified articles after the electronic removal of duplicates (n= 6825). Next, the full text of those papers identified as potentially relevant was reviewed for eligibility. Any uncertainty regarding paper inclusion at the full-text screening stage was discussed and resolved with the research team.

Inclusion: All studies employing quantitative designs were eligible for inclusion in this review and papers were not excluded on the basis of quality assessment. To be included in the review, studies had to have employed (i) a validated measure of resilience; and (ii) any measure of self-harm regardless of suicidal or non-suicidal intent. There were no restrictions on age, gender, or ethnicity.

Exclusion: All qualitative studies, book chapters, reviews and commentaries were excluded from the current review, as well as studies that were not published in English. Studies were also excluded if the association between self-harm and resilience was not explicitly analysed and/or reported, or if they reported on self-harm ideation instead of an act of self-harm.

Quality assessment

The methodological quality of included studies was appraised via the Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies (QATCCS; National Institute of Health, 2014) (see Appendix 1.2). The QATCSS is a 14-item quality assessment tool measuring criteria which covers the three fundamental domains that are reflected in a review of quality; (1) appropriate selection of participants, (2) appropriate measurement of variables, (3) appropriate control of confounding variables (Sanderson, et al., 2007; Rankin, 2018).

Items were rated with either 'yes', 'no' or 'not applicable/not reported', leading to scores ranging from 0-14. The quality rating tool does not have cut-offs to determine

the quality rating and so for the purpose of this study a score of 10 or above was rated good; 5 or above was rated fair; less than 5 rated as poor. These 'cut-off' scores are based on previous reporting of the QATCCS (Rankin, 2018); a good study has the least risk of bias and the results are considered to be valid. The quality and risk of bias were assessed by the author, and an independent reviewer (a fellow Trainee Clinical Psychologist) rated six studies (30%) using the same quality rating scale. The inter-rater agreement was high (96%) and disagreements were resolved through discussion to reach a consensus.

Results

Results of Search Strategy

A PRISMA flowchart recording each stage of the search process is provided in Figure 1. A total of 59 full-text articles were assessed for eligibility based on meeting the inclusion and exclusion criteria, which yielded 18 studies. Hand searches of citations from the reference lists were conducted on these 18 studies by the author, which identified a further study. This resulted in a total of 19 studies comprising 18 cross-sectional and 1 longitudinal studies.

Data Synthesis

Due to the heterogeneity of included studies in relation to statistical methodology, measures of included variables and confounding variables, a meta-analysis of the results was considered inappropriate. Narrative synthesis of the included studies was

therefore completed following Siddaway, Wood & Hedges' (2019) guidelines on conducting systematic review and reporting narrative reviews.
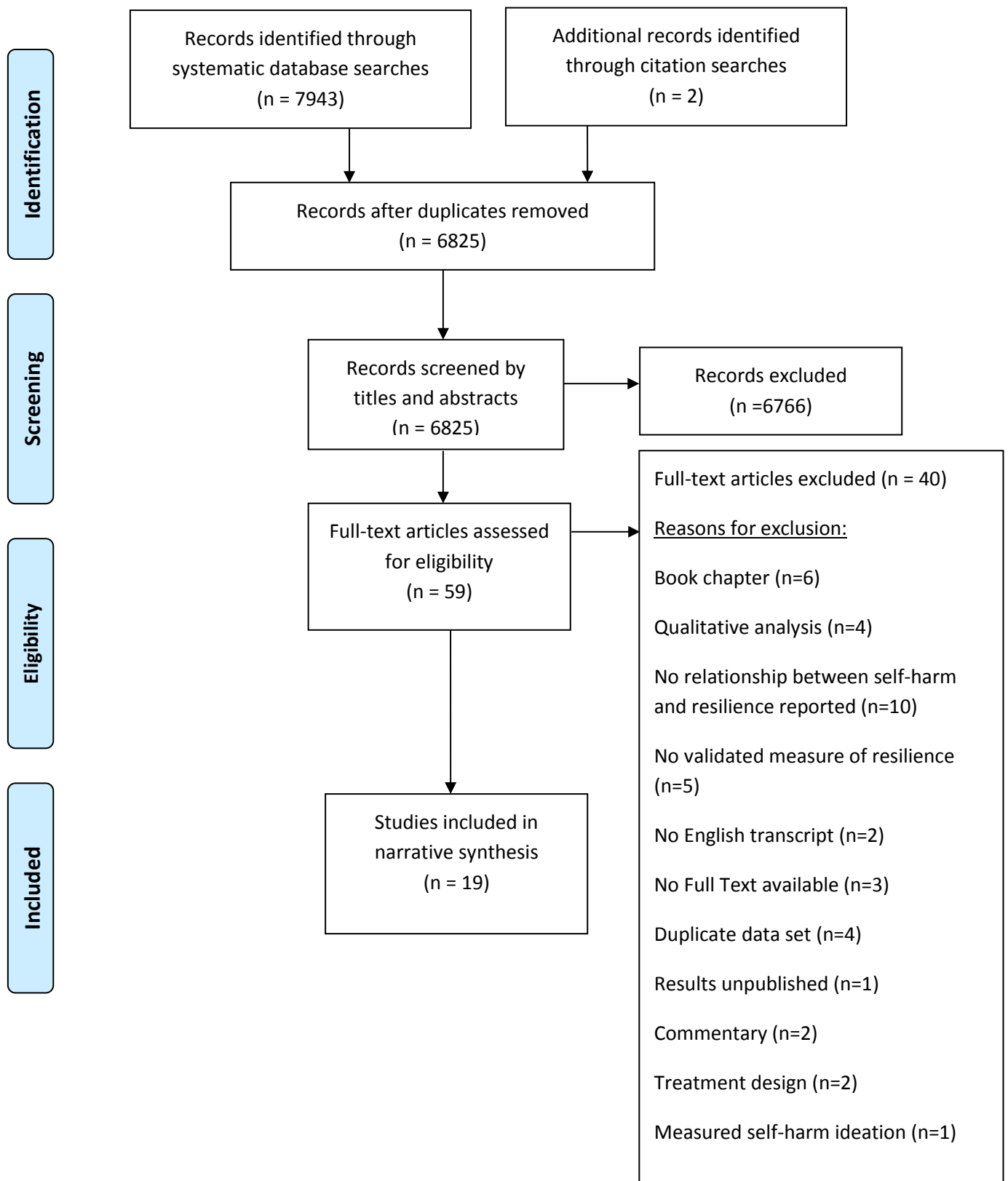
Figure 1. Flow chart of systematic search process and study selection

The results of the quality appraisal for each study can be found in Appendix 1.4. All were rated as 'Fair'. Common methodological problems included lack of clarity or justification of sample size and how many eligible people participated, and issues inherent to cross-sectional research.

Only one study adopted a longitudinal design (Garisch & Wilson, 2015). Their methodological quality was rated higher as they assessed resilience prior to the outcome of interest, making causal inference between resilience and self-harm more plausible. Most studies only assessed variables at one time point using self-report questionnaires (n=18), limiting any causality or direction of relationship between resilience and self-harm.

Another common area of concern was selection bias. Nine studies did not report how many eligible participants agreed to participate, meaning that we cannot determine if the study sample adequately represents the target population. Only four studies justified their sample sizes (Kim et al., 2019; Tian et al., 2019; Xiao et al., 2020; You & Park, 2017), however fourteen of the studies used large sample sizes (e.g. n>300), therefore reducing the risk of analyses being underpowered.

Four studies did not consider confounding factors (Garisch & Wilson, 2015; Kim et al., 2019; Muehlenkamp et al., 2019; Roy et al., 2007) which may lead to biased and inconsistent estimates of the nature of the relationship between resilience and self-harm and so these studies were rated lower quality. Masking or blinding of assessors to participant status was not relevant to fourteen studies, due to their design not involving an assessor (e.g. online questionnaires).

<u>Sample Characteristics</u>

An overview of study characteristics and relevant extracted data can be found in Table 1. The combined sample size was 38,889 participants with an age range of 10-98 years old, with 50.2% female, and 0.07% transgender. The majority of studies recruited non-clinical samples, with only two focused on clinical samples (Philipe et al., 2011; Roy et al., 2007).   Six studies examined children and adolescents; one study specifically studied older adults (You & Park, 2017) while all other studies used adult samples, one of which was a forensic population (Carli et al., 2010). Five studies were conducted in North America (Brennan et al., 2017; McDowell et al., 2019; Muelhenkamp & Brausch, 2019; Muelhenkamp et al., 2019; Phillipe et al., 2011); three in Australasia (Garisch & Wilson, 2015; Rotolone & Martin, 2019; Watson & Tatnell, 2019), five studies in Asia (Kim et al., 2019; Tang et al., 2018; Tian et al., 2019; Xiao et al., 2020; You & Park 2017); and the remaining six studies in Europe (Carli et al., 2010; Huang & Mossige, 2015; Nagra et al., 2016; Roy et al., 2007; Suarez-Sato et al., 2019; Wetherall et al., 2018b). One study did not state the number of people self-harming (Phillipe et al., 2011).   Three studies examined populations of individuals with a history of self-harm with no comparator groups (Muehlenkamp & Brausch, 2019; Muehlenkamp et al., 2019; Nagra et al., 2016) instead comparing frequency of self-harm, age of onset, or suicidal/non-suicidal intent.

Table 1: The characteristics and key findings of each study

Author, year, country	Population and sample size	Sample characteristics	Assessment of Self-harm	Resilience measure	Analysis and covariates	Key finding(s)
Cross-sectional studies						
Brennan et al (2017), USA	• 83 Transgender and gender non-conforming adults • Non-clinical	• Age range 19-70 • 44% in the range 19-24 • 84.3% White; Black 1.2%; Asian 1.2%; Native American 1.2%; Multiracial 8.4%; Hispanic/Latino 7.2% • 40% history of NSSI	• Single item question about history of NSSI	• GMSR; Testa et al., 2015) • 2 subscales: Pride and community connectedness	• Correlations ANOVAs were used to compare history of SI, SA and NSSI • Regressions: Age, hormones, gender identity, distal and proximal stressors, depression and anxiety	No significant relationship was found between any of the resilience subscales and NSSI but lower levels of resilience were associated with SA (r=-0.281, p<0.05).
Carli et al (2010), Italy	• 1265 males detained in prison settings • Non-clinical	• Mean age= 39.61 (±10.53) • 17% SH • 42.4% SI • 13% SA	• Interview question • SI or SA excluded from SH group	• CD-RISC (Connor & Davidson, 2003)	• Impulsivity • SI • SA	The risk for SH is significantly decreased with higher levels of resilience(OR= 0.966, p<0.001)
Huang & Mossige (2015), Norway	• 6304 students • Non-clinical	• Age range= 18-19 • 58% female • 18.8% SH (8.1% SSH; 10.7% NSSH)	• A non-zero response to at least one of 3 questions related to self-harm • Measure of SSH and NSSH	• READ (Hjemdal et al., 2006)	• ANOVAs conducted, C, SSH(with or without history of violence), NSH(with or without history of violence)	All subscales of resilience showed significant negative correlations with SH (regardless of intent). Highest resilience = no history of SH or victim of violence. The lowest level of resilience=victim of multiple forms of violence and who engaged in SSH.
Kim et al (2019), South Korea	• 539 Adults • Non-clinical	• Age range= 19-30 • 66.2% female • 0.7% sex unspecified • 67.7% in University • 63.6% NSSI	• FASM (Lloyd et al., 1997) and the Korean version of ISAS (Kim et al., 2019)	• KRQ-53 (Kim, 2011)	• Correlations • No	Frequency of NSSI is significantly negatively correlated with resilience (r=-0.33, p<0.001).

McDowell et al (2019), USA	• 150 Adults • Trans-masculine • Non-clinical	• Mean age= 27.5 (±5.7) • Age range=21-50 • 74.7% White • 56.7% had MH comorbidity • 31.3% NSSI	• Single item question on SH • Engaged in past 12 months	• BRS (Smith et al., 2008)	• Regression: Anxiety, depression, PTSD	Higher levels of resilience (aOR=0.78, p=0.002) were associated with the reduced odds of NSSI
Muelhenkamp & Brausch (2019) USA	• 828 University students with a past history of NSSI • Non-clinical	• 83% female • Mean age= 18.9 (1.3) • Average past year history of 12.7 acts of NSSI	• SITBI-NSSI (Nock et al., 2007)	• CD-RISC Brief (Campbell-Sill and Stein, 2007)	• Logistic regression moderation models: past year NSSI frequency, NSSI versatility, life satisfaction, subjective happiness	Resilience did not moderate the association between past-year NSSI frequency and past-year SA nor did it moderate the relationship between NSSI method versatility and past-year SA.
Muelhenkamp et al (2019) USA	• 644 college students with past year NSSI • Non-clinical	• Mean age= 18.96 (1.53) • 74.1% female • 54.2% identified as minority race • Mean age of onset= 14.36	• SITBI-NSSI (Nock et al., 2007)	• CD-RISC Brief (Campbell-Sills and Stein, 2007)	• MANCOVA • Duration of NSSI engagement and perceived recovery	Early onset (age 12); Typical age onset (13-17); Late onset (19+). No significant association between age of onset of NSSI and resilience.
Nagra et al (2016) UK	• 323 respondents of SH websites with a history of SH • Non-clinical	• 88.2% female • Age range 16–62 (M=22.86± 7.62) • 63.7% current SH • 48.9% history of SH • 63.8% Self-reported psychiatric diagnosis • 38.7% were receiving treatment from MH services	• DSHBQ (Harris and Roberts, 2013).	• RAS (Johnson et al., 2010)	• Correlations • Regression: age, substance misuse, attachment, self-forgiveness, positive appraisals	No suicidality= 165 (51%); suicidality= 158 (49%). Moderate inverse associations of suicidality and the resilience subscales of support seeking(r=-0.30,P<0.001), emotion coping(r=-0.38, p<0.001) and problem solving (r= -0.34, p<0.001).
Philippe et al (2011), Canada	• 118 adults • Clinical sample from psychology outpatients clinic	• Mean age= 32.82 (±12.65) • 69% females • 52.5% University	• SBHQ (Gutierrez, 1998) • Assesses SH, SI and SA	• The Ego-resiliency Scale (Block & Kremen, 1996)	• Correlations • Mediation • Childhood trauma	Ego-resiliency was significantly negatively associated with SH (r=-0.27, p<0.01) Ego resiliency mediated the

		education • 56% single			relationship between childhood trauma and SH.
Rotolone et al (2019), Australia	• 312 University of Queensland students • Non-clinical	• Mean age= 20.8 (±4.3) • Age range= 16-50 • 69% females • 34% SH	• Single item question on SH behaviour with follow-up question about frequency, purpose, type and SI	• RS-14 (Wagnild & Young, 1993)	• ANOVAS; C, current SH; past SH • Marital status, ethnicity, religious worship, gender	People with SH reported significantly lower levels of resilience (t= 5.43, p<0.001, r 0.50) than those who did not SH. Current SH significantly lower resilience than past SH (t=4.30, p<0.001; r=0.48) No significant difference in resilience between NSSH and SSH
Roy et al (2007) Italy	• 100 abstinent substance dependent outpatients • Clinical	• 41% SA • 9% female • SA mean age= 46.2 (7.9) • C mean age=51.3(9.2)	• Interview to determine SA as well as interviewing staff and reviewing medical records	• CD-RISC (Connor & Davidson, 2003)	• Correlations • None	Patients who SA had significantly lower resilience scores than patients who had never SA (SA mean score=49.8; C mean=62.7, p<0.001).
Suaroz-Sato et al (2019) Spain	• 227 adolescents from juvenile justice (n=101) and children welfare (n=127) • Non-clinical	• Age range 12-17 • Mean age= 15.26 (1.54) • 64% males • 39.6% suicidality	• Two items from the YSR (Achenbach & Rescorla, 2001) were used to assess SH behaviour and SI • "suicidality" referred to the presence of either SI or SH behaviour.	• ARQ (Gartland et al.,2006)	• Correlations • Chi Square • Regression • Age and gender	The suicidality group presented lower scores in each resilience domain than the group without suicidal behaviours. Significant differences were found in almost all domains, including self (t (223)=5.04, p < .01), family (t(222)=3.46, p < .01), peers (t(223)=2.20, p < .05), school (t(216)=2.33, p < .05) and community (t(221)=2.91, p < .01).
Tang et al (2018), China	• 15,623 adolescents • Grade 7-12 students • Non-clinical	• Mean age= 15.2 (±1.8) • 52.4% males • 29.1% NSSI (16.9% pre-NSSI; 12.2% NSSI)	• FASM- Chinese version (Tang et al., 2014) • Pre-NSSI = 1-4 times in year • NSSI=>5 times in year	• RSCA (Hu & Gan, 2008)	• ANOVA; C, pre-NSSI, NSSI • Regression adjusting for Socio-demographic, Provinces, Economic factors	No significant relationship was found between resilience and risk of NSSI or pre-NSSI.
Tian et al (2019), China	• 2,898 left-behind children (LBC) aged 10-17	• Mean age=14.4 (±1.81) • 51.9% male	• MASHS (Feng, 2008) • Never, once, two-four times, 5+ times	• RSCA (Hu & Gan, 2008)	• Correlations, Regression • Gender, Education grade, Father's age, Mother's	Higher resilience levels (scores>94) were related to reduced chance of SH (OR 0.4;95%CI: 0.34–0.48) Among dimensions of resilience, every

	• Non-clinical	• 48.76% SH			age, Father's education level	1 average score increase of emotion regulation and family support were associated with OR=0.13 (95%CI: 0.04–0.37) and OR=0.14 (95%CI: 0.04–0.47) in severity SH, respectively.
Watson & Tatnell (2019), Australia	• 330 young adults from LBTQIA+ community • Non-clinical	• Age range= 18-30 • Mean age= 22 years (±3.63) • 20.3% males;62% female;14.8% non-binary • 63.9% NSSI	• ISAS (Klonsky & Glen, 2009)	• RSA (Friborg et al., 2003)	• Inter-correlations • MANOVA • Age, depression, anxiety, stress, resilience, discrimination	Significantly lower levels of resilience were reported in NSSI group (r=−.253, p<0.001)
Wetherall et al, (2018b) Scotland, UK	• 3330 Adults • Non-clinical	• Age range= 18-35 • Mean age= 25.70 (4.86) • 49.4% female • 93.8% white • 74.6% no suicidal history • 14.3% SI:11% SA	• Two items from the APMS(McManus et al., 2007)	• BRS (Campbell-Sills & Stein, 2007)	• Multinomial regression • Demographics, mood	X^2 = 320.31, p<0.001 The control group (C) had significantly higher levels of resilience than the SI (OR= 0.93) or SA groups (OR=0.90). SI had significantly higher resilience than SA (OR=0.97).
Xiao et al (2020), China	• 2619 LBC aged 10-17 • Non-clinical	• Mean age=14.01 (±1.79) • 51.24% boys • 48.45% DSH	• MASHS (Feng, 2008) • Never, once, two-four times, 5+ times	• RSCA (Hu & Gan, 2008)	• Correlations • Moderation and mediation analysis • Age, sex, ethnicity, education, father's age, mother's age, grade	LBC with higher levels of resilience (RSCA score≥94) were 53 % less likely (95 %CI: 43 %–62 %) to report DSH than LBC with lower levels of resilience (RSCA score<94) Resilience mediated the depression-DSH association (Direct+ indirect=Total: 0.081+0.221=0.302).
You et al (2017) South Korea	• 2034 older adults • Non-clinical	• Age range= 65-98 • Mean age=74.5 (6.36) • 59% female	• SBQ-R (Osman et al., 2001)	• CD-RISC (Connor & Davidson, 2003)	• Correlations, multiple regression • Sociodemographic, depression, physical illness	Significant inverse relationship between scores on CD-RISC and the SBQ-R only for men(β=-0.12, t=-2.98, p < 0.01), and not for women (β=-0.03,t =-1.04, p = 0.297)

Longitudinal Studies						
Garisch & Wilson (2015), New Zealand	• Time 1: 1162 secondary school students • Time 2: 830 • Non-clinical	• Time 1: Mean age= 16.35 (±0.62); 43% female; 48.7% NSSI • Time 2: Mean age= 16.49 (±0.71); 47% female; 34.48% NSSI	• DSHI- Short form (Lundh et al., 2007) • 5 point Likert scale: 'Never'- 'Many times'	• RS-14 (Wagnild & Young, 1993)	• Correlations • No	Resilience was significantly negatively related to NSSI at T1 (r=-0.34). Higher levels of resilience at T1 predicted lower engagement in NSSI at T2 (r=-0.33).

