

ORIGINAL ARTICLE

Experiential avoidance in non-suicidal self-injury and suicide experiences: A systematic review and meta-analysis

Ioannis Angelakis PhD¹  | Patricia Gooding PhD^{2,3} 

¹School of Psychology, University of South Wales, Pontypridd, Wales, UK

²Division of Psychology and Mental Health, Faculty of Biological, School of Health Sciences, Medical and Health Sciences, University of Manchester, Manchester, UK

³Manchester Academic Health Science Centre (MAHSC), Manchester, UK

Correspondence

Ioannis Angelakis, School of Psychology, University of South Wales, Pontypridd, Wales, UK.

Email: ioannis.angelakis@southwales.ac.uk

Abstract

Introduction: This systematic review and meta-analysis aimed to (i) examine the associations between experiential avoidance (EA), non-suicidal self-injury (NSSI), and suicide experiences, and (ii) identify sample- and methodological-related variables affecting the strength of these associations.

Method: Medline, Embase, PsychINFO, Web of Science, and CINAHL were searched until April 2020. Random-effect meta-analyses were applied. The I^2 statistic and the Egger's test assessed heterogeneity and publication bias. Meta-regression analyses were used to evaluate the impact of moderator variables on the strength of these associations.

Results: Data from 19 independent studies based on $n = 9900$ participants were pooled. The analyses demonstrated a weak but significant association between EA and NSSI. None of the examined moderator variables influenced the strength of this relationship. There was an indication of publication bias, suggesting that this association may have been inflated. The associations between EA, and suicide ideation and behaviors were moderate to strong.

Discussion: The current study concluded that (i) the EA model for NSSI should be revised by incorporating new evidence implicating feelings of relief in NSSI, and (ii) future studies should examine interactive factors between EA and key psychological components in the pathways to suicide experiences because these findings have direct clinical implications.

INTRODUCTION

Deliberate engagement in non-suicidal self-injury (NSSI) involves such behaviors as damaging and/or deforming skin by cutting, kicking, scratching, pulling hair, carving and burning, among others, in targeted body areas (Claes & Vandereycken, 2007; Zatterqvist, 2015). The prevalence estimates of these types of NSSI within an American adult sample ranged between 4% and 5.9% (Briere & Gil, 1998; Klonsky, 2011), whereas the prevalence estimates of these acts across clinical,

adolescent, and college populations appeared comparatively higher ranging between 11.7% and 21.0% (Briere & Gil, 1998; Heath et al., 2008; Muehlenkamp et al., 2012). Although NSSI is distinguished from suicide thoughts and behaviors in that individuals who self-injure are characterized as not consciously intending to die (Brausch & Gutierrez, 2010), NSSI has been strongly associated with suicide experiences. In particular, recent studies have identified that a prolonged engagement in NSSI was associated with suicide ideation and attempts in adolescents on psychiatric in-patient wards, high

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school students, college learners, and adults from the community (Anestis et al., 2013; Klonsky et al., 2013).

Suicide ideation refers to thoughts, urges, or plans about killing oneself, whereas suicide attempts are deliberate acts to die by suicide that do not result in actual deaths (Hawton et al., 2012; Klonsky et al., 2016). Within American adolescent and adult populations, the prevalence estimates of suicide ideation range between 9.2% and 10.9%, whereas the estimates of suicide attempts range between 2.7% and 3% (Nock et al., 2008; Wolitzky-Taylor et al., 2010). Having suicide experiences, such as thoughts, urges, plans, and acts, are strong predictors of suicide deaths (Johnson et al., 2010; Joiner, 2005; Kapur et al., 2015). Therefore, there is an urgent need to identify key explanatory factors that can contribute to, and therefore, help explain any overlap in the pathways to both NSSI and suicide acts.