Note: OR=Odds ratio, AOR=adjusted odds ratio, T1=Time 1, T2=Time 2, CI=confidence intervals, p=significance level, SI=suicidal ideation, SA=suicide attempt; SHI=self-harm ideation; C= Control; APMS: Adult Psychiatric Morbidity Survey; FASM= Functional Assessment of Self-Mutilation; DSHBQ= Deliberate Self-harm Behaviours Questionnaire; DSHI= Deliberate Self-Harm Inventory; ISAS= Inventory of statement about self-injury; MASHS= Modified version of Adolescents Self-Harm Scale; SBQR= Suicide behaviour Questionnaire-Revised; SBHQ= The Self-Harm Behaviour Questionnaire; SITBI-NSSI= Self-injurious thoughts and behaviours inventory-NSSI module; YSR: Youth Self-report; GMSR= The Gender Minority stress and Resilience measure; ARQ= The Adolescent Resilience Questionnaire; BRS= The Brief Resilience Scale; CD-RISC=Connor-Davidson Resilience Scale; READ=Resilience Scale for Adolescents; RSCA= The Resilience Scale for Chinese Adolescents; RSA= Resilience Scale for Adults; RAS= Resilience Appraisal Scale; RS-14= The Resilience Scale; KRQ-53= Korean Resilience Scale.

Assessment of Self-harm

Three studies (Brennan et al.,2017; McDowell et al., 2019; Roy et al., 2007) used single item questions to identify those who self-harmed/attempted suicide; one only specified that "data on self-mutilation was obtained at interview" (Carli et al., 2010). These studies produced a dichotomised score indicating the presence or absence of self-harm. One study only reported age of onset of act of self-harm (Muelhenkamp et al., 2019).

Eight studies examined the presence of NSSI, two measured self-harm and did not identify whether there had been suicidal intent or not (Tian et al., 2019; Xiao et al., 2020), and four studies examined both self-harm with and without suicidal intent (Huang & Mossige, 2015; Muehlenkamp & Brausch, 2019; Nagra et al., 2016; Rotolone & Martin, 2019). Two studies used a measure providing a score which combined self-harm, suicidal intent, suicide threat and suicide attempt together (Phillipe et al., 2011; You & Park, 2017), and so it is unclear which construct was assessed in either of these studies. Although Suarez-Sato and colleagues (2017) recorded suicidal ideation and self-harm, they too reported a dichotomised score indicating the presence or absence of the variable of suicidal behaviour. Two studies examined history or presence of suicide attempts (Roy et al., 2007; Wetherall et al., 2018b). Eleven studies used multi-dimensional measures examining frequency, severity, functions and methods.

<u>Assessment of Resilience</u>

Four measures were used to assess resilience in adolescent populations; the Adolescent Resilience Questionnaire (ARQ; Gartland et al., 2006; n=1); the Resilience Scale for Adolescents (READ; Hjemdal et al., 2006; n=1); the Resilience Scale for Chinese Adolescents (RCSA; Hu & Gan, 2008; n=3); and the Resilience Scale (RS-14; Wagnild & Young, 1993; n=1). Three of the six studies in adolescent populations reported subscale scores (Huang & Mossige, 2015; Suarez-Sato, et al., 2019; Tian et al., 2019), while the remainder reported total resilience scores.

In adult populations the most commonly used measure was the Connor-Davidson Resilience Scale (CD-RISC; n=6); three of these studies used the 10-item short form (CD-RISC-10; Campbell-sills & Stein, 2007) and four used the original 25-item version (CD-RISC; Connor & Davidson, 2003). Each of these provided a single resilience score and measured resilience as a trait.

One study utilised the Ego-Resiliency Scale (Block & Kremen, 1996) which specifically measures resilience as a personality trait, providing a total score. Six other measures were used across the remaining studies. Two studies within the adult population reported subscale scores (Brennan et al., 2017; Nagra et al., 2016). Each of the measures that reported subscale scores measured variable dimensions. Resilience dimensions measured across studies included positive perception, family support, interpersonal assistance, goal concentration, perception of self, planned future, social competence, family cohesion, social resources, emotion coping, problem solving, and support seeking.

Relationship between self-harm and resilience

Higher levels of resilience were associated with reduced risk of non-suicidal self-harm in three studies (OR=0.97, p<0.001, Carli et al., 2010; aOR=0.78, p<0.05, McDowell et al, 2019; OR=0.4, p<0.001, Tian et al., 2019). Individuals with no history of self-harm or suicide attempt reported higher levels of resilience (Huang & Mossige, 2015; Wetherall et al., 2018b) than those with a self-harm history.

Four studies compared control groups with NSSH and suicidal self-harm/suicide attempt groups. Three of these studies showed significant differences between self-harm and control groups, but no differences between self-harm with or without suicidal intent. However, Brennan and colleagues (2017) found no significant relationship between NSSH and resilience but did find a significant inverse relationship between the resilience subscales of pride and community connection, and suicide attempt (r=-0.281, p<0.05).

Three studies showed no significant relationship between self-harm and resilience (Muehlenkamp & Brausch, 2019; Muehlenkamp et al., 2019; Tang et al, 2019). In both studies by Muehlenkamp and colleagues, there were no comparison groups and they each focused on one particular aspect of self-harm; NSSI versatility (Muehlenkamp & Brausch, 2019) and NSSI age of onset (Muehlenkamp et al., 2019).

In a study of those with a history of self-harm, Nagra et al (2016) found moderate inverse relationships between suicidal intent and the positive resilience subscales of emotion coping (r=-0.38, p<0.001), problem solving (r=-0.34, p<0.001) and support seeking (r=-0.30, p<0.001). Current self-harm was associated with lower resilience than those with a past history of self-harm (Rotolone et al., 2019); and NSSH frequency was significantly negatively

correlated with resilience (r=-0.33, p<0.001; Kim et al., 2019). You and Park (2017) found that lower resilience was significantly associated with suicide attempts, however this relationship was only found in men.

Garish and Wilson (2015) found that higher levels of resilience reported at time 1, predicted lower engagement in NSSH at time 2 for secondary school student in New Zealand.

Resilience as a mediator between risk factors and self-harm

Two studies suggested that levels of resilience mediated the relationship between risk factors and self-harm. Phillipe and colleagues (2011) found that 'ego resiliency' mediated the relationship between childhood trauma (emotional abuse, emotional neglect, physical neglect but not sexual abuse) and self-harm behaviours (including suicide attempt, suicide threat and suicide ideation) in a clinical sample of 118 adults who attended clinical psychology outpatients. In a study of children in China who are left alone or live with rural relatives or neighbours, because their parents have left the home to work in urban areas (Left-behind children), Xiao and colleagues (2020) found that resilience was a significant mediator in the relationship between depression and self-harm. One study explored whether resilience could moderate the relationship between NSSH versatility and suicide attempt, however no relationship was found (Muehlenkamp & Brausch, 2019).

Discussion

With increasing interest in understanding the factors that may protect against self-harm, this study aimed to review and synthesise the literature examining the relationship between

resilience and self-harm. The findings indicated that regardless of definition, resilience was

repeatedly found to be significantly and negatively correlated with self-harm, regardless of

suicidal intent, and higher resilience was found in those with no history of self-harm. These

findings were consistent across populations (e.g. adolescents, university student, older

adults) and are similar to the research on resilience in the mental health literature which has

shown associations between higher levels of resilience and more positive emotions and

overall psychological wellbeing (Campbell-Sills & Stein, 2007; Joyce et al., 2018; Southwick &

Charney, 2018).

It is important to interpret these results with caution due to the methodological differences

in how the data were measured, analysed and reported. For example, there are

methodological differences in the measurement of resilience with studies utilising different

methodologies for scoring, such that some used a total resilience score, while others

reported subscale scores. For those measures assessing multiple dimensions of resilience,

different constructs were assessed which limits our ability to compare mean resilience

scores across different populations. For example, in a study of transgender adults using a

specific gender minority measure of resilience, resilience was measured using two subscales

of pride and community connection, and showed no association with self-harm (Brennan et

al., 2017) while other studies examining resilience across domains of emotion coping,

problem solving, and support seeking showed significant relationships with self-harm (Nagra

et al., 2016).

Few studies have examined associations beyond cross-sectional inquiry, which makes any

causal influence of resilience hard to establish. While one longitudinal study reported that

lower resilience may be a risk factor for later self-harm (Garisch & Wilson, 2015), the

researchers used a correlational design and did not assess resilience at time 2, therefore limiting the understanding of the stability of the construct.

Further, the inconsistencies in the analysis of confounding variables may lead to biased and inconsistent estimates of the nature of the relationship between resilience and self-harm. The majority of studies focused on adult populations and only one study focused on the older adult age range (>65 years old; You & Park, 2017). In addition to this, most of the literature focused on samples of White participants, therefore limiting the generalizability of finding and suggesting the need for cultural differences to be further explored. Consistent with the wider self-harm research, there is variability within the studies analysed in this paper in relation to how self-harm is defined (e.g. non-suicidal self-harm versus suicide attempt). This impacts the comparability of findings.

Strengths and Limitations

The present study is the first to the authors' knowledge that has synthesised the literature on the relationship between resilience and self-harm. It employed a broad range of terms synonymous with self-harm in order to be inclusive and capture a wide range of conceptualisations. However a number of limitations should also be noted. The predominantly cross-sectional nature of the included studies limits the conclusions that can be drawn from the extant literature, and indicate the need for more robustly designed research and longitudinal studies to fully capture the nature of the relationship between resilience and self-harm. Furthermore, the heterogeneity of definitions and therefore measurement tools used, meant a meta-analysis was precluded.

While a second author was recruited in order to rate the quality of the included studies, only the primary researcher (JM) was involved in the eligibility screening for this study. This has implications for the reliability of this screening process as there is the risk that the author has rejected relevant studies for review. Within this study, the author did consult with research supervisor when there were any queries about inclusion in the review. In order to enhance the quality of studies included in this review we did not include the grey literature, however this may have limited our findings. Finally, due to the variability in definitions and measures of both self-harm and resilience, it is difficult to compare findings and as such this review can only perhaps suggest the feasibility of resilience as a protective factor and recommend that the strength of the relationship is yet to be established through further research .

Future research

Researchers should employ more prospective designs in order to explore whether resilience is predictive of self-harm in the short and longer-term. With the continued debate in the literature about the conceptualization of resilience, prospective studies would allow researchers to investigate the extent to which this is a stable construct.

This study focused on the quantitative research using a validated resilience measure, but it would be advantageous for a future review of the qualitative literature in order to further enhance the understanding of the relationship between self-harm and resilience. Windle (2011) identified that there is no 'gold standard' tool for measuring resilience, and the establishment of a standard tool for measuring resilience in relation to self-harm would enhance the comparability between studies.

<u>Theoretical and Clinical Implications</u>

Resilience has been proposed as theoretically important in pathways to suicidal thoughts and behaviour with evidence from the wider suicide literature identifying the buffering effect of resilience in the relationship between entrapment and suicidal ideation through the lens of the Integrated Motivational Volitional model (IMV; Wetherall et al., 2018a). The IMV model (O'Connor & Kirtley, 2018) is a tripartite diathesis-stress framework which maps the pathways from background stressors to the emergence of thoughts of suicide, and the translation of thoughts into behaviour (O'Connor & Kirtley 2018). Emerging evidence supports the use of this model in understanding the transition from self-harm ideation to action (O'Connor et al., 2012). However, there are important gaps in our understanding of the wider context within which resilience relates to self-harm and future research may benefit from using theoretical models such as the IMV model to better understand the relationship between self-harm/suicide attempt, risk factors and resilience. Future research focusing on moderation or mediation designs will help to delineate alternative pathways of influence.

The findings from this review also have clinical implications, particularly given the identification of the inverse relationship with self-harm. However as this review has demonstrated there have been various dimensions and constructs measured in relation to the concept of resilience which therefore limits our understanding of the necessary treatment focus. Further research into how resilience can be targeted, as well as a better understanding of how resilience fits into and develops across the life course, will have important implications for clinical practice, and for supporting those who self-harm.

Conclusion

In conclusion, this review provides preliminary evidence on the positive role of resilience in relation to self-harming behaviour. However methodological and theoretical limitations require addressing, and the construct of resilience requires further exploration in order to understand how it can be targeted in treatment interventions, particularly in relation to self-harm behaviours.

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CHAPTER 2: Major Research Project

Exploring the role of protective factors on the development of suicidal ideation through the lens of the Integrated Motivational-Volitional Model

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instructions Appendix 2.1)

Plain English Summary

Title: Exploring the role of protective factors in suicidal behaviour through the lens of the Integrated Motivational-Volitional Model.

Background: Suicide is a global public health problem. Research has focused on the identification of risk factors for suicide, but there has been less focus on the role of protective factors in suicide prevention.   A greater understanding of the factors which might serve to protect individuals from experiencing suicidal thoughts or behaviour may provide important insights for intervention and reducing the risk of suicide.

Aims: In the current study we investigated how a number of protective factors (social support, optimism and resilience) are related to suicidal ideation within the context of the Integrated Motivational-Volitional model, a leading theory in suicide research.   We also aimed to explore whether there were gender differences in our findings.

Methods: This project used data from an existing study of 3,508 young adults aged 18 to 34 years from across Scotland recruited for the Scottish Wellbeing Study (O'Connor, et al, 2018). Within this study, participants completed a 1 hour-long interview, carried out face-to-face in their homes, including an online survey facilitated by an interviewer. A number of measures were used

to assess a range of factors including social support, optimism and resilience. Complex statistical tests were applied to the data in order to address the aim of the project. Ethical approval was obtained from the Department of Psychology Ethics Committee at the University of Stirling and University of Glasgow.

Results: Findings from the study indicate that the perception of defeat and feelings of being trapped by life circumstances are key factors in the development of suicidal ideation. Optimism, resilience and social support acted as protective factors within the suicidal process. No gender differences were found in relation to suicidal ideation. However females reported higher levels of defeat and depressive symptoms, and lower levels of resilience and optimism than males.

Practical Applications: Evidence provides support for key aspects of the Integrated Motivational-Volitional model of suicide suggesting that feelings of being trapped by life circumstances are central to the development of suicidal ideation. The current findings highlight that optimism, resilience and social support should be targets for intervention which may impede the emergence of suicidal ideation.

Reference: O'Connor, R.C., Wetherall, K., Cleare, S., Eschle, S., J., et al. (2018).

Suicide attempts and non-suicidal self-harm: a national prevalence study of

young adults. *British Journal of Psychiatry Open*, **4**, 142–148

Abstract

Background: Suicide is a global public health problem. The integrated motivational-volitional (IMV) model is a leading psychological theory of suicide which posits that perceptions of defeat and feelings of entrapment are key to the development of suicidal ideation. Emerging evidence has suggested that factors such as resilience and social support may have a moderating role in the IMV model but these protective factors are under researched. This study aims to explore the role of protective factors in the IMV model.

Methods: This project analysed data from an existing study of 3,508 young adults aged 18 to 34 years recruited from Scotland. Participants completed a 1 hour-long interview which included a number of psychological measures to assess a range of factors including social support, optimism and resilience.

Results: Multivariate analyses indicated that the relationship between defeat and suicidal ideation was mediated by feelings of entrapment. The pathways from defeat to entrapment, and from entrapment to suicide ideation were moderated by optimism, resilience and social support. The buffering effects were greatest when levels of entrapment were high, with low levels of protective factors being associated with increased suicidal ideation. No gender differences were found in levels of suicidal ideation, but they were evident in depression, defeat, resilience and optimism.

Limitations: The cross-sectional nature of the data, preclude analyses related to causality.

Conclusion: Low levels of optimism, resilience and social support are associated with increased feelings of entrapment, and increased susceptibility to suicidal ideation. These findings have important clinical and theoretical implications.

Introduction

Suicide is a global public health problem with an estimated 804,000 people dying by suicide across the world each year (World Health Organization, 2014). The Office for National Statistics (ONS; 2019) reported that in 2018 6,507 people died by suicide in the UK, and of these deaths 784 were in Scotland. Suicidal thoughts are even more common, and a recent national study in Scotland found that more than 20% of young adults reported that they had thought about suicide at some stage in their lives, and 11.3% reported a history of suicide attempts (O'Connor et al., 2018). Given that cross-national research suggests that about a third of individuals who think about suicide will go on to make a suicide attempt (Nock et al., 2008), it is important to distinguish the psychological factors and processes which lead to suicidal ideation and the decision to act on these suicidal thoughts (O'Connor & Nock, 2014).

It is widely accepted that suicidal behaviour results from a complex interplay of biological, cultural, social and psychological factors and research has identified a number of risk factors for suicidal behaviour including depression, perfectionism, entrapment and self-criticism to name a few (O'Connor & Nock, 2014). It has been argued that a greater understanding of the factors which might serve to protect individuals from experiencing suicidal thoughts or behaviour may provide important insights for intervention and reducing the risk of suicide (Mclean, Maxwell, Platt, Harris & Jepson, 2008). Psychological theories of suicidal behaviour are essential in the understanding of how these factors interact to determine suicide risk.

A number of psychological models have been developed to better understand the emergence of suicidal ideation and suicidal behaviours. One such model is the Integrated Motivational–Volitional Model of suicide (IMV; O'Connor, 2011; O'Connor & Kirtley, 2018;

see Figure 1 below). The IMV model is comprised of three phases which describe the biopsychosocial context in which suicidal ideation and behaviour may develop (pre-motivational phase), the factors that lead to the development of suicidal ideation (motivational phase) and the factors that facilitate the transition from suicidal ideation to suicidal behaviour (volitional phase; O'Connor, 2011; O'Connor, et al, 2016; O'Connor & Kirtley, 2018). According to the model, the presence of a range of factors (threat to self, motivational, and volitional moderators) facilitate or moderate the transition between these phases (Dhingra, Boduszek, & O'Connor, 2015; O'Connor, 2011; O'Connor, Smyth, & Williams, 2015).

Figure 1: The Integrated Motivational Volitional Model of Suicide (O'Connor, 2011; O'Connor & Kirtley, 2018).
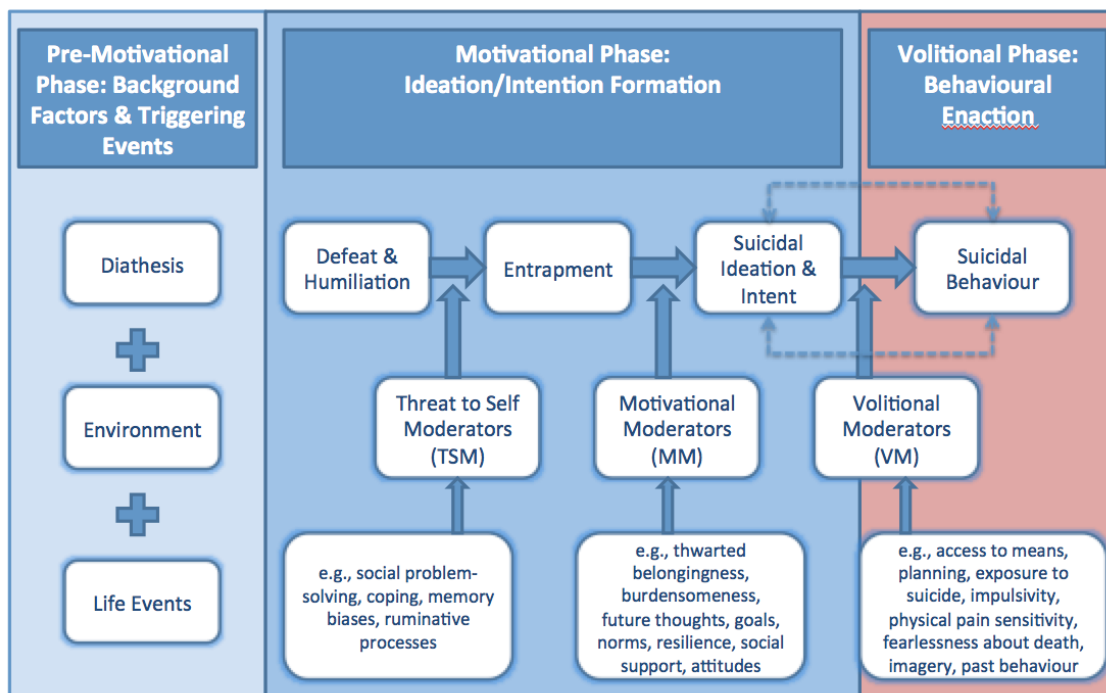
Central to the motivational phase of the IMV model is the relationship between defeat and entrapment in the development of suicidal ideation (O'Connor, 2011; O'Connor & Kirtley, 2018). Entrapment is theorised to be the key driver of suicidal behaviour (O'Connor &

Kirtley, 2018) and evidence suggests that it mediates the defeat – suicidal ideation relationship (Rasmussen et al., 2010). In line with the theoretical assumptions of the IMV model, research has shown that a number of protective factors moderate (i.e., weaken) the association between entrapment and suicidal ideation, including hope (Tucker, O'Connor, & Wingate, 2016), social support (Shelef, et al., 2016) and resilience (Wetherall, et al., 2018b). In a recent synthesis of the developments and challenges in suicide research, O'Connor and Portzky (2018) argued that the factors that moderate and mediate the defeat-entrapment-suicidality relationships, as specified in the IMV model, require further research attention.

A factor which has not been examined in relation to the IMV model is optimism. Optimism is defined as a generalised positive outcome expectancy (Scheier & Carver, 1985) and is linked to lower suicide risk in adults (O'Keefe & Wingate, 2013; Yu & Chang, 2016).   In a study by Hirsch and colleagues (2007), they found that in adults aged between 18-57 years old, negative life events were associated with current suicidal ideation and previous suicide attempts, and optimism moderated these relationships. Rasmussen and Wingate (2011) found that optimism was a protective factor against suicidal ideation. In a novel study utilizing complex network analysis of different psychological factors associated with suicidal ideation and behaviour, De Beurs and colleagues (2019) found that optimism and resilience were directly but inversely related to suicidal ideation. It is therefore reasonable to suggest that optimism may play a role within the IMV model.

There are much higher rates of deaths by suicide in males than females (Turecki & Brent, 2016); in studies of adolescents and young adults, death by suicide is 2–4 times higher in males, while suicide attempts are 3–9 times more common in females (Wunderlich et al. 2001). In the UK suicide is the highest leading cause of death in men under 45 years old

(ONS, 2019). Given these gender disparities, exploring gender differences in protective factors is important for suicide prevention. As the majority of people who think about or attempt suicide do not receive treatment (Bruffaerts, et al., 2011) large scale research into non-clinical samples provides important insights into the factors associated with suicidal ideation and behaviour.

Aims

In the current study we aimed to investigate how a number of protective factors (social support, optimism and resilience) are related to suicidal ideation within the context of the IMV model, using data from an existing study. Specifically, we employed moderation and mediation analyses to explore the factors within the motivational phase of the IMV model. Firstly, entrapment was tested as a mediator of the defeat leading to suicide ideation relationship. Optimism, resilience and social support were then individually tested as moderating variables in the defeat to entrapment pathway, as per the threat-to-self moderators within the IMV model. Then in a second model, each of the protective factors were tested individually as motivational moderators in the final pathway. The IMV model posits that resilience and social support serve as moderators of the entrapment to suicidal ideation relationship, but not the defeat to entrapment relationship. However, as these moderating pathways have rarely been tested, we have explored the relationship in both pathways and additionally examined the role of optimism. The following hypotheses were tested:

H1: Firstly, in line with the IMV we hypothesised that entrapment would mediate the defeat leading to suicide ideation relationship.

H2: Optimism, Resilience and Social Support would independently serve as motivational moderator in the entrapment to suicidal ideation pathway.

We also aimed to explore group differences in all variables between men and women.

Methods

This project is a secondary data study, and the procedures for the original study are presented below, including the measures and analysis which shall be employed in this current study.

Sample and Procedure

The Scottish Wellbeing study is a representative population based study of 3,508 young adults aged 18 to 34 years from across Scotland (O'Connor et al., 2018). Participant recruitment was conducted by Ipsos MORI, a social research organisation between 25th March 2013 and 12th December 2013. The study utilised a quota sampling methodology whereby quotas were based on age (three quota groups), sex and working status. Following written consent, participants completed a 1 hour-long interview, carried out face-to-face in their homes, using Computer-Assisted Personal Interviewing (CAPI) and including a computer-assisted self-interviewing module (the questions about suicide attempts were completed confidentially on the computer).   All interviewers were trained in the administration of the included measures.

Ethical approval was obtained from the Department of Psychology Ethics Committee at the University of Stirling and the US Department of Defense, Human Research Protections Office

and the University of Glasgow. Participants received £25 in compensation for taking part. All participants were given a list of support organisations at the end of the interview.

Ethical approval was obtained from the Department of Psychology Ethics Committee at the University of Stirling in order for the author to be added as a researcher to access this data set.

Measures

The participants completed a battery of psychological and social measures; however for the purpose of this secondary data study only the following measures are being reported:

Demographic and background data were obtained. These were age, gender, marital status (married vs. not married), ethnicity (white vs. non-white) and economic activity (employed, inactive and unemployed).

Outcome measure: lifetime history of suicidal ideation.

This was assessed with one item drawn from the Adult Psychiatric Morbidity Survey (APMS; McManus et al., 2007): "Have you ever seriously thought of taking your life, but not actually attempted to do so?" Responses to this question were "no", "yes" or "would rather not say". This item has been used in multiple surveys and is well established (Wetherall et al., 2018a, 2018b).

The Beck Scale for Suicide Ideation (BSS; Beck, Steer, & Ranieri, 1988) is a 21-item measure that assesses suicidal ideation and intent experienced in the past week. Response options range from 0 to 2 with each statement group consisting of three sentences that describe different intensities of suicidal ideation (e.g. ''I have no wish to die; a weak wish to die; a moderate to strong wish to die''). Higher scores on the BSS are interpreted as indicating

heightened suicide ideation, intent, and planning, as well as general risk for suicide. Only the first 19 items of this measure specifically reflect the experience of suicide ideation (i.e., within the week prior to administration). The last two items assess the presence of past suicide attempts and the wish to die during these attempts. As this study focused on suicide ideation only data from the first 19 items were utilized in the analyses. The first 19 items of the BSS demonstrated high internal reliability in the current study (Cronbach's $\alpha = 0.95$).

The Defeat Scale (Gilbert & Allan, 1998) is a 16-item self-report measure of perceived failed struggle and loss of rank (e.g., "I feel that I have not made it in life"). This scale has good psychometric properties and is significantly correlated with depressive symptoms (Griffiths et al., 2014). In the present study the measure had high internal reliability (Cronbach's $\alpha = 0.96$).

The 16-item Entrapment Scale (Gilbert & Allan, 1998) is a measure of the sense of being unable to escape feelings of defeat and rejection (e.g., I am in a situation I feel trapped in). This measure consists of 10 items reflecting external entrapment (entrapment by external situations), and 6 items tapping into internal entrapment (entrapment by one's own thoughts and feelings). The scale has good psychometric properties (Griffiths et al., 2014) and demonstrated high internal consistency in the present study (Cronbach's $\alpha = 0.96$).

The Beck Depression Inventory-II (BDI-II; Beck et al., 1996) is a well-established measure which evaluated a range of depressive symptoms (e.g., loss of energy, sense of failure) containing 21 items. It has been shown to yield reliable, internally consistent, and valid scores in a range of populations (e.g., Dozois et al., 1998), and in this study, it demonstrated high internal reliability (Cronbach's $\alpha = 0.95$).

Resilience was measured using the 10-item Brief Resilience Scale (BRS; Campbell-Sills and Stein, 2007), adapted from the 25-item Connor-Davidson Resilience Scale (CD-RISC; Connor and Davidson, 2003). This 10-item version (e.g., "Coping with stress can strengthen me") has good psychometric properties and is highly correlated with the original 25-item version (Campbell-Sills and Stein, 2007), and in the present study it displayed excellent internal consistency (Cronbach's $\alpha = 0.90$).

The 7-item ENRICHD Social Support Instrument (ESSI; Mitchell et al., 2003), taps four defining attributes of social support: emotional, instrumental, informational, and appraisal (e.g., "Is there someone available to give you good advice about a problem?"). It has been found to be a valid and reliable measure of social support (Vaglio et al., 2004), and displayed good internal reliability in the present study (Cronbach's $\alpha = 0.87$).

Optimism was assessed with the Life Orientation Test-Revised (LOT-R; Scheier, Carver, & Bridges, 1994). This is a 10-item measure, with 3 items which measure optimism (e.g. I'm always optimistic about my future), 3 items which measure pessimism (e.g. Things never work out the way I want them to) and 4 items which serve as fillers (e.g. It's easy for me to relax). Response choices range from 0 (''Strongly Agree") to 4 (''Strongly Disagree") with scores ranging from 0-24. Responses were summed (after reversals as needed) such that higher scores represent greater optimism. The measure demonstrated high internal consistency in the present study (Cronbach's $\alpha = 0.79$).

Statistical Analysis

Data analysis was conducted using the statistical package SPSS Version 26 (IBM Corp, 2019). Initial correlation analyses were conducted to test the associations between all study variables. Linear regression analysis was used to test whether defeat was associated with

suicidal ideation, and also to test the total effects of entrapment on suicidal ideation before taking moderators into account. Hayes' (2013) PROCESS macro for SPSS was then used to test mediation and moderation effects within models. The macro employs bootstrapping techniques to estimate the confidence intervals (these yield inferences that are more accurate and better reflect the potential irregularities of sampling design). Hayes (2013) suggested that this is best repeated thousands of times, as this will more accurately reflect the sample population, and therefore, all analyses used a minimum of 10,000 bootstraps. This method rigorously tests the pathways for mediation and moderation, including the indirect effects, direct effects, and tests of simple slopes. To investigate the moderation and mediation effects within the pathways of the IMV model, we tested six moderated mediation models. Firstly, Hayes (2013) PROCESS model 7 (Figure 2) was used to test moderated mediation whereby entrapment was the mediator of the relationship between defeat and suicidal ideation, and optimism, resilience and social support were individually entered as moderator 'W' in these models. Then the second moderated mediation model used Hayes (2013) PROCESS model 14 (Figure 3), whereby optimism, resilience and social support were individually inputted as 'W' to test whether they moderated the entrapment to suicidal ideation pathway. To ensure that these relationships were not accounted for by depressive symptoms, the latter were controlled for in all analyses. The beta values reported in these results are unstandardised. Lastly, independent samples t-tests were used to examine group differences between males and females.   The large sample size of 3508 participants increases the statistical power of this study and reduces the risk of our analysis being underpowered.

Figure 2: Moderated-Mediation Analysis of entrapment on the relationship of defeat and suicidal

ideation, with threat- to- self moderators on the defeat-entrapment pathway
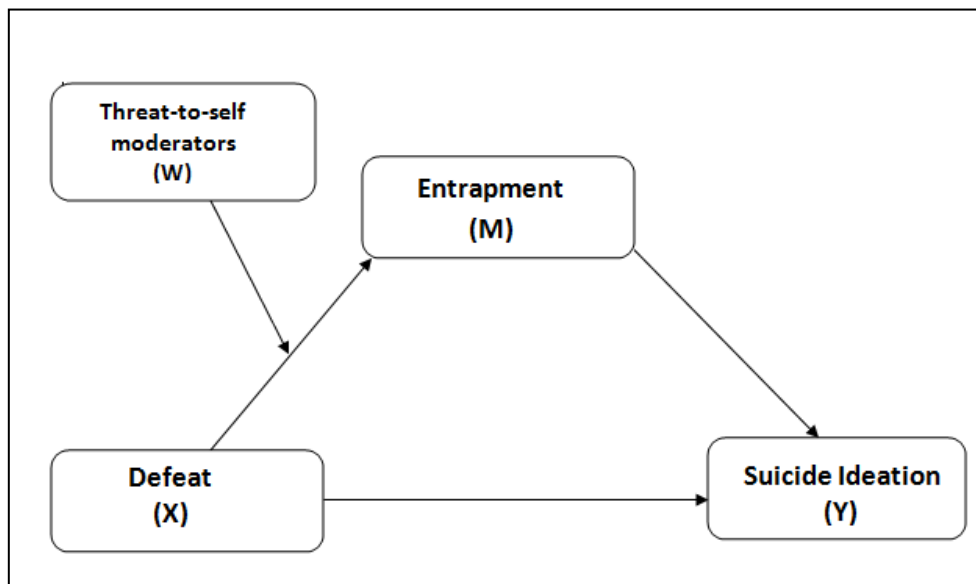
Suicidal ideation is measured using the BSS Scale.

Figure 3: Moderated-Mediation Analysis of entrapment on the relationship of defeat and suicide

ideation, with motivational moderators on the entrapment-suicide ideation pathway
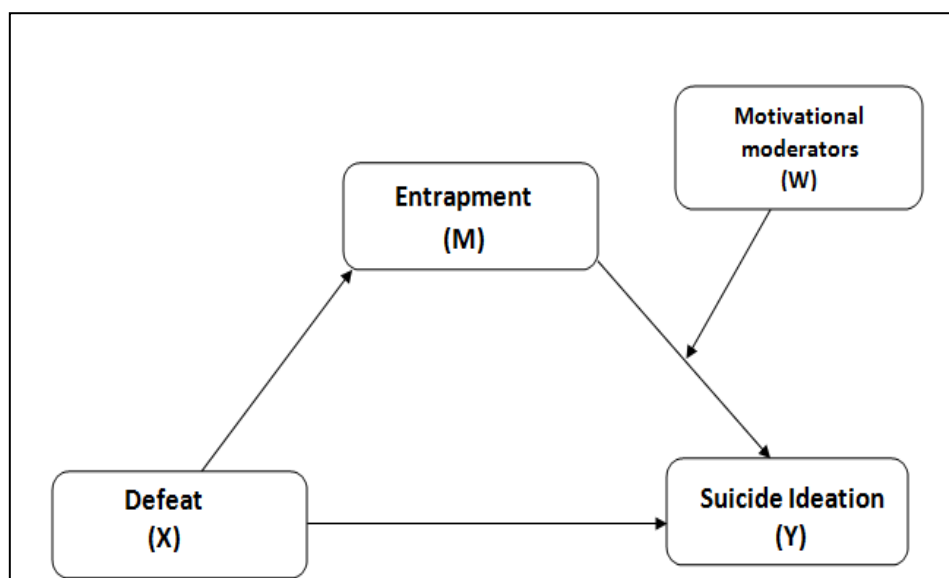
Suicidal ideation is measured using the BSS Scale.

Missing Data

Data in this study were considered missing if participants missed out a question or if they selected 'would rather not say'. Only participants who had completed 75% or more of a psychological scale were included, which resulted in minimal missing data, <1% on any variable (range 0.31–0.86%). The patterns of missing data were checked against demographic characteristics, and there was no systematic bias in the missingness, indicating that the data were missing at random. As there were no significant associations ($p>0.05$) expectation maximisation (EM) was applied to replace missing items for each scale. After removing those who had not completed at least 75% of each of the included measures, analyses included 3,428 participants, with a small proportion of the data EM replaced.

Results

Sample characteristics

The sample included 3508 participants (Table 1). Over half (50.4%) of the respondents were female and 94.8% identified as White. The mean age of the participants was 25.47 years (SD=4.82). A total of 83.7% were not married, 49.6% were in full-time employment, 17.4% were in full-time education and 11.5% were unemployed. Almost half of participants lived in rental accommodation (49.8%). A total of 74.7% participants reported having never experienced suicidal ideation, with 22.5% reporting lifetime history.

Correlations between study variables

Means, standard deviations and correlations (Pearson's r) of all study variables are presented in Table 2. All of the psychological variables were significantly associated with

each other; all protective factors were negatively correlated with suicidal ideation with moderate effect sizes (Cohen, 1988). Defeat, entrapment and depressive symptoms were positively correlated with suicidal ideation with large effect sizes. Resilience and optimism each showed large negative correlations to both defeat and entrapment, and social support was negatively correlated with a moderate effect size.

Table 1: Demographic Characteristics

Characteristic			
Continuous variables		**M**	**SD**
Age		25.47	4.82
Categorical variables		**N**	**%**
Gender	Male	1740	49.6
	Female	1768	50.4
Ethnicity	White	3298	94.8
	South Asian	71	2.0
	Chinese/Other Asian	36	1.0
	Black	39	1.1
	Other	34	1.0
Marital Status	Married/civil partnership	570	16.3
	Not married*	2937	83.7
Economic Activity	Full-time employment	1739	49.6
	Full-time Education	609	17.4
	Part-time employed	400	11.4
	Unemployed	405	11.5
	Sick/disabled	78	2.2
	Homemaker	252	7.2
	Other	25	0.7
Accommodation	Owns home	814	23.2
	Rent-social housing	813	23.2
	Private rent	931	26.6
	Lives with parents/relatives	843	24.1
	Other	102	2.9

*Not married includes never married, separated, divorced or widowed

Table 2: Means, standard deviations and correlations (Two-tailed Pearson r) of all study variables

	Suicidal Ideation	Depressive Symptoms	Defeat	Entrapment	Resilience	Optimism	Social Support
Suicidal Ideation	-						
Depressive Symptoms	.575**	-					
Defeat	.526**	.849**	-				
Entrapment	.569**	.821**	.843**	-			
Resilience	-.326**	-.561**	-.596**	-.507**	-		
Optimism	-.324**	-.565**	-.618**	-.522**	.515**	-	
Social Support	-.301**	-.466**	-.484**	-.479**	.364**	.371**	-
Means (SD)	1.01(3.60)	10.99 (11.36)	16.42 (13.37)	10.37 (13.90)	28.09 (7.52)	14.50 (4.87)	25.72 (4.63)

**p<0.001

Suicidal ideation is measured using the BSS Scale.

Linear regression analysis

In all of the moderated mediation models, entrapment was tested as the mediator in the defeat to suicidal ideation relationship. An initial linear regression analysis was first conducted in order to test the total effect of the defeat-suicidal ideation relationship, and found that before taking into account the mediator, higher scores on the measure of defeat were significantly associated with suicidal ideation (β= 0.036, t=5.206, CI=0.023, 0.050, p<0.001).

Moderated mediation using Hayes (2013) PROCESS model 7: Mediation of entrapment on the defeat to suicidal ideation relationship and the moderating effect of protective factors in the defeat to entrapment pathway

Optimism

Figure 4 (Panel A) shows that in the moderated mediation model, defeat was significantly associated with entrapment (β=0.521, t=29.42, CI=0.486, 0.555, p<0.001) and the association between entrapment and suicidal ideation was also significant (β=0.080, t=11.14, CI=0.066, 0.094, p<0.001). The addition of entrapment reduced the direct effect of defeat on suicidal ideation to non-significance (β=-0.006, t=-0.795, CI=-0.022, 0.009, p=0.426). As the indirect effect through entrapment was significant (β=0.043, SE=0.006, CI=0.030, 0.055) this indicates that entrapment mediated the relationship between defeat and suicidal ideation. The interaction between defeat and optimism was also significant (β= -0.015, t=-8.57, CI=-0.018, -0.011, p<0.001), indicating that optimism moderates the relationship between defeat and entrapment.

The simple slopes analysis (the relationship between defeat and entrapment at 1 standard deviation below and above the mean of optimism), demonstrated that the magnitude of the relationship between defeat and entrapment is significantly greater among people with low optimism (β=0.592, SE=0.018, CI=0.556-0.627) than those with high levels of optimism (β=0.450, SE=0.021, CI=0.410-0.491). By looking at the confidence intervals (CI) in these relationships we can see that they do not overlap, which suggests that the relationship between defeat-entrapment is different for those with low optimism, as opposed to high optimism. As demonstrated in Figure 6 Panel A, the slope of the line for low optimism is much steeper than that of high optimism, and that these lines cross over suggesting an interaction. We can see that at low levels of optimism, lower levels of entrapment are reported at low levels of defeat, than those with higher optimism. However feelings of entrapment are highest for those with lower optimism than for those with high optimism when defeat is high.

Resilience

Figure 4, Panel B shows that defeat was significantly associated with entrapment (β=0.536, t=30.98, CI=0.502-0.570, p<0.001) and the association between entrapment and suicidal ideation was also significant (β=0.053, t=7.33, CI=0.039-0.068, p<0.001). The model also found a mediating effect of entrapment on the defeat to suicidal ideation relationship, resulting in non-significance of the direct effect (β =0.006, t = 0.719, CI = -0.010 - 0.022, p = 0.471).

Resilience significantly moderated the defeat to entrapment pathway (β= -0.007, t=-7.09, CI=-0.009- -0.005, p<0.001). The simple slope analysis indicates that the strength of the relationship between defeat and entrapment was greater at lower resilience (β=0.591,

SE=0.019, CI=0.555-0.627) than when resilience was high (β=0.481, SE=0.019, CI=0.443-0.519), with no overlap in the CI's suggesting different relationships. Looking at the graph in Figure 7 Panel A we can see that the slope of the line for low levels of resilience is steeper than for high resilience, with slopes crossing over when defeat is high.   Lower levels of resilience are associated with the highest levels of entrapment when defeat is high.

Social Support

In a further moderated mediation model, Figure 4 (Panel C) shows that defeat was significantly associated with entrapment (β=0.511, t=30.27, CI=0.478-0.544, p<0.001) and entrapment and suicidal ideation was also significant associated (β=0.058, t=7.99, CI=0.044 - 0.072, p<0.001).   Entrapment mediated the defeat to suicidal ideation relationship, resulting in non-significance of the direct effect (β=0.003, t = 0.426, CI = -0.012 - 0.019, p= 0.670).

Social support significantly moderated the relationship between defeat and entrapment (β=-0.011, t=-6.712, CI=-0.015, -0.008, p<0.001). A greater strength in the defeat-entrapment relationship was evidenced at low levels of social support (β=0.563, SE=0.019, CI=0.526-0.599) as compared to high levels of social support (β=0.463, SE=0.018, CI=0.427-0.499), with no overlap in CI scores. As demonstrated in Figure 8 Panel A, the slopes for high and low social support cross over at lower levels of defeat, suggesting an interaction when defeat is low. The steeper line of the slope for lower social support suggests a greater rate of change in the defeat-entrapment relationship than for high social support.   For those with lower social support, greater levels of entrapment are reported at high levels of defeat, than those with high levels of social support.

Figure 4: Moderated mediation analysis of entrapment on the relationship of defeat and suicidal ideation, with protective factors as moderators in the defeat to entrapment pathway (Panel A-Optimism; Panel B- Resilience; Panel C-Social Support)
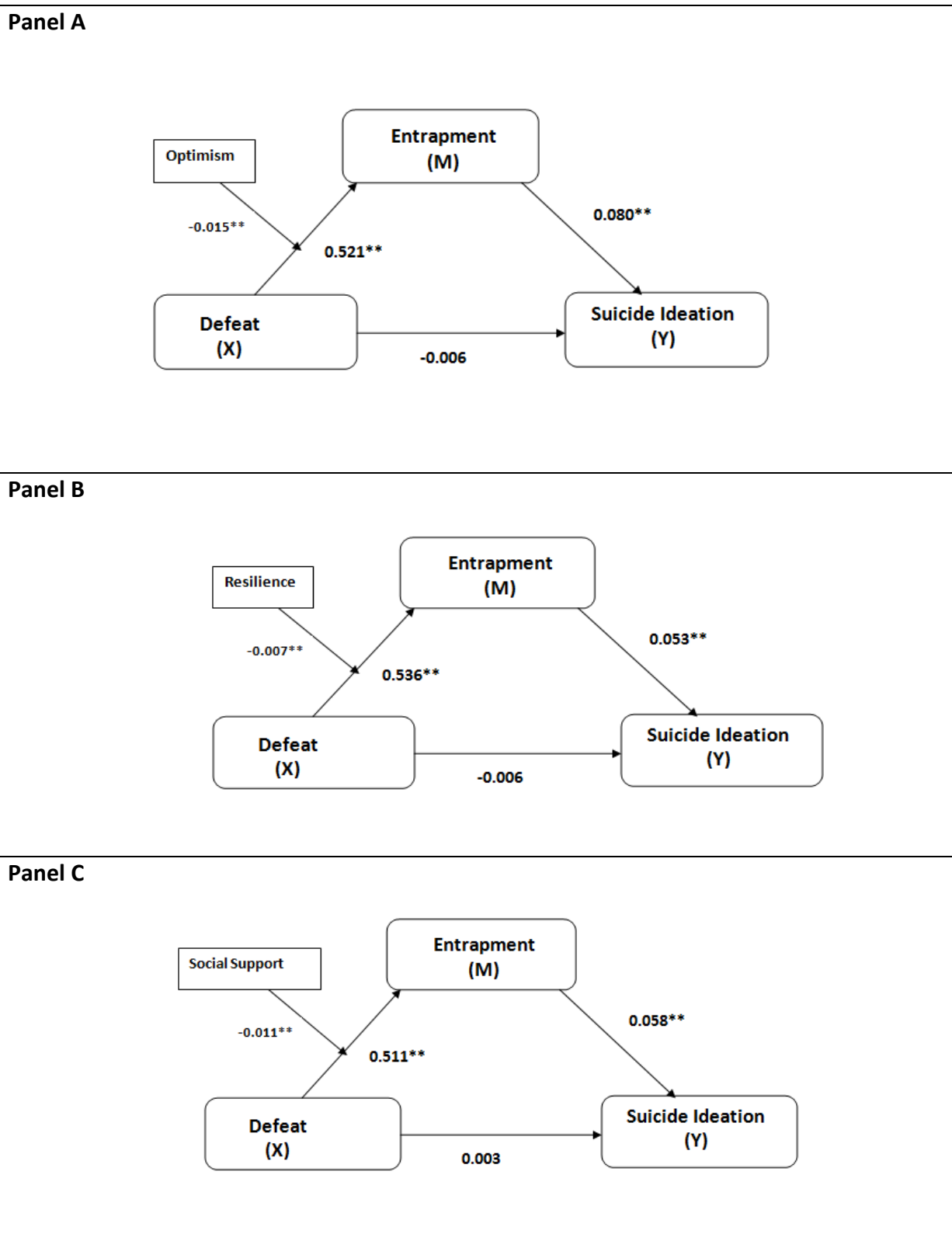
All coefficients are unstandardised and reflect different scales of measurement, and therefore coefficients shown along the various paths within a given model are not directly comparable with each other.

**p<0.001

Moderated mediation using Hayes (2013) PROCESS model 14: Mediation effect of entrapment on the defeat to suicidal ideation relationship and moderating effects of protective factors in the entrapment to suicide ideation relationship

Optimism

As evidenced in Figure 5 (Panel A), the moderated mediation model indicates that defeat was significantly associated with entrapment (β=0.533, t=31.89, CI=0.501-0.566, p<0.001) and the association between entrapment and suicidal ideation was also significant (β=0.046, t=6.201, CI=0.031-0.060, p<0.001), with entrapment mediating the defeat to suicidal ideation relationship, resulting in non-significance of the direct effect (β =0.004, t = 0.448, CI = -0.012 - 0.020, p = 0.647).

The interaction between optimism and entrapment was significant (β=-0.01, t=-13.810, CI=-0.011, -0.008, p<0.001) indicating that optimism moderates the relationship between entrapment and suicidal ideation. The simple slopes analysis showed this at low (β=0.092, SE= 0.007, CI=0.078- 0.106) and moderate levels of optimism (β=0.046, SE=0.007, CI= 0.031-0.060), with the greatest strength in the relationship between entrapment and suicidal ideation at low levels of optimism. However when levels of optimism were high, there was no significant relationship found between entrapment and suicidal ideation (β=-0.000, SE=0.009, CI= -0.018 - 0.017). Figure 6 Panel B demonstrates that lower optimism is associated with higher levels of suicidal ideation, when entrapment is high.

Resilience

In the second moderated mediation model examining motivational moderators (Figure 5, Panel B), defeat was significantly associated with entrapment (β=0.541, t=31.76, CI=0.509-0.575, p<0.001) and the association between entrapment and suicidal ideation was also significant (β=0.053, t=7.33, CI=0.039-0.068, p<0.001). Entrapment mediated the defeat to suicidal ideation relationship resulting in non-significance of the direct effect (β =0.005, t = 0.745, CI=-0.003 - 0.041, p = 0.480).

The interaction between resilience and entrapment was also significant (β=-0.006, t=-13.29, CI=-0.006, -0.005, p<0.001) suggesting moderation. When looking at the simple slopes analysis, the magnitude of the relationship between entrapment and suicidal ideation is greater for people with low levels of resilience (β=0.094, SE= 0.007, CI=0.080- 0.108) than for those with moderate levels of resilience (β=0.053, SE=0.007, CI= 0.039=0.068). However entrapment and suicidal ideation were unrelated at high levels of resilience (β=-0.013, SE=0.009, CI=-0.043- 0.030), as highlighted by the flattened gradient of the slope in Figure 7, Panel B. In this same figure, the slope of the line is steepest for lower resilience with the crossing of lines suggesting an interaction between low, moderate and high levels of resilience. The graph suggests that people with lower resilience will experience higher levels of suicidal ideation when entrapment is high.

Social Support

In the final moderated mediation model (Figure 5, Panel C), defeat was significantly associated with entrapment (β=0.510, t=30.98, CI=0.492-0.573, p<0.001) and the

association between entrapment and suicidal ideation was also significant (β=0.058, t=7.99, CI=0.044-0.072, p<0.001), with entrapment mediating the defeat to suicidal ideation pathway, resulting in non-significance of the direct effect (β =0.003, t = 0.513, CI = -0.004 - 0.038, p = 0.692).

When social support was tested as a moderator in the entrapment to suicidal ideation pathway, the model showed that social support significantly moderated the relationship between entrapment and suicidal ideation (β=-0.008, t=-12.61, CI=-0.010, -0.007, p<0.001). The simple slopes analysis indicates that at low levels of social support the strength of the relationship between entrapment and suicidal ideation is stronger (β=0.096, SE=0.007, CI= 0.082-0.110) than for moderate levels (β=0.058, SE=0.007, CI= 0.044-0.072) and high levels of social support (β=0.023, SE=0.008, CI= -0.006-0.039). The line of the slopes in Figure 8, Panel B suggest the steepest relationship for lower levels of social support with the relationships between low, moderate and high levels of social support interacting at mean levels of entrapment. For people with lowest levels of social support,   they will experience greater levels of suicidal ideation when feelings of entrapment are high, as compared with those with higher levels of social support.

Figure 5: Moderated mediation analysis of entrapment on the relationship of defeat and suicide ideation, with protective factors as moderators in the entrapment to suicidal ideation pathway (Panel A- Optimism; Panel B- Resilience; Panel C-Social Support)
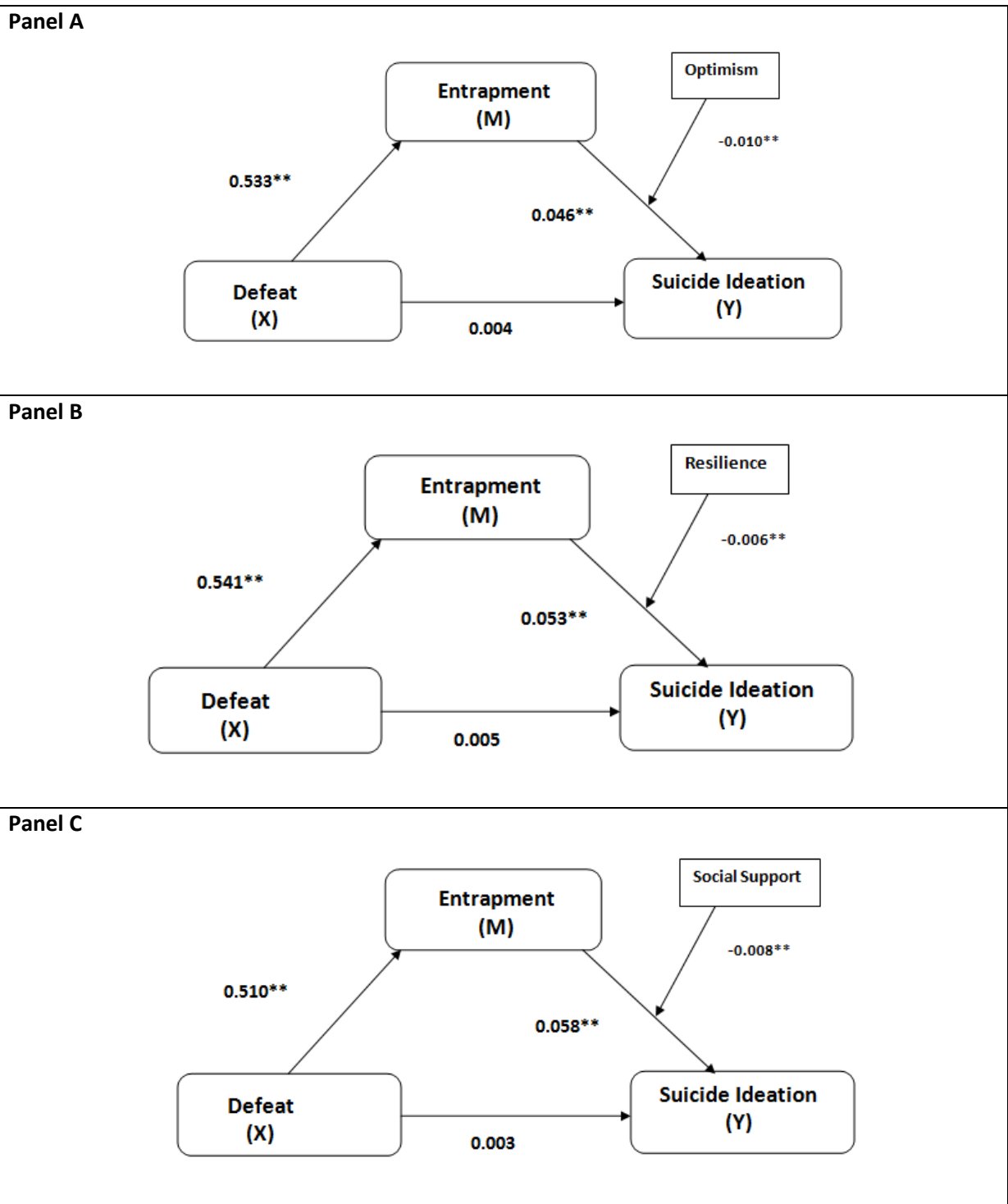
All coefficients are unstandardised and reflect different scales of measurement, and therefore coefficients shown along the various paths within a given model are not directly comparable with each other.

**p<0.001
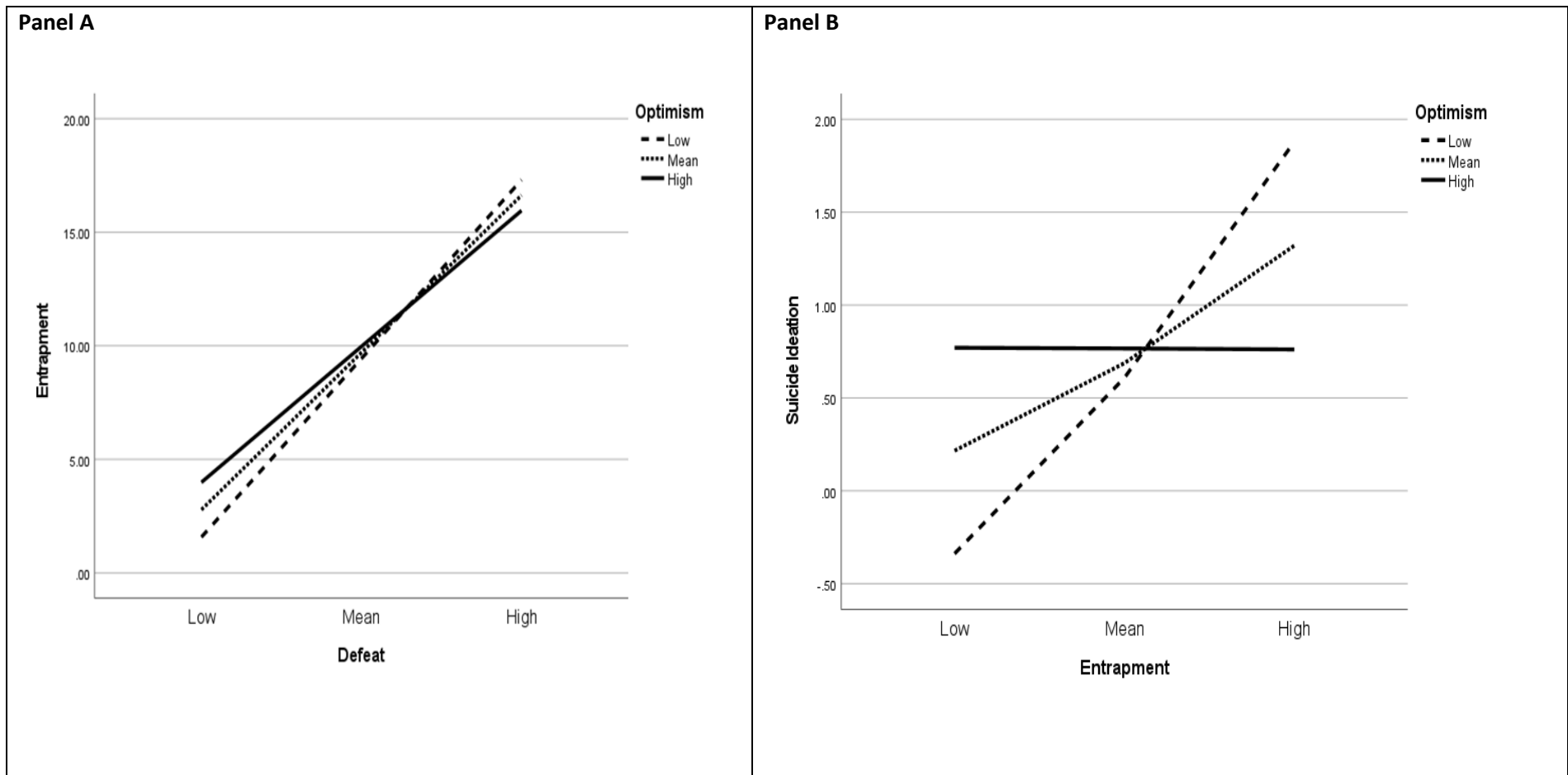
Panel A

Panel B

Figure 6: Panel A: Moderation of Optimism on the relationship of defeat to entrapment; Panel B: Moderation of Optimism on the relationship between entrapment to suicidal ideation.
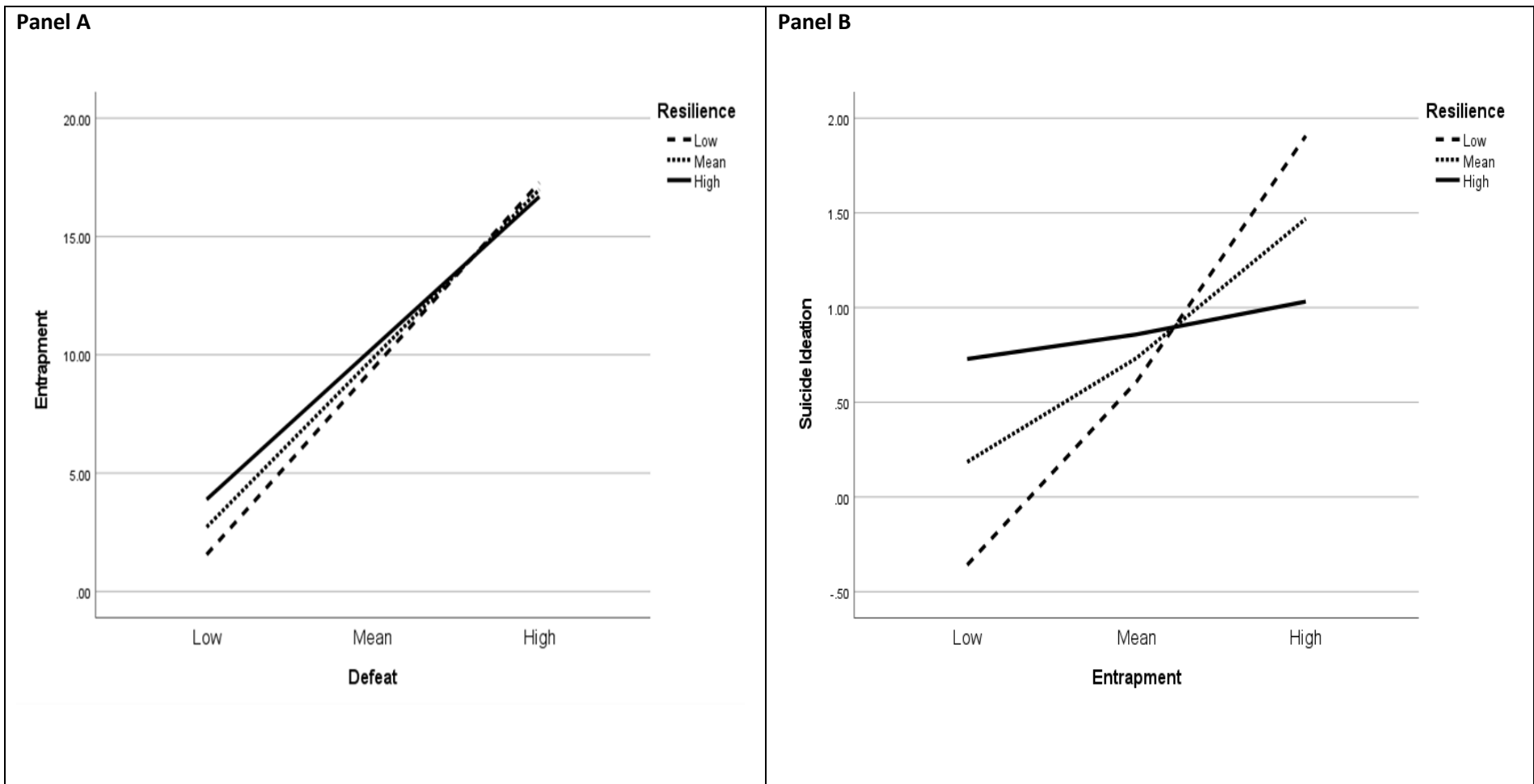
Figure 7: Panel A: Moderation of Resilience on the relationship of defeat to entrapment; Panel B: Moderation of Resilience on the relationship between

entrapment to suicidal ideation.
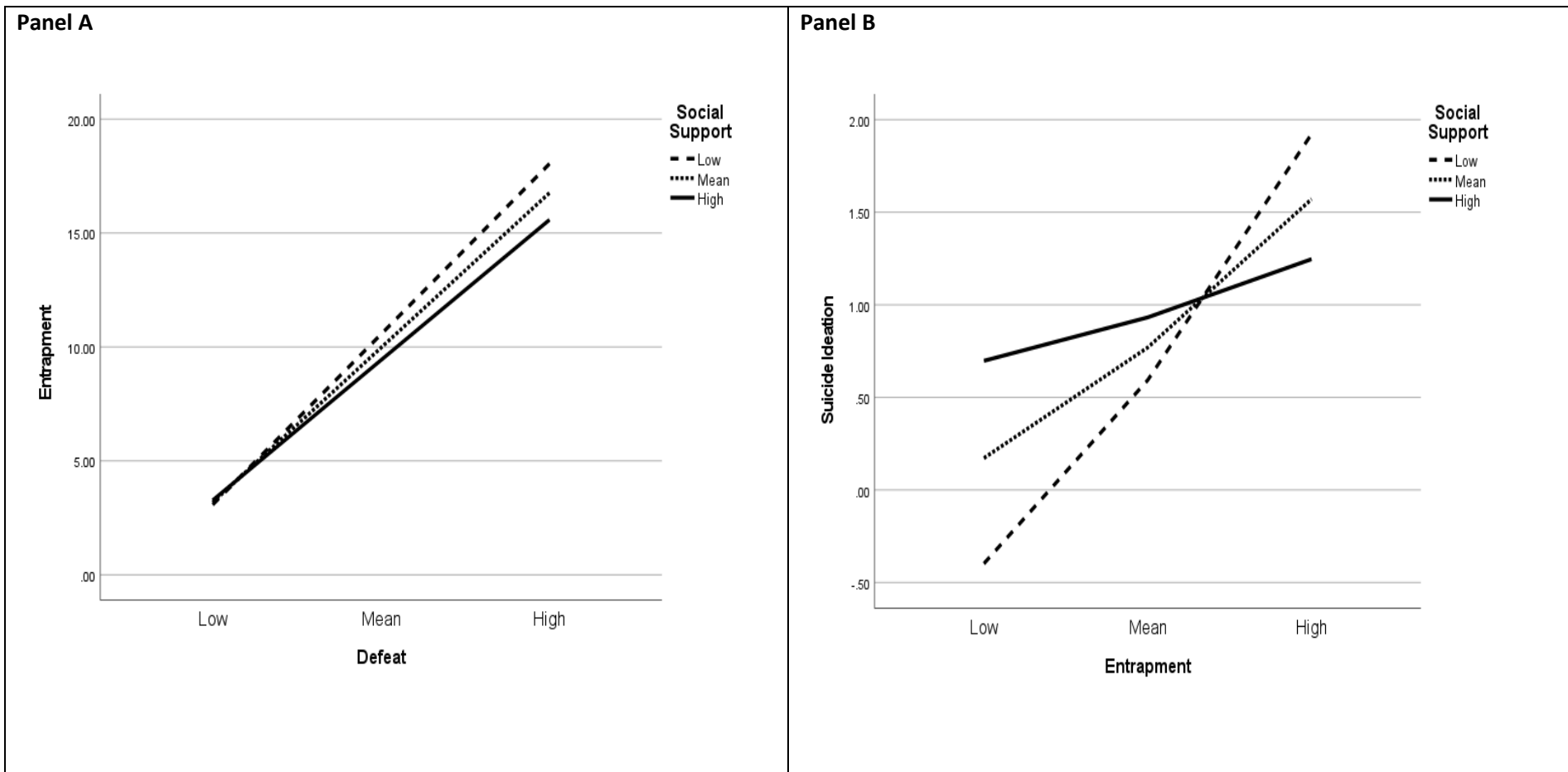
Figure 8: Panel A: Moderation of Social Support on the relationship of defeat to entrapment; Panel B: Moderation of Social Support on the relationship

between entrapment to suicidal ideation.

Group differences in variable scores between males and females

As detailed in Table 3, statistically significant differences were found between males and females on depressive symptoms, defeat, resilience and optimism. Females reported higher levels of depressive symptoms (t=-4.289, p<0.001) and defeat (t=-2.89, p<0.05). However they reported lower levels of resilience (t=7.038, p<0.001) and optimism (t= 2.789, p<0.005). The magnitudes of the score differences are very small for each of these variables, and statistical significance reflects the large sample size used in this study. On measures of entrapment, suicidal ideation and social support, no significant gender differences were evident.

Table 3: Independent sample t-tests between variables and gender

	Male (n=1706) M(SD)	Female (n=1722) M(SD)	t
Suicidal Ideation	1.12 (3.78)	0.93 (3.43)	1.55
Depressive symptoms	10.03 (10.34)	11.67 (11.98)	-4.30***
Defeat	15.83 (13.10)	16.85 (13.49)	-2.26*
Entrapment	10.10 (13.33)	10.52 (14.28)	-0.89
Resilience	29.08 (6.89)	27.30 (7.87)	7.04***
Optimism	14.77 (4.66)	14.31 (5.08)	2.79**
Social Support	25.81 (4.56)	25.78 (4.57)	0.19

P<0.05*; p<0.005**; p<0.001***

Discussion

The present study investigated the association between a number of protective factors (optimism, resilience and social support) and suicidal ideation through the lens of the

integrated motivational-volitional (IMV) model of suicide. Initial correlational analysis demonstrated a strong negative relationship between these protective factors and suicidal ideation, suggesting that lower levels of resilience, optimism and social support are associated with higher suicidal ideation. The IMV model suggests that suicidal ideation develops through feelings of defeat which lead to increased feelings of entrapment and susceptibility to thoughts of suicide. Within this motivational phase of the IMV model, specific moderators are thought to influence the pathway from defeat to entrapment (threat-to self-moderators) and the relationship between entrapment and suicidal ideation (motivational moderators). Based on these theoretical assumptions, a range of moderation and mediation analyses were used to explore if optimism, resilience and social support each functioned as moderators within the two motivational pathways, independent of each other. The IMV model specifies that resilience and social support serve as motivational moderators, however as there is limited research on the moderating pathways, this study tested the effects of these factors on both pathways.

The moderation and mediation analyses indicated that entrapment mediated the relationship between defeat and suicidal ideation. This suggests that entrapment (i.e. feeling of being trapped by life circumstances) plays a key role in explaining how feeling defeated by life circumstances may increase susceptibility to suicidal ideation and is consistent with previous support for the IMV model (Rasmussen et al., 2010; O'Connor & Kirtley, 2018; Wetherall et al., 2018b). Additionally resilience, optimism and social support were each found to moderate the relationship between defeat and entrapment, as well as the pathway from entrapment to suicidal ideation. Each of these relationships held when controlling for depressive symptoms and are discussed individually.

As well as extending the literature investigating protective factors in suicide prevention, this study is also the first to investigate the role of optimism in the IMV model. Results indicated that optimism was found to moderate the pathway between defeat and entrapment. The strongest relationship was found when optimism was low, with those reporting lower levels of optimism experiencing highest levels of entrapment when high levels of defeat were present, as compared with those with high optimism. These results suggest that people who feel more optimistic about their circumstances and believe that their future can be changed, are less susceptible to suicidal ideation when feeling defeated or trapped by their circumstances.

Similar to previous findings (Wetherall et al., 2018b), results of the current study indicate that resilience moderated the relationship between entrapment and suicidal ideation. Specifically entrapment and suicidal ideation were positively correlated at low and moderate levels of resilience, but were unrelated when resilience scores were high. This result indicates that individuals who report higher levels of resilience (i.e. the ability to bounce back from life stressors) are at less risk for experiencing suicidal ideation even when experiencing feelings of being trapped. Resilience was also found to moderate the pathway from defeat to entrapment. This suggests that people who have the ability to bounce back from stress are less susceptible to feelings of entrapment when they feel defeated. There has been much debate around how resilience is conceptualised (Windle, 2011) and in the mental health literature it is most commonly defined as a stable trait, or a dynamic process which evolves across different contexts and as a result of interaction between biopsychosocial factors (Ayed et al., 2019). The current study measured resilience as a trait, and provided a total resilience score. Future research may wish to focus on different

dimensions of resilience to provide better understanding of treatment targets, particularly in relation to suicidal ideation.

As with optimism and resilience, social support similarly was found to moderate the defeat to entrapment, and the entrapment to suicidal ideation pathways. Social support is a multifaceted construct which includes psychological factors (e.g. increased self- esteem), social factors (e.g. having more people available to distract in times of stress). Future research is needed to determine the aspects of social support which are most beneficial in reducing experiences of defeat, entrapment and suicidal ideation and which are most relevant to suicide (e.g. providing instrumental or emotional support; family support or friendships).

These findings suggest that optimism, resilience and social support, may tap into aspects of the threat to self-moderators and the motivational moderators in the IMV model. In sum, results suggest that when individuals perceive that they are defeated by life circumstances, low levels of optimism, resilience and social support, increase the likelihood that they will experience feelings of entrapment. Additionally low reported levels of the measured protective factors increase the susceptibility to suicide ideation when feeling trapped and having difficulty coping with life circumstances.

Theoretical Implications

The IMV posits that specific moderators influence the likelihood that feelings of entrapment develop when an individual feels defeated (threat-to-self moderators) as well as the likelihood that suicidal ideation develops when a person feels trapped (motivational moderators). Within the model these moderators are suggested to have distinct roles

however our findings that each of the protective factors tested, each served as both threat-to-self, and motivational moderators suggests that this may not be the case. This suggests that life and the development of suicidal ideation is much more complicated that is denoted by distinct moderators within the motivational phase of this model and highlights the need for further research to continue to investigate the role that these moderators serve in the development of suicidal ideation and behaviour.

Group differences

Consistent with mental health research, females reported higher levels of depressive symptoms (Leach et al., 2008). With this in mind, it is surprising that self-reported suicidal ideation was not higher among females. Females were more likely to report increased feelings of defeat, and lower levels of resilience and optimism than males did. This may account for the higher rate of attempted suicide found in females in the literature (Wunderlich et al. 2001). However as this study focused on the pathway to suicide ideation, it may be that gender differences may be more pronounced in factors impacting the transition from ideation to action; within the IMV model these factors are known as the volitional-moderators.

Clinical Implications

These findings have several clinical implications. The assessment and targeting of perceptions of defeat and feelings of entrapment continue to be highlighted as important factors for consideration when identifying those at risk for suicide ideation. Interventions such as Cognitive Behavioural Therapy could be utilised in order to reframe the perceptions of defeat or entrapment and generate a more optimistic belief that the future is changeable

in order to reduce suicide risk. Psychotherapeutic interventions which incorporate mindfulness techniques to decentre thoughts from the present situation may also be useful in order to shift perceptions of defeat and entrapment. However more research is needed in order to investigate the impact of such interventions. The integration of Health and Social Care interventions will be beneficial in supporting those who are physically trapped by their circumstances, through for example financial insecurity or loss of employment. Social work and third sector involvement may play a critical role in the support of these individuals.

The findings that optimism, resilience and social support each have buffering effects on the defeat to entrapment, and the entrapment to suicidal ideation pathways suggest that targeting these factors early on could lead to reduced feelings of entrapment and impede the emergence of suicidal ideation. Treatment interventions which focus on building resilience, optimism and increasing social support would therefore be of benefit.

Optimism and resilience are both considered as traits, and so more research is required to investigate how amenable these are to change and how these can be targeted in treatment interventions. In a systematic review of optimism interventions, Malouff and Schutte (2017) found that the 'Best Positive Self' intervention, which uses imagery to develop a positive future self, was effective in increasing levels of optimism. Future research should investigate whether these are effective for people experiencing feelings of defeat, entrapment or suicidal ideation.

Attachment based approaches may be beneficial in supporting people to strengthen the social supports around them. Evidence suggests that attachment based family therapy has been effective in reducing suicidal ideation in adolescents (Barnes, 2011; Diamond et al.,

2010) and further research to continue exploring the efficacy in adult populations will be beneficial.

Limitations

A number of limitations should be noted when interpreting the results of this study. Firstly the study utilised a cross-sectional design, therefore limiting the causative conclusions. It is also argued that tests of mediation using cross-sectional data undermine the assumption that mediation consists of causal processes that unfold over time (Maxwell & Cole, 2007) as temporal relationships cannot be ascertained. Future research could look to establish temporal and causal relationships between study variables by employing longitudinal and experimental research designs. This could also help to delineate whether the threat-to-self moderators and motivational moderators are distinct of each other.

Secondly the study consisted of predominantly white people (94 %) living in Scotland, which limits the generalisability of the study results. For example there may be cultural differences that could be explored further, as research has suggested that suicidal outcomes vary as a function of ethnicity (Drapeau & McIntosh, 2020) and risk and protective factors may manifest in different ways as a result of cultural expectations and experiences, particularly for minority groups living in post-Brexit Britain.

A further limitation is the use of self-report measures, which carries its own reporting biases. The measures used in the analysis for this study were part of a wider battery of measures and so responses could be affected by demand characteristics and questionnaire fatigue. While the current study targeted key gaps in the literature in regards to protective factors in suicide prevention, it focused on the association with suicidal ideation and future

research examining the relationship with suicide behaviour may help to better understand the underlying mechanisms which lead to dying by suicide.

Conclusion

This study provides further evidence for the IMV model of suicidal behaviour, showing that defeat and entrapment have a prominent role in the development of suicidal ideation in a Scottish adult population. While the IMV model proposes that resilience and social support serve as motivational moderators in the entrapment to suicidal ideation pathway, this study suggests that they also play a role in the defeat to entrapment pathway; results also suggests that optimism has a role in both pathways in the IMV model. Overall, the findings suggest that the emergence of entrapment and suicidal ideation may be buffered by optimism, resilience and social support, suggesting that these may be potential targets for early intervention.

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Appendices

Appendix 1.1: Guidelines for Authors for submission to Psychological Bulletin

Description

Psychological Bulletin ® publishes evaluative and integrative research reviews and interpretations of issues in scientific psychology. Both qualitative (narrative) and quantitative (meta-analytic) reviews will be considered, depending on the nature of the database under consideration for review.

Availability of Data

For use during the review process, we strongly recommend that authors who submit quantitative analyses supply their databases, codebook, and relevant scripts (e.g., so that reviewers can check analyses).

Authors may provide anonymized links to databases, codebook, and relevant scripts (here's how to do so on OSF, the Open Science Framework; Dataverse and ICPSR also offer services for posting replication data files). Should the manuscript be published, these links (now made non-anonymized) should be included in the author note.

Submitting Supplemental Materials

APA can place supplemental materials online, available via the published article in the PsycARTICLES® database. Please see Supplementing Your Article With Online Material for more details.

Abstract and Keywords

All manuscripts must include an abstract containing a maximum of 250 words typed on a separate page. After the abstract, please supply up to five keywords or brief phrases.

References

List references in alphabetical order. Each listed reference should be cited in text, and each text citation should be listed in the References section.

Figures

Graphics files are welcome if supplied as Tiff or EPS files. Multipanel figures (i.e., figures with parts labeled a, b, c, d, etc.) should be assembled into one file.

Appendix 1.2: The National Institute of Health 'Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies'

1. Was the research question or objective in this paper clearly stated?

2. Was the study population clearly specified and defined?

3. Was the participation rate of eligible persons at least 50%?

4. Were all the subjects selected or recruited from the same or similar populations (including the same time period)? Were inclusion and exclusion criteria for being in the study prespecified and applied uniformly to all participants?

5. Was a sample size justification, power description, or variance and effect estimates provided?

6. For the analyses in this paper, were the exposure(s) of interest measured prior to the outcome(s) being measured?

7. Was the timeframe sufficient so that one could reasonably expect to see an association between exposure and outcome if it existed?

8. For exposures that can vary in amount or level, did the study examine different levels of the exposure as related to the outcome (e.g., categories of exposure, or exposure measured as continuous variable)?

9. Were the exposure measures (independent variables) clearly defined, valid, reliable, and implemented consistently across all study participants?

10. Was the exposure(s) assessed more than once over time?

11. Were the outcome measures (dependent variables) clearly defined, valid, reliable, and implemented consistently across all study participants?

12. Were the outcome assessors blinded to the exposure status of participants?

13. Was loss to follow-up after baseline 20% or less?

14. Were key potential confounding variables measured and adjusted statistically for their impact on the relationship between exposure(s) and outcome(s)?

Appendix 1.3: Guidance for Assessing the Quality of Observational Cohort and Cross-Sectional Studies.

Question 1. Research question.

Did the authors describe their goal in conducting this research? Is it easy to understand what they were looking to find? This issue is important for any scientific paper of any type. Higher quality scientific research explicitly defines a research question.

Questions 2 and 3. Study population.

Did the authors describe the group of people from which the study participants were selected or recruited, using demographics, location, and time period? If you were to conduct this study again, would you know who to recruit, from where, and from what time period? Is the cohort population free of the outcomes of interest at the time they were recruited?

In cohort studies, it is crucial that the population at baseline is free of the outcome of interest. This information is usually found either in descriptions of population recruitment, definitions of variables, or inclusion/exclusion criteria. You may need to look at prior papers on methods in order to make the assessment for this question. Those papers are usually in the reference list.

If fewer than 50% of eligible persons participated in the study, then there is concern that the study population does not adequately represent the target population. This increases the risk of bias.

Question 4. Groups recruited from the same population and uniform eligibility criteria.

Were the inclusion and exclusion criteria developed prior to recruitment or selection of the study population? Were the same underlying criteria used for all of the subjects involved? This issue is related to the description of the study population, above, and you may find the information for both of these questions in the same section of the paper.

Most cohort studies begin with the selection of the cohort; participants in this cohort are then measured or evaluated to determine their exposure status. However, some cohort

studies may recruit or select exposed participants in a different time or place than unexposed participants, especially retrospective cohort studies–which is when data are obtained from the past (retrospectively), but the analysis examines exposures prior to outcomes.

Question 5. Sample size justification.

Did the authors present their reasons for selecting or recruiting the number of people included or analyzed? Do they note or discuss the statistical power of the study? This question is about whether or not the study had enough participants to detect an association if one truly existed. However, observational cohort studies often do not report anything about power or sample sizes because the analyses are exploratory in nature. In this case, the answer would be "no." This is not a "fatal flaw." It just may indicate that attention was not paid to whether the study was sufficiently sized to answer a pre specified question–i.e., it may have been an exploratory, hypothesis-generating study.

Question 6. Exposure assessed prior to outcome measurement.

This question is important because, in order to determine whether an exposure causes an outcome, the exposure must come before the outcome.

For some prospective cohort studies, the investigator enrols the cohort and then determines the exposure status of various members of the cohort (large epidemiological studies like Framingham used this approach). However, for other cohort studies, the cohort is selected based on its exposure status. If a cohort study is conducted properly, the answer to this question should be "yes," since the exposure status of members of the cohort was determined at the beginning of the study before the outcomes occurred.

For retrospective cohort studies, the same principal applies. The difference is that, rather than identifying a cohort in the present and following them forward in time, the investigators go back in time (i.e., retrospectively) and select a cohort based on their exposure status in the past and then follow them forward to assess the outcomes that occurred in the exposed and non-exposed cohort members. Because in retrospective cohort studies the exposure and outcomes may have already occurred (it depends on how long

they follow the cohort), it is important to make sure that the exposure preceded the outcome.

Sometimes cross-sectional studies are conducted (or cross-sectional analyses of cohort-study data), where the exposures and outcomes are measured during the same timeframe. As a result, cross-sectional analyses provide weaker evidence than regular cohort studies regarding a potential causal relationship between exposures and outcomes. For cross-sectional analyses, the answer to Question 6 should be "no."

Question 7. Sufficient timeframe to see an effect.

Did the study allow enough time for a sufficient number of outcomes to occur or be observed, or enough time for an exposure to have a biological effect on an outcome? The issue of timeframe is important to enable meaningful analysis of the relationships between exposures and outcomes to be conducted. This often requires at least several years, especially when looking at health outcomes, but it depends on the research question and outcomes being examined.

Cross-sectional analyses allow no time to see an effect, since the exposures and outcomes are assessed at the same time, so those would get a "no" response.

Question 8. Different levels of the exposure of interest.

If the exposure can be defined as a range, were multiple categories of that exposure assessed? Sometimes discrete categories of exposure are not used, but instead exposures are measured as continuous variables.

In any case, studying different levels of exposure (where possible) enables investigators to assess trends or dose-response relationships between exposures and outcomes–e.g., the higher the exposure, the greater the rate of the health outcome. The presence of trends or dose response relationships lends credibility to the hypothesis of causality between exposure and outcome.

For some exposures, however, this question may not be applicable (e.g., the exposure may be a dichotomous variable like living in a rural setting versus an urban setting, or vaccinated/not vaccinated with a one-time vaccine). If there are only two possible

exposures (yes/no), then this question should be given an "NA," and it should not count negatively towards the quality rating.

Question 9. Exposure measures and assessment.

Were the exposure measures defined in detail? Were the tools or methods used to measure exposure accurate and reliable–for example, have they been validated or are they objective?

This issue is important as it influences confidence in the reported exposures. When exposures are measured with less accuracy or validity, it is harder to see an association between exposure and outcome even if one exists. Also as important is whether the exposures were assessed in the same manner within groups and between groups; if not, bias may result.

Question 10. Repeated exposure assessment.

Was the exposure for each person measured more than once during the course of the study period? Multiple measurements with the same result increase our confidence that the exposure status was correctly classified. Also, multiple measurements enable investigators to look at changes in exposure over time. Once again, this may not be applicable in all cases. In many older studies, exposure was measured only at baseline. However, multiple exposure measurements do result in a stronger study design.

Question 11. Outcome measures.

Were the outcomes defined in detail? Were the tools or methods for measuring outcomes accurate and reliable–for example, have they been validated or are they objective? This issue is important because it influences confidence in the validity of study results. Also important is whether the outcomes were assessed in the same manner within groups and between groups.

Question 12. Blinding of outcome assessors.

Blinding means that outcome assessors did not know whether the participant was exposed or unexposed. It is also sometimes called "masking." The objective is to look for evidence in

the article that the person(s) assessing the outcome(s) for the study is masked to the exposure status of the participant. Sometimes the person measuring the exposure is the same person conducting the outcome assessment. In this case, the outcome assessor would most likely not be blinded to exposure status because they also took measurements of exposures. If so, make a note of that in the comments section.

As you assess this criterion, think about whether it is likely that the person(s) doing the outcome assessment would know (or be able to figure out) the exposure status of the study participants. If the answer is no, then blinding is adequate. If blinding was not possible, which is sometimes the case, mark "NA" and explain the potential for bias.

Question 13. Follow up rate.

Higher overall follow up rates are always better than lower follow up rates, even though higher rates are expected in shorter studies, whereas lower overall follow up rates are often seen in studies of longer duration. Usually, an acceptable overall follow up rate is considered 80 % or more of participants whose exposures were measured at baseline. However, this is just a general guideline.

Question 14. Statistical analyses.

Were key potential confounding variables measured and adjusted for, such as by statistical adjustment for baseline differences? Logistic regression or other regression methods are often used to account for the influence of variables not of interest.

This is a key issue in cohort studies, because statistical analyses need to control for potential confounders, in contrast to an RCT, where the randomization process controls for potential confounders. All key factors that may be associated both with the exposure of interest and the outcome–that are not of interest to the research question–should be controlled for in the analyses.

The questions on the form are designed to help you focus on the key concepts for evaluating the internal validity of a study. They are not intended to create a list that you simply tally up to arrive at a summary judgment of quality.

Internal validity for cohort studies is the extent to which the results reported in the study can truly be attributed to the exposure being evaluated and not to flaws in the design or conduct of the study–in other words, the ability of the study to draw associative conclusions about the effects of the exposures being studied on outcomes. Any such flaws can increase the risk of bias.

Critical appraisal involves considering the risk of potential for selection bias, information bias, measurement bias, or confounding (the mixture of exposures that one cannot tease out from each other).

In addition, the more attention in the study design to issues that can help determine whether there is a causal relationship between the exposure and outcome, the higher quality the study. These include exposures occurring prior to outcomes, evaluation of a dose-response gradient, accuracy of measurement of both exposure and outcome, sufficient timeframe to see an effect, and appropriate control for confounding–all concepts reflected in the tool.

Generally, when you evaluate a study, you will not see a "fatal flaw," but you will find some risk of bias. By focusing on the concepts underlying the questions in the quality assessment tool, you should ask yourself about the potential for bias in the study you are critically appraising. For any box where you check "no" you should ask, "What is the potential risk of bias resulting from this flaw in study design or execution?" That is, does this factor cause you to doubt the results that are reported in the study or doubt the ability of the study to accurately assess an association between exposure and outcome?

Appendix 1.4

Assessment of Quality for each systematic review study.
Quality rating assessment of each study using the NIH Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies

| Study | Quality rating for each question | | | | | | | | | | | | | | Quality rating |
| | Criteria: Yes/No/Other (Cannot Determine (CD), Not Reported (NR), Not Applicable (NA)) | | | | | | | | | | | | | | |
Cross-Sectional	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
Brennan et al (2017)	Yes	Yes	NR	Yes	No	No	No	Yes	Yes	NA	Yes	NA	NA	Yes	Fair
Carli et al (2010)	Yes	Yes	Yes	Yes	No	No	No	Yes	Yes	NA	No	No	NA	Yes	Fair
Huang & Mossige (2015)	Yes	Yes	Yes	Yes	No	No	No	Yes	No	NA	No	NA	NA	Yes	Fair
Kim et al (2019)	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	NA	Yes	NA	NA	No	Fair
McDowell et al (2019)	Yes	Yes	CD	Yes	No	No	No	Yes	Yes	NA	Yes	NA	NA	Yes	Fair
Muehlenkamp & Brausch (2019)	Yes	Yes	Yes	Yes	No	No	No	Yes	Yes	NA	Yes	NA	NA	Yes	Fair
Muehlenkamp et al (2019)	Yes	No	Yes	Yes	No	No	No	Yes	Yes	NA	Yes	NA	NA	No	Fair
Nagra et al (2016)	Yes	Yes	CD	Yes	No	No	No	Yes	Yes	No	Yes	NA	NA	Yes	Fair
Philippe et al (2011)	Yes	Yes	CD	Yes	No	No	No	Yes	Yes	No	Yes	NA	NA	Yes	Fair
Rotolone et al (2019)	Yes	Yes	CD	Yes	No	No	No	Yes	No	No	Yes	NA	NA	Yes	Fair

Roy et al (2007)	Yes	Yes	CD	Yes	No	No	No	Yes	Yes	NA	Yes	No	NA	No	Fair
Suarez-Soto et al (2019)	Yes	Yes	CD	Yes	No	No	No	Yes	Yes	NA	Yes	No	NA	Yes	Fair
Tang et al (2018)	Yes	Yes	Yes	Yes	No	No	No	Yes	Yes	NA	Yes	NA	NA	Yes	Fair
Tian et al (2019)	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	NA	Yes	NA	NA	Yes	Fair
Watson & Tatnell (2019)	Yes	Yes	NR	Yes	No	No	No	Yes	Yes	NA	Yes	NA	NA	Yes	Fair
Wetherall et al (2018)	Yes	Yes	Yes	Yes	No	No	No	Yes	Yes	NA	Yes	NA	NA	Yes	Fair
Xiao et al (2020)	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	NA	Yes	No	NA	Yes	Fair
You et al (2017)	Yes	Yes	No	Yes	Yes	No	No	Yes	Yes	NA	Yes	No	NA	Yes	Fair
Longitudinal Studies															
Garisch & Wilson (2015)	Yes	Yes	Yes	Yes	No	No	No	Yes	Yes	Yes	Yes	NA	CD	No	Fair

Appendix 2.1: Guidelines for Authors for submission to Journal of Affective Disorders

Description

The Journal of Affective Disorders publishes papers concerned with affective disorders in the widest sense: **depression, mania, anxiety and panic**. It is interdisciplinary and aims to bring together different approaches for a diverse readership. High quality papers will be accepted dealing with any aspect of affective disorders, including biochemistry, pharmacology, endocrinology, genetics, statistics, epidemiology, psychodynamics, classification, clinical studies and studies of all types of treatment.

Submission checklist

You can use this list to carry out a final check of your submission before you send it to the journal for review. Please check the relevant section in this Guide for Authors for more details. Ensure that the following items are present: One author has been designated as the corresponding author with contact details:

• E-mail address

• Full postal address

All necessary files have been uploaded:

Manuscript:

• Include keywords

• All figures (include relevant captions)

• All tables (including titles, description, footnotes)

• Ensure all figure and table citations in the text match the files provided

• Indicate clearly if color should be used for any figures in print

Author Statement Contributors, Role of the Funding Source and Acknowledgements are mandatory and must be retained in the Author Statement (submission file type) under their respective headings.   Graphical Abstracts / Highlights files (where applicable); Supplemental files (where applicable).

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Immediately after the abstract, provide a maximum of 6 keywords, using American spelling and avoiding general and plural terms and multiple concepts (avoid, for example, 'and', 'of'). Be sparing with abbreviations: only abbreviations firmly established in the field may be eligible. These keywords will be used for indexing purposes.

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Acknowledgements

Collate acknowledgements in a separate section at the end of the article before the references and do not, therefore, include them on the title page, as a footnote to the title or otherwise. List here those individuals who provided help during the research (e.g., providing language help, writing assistance or proof reading the article, etc.).

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Appendix 2.2.: Original MRP Proposal

Assessment: Major Research Project Proposal

Title: Exploring the role of social influences and social networks in adolescent self-harm: A school-based study in the Scottish Highlands

Matriculation:

Date: 08/07/2019

Version: 4

Actual Word Count: 3,875 words (Abstract: 198 words)

Maximum Word Count: 3,000 words

Abstract: 198 words

1. ABSTRACT

Background: The prevalence of self-harm in adolescents is increasing, highlighting the need to further understand the risk factors associated with the initiation and maintenance of self-harm in this age group. Social media is a growing area in modern society, particularly among young people. High profile cases in the media have drawn attention to the proliferation of self-harm content online and the potential contagion effect of self-harm in young people, however research continues to show mixed results.

Aims: The research aims to investigate how social factors and social networks potentially influence emotional wellbeing and self-harm in teenagers (14 -18 years) and to explore the types of self-harm related content teenagers report accessing and using online.

Methods: An observational study of a school-based sample of young people aged between 14-18 years old, employing an anonymous self-report questionnaire. Information will be obtained on demographics, life style, social support, peer influences, self-harm, internet and social media influences, depression and anxiety, life events, help seeking and resilience.

Applications: This research will add to our understanding of self-harm how social media platforms influence self-harm and wellbeing in teenagers, in order to better inform how to support young people and those working with young people.

2. INTRODUCTION

Self-harm in adolescents is a major public health concern, which is found to be a key predictor of completed suicide (Owens, Horrocks & House, 2002). The National Institute of Clinical Excellence (NICE) defined self-harm as "any act of self-poisoning or self-injury carried out by a person, irrespective of their motivation" (NICE, 2013), and community samples estimate the prevalence of self-harm in young people in the UK to

range from 6.9% to 18.8% (Jacob, Evans & Scourfield, 2017). Research suggests that the age of onset of self-harm is decreasing and that the transition from childhood to adolescence is a critical stage for this inception (Griffin et al., 2017). This highlights the need to further understand the risk factors associated with the initiation and maintenance of self-harm in this age group.

According to the Pew Research Centre (2018) 95% of young people aged between 13-17 years old access social media, and 45% reported that they use it "almost constantly".   High profile cases in the media, such as the recent case of Molly Russell, a 14 year old who died by suicide in 2017 after accessing images of self-harm online, has focused attention on the proliferation of self-harm content available through social media sites. This has raised concern among researchers and policy makers that self-harm has become a normalised behaviour, which may be socially transmitted (Whitlock et al., 2006, Marchant et al., 2017; Jacobs et al, 2017).

A systematic review conducted by Marchant and colleagues, provided a comprehensive review of the literature on the role of the internet, including social media, on self-harm and suicide in young people (Marchant et al., 2017). This review highlighted that research continues to show both harmful and beneficial effects of these mediums on adolescent self-harm and that more high quality research is needed to better understand how these technologies influence this (Daine et al., 2014; Marchant et al., 2017). Much of the research in this area has used content analysis to examine the publicly accessible social media platforms and virtual communities, such as Facebook, Youtube, Tumblr and Instagram (Brown et al., 2017; Young et al., 2014; Dyson, et al., 2016; Marchant et al., 2017). However the landscape of social media is constantly changing and private messaging sites such as Whatsapp, Facebook Messenger and Snapchat have increased in popularity among young people (Ofcom, 2017). This growth in instant messaging means that social media content is not easily monitored, and so research methods need to progress in order to measure patterns of behaviour associated with private forums and self-harm.

Adolescence is considered a key stage of development whereby peer relationships and the social environment play an important role (Rageliene, 2017) and these influences may represent an important context to understand self-harm in this age group. Exposure to self-harm in other people has consistently been shown to be a risk factor for self-harm in adolescents, with evidence showing a strong association between self-harm in young people and that of their friends' and family (Hawton et al., 2002; Heath et al., 2009; O'Connor et al., 2009; O'Connor et al., 2014; Young et al., 2014). Although the importance of peer influences for understanding engagement in behaviour is widely acknowledged, there continues to be question about the processes underlying these peer influences. In the peer influence research, Kandal (1978) proposed two underlying mechanisms that account for similarities among friends: selection effects where young people select friends based on their shared experiences; and socialisation effects where behaviours between peers is emulated to conform to the group norms (Kandal, 1978; Prinstein et al., 2010). Social media and the internet have transformed how young people interact and communicate with others, and they provide a platform where young people can contact a far wider network of people than was once possible. Further research to understand the mechanisms of peer influence associated with self-harm, may shed light on the role that social media platforms play in influencing self-harm in adolescents.

The proposal that self-harm may have become normalised and that social influences play a role in the onset of this behaviour, raises the possibility that some young people may be engaging in self-harm for social reasons. While the dominant models of the function of self-harm, are based on theories of emotion regulation and communication of distress, there is growing evidence that adolescents' report multiple reasons for engaging in self-harm (Lloyd-Richardson et al., 2007; Rasmussen et al., 2016). Among these are social reasons such as 'connecting with others' and 'a wish to belong' (Kaminski, Puddy, Hall, Cashman, Crosby, & Ortega, 2010; Stanicke et al., 2018). In a study of reasons for self-harming among adolescents who identified with an 'alternative subculture' such as Emo or Goth, Young and colleagues (2014) found that while over half of participants who self-harmed reported the primary function as

communicating distress or regulating emotions, a minority reported the that it was to reinforce group identity (Young et al., 2014).

Edmonson, Brennan and House (2016) conducted a systematic review of first-hand accounts of motivations for non-suicidal self-harm and suggested that there are a number of reasons reported which are neglected in the theoretical literature. The researchers suggested that the recent debates in the definition of self-harm as associated with suicidal intent or not, limits the understanding of functions behind the act, and that research in the field requires exploratory designs in order to determine the possibility of new functions of self-harm not measured in pre-determined responses within questionnaire measures (Edmonson et al., 2016). As such this study has used an open response format to capture possible range of motivations for engaging in self-harm.

3. AIMS

The research aims to investigate how social factors and social networks potentially influence emotional wellbeing and self-harm in teenagers (14 -18 years) and to explore the types of self-harm related content teenagers report accessing and using online. More specifically, within the group of adolescents who self-harm, we plan to examine:

a) The motivations for self-harm and whether these are more likely to be intrapersonal or interpersonal.

b) Whether differences exist in the motivations for initiation of self-harm versus the repetition of the behaviour,

c) How and why adolescents use social media and the internet in relation to self-harm and how this effects their engagement in self-harm.

3. PLAN FOR INVESTIGATION

3.1 Participants

The sample population will be young people in secondary school years S4-S6 in order to include the age range of 14-18 years old. The target population are the 29 secondary schools in the Highlands regions.

3.2 Recruitment procedure

Ethics approval will be sought from the Head of Additional Support Services within the Department of Education within the Highland Council, as well as the University of Glasgow Research and Development ethics committee. Following this, each of the 29 schools in the Highlands council will be invited to participate in this study. Parents of children within S4-S6 of the recruited schools, will be informed of the study by letter, and will be asked to notify the school if they do not want their child to participate in the study.

3.3   Measures

The questionnaire pack (Appendix i) includes items on demographic characteristics (gender, age, ethnicity), lifestyle (smoking, alcohol/drug use, exercise, internet and social media use), life events and problems, help-seeking, social influences, internet and social media influences, psychological variables and self-harm. It is made up of the following measures:

-        An adapted version of the <u>Lifestyle and Coping Questionnaire</u> used in the Child and Adolescent Self-harm in Europe (CASE) study (Madge et al., 2008). The Lifestyle and Coping questionnaire was developed in English, piloted and then administered anonymously to school pupils in each participating country of the CASE study (6 centres in Europe and one in Australia).

In addition, we have added questions specifically related to social media and internet use in relation to self-harm which have been taken from a qualitative study on the experience of internet use in relation to self-harm among adolescents (Brett-Taylor, 2015).

-        Susceptibility to social influence was assessed using The Resistance to Peer Influence questionnaire (RPI; Steinberg & Monahan, 2007) which is a 10-item self-report scale, which measures the degree to which adolescents are influenced by the views and opinions of their peers. Items are scored on a 4-point Likert scale, with higher scores representing more resistance to peer influence (i.e. less susceptibility to the opinions of peers). The total RPI score is an average of all item scores.

-        The Paediatric Index of Emotional Distress (PI-ED; O'Connor, et al., 2015) is a 14-item questionnaire for children aged between 8-16 years old to assess symptoms of emotional distress. It is a valid and reliable measure, based on the Hospital Anxiety and Depression Scale and has a clear cut-off of 20 to distinguish those with clinically significant symptoms of anxiety and depression. Participants are asked to rate the frequency of positive and negative feelings and emotions on a 4-point Likert scale (1=always, 2=a lot of the time, 3=sometimes, and 4=not at all).

-        The 10-iten Connor-Davidson Resilience Scale (CD-RISC-10; Campbill-Hills & Stein, 2007) consists of 10 items and is structured as a 5-point Likert-scale from 0 (not true at all) to 4 (true nearly all of the time). The original version demonstrated a one-dimensional factor structure (Campbell-Sills & Stein, 2007). A summation of the response scores combines to a single score that ranges from a minimum of 0 to a maximum of 40 that indicates the highest level of resilience. The scale has been validated across various samples of young adults, adolescents, young women nurses, graduate students, as well as the general populations (Shin et al., 2018).

-         The Multidimensional Scale of Perceived Social Support (MSPSS; Zimet, et al, 1988) is a self-reported measure that evaluates the perception of social support from three specific sources: family, friends, and other significant people. It is rated on a 7-point Likert scale with higher scores representing

higher levels of perceived social support.   Items are summed within each subscale, and a total score is also calculated. The MSPSS has demonstrated psychometric validity in several studies conducted in different populations including adolescents (Hardan-Khalil & Mayo, 2015).

3.4 Design

The study will use an observational cross-sectional design, employing an anonymous self-report questionnaire pack.

3.5 Procedure

On the day of participation, the primary researcher shall travel to schools on previously agreed dates in order to collect data from schools who agree to participate in the study. The primary researcher will provide pupils within a classroom setting with an information sheet regarding the study and will be available in order to answer any potential questions. All pupils will be given the choice of opting out on the day, and not participating. The questionnaire pack should take approximately 20-30 minutes to complete, and will be completed within a timetabled lesson. The researcher will collect all of the completed packs on the same day.

3.6 Sample size

The current study will use hierarchical linear regression to investigate the study measures (see appendix i) in relation to predicting self-harm. According to the Highlands Council School Roll (2018-2019), there are 5835 pupils within our target sample population of 29 secondary school years S4-S6 (The Highland Council, 2019). Based on previous studies in Scotland, England and Northern Ireland (Hawton., et al., 2002; O'Connor, et al., 2009; O'Connor, et al., 2014), it is assumed that there will be a prevalence estimate of 13% for young people reporting self-harm. Using G*Power software, an a priori multi-linear regression assessment with a moderate effect size (Cohen, 1992) of $\rho= 0.15$ and power ($1-\beta$) of 0.8 ($p<0.05$) determined that a minimum of 385 participants are required to detect an effect with a maximum of 10 predictors. With this in mind, we have chosen to recruit approximately 500 participants.

3.7 Settings and equipment

The study will be conducted in classroom settings within the schools who have agreed to be recruited. Negotiation with the head of the school will determine where and how many participants will be approached in each data collection setting. A questionnaire pack will be provided which will be printed on paper and provided to participants in sealed envelopes.

3.8 Statistical Analysis

Hierarchical linear regression analyses and Chi-square tests will be used to investigate the association between self-harm and associated variables.

4.   HEALTH AND SAFETY

In similar study formats over many years, there have been no reports of adverse participant experiences following the application of the named questionnaires of this study. The research team is nevertheless mindful of the small possibility of risk that some participants may find some of the measures upsetting. The contact details of support services will be provided on the Information Sheet (Appendix ii) given to the participant and parents' prior to their participation and on the Support Sheet (Appendix iv) provided on completion of the questionnaire. These information sheets will also include the researcher's details and a contact for the Duty service within the local NHS Highlands Health Board in case they feel concerned about any of the topics covered by the survey. This contact will also be made available for school counsellors to contact if they require any assistance with supporting a young person, after the day of participation in the study.

No risks to the researcher are anticipated. However frequent meetings with supervisors will provide an opportunity to ensure that the researcher is supported throughout the study.

5. ETHICAL CONSIDERATIONS

Ethics approval has been provisionally given from the Head of Additional Support Services within the Department of Education within the Highland Council, subject to approval from the University of Glasgow, College of Medical, Veterinary & Life Sciences Ethics Committee. Following this, each of the 29 schools in the Highlands council will be invited to participate in this study. This study will not be seeking approval from the NHS R&D as we shall not be recruiting participants from a clinical sample.

As a number of participants are likely to be under the age of 16 years old, the age where an individual is able to give informed consent, the issue of parental consent will be addressed by obtaining consent through 'opt-out' consent from parents who will be provided with study information. For all participants who are 16 years and above, parental consent will not be required. Informed consent will be obtained from young people on the day of data collection.

Although we are not asking for anybody's name, in order to maintain confidentiality in the study, each pupil will be provided with a sealed anonymous envelope in which to return their own questionnaires used in the study. Two questionnaires shall be produced, each made up of different order of questions so that children sitting directly next to each other, will be unable to determine what answers are being provided to different questions.

Each questionnaire shall be transported in a locked briefcase. The primary researcher will give each questionnaire pack a unique identifier number in order to manage the data for analysis, and all packs will be stored confidentially in a locked file cabinet within the NHS Gartnavel Royal Hospital, Glasgow. The sealed envelopes will only be opened by the researcher and supervisors involved in the project. All data from the paper-based questionnaire will be transferred onto an SPSS data file and stored on a University of Glasgow password secured laptop.

6. FINANCIAL ISSUES

In order to facilitate questionnaires for the number of participants we aim to recruit, a stationary budget for paper, envelopes and printing have been considered and can be found in Appendix v.

Transport costs will be considered following identification of the number of schools willing to recruit to the study, in order to accurately estimate the distance to be covered between schools.

7. TIMETABLE

With consideration of the academic timetable for young people and forthcoming exams, we hope to have obtained ethical approval in order to commence recruitment between November/December 2019 and February 2020.

8. PRACTICAL APPLICATIONS AND DISSEMINATION

The results of this project will be included in my major research project which will be submitted to the University of Glasgow in part fulfilment of my doctorate in Clinical Psychology degree, with a view of publication in a reputable peer reviewed journal. No participants shall be identified in any reports or publications that might be produced for this research. When the research is finished we will send an overall summary of results to all participating schools. This research will add to our understanding of how social media platforms influence self-harm and wellbeing in teenagers, in order to better inform how to support young people and those working with young people.

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Appendix 2.2.1: Ethics Approval letter from College of Medical, Veterinary and Life Sciences

Dear   Jenny Mclean,

MVLS College Ethics Committee
Project Title: *Exploring the role of social influences and social networks in adolescent self-harm: A school based study in the Scottish Highlands.*
200190064

The College Ethics Committee has reviewed your application and has agreed that there is no objection on ethical grounds to the proposed study.

We are happy therefore to approve the project, subject to the following conditions.

- Project end date as stipulated in original application.

- The research should be carried out only on the sites, and/or groups defined in the application.

- Any proposed changes in the protocol should be submitted for reassessment, except when it is necessary to change the protocol to eliminate hazard to the subjects or where the change involves only the administrative aspects of the project. The Ethics Committee should be informed of any such changes.

- For projects requiring the use of an online questionnaire, the University has an Online Surveys account for research. To request access, see the University's application procedure at https://www.gla.ac.uk/research/strategy/ourpolicies/useofonlinesurveystoolforresearch/.

- You should submit a short end of study report to the Ethics Committee within 3 months of completion.

Yours sincerely

Dr Terry Quinn

Terry Quinn
FESO, MD, FRCP, BSc (hons), MBChB (hons)
Senior Lecturer / Honorary Consultant

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Appendix 2.2.2: Ethics Approval letter from The Highland Council

Miss Jennifer Mclean
Trainee Clinical Psychologist   **Department of Education**
Mental Health and Wellbeing   Highland Council
Academic Centre   11-13 Culcabock Avenue
Gartnavel Royal Hospital   Inverness
G12 0XH   IV2 3RG

                                     Tel: 01463 644400
                                     Date: 23rd January 2020

Dear   Jennifer Mclean,

Research Project: *Exploring the role of social influences and social networks in adolescent self-harm: A school based study in the Scottish Highlands.*

Thank you for sending on the letter of ethical approval from the College of Medical and Veterinary Sciences. I can now confirm that approval has been granted for you to approach the head of secondary schools, to ask if their school is willing to participate in your project. I would remind you that it is the head of establishment who will make the final decision if the school is to participate in the research project.

I wish you every success with your project. If I can be of any further assistance please do not hesitate to contact me.

Yours sincerely,

Bernadette Cairns
Interim Head of Education Bernadette.Cairns@highland.gov.uk

Appendix 2.2.3: Health and Safety Form

<div align="center">

DOCTORATE IN CLINICAL PSYCHOLOGY
HEALTH AND SAFETY FOR RESEARCHERS

</div>

1. Title of Project	Exploring the role of social influence and social networks in adolescent self-harm: A school-based study in the Scottish Highlands
2. Trainee	Jennifer McLean
3. University Supervisor	Professor Rory O'Connor
4. Other Supervisor(s)	Dr Stephanie Bannon Dr Clodagh Feehan
5. Local Lead Clinician	Dr Stephanie Bannon
6. Participants: (age, group or subgroup, pre- or post-treatment, etc)	14-18 years old
7. Procedures to be applied (eg, questionnaire, interview, etc)	Questionnaire
8. Setting (where will procedures be carried out?) i) **General**	The questionnaires will be completed in the classroom environment within the participants' school.
ii) Are home visits involved	N
9. Potential Risk Factors Identified see chart	This study asks about participants' psychological wellbeing, past experiences and self-harming behaviours which presents a low risk that participants may become distressed

	by some of the questions.
10.Actions to minimise risk (refer to 9)	To mitigate this, an Information Sheet will be provided to parents and participants prior to obtaining consent, which will summarise the topics being measured in the study. Both the Information Sheet and consent form (Appendix iii) will also highlight to the participant that they can withdraw from the study at any time and that their information is entirely confidential. The Information Sheet will also include a list of services participants can contact should they wish to discuss any personal experiences which the study may make them aware of.

Trainee signature: Date: 13/9/19

University supervisor signature: Date: 13/9/19

Appendix 2.2.4: Recruitment letter to Schools

TEACHER/SCHOOL LETTER

Address of school

Dear Mr/ Mrs/ Ms,

My name is Jenny Mclean and I am a Trainee Clinical Psychologist at the University of Glasgow. As part of the requirements for my Doctorate degree, I am conducting a research study, and I am writing to ask if you would be interested in supporting this.

The research aims to look at how social factors and social networks influence self-harm in teenagers (14 -18 years) to better understand the function of these behaviours. Social media is a growing area in modern society, particularly among young people, and it continues to show mixed effects on young people's mental health. It is hoped that this research will add to our understanding of how these platforms influence self-harm in teenagers, in order to best inform how to support these individuals in the future.

We wondered whether your school would be able to assist us in conducting this research. This would involve me meeting with your students on two occasions:

1) A brief meeting to introduce the project to your students and provide them with information so that they can make an informed decision on whether they would like to take part.

2) A data collection session in which pupils would be asked to complete a questionnaire. This session will last about 20 - 30 minutes. This project has been approved by the Highlands Council Department of Education and the University of Glasgow College of Medical, Veterinary and Life Sciences Research Ethics Committee. We believe that our study is consistent with the principles of the Curriculum of Excellence, in particular supporting students to expanding their capacities as 'Effective contributors' through enhancing their knowledge of "emotional and psychological well-being".

I would be happy to come and meet with you to explain the study in further detail, or to discuss the study by phone. I hope that this study will benefit your school and students by raising awareness of self-harm and the associated social influences. If you would find it helpful, I would be happy to come and give an educational talk about psychology, going to University, or other topics that may be of interest to your students and staff. I have additionally enclosed an information sheet for class/year teachers.

If you have any questions about the research or would like to arrange a time to meet, please contact me by email at :

Yours sincerely,

Jenny McLean

Trainee Clinical Psychologist

Supervised by:
Dr Stephanie Bannon- Clinical Psychologist, Paediatric Clinical Health Psychology Service, Child and Adolescent Mental Health Services, Phoenix Centre, Raigmore Hospital, Old Perth Road, Inverness, IV2 3UJ

Dr Clodagh Feehan- Clinical Psychologist, Child and Adolescent Mental Health Services, Phoenix Centre, Raigmore Hospital, Old Perth Road, Inverness, IV2 3UJ

Rory O'Connor-Professor of Health Psychology, Suicidal Behaviour Research Laboratory, Institute of Health & Wellbeing, University of Glasgow, Mental Health & Wellbeing, Academic Centre, Gartnavel Royal Hospital, 1055 Great Western Road, Glasgow, G12 0XH.

University | College of Medical,
of Glasgow | Veterinary & Life Sciences

Title: Exploring the role of social influence and social networks in adolescent self-harm: A school-based study in the Scottish Highlands

Main Researcher: Jenny McLean, Trainee Clinical Psychologist

PARTICIPANT INFORMATION SHEET

You are being invited to take part in a research study. Before you decide to take part, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Please ask us if there is anything that is not clear or if you would like more information. If you decide to take part in this study, you will be given a copy of this Participant Information Sheet and the signed consent form to keep. Thank you for your interest in this study.

What is the purpose of the study?

The research study aims to look at how social factors and social networks influence self-harm in teenagers (14 -18 years), in order to better understand why young people self-harm. Social media use is growing in modern society, particularly among young people, and its relationship with young people's mental health is unclear. It is hoped that this research will add to our understanding of how social media use influences self-harm in teenagers, in order to best inform how to support these individuals in the future.

Why have I been invited to take part?

You have been invited to take part in this study because you are a young person between the ages of 14-18 years old attending a school within the Highland Council.

If you want to take part, you will be asked to complete a consent form. If you are 16 years old or older, we do not require parental/guardian consent. If you are under 16, we will provide you with information to give to your parent/guardian. If your parent/ guardian does not want you to take part in the research study they should complete the enclosed opt-out form which you should return to the school. If they are happy for you to take part they do not need to do anything.

Do I have to take part?

No. It is up to you to decide whether you wish to take part or not. If you decide to take part, you will be given this information sheet to keep and be asked to sign a consent form. You can change your mind at any time. You can stop taking part without giving a reason and your questionnaires will be destroyed.

What will I have to do if I take part?

The study involves answering a questionnaire about your lifestyle and well-being. We will arrange a time for you to do this at school. It will take about 20-30 minutes of your time.

What if this leaves me with any worries or wishing to seek support?

Some of the questions ask about sensitive information and may be upsetting. All participants will be provided with a list of support organisations and helplines at the end of the study. But in the meantime if you have any worries, you could contact one of the following helplines so that you can discuss your feelings with a qualified and supportive individual:

Breathing Space- A free and confidential helpline service for anyone who is experiencing low mood or depression. Helpline: 0800 83 85 87 Website: www.breathingspacescotland.co.uk	**Samaritans-**This is a free, private and confidential 24 hour helpline for children, adolescents and adults. *Helpline* - 08457 90 90 90 *Email:* jo@samaritans.org

What are the possible benefits of taking part?

This study will help us to understand more about how young people feel and cope, and will be very helpful in understanding how to better support young people of your age.

Will my answers be kept secret and confidential?

Yes. We will not ask you to put your name on any questionnaires. All questionnaires will be stored separately from consent forms, and you will be identified as an ID number.

All questionnaire packs will be stored in a locked file cabinet within the NHS Mental Health & Wellbeing, Academic Centre, Gartnavel Royal Hospital Glasgow. All data from the paper-based questionnaire will be manually transferred onto a password-protected SPSS data file and stored on a University of Glasgow password secured laptop. Both passwords will be different and only known to the research team. Only the researcher and supervisors, as well as sponsor representatives who require access for audit purposes, will be able to access the data. Data will be stored no longer than 10 years and then will be disposed of confidentially.

What will happen to the results of the study?

The results will be included in a research project submitted to the University of Glasgow. A summary of the results will be sent to your school.

Who has reviewed this study?

This study has been approved by the Department of Education in the Highland Council and the University of Glasgow College of Medical, Veterinary & Life Sciences Ethics Committee.

What should I do if I have any more questions?

If you have any more questions, please do not hesitate to contact me or my supervisors (see contact information below). We will do our best to answer any questions. If you are unhappy and would like to raise a formal complaint, please contact the University of Glasgow College of Medical, Veterinary & Life Sciences Ethics Committee mvls-ethics-admin@glasgow.ac.uk.

Please keep this sheet and think about whether you would like to take part. I will be back in school with the questionnaires within the next few weeks. If you choose to take part we will complete them then.

Thank you for your time,

Jenny McLean
Trainee Clinical Psychologist

Contact Information:
Address: Mental Health & Wellbeing, Academic Centre, Gartnavel Royal Hospital Glasgow, G12 0XH
Email: J.mclean@research.gla.ac.uk

Supervised by

Dr Stephanie Bannon- Clinical Psychologist, Paediatric Clinical Health Psychology Service, Child and Adolescent Mental Health Services, Phoenix Centre, Raigmore Hospital, Old Perth Road, Inverness, IV2 3UJ

Dr Clodagh Feehan- Clinical Psychologist, Child and Adolescent Mental Health Services, Phoenix Centre, Raigmore Hospital, Old Perth Road, Inverness, IV2 3UJ

Rory O'Connor-Professor of Health Psychology, Suicidal Behaviour Research Laboratory, Institute of Health & Wellbeing, University of Glasgow, Mental Health & Wellbeing, Academic Centre, Gartnavel Royal Hospital, 1055 Great Western Road, Glasgow, G12 0XH.

University | College of Medical,
of Glasgow | Veterinary & Life Sciences

Centre Number:
Project Number:
Subject Identification Number for this trial:

Title of Project: "Exploring the role of social influence and social networks in adolescent self-harm: A school-based study in the Scottish Highlands"

Name of Researcher(s): Jenny Mclean, Trainee Clinical Psychologist

PARTICIPANT CONSENT FORM

Please initial box

I confirm that I have read and understood the Participant Information Sheet version 3 dated 09/12/2019.

I have had the opportunity to think about the information and ask questions, and understand the answers I have been given.

I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason, without my legal rights being affected.

I confirm that I agree to the way my data will be collected and processed and that data will be stored for up to 10 years in University archiving facilities in accordance with relevant Data Protection policies and regulations.

I understand that all data and information I provide will be kept confidential and will be seen only by study researchers and regulators whose job it is to check the work of researchers.

I agree to take part in the study.

Participant's name   **Date**   **Signature**

Name of Person taking consent   **Date**   **Signature**
(if different from researcher)

(1 copy for subject; 1 copy for researcher)

Appendix 2.2.7: Parental Consent Form

University of Glasgow | College of Medical, Veterinary & Life Sciences

Centre Number:
Project Number:
Subject Identification Number for this trial:

Title of Project: "Exploring the role of social influence and social networks in adolescent self-harm: A school-based study in the Scottish Highlands"

Name of Researcher(s): Jenny Mclean, Trainee Clinical Psychologist

PARENTAL CONSENT FORM

PERMISSION FOR A SCHOOL AGE CHILD TO PARTICIPATE IN A RESEARCH STUDY

ONLY COMPLETE AND RETURN THIS FORM IF YOU <u>DO NOT WISH</u> YOUR CHILD TO PARTICIPATE IN THE RESEARCH STUDY.

To be completed by the child's parent or guardian. Please read the following notes carefully before completing the form

PLEASE USE BLOCK CAPITALS

I, (insert your name)

_____

BEING THE (insert your relationship to the child, e.g. mother/father/guardian

_____ OF (insert class or form)

_____

OF (Insert name of school)

_____

DO NOT GIVE PERMISSION FOR MY CHILD TO PARTICIPATE IN THE RESEARCH STUDY DESCRIBED IN THE LETTER ATTACHED.

SIGNATURE:

DATE:

Appendix 2.2.8: Support Resources for Participants

If you are struggling with difficult feelings and experiences, and need to talk to someone, there are lots of places that can offer support and advice.

Talk to your GP or your school counsellor. They are there to help you with any problems or worries that you might have. You do not have to be physically sick to speak to your GP; it's OK to talk to them about feelings and worries too. You could also talk to your family or carers, or other adults that you trust.

If you don't want to speak to your GP, family, or school counsellor, you might want to phone a helpline or talk with an online support service. Below are some useful contacts who can offer advice, information, or just someone friendly to talk to.

Breathing Space	ChildLine
www.breathingspacescotland.co.uk	www.childline.org.uk
Helpline: 0800 83 85 87	Helpline: 0800 1111
A free and confidential helpline service for anyone who is experiencing low mood or depression.	Childline is a free, 24-hour helpline for children and young people in trouble or danger. Children who are deaf or find using a regular phone difficult can try our text phone service on 0800 400 222
NHS 24	Samaritans
Tel: 111 (free of charge)	www.samaritans.org
	Helpline: 116 123 (free from any phone),
Available 24-hours, 365 days a year.	Email: jo@samaritans.org (may take 24 hours to reply)
	A 24/7 helpline service which gives you a safe space to talk about what is happening, how you are feeling, and how to find your own way forward.

The Child and Adolescent Mental Health Service (CAMHS) offer support for children and young people who are struggling with their mental health. If you need support and would like to speak with a Mental Health professional do not hesitate to contact the number below:

CAMHS The Phoenix Centre: 01463 705597 (9am-5pm Monday to Friday)

If there is anything that has concerned you about the study or that you would like to talk to me about, please do not hesitate to contact me on :

A secondary data study

Title: Exploring the role of protective factors in suicidal behaviour through the lens of the Integrated Motivational-Volitional Model: A moderation analysis

1. Introduction

Suicide is a global public health problem with an estimated 804,000 people dying by suicide across the world each year and at least 20 times that number engaging in suicide attempts (World Health Organization, 2014). Research has continued to identify a wide range of social, psychological, cultural and biological risk factors that act to increase suicide risk (O'Connor & Nock, 2014). Among these risks, suicidal ideation is seen as one of the strongest predictors of subsequent suicide behaviour (Brown, et al., 2000; Brown et al., 2005). A number of psychological models have been developed to better understand the emergence of suicidal ideation and suicidal behaviours.

One such model which has established a considerable empirical foundation is the Integrated Motivational–Volitional (IMV) Model of suicide (O'Connor, 2011; O'Connor & Kirtley, 2018). The IMV model is comprised of three phases, describing the biopsychosocial context in which suicidal ideation and behaviour may emerge (pre-motivational phase), the factors that lead to the emergence of suicidal ideation (motivational phase) and the factors that govern the transition from suicidal ideation to suicidal behaviour (volitional phase; O'Connor, 2011; O'Connor, et al, 2016; O'Connor & Kirtley, 2018). According to the model, the presence of a range of factors (threat to self, motivational, and volitional moderators) facilitate or moderate the transition between these phases (Dhingra, Boduszek, & O'Connor, 2015; O'Connor, 2011; O'Connor, Smyth, & Williams, 2015).

Central to the motivational phase of the IMV model is the relationship between defeat/humiliation, and entrapment, leading to suicidal ideation, which is consistent with William's cry of pain model (2001). In line with the theoretical assumptions of the IMV, research has shown that hope (Tucker, O'Connor, & Wingate, 2016), social support (Shelef, Levi-Beltz, Fruchter, Santo, & Dahan, 2016) and resilience (Wetherall, Robb, & O'Connor, 2019) moderate the association between entrapment and suicide ideation. In a recent synthesis of the developments and challenges in suicide research, O'Connor and Portzky (2018) argued that the factors which moderate and mediate the defeat-entrapment-suicidality relationships, as specified in the IMV model, require further research attention.

Protective factors are poorly researched in suicide prevention (De Beurs et al., 2019) and a greater understanding of the factors which might serve to protect individuals from experiencing suicidal thoughts or behaviour may provide important insights for intervention and reducing the risk of suicide. A further factor which has not been examined in relation to the IMV model is optimism. In a study by Hirsch and colleagues (2007), they found that in adults aged between 18-57 years old, negative

life events were associated with current suicidal ideation and previous suicide attempts, and optimism moderated these relationships. Rasmussen and Wingate (2011) found that optimism was a protective factor against suicidal ideation. In an exciting study utilizing complex network analysis of different psychological factors associated with suicidal ideation and behaviour, De Beurs and colleagues (2019) found that optimism and resilience were directly but inversely related to suicidal ideation.

In young adults, suicide rates are 2–4 times higher in males than in females, while suicide attempts are 3–9 times more common in females (Wunderlich et al. 2001; Eaton et al. 2012). IN the UK suicide is the highest leading cause of death in men under 45 years old (ONS, 2019). Given these gender disparities, exploring gender differences in protective factors is important for suicide prevention. Given that the majority of people who think about or attempt suicide do not receive treatment (Bruffaerts, et al., 2011) large scale research into non-clinical samples provides important insights into the factors associated with suicidal ideation and behaviour.

Aims

In the current study we aim to investigate how a number of protective factors (social support, belongingness, optimism and resilience) are related to suicidal ideation within the context of the IMV model. Consistent with the IMV theory, it is hypothesized that entrapment will mediate the relationship between defeat and suicidal ideation. We further aim to consider the moderation effects of social support, optimism and resilience between defeat and entrapment, as well as entrapment and suicidal ideation. We also aim to explore group differences between men and women. Addressing these aims will have important clinical implications.

2. Methods

This project is a secondary data study, and the procedures for the original study are presented below, including the measures and analysis which shall be employed in my project.

3.1 Participants and Procedure

The sample included 3,508 young people aged 18 to 34 years from across Scotland recruited for the Scottish Wellbeing Study (O'Connor, et al, 2018). Participant recruitment was conducted by Ipsos MORI, a social research organisation between 25th March 2013 and 12th December 2013. The study utilised a quota sampling methodology whereby quotas were based on age (three quota groups), sex and working status. Following written consent, participants completed a 1 hour-long interview, carried out face-to-face in their homes, using Computer-Assisted Personal Interviewing (CAPI) and including a computer-assisted self-interviewing module (the

questions about suicide attempts and NSSH were completed confidentially on the computer).

3.2 Measures

The participants completed a battery of psychological and social measures; however for the purpose of this secondary data study only the following measures are being reported:

- Outcome measure: lifetime history of suicidal ideation and attempts
  This was assessed with two items drawn from the Adult Psychiatric Morbidity Survey (APMS; McManus et al., 2007): "Have you ever seriously thought of taking your life, but not actually attempted to do so?" and "Have you ever made an attempt to take your life, by taking an overdose of tablets or in some other way?" Responses to these questions were "no", "yes" or "would rather not say". These items were used to create a 3 category variable indicating if participants had (i) no history of suicidal ideation/ attempt (control group), (ii) had experienced suicidal ideation but had never attempted suicide (suicidal ideation group), or (iii) had reported having attempted suicide in the past (suicidal attempt group).

- The Defeat Scale (Gilbert & Allan, 1998) is a 16-item self-report measure of perceived failed struggle and loss of rank (e.g., "I feel that I have not made it in life"). This scale has good psychometric properties and is significantly correlated with depressive symptoms (Griffiths et al., 2014). In the present study the measure had high internal reliability (Cronbach's α = 0.96).

- The 16-item Entrapment Scale (Gilbert & Allan, 1998) is a measure of the sense of being unable to escape feelings of defeat and rejection (e.g., I am in a situation I feel trapped in). This measure consists of 10 items reflecting external entrapment (entrapment by external situations), and 6 items tapping internal entrapment (entrapment by one's own thoughts and feelings). The scale has good psychometric properties (Griffiths et al., 2014) and demonstrated high internal consistency in the present study (Cronbach's α = 0.96).

- The Beck Depression Inventory-II (BDI-II; Beck et al., 1996) is a well-established measure which evaluated a range of depressive symptoms (e.g., loss of energy, sense of failure) containing 21 items. It has been shown to yield reliable, internally consistent, and valid scores in a range of populations (e.g., Dozois et al., 1998), and in this study, it demonstrated high internal reliability (Cronbach's α = 0.95).

- Resilience was measured using the 10-item <u>Brief Resilience Scale (BRS; Campbell-Sills and Stein, 2007),</u> adapted from the 25-item Connor-Davidson Resilience Scale (CD-RISC; Connor and Davidson, 2003). This 10-item version (e.g., "Coping with stress can strengthen me") has good psychometric properties and is highly correlated with the original 25-item version (Campbell-Sills and Stein, 2007), and in the present study it displayed excellent internal consistency (Cronbach's α = 0.90).

- The 7-item <u>ENRICHD Social Support Instrument (ESSI; Mitchell et al., 2003),</u> taps four defining attributes of social support: emotional, instrumental, informational, and appraisal (e.g., "Is there someone available to give you good advice about a problem?"). It has been found to be a valid and reliable measure of social support (Vaglio et al., 2004), and displayed good internal reliability in the present study (Cronbach's α = 0.87).

- Optimism was assessed with the <u>Life Orientation Test-Revised (LOT-R; Scheier, Carver, & Bridges, 1994).</u> This is a 10-item measure, with 3 items which measure optimism (e.g. I'm always optimistic about my future), 3 items which measure pessimism (e.g. Things never work out the way I want them to) and 4 items which serve as fillers(e.g. It's easy for me to relax). Response choices range from 0 ("Strongly Agree") to 4 ("Strongly Disagree") with scores ranging from 0-24. Responses were summed (after reversals as needed) such that higher scores represent greater optimism. The measure demonstrated high internal consistency in the present study (Cronbach's α = 0.79).

All interviewers were trained in the administration of the measures.

Demographic and background data were also obtained. These were age, gender, marital status (married vs. not married), ethnicity (white vs. non-white) and economic activity (employed, inactive and unemployed).

3.3 Design

This study used an observational cross-sectional design.

3.4 Statistical Analysis

Initial correlation analyses will be conducted to test the associations between all study variables.

Hayes' (2013) PROCESS macro for SPSS will be used to test mediation and moderation effects within models. The macro employs bootstrapping techniques to estimate the confidence intervals (these yield inferences that are more accurate and better reflect the potential irregularities of sampling design). Hayes (2013) suggested that this is best repeated thousands of times, as this will more accurately reflect the sample population, and therefore, all analyses will use a minimum of 10,000 bootstraps. This method rigorously tests the pathways for mediation and moderation, including the indirect effects, direct effects, and tests of simple slopes.

A moderated mediation model will be used to test entrapment as a mediator of defeat and suicidal ideation, with resilience, optimism and social support as individual moderators of the defeat and entrapment relationship.

The final model will be a moderated mediation model testing entrapment as a mediator of the defeat to suicide ideation relationship, and resilience, optimism and social support as individual moderators of entrapment to suicide ideation.

To ensure that these relationships are not accounted for by depressive symptoms, these were controlled for in all analyses.

Ethical Approval

The Scottish Wellbeing Study was approved by the College of Medical Veterinary & Life Sciences ethics committee and the proposed analyses are consistent with the original aims of the study. This study has already ended however we have written to the ethics committee alerting them that I am being added to the ethics approval.

Practical Applications and Disseminations

The results of this project will be included in a research report submitted to the University of Glasgow with a view of publication in a reputable peer reviewed journal. No participants shall be identified in any reports or publications that might be produced for this research.

From a clinical perspective, findings from this study will broaden the understanding of protective factors which may reduce suicide risk. By understanding the protective factors and how they may relate to suicide will be useful for practitioners in health, social and educational settings, to help identify vulnerable groups at risk of suicide and understand potential opportunities for intervention and management plans.

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Appendix 2.3.1: The psychological measures used in the Scottish Wellbeing Study

The Beck Depression Inventory-II

You are going to be shown some groups of statements. Choose one statement in each group that best describes how you have been feeling for the past 2 weeks, including today.

Please read all of the statements in each group before making a choice.

If you can't find a response that describes exactly how you have been feeling, please choose the one that is closest to how you have been feeling for the past 2 weeks, including today.

1.   Sadness
PLEASE SELECT ONE OPTION ONLY.

1	I do not feel sad.
2	I feel sad much of the time.
3	I am sad all of the time.
4	I am so sad or unhappy that I can't stand it
5	Would rather not say

2.   Pessimism
PLEASE SELECT ONE OPTION ONLY.

1	I am not discouraged about my future.
2	I feel more discouraged about my future than I used to be.
3	I do not expect things to work out for me.
4	I feel my future is hopeless and will only get worse.
5	Would rather not say

3.   Past Failure

PLEASE SELECT ONE OPTION ONLY.

1	I do not feel like a failure.
2	I have failed more than I should have.
3	As I look back, I see a lot of failures.
4	I feel I am a total failure as a person.
5	Would rather not say

4.   Loss of Pleasure

PLEASE SELECT ONE OPTION ONLY.

1	I get as much pleasure as I ever did from the things I enjoy.
2	I don't enjoy things as much as I used to.
3	I get very little pleasure from the things I used to enjoy.
4	I can't get any pleasure from the things I used to enjoy.
5	Would rather not say

5.   Guilty Feelings
PLEASE SELECT ONE OPTION ONLY.

1	I don't feel particularly guilty.
2	I feel guilty over many things I have done or should have done.

3	I feel quite guilty most of the time.
4	I feel guilty all of the time.
5	Would rather not say

6. Punishment Feelings
PLEASE SELECT ONE OPTION ONLY.

1	I don't feel I am being punished.
2	I feel I may be punished.
3	I expect to be punished.
4	I feel I am being punished.
5	Would rather not say

7. Self-Dislike
PLEASE SELECT ONE OPTION ONLY.

1	I feel the same about myself as ever.
2	I have lost confidence in myself.
3	I am disappointed in myself.
4	I dislike myself.
5	Would rather not say

8. Self-Criticalness
PLEASE SELECT ONE OPTION ONLY.

1	I don't criticize or blame myself more than usual.
2	I am more critical of myself than I used to be.
3	I criticize myself for all of my faults.
4	I blame myself for everything bad that happens.
5	Would rather not say

9. Suicidal Thoughts or Wishes
PLEASE SELECT ONE OPTION ONLY.

1	I don't have any thoughts of killing myself.
2	I have thoughts of killing myself, but I would not carry them out.
3	I would like to kill myself.
4	I would kill myself if I had the chance.
5	Would rather not say

10. Crying
PLEASE SELECT ONE OPTION ONLY.

1	I don't cry any more than I used to.
2	I cry more than I used to.
3	I cry over every little thing.
4	I feel like crying, but I can't.
5	Would rather not say

11. Agitation
PLEASE SELECT ONE OPTION ONLY.

1	I am no more restless or wound up than usual.
2	I feel more restless or wound up than usual.
3	I am so restless or agitated that it's hard to stay still.
4	I am so restless or agitated that I have to keep moving or doing something.
5	Would rather not say

12. Loss of Interest
PLEASE SELECT ONE OPTION ONLY.

1	I have not lost interest in other people or activities.
2	I am less interested in other people or things than before.
3	I have lost most of my interest in other people or things.
4	It's hard to get interested in anything.
5	Would rather not say

13. Indecisiveness
PLEASE SELECT ONE OPTION ONLY.

1	I make decisions about as well as ever.
2	I find it more difficult to make decisions than usual.
3	I have much greater difficulty in making decisions than I used to.
4	I have trouble making any decisions.
5	Would rather not say

14. Worthlessness
PLEASE SELECT ONE OPTION ONLY.

1	I do not feel I am worthless.
2	I don't consider myself as worthwhile and useful as I used to.
3	I feel more worthless as compared to other people.
4	I feel utterly worthless.
5	Would rather not say

15. Loss of Energy
PLEASE SELECT ONE OPTION ONLY.

1	I have as much energy as ever.
2	I have less energy than I used to have.
3	I don't have enough energy to do very much.
4	I don't have enough energy to do anything.
5	Would rather not say

16. Changes in Sleeping Pattern
PLEASE SELECT ONE OPTION ONLY.

1 -	I have not experienced any changes in my sleeping pattern.
2 - 3 -	I sleep somewhat more than usual. I sleep somewhat less than usual.
4 - 5 -	I sleep a lot less than usual. I sleep a lot more than usual.
6 - 7 -	I sleep most of the day. I wake up 1-2 hours early and can't get back to sleep.
8	Would rather not say

17. Irritability
PLEASE SELECT ONE OPTION ONLY.

1	I am no more irritable than usual.
2	I am more irritable than usual.
3	I am much more irritable than usual.
4	I am irritable all of the time.
5	Would rather not say

18. Changes in Appetite
PLEASE SELECT ONE OPTION ONLY.

1 -	I have not experienced any change in my appetite.
2 - 3 -	My appetite is somewhat less than usual. My appetite is somewhat greater than usual.
4 - 5 -	My appetite is much less than before. My appetite is much greater than before.
6 - 7 -	I have no appetite at all. I crave food all of the time.
8	Would rather not say

19. Concentration Difficulties
PLEASE SELECT ONE OPTION ONLY.

1	I can concentrate as well as ever.
2	I can't concentrate as well as usual.
3	It's very hard to keep my mind on anything for very long.
4	I find I can't concentrate on anything.
5	Would rather not say

20. Tiredness or Fatigue
PLEASE SELECT ONE OPTION ONLY.

1	I am no more tired or fatigued than usual.
2	I get more tired or fatigued more easily than usual.
3	I am too tired or fatigued to do a lot of the things I used to do.
4	I am too tired or fatigued to do most of the things I used to do.
5	Would rather not say

21. Loss of Interest in Sex
PLEASE SELECT ONE OPTION ONLY.

1	I have not noticed any recent change in my interest in sex.
2	I am less interested in sex than I used to be.
3	I am much less interested in sex now.
4	I have lost interest in sex completely.
5	Would rather not say

The Beck Scale of Suicidal Ideation

You are now going to be shown some more groups of statements. Select the one statement in each group that <u>best</u> describes how you have been feeling for the <u>past week, including today</u>. Please read all of the statements in each group before making a choice.

		PLEASE SELECT ONE OPTION ONLY.
1	1	I have a moderate to strong wish to live.
	2	I have a weak wish to live.
	3	I have no wish to live.
	4	Would rather not say
		PLEASE SELECT ONE OPTION ONLY.
2	1	I have no wish to die.
	2	I have a weak wish to die.
	3	I have a moderate to strong wish to die.
	4	Would rather not say
		PLEASE SELECT ONE OPTION ONLY.
3	1	My reasons for living outweigh my reasons for dying.
	2	My reasons for living and dying are about equal.
	3	My reasons for dying outweigh my reasons for living
	4	Would rather not say
		PLEASE SELECT ONE OPTION ONLY.
4	1	I have no desire to kill myself.
	2	I have a weak desire to kill myself.
	3	I have a moderate to strong desire to kill myself.
	4	Would rather not say
		PLEASE SELECT ONE OPTION ONLY.
5	1	I would try to save my life if I found myself in a life-threatening situation.
	2	I would take a chance on life or death if I found myself in a life-threatening situation.
	3	I would not take the steps necessary to avoid death if I found myself in a life-threatening situation.
	4	Would rather not say

		PLEASE SELECT ONE OPTION ONLY.
6	1	I have brief periods of thinking about killing myself which pass quickly.
	2	I have periods of thinking about killing myself which last for moderate amounts of time.
	3	I have long periods of thinking about killing myself.
	4	Would rather not say
		PLEASE SELECT ONE OPTION ONLY.
7	1	I rarely or only occasionally think about killing myself.
	2	I have frequent thoughts about killing myself.
	3	I continuously think about killing myself.
	4	Would rather not say
		PLEASE SELECT ONE OPTION ONLY.
8	1	I do not accept the idea of killing myself.
	2	I neither accept nor reject the idea of killing myself.
	3	I accept the idea of killing myself.
	4	Would rather not say
		PLEASE SELECT ONE OPTION ONLY.
9	1	I can keep myself from committing suicide.
	2	I am unsure that I can keep myself from committing suicide.
	3	I cannot keep myself from committing suicide.
	4	Would rather not say
		PLEASE SELECT ONE OPTION ONLY.
10	1	I would not kill myself because of my family, friends, religion, possible injury from an attempt, etc.
	2	I am somewhat concerned about killing myself because of my family, friends, religion, possible injury from an attempt, etc
	3	I am not or a little concerned about killing myself because of my family, friends, religion, possible injury from an attempt, etc.
	4	Would rather not say
		PLEASE SELECT ONE OPTION ONLY.
11	1	My reasons for wanting to commit suicide are primarily aimed at influencing other people, such as getting even with people, making people happier, making people pay attention to me, etc.
	2	My reasons for wanting to commit suicide are not only aimed at influencing other people, but also represent a way of solving my problems.
	3	My reasons for wanting to commit suicide are primarily based upon escaping from my problems.
	4	Would rather not say
		PLEASE SELECT ONE OPTION ONLY.
12	1	I have no specific plan about how to kill myself.
	2	I have considered ways of killing myself, but have not worked out the details.
	3	I have a specific plan for killing myself.
	4	Would rather not say
		PLEASE SELECT ONE OPTION ONLY.
13	1	I do not have access to a method or an opportunity to kill myself.

	2	The method that I would use for committing suicide takes time, and I really do not have a good opportunity to use this method.
	3	I have access or anticipate having access to the method that I would choose for killing myself and also have or shall have the opportunity to use it.
	4	Would rather not say
		PLEASE SELECT ONE OPTION ONLY.
14	1	I do not have the courage or the ability to commit suicide.
	2	I am unsure that I have the courage or the ability to commit suicide.
	3	I have the courage and the ability to commit suicide.
	4	Would rather not say
		PLEASE SELECT ONE OPTION ONLY.
15	1	I do not expect to make a suicide attempt.
	2	I am unsure that I shall make a suicide attempt
	3	I am sure that I will make a suicide attempt.
	4	Would rather not say
		PLEASE SELECT ONE OPTION ONLY.
16	1	I have made no preparations for committing suicide.
	2	I have made some preparations for committing suicide.
	3	I have almost finished or completed my preparations for committing suicide.
	4	Would rather not say
		PLEASE SELECT ONE OPTION ONLY.
17	1	I have not written a suicide note.
	2	I have thought about writing a suicide note, but have not completed it.
	3	I have completed a suicide note.
	4	Would rather not say
		PLEASE SELECT ONE OPTION ONLY.
18	1	I have made no arrangements for what will happen after I have committed suicide.
	2	I have thought about making some arrangements for what will happen after I have committed suicide.
	3	I have made definite arrangements for what will happen after I have committed suicide.
	4	Would rather not say
		PLEASE SELECT ONE OPTION ONLY.
19	1	I have not hidden my desire to kill myself from people.
	2	I have held back telling people about wanting to kill myself.
	3	I have attempted to hide, conceal, or lie about wanting to commit suicide.
	4	Would rather not say

The Defeat Scale

SELECT ONE OPTION ONLY.	Never	Rarely	Sometimes	Mostly (a lot)	Always	Would rather not say
1. I feel that I have not made it in life.	1	2	3	4	5	6
2. I feel that I am a successful person.	1	2	3	4	5	6
3. I feel defeated by life.	1	2	3	4	5	6
4. I feel that I am basically a winner.	1	2	3	4	5	6
5. I feel that I have lost my standing in the world.	1	2	3	4	5	6
6. I feel that life has treated me like a punch-bag.	1	2	3	4	5	6
7. I feel powerless.	1	2	3	4	5	6
8. I feel that my confidence has been knocked out of me.	1	2	3	4	5	6
9. I feel able to deal with whatever life throws at me.	1	2	3	4	5	6
10. I feel that I have sunk to the bottom of the ladder.	1	2	3	4	5	6
11. I feel completely knocked out of action.	1	2	3	4	5	6
12. I feel that I am one of life's losers.	1	2	3	4	5	6
13. I feel that I have given up.	1	2	3	4	5	6
14. I feel down and out	1	2	3	4	5	6
15. I feel that I have lost important battles in life.	1	2	3	4	5	6
16. I feel that there is no fight left in me.	1	2	3	4	5	6

The Entrapment Scale

You will now be shown some more statements about thoughts and feelings. Please read each and indicate how much it applies to you.

	Not at all like me	A little bit like me	Moderately like me	Quite a bit like me	Extremely like me	Would rather not say
1. I am in situation I feel trapped in.	1	2	3	4	5	6
2. I have a strong desire to escape from things in my	1	2	3	4	5	6

	life.						
3.	I am in a relationship I can't get out of.	1	2	3	4	5	6
4.	I often have the feeling that I would just like to run away.	1	2	3	4	5	6
5.	I feel powerless to change things.	1	2	3	4	5	6
6.	I feel trapped by my obligations.	1	2	3	4	5	6
7.	I can see no way out of my current situation.	1	2	3	4	5	6
8.	I would like to get away from other more powerful people in my life.	1	2	3	4	5	6
9.	I have a strong desire to get away and stay away from where I am now.	1	2	3	4	5	6
10.	I feel trapped by other people.	1	2	3	4	5	6
11.	I want to get away from myself.	1	2	3	4	5	6
12.	I feel powerless to change myself.	1	2	3	4	5	6
13.	I would like to escape from my thoughts and feelings.	1	2	3	4	5	6
14.	I feel trapped inside myself.	1	2	3	4	5	6
15.	I would like to get away from who I am and start again.	1	2	3	4	5	6
16.	I feel I'm in a deep hole I can't get out of.	1	2	3	4	5	6

Brief Resilience Scale

Using this scale, please indicate to what extent you feel the following descriptions apply to you. Just read out the number that applies.

		Not true at all				True nearly all the time	Refused
1	Able to adapt to change	1	2	3	4	5	6
2	Can deal with whatever comes	1	2	3	4	5	6
3	Tries to see humorous side of problems	1	2	3	4	5	6
4	Coping with stress can strengthen me	1	2	3	4	5	6
5	Tend to bounce back after illness or hardship	1	2	3	4	5	6
6	Can achieve goals	1	2	3	4	5	6

	pressure					
8	Not easily discouraged by failure	1	2	3	4	5	6
9	Think of myself as a strong person	1	2	3	4	5	6
10	Can handle unpleasant feelings	1	2	3	4	5	6

Life Orientation Test-Revised

And, finally, I'm going to read out a list of statements and I'd like you to tell me how much you agree or disagree with each. Please be as honest and accurate as you can throughout and try not to let your response to one statement influence your responses to other statements. There are no 'correct' or 'incorrect' answers. Answer according to your own feelings, rather than how you think "most people" would answer. Just read out the number that applies.

	I agree a lot	I agree a little	I neither agree nor disagree	I disagree a little	I disagree a lot	Refused
1. In uncertain times, I usually expect the best.	1	2	3	3	5	6
2. It's easy for me to relax.	1	2	3	3	5	6
3. If something can go wrong for me, it will.	1	2	3	3	5	6
4. I'm always optimistic about my future.	1	2	3	3	5	6
5. I enjoy my friends a lot.	1	2	3	3	5	6
6. It's important for me to keep busy.	1	2	3	3	5	6
7. I hardly ever expect things to go my way.	1	2	3	3	5	6
8. I don't get upset too easily.	1	2	3	3	5	6
9. I rarely count on good things happening to me.	1	2	3	3	5	6
10. Overall, I expect more good things to happen to me than bad.	1	2	3	3	5	6

The ENRICHED Social Support Instrument

I'm going to ask a number of questions and, from this card, I'd like to you to choose the response that most closely describes your _current situation_. Just read out the number that applies SINGLE CODE PER ROW.

	None of the time	A little of the time	Some of the time	Most of the time	All of the time	Refused
1. Is there someone you can count on to listen to you when you need to talk?	1	2	3	4	5	6

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2. Is there someone available to give you good advice about a problem?	1	2	3	4	5	6
3. Is there someone available to you who shows you love and affection?	1	2	3	4	5	6
4. Is there someone available to help you with daily chores?	1	2	3	4	5	6
5. Can you count on anyone to provide you with emotional support; for example, being there to talk over problems or help you make a difficult decision?	1	2	3	4	5	6
6. Do you have as much contact as you would like with someone you feel close to, someone in whom you can trust and confide?	1	2	3	4	5	6

Q18b). Are you currently married or living with a partner?

1. Yes
2. No
3. Refused