Recent evidence has implicated experiential avoidance (EA) or states of psychological inflexibility¹ as a potentially important factor in the engagement of NSSI and/or suicide ideation and behaviors (Angelakis & Gooding, 2020; Brausch & Woods, 2019). The EA model posits that the individual experiencing the avoidance is unable, or unwilling, to endure internal sources of aversive stimulation, including unwanted cognitions (e.g., memories and beliefs), mental images (e.g., forest fires and motor vehicle accidents), uncomfortable emotions (e.g., anger and fear), and/or bodily sensations (e.g., hunger, sweating) that can enact escape and/or avoidance behaviors (Hayes et al., 1996). As such, an individual who engages in avoidance behaviors may be able to terminate, in the short term, their distressing thoughts and/or emotions by escaping or avoiding the situations, activities, and/or people responsible for their development. To illustrate, someone who is faced with grief may try to control or avoid some of those difficult, and potentially overwhelming, feelings by using substances (e.g., Creighton et al., 2016). Another example is that people who tend to be perfectionists and to avoid failure may use procrastination-related thoughts and behaviors to ensure that failure does not occur (e.g., Jadidi et al., 2011).

According to the EA framework, self-injury is viewed as an avoidance and escape behavior in relation to (i) low tolerance of unwanted, distressing, cognitions and/or emotions, and/or (ii) the experience of uncontrollable heightened emotional arousal (Chapman et al., 2006). Engagement in self-injury can narrow attention to physical pain experienced in

the here and now which can also alleviate acute distress (e.g., Brown et al., 2002; Franklin et al., 2010). When the desired outcome is achieved, it appears that these avoidance thoughts and behaviors are negatively reinforced by re-establishing a sense of positive achievement. Therefore, EA is considered to be a maladaptive emotion regulation coping strategy, where the individual, who initially has problems with controlling their internal mood states, engages in NSSI in an effort to escape from extreme negative distress and, consequently, restore and attain more positive mood states, and/or neutralize distress (e.g., Gratz et al., 2002). Evidence, thus far, has widely supported this purported role of EA in NSSI (Brausch & Woods, 2019; Greene et al., 2019; Xavier et al., 2018). For example, it has been found that NSSI improved perceived escape from intrusive thoughts and/or potentially overwhelming and distressing negative emotions, such as, tension, stress, and anger (Anderson et al., 2018; Klonsky, 2007, 2009).

Psychological models of suicide thoughts and behaviors have highlighted the perception of being trapped by immense psychological pain and distress as being central in the pathways to suicide experiences (Johnson et al., 2008; O'Connor, 2011; Williams, 1997). Furthermore, the key role of entrapment in the pathways to suicide thoughts and behaviors is supported by vast and expanding qualitative (Owen et al., 2015) and quantitative evidence (Taylor et al., 2011). Such evidence appears transdiagnostic in that it applies to bipolar disorder, post-traumatic stress disorder (PTSD), and psychosis (Gooding et al., 2015; Owen et al., 2018; Panagioti et al., 2013; Shelef et al., 2016). EA may be an important aspect in escaping from intense and overwhelming feelings of being trapped in the pathways to suicide experiences. Indeed, research is accumulating that demonstrates the role of EA in a range of suicide experiences (Chou et al., 2018; Ellis & Rufino, 2016; Roush et al., 2019; Zvolensky et al., 2015, 2016). Furthermore, new evidence has supported the strong associations between EA and obsessive-compulsive and related disorders, including obsessive-compulsive disorder, hoarding disorder, body dysmorphic disorder and hair-pulling disorder (Angelakis & Pseftogianni, 2021) which also have been strongly associated with suicide and related behaviors (e.g., Angelakis et al., 2015; Angelakis et al., 2016).

Hence, the investigation of EA in pathways to both self-injury and suicide experiences is important, from theoretical and clinical perspectives. A recent systematic review supported the role of EA in self-injury (Brereton & McGlinchey, 2020). However, the authors did not provide a quantitative synthesis of this evidence, which is important in corroborating their findings. Furthermore, a systematic synthesis of the evidence examining the strength of the association between EA, and suicide ideation and behaviors is currently lacking. Therefore, we undertook the first systematic review and meta-analysis of the associations between EA, self-injury, and suicide experiences. There were two key objectives:

¹We acknowledge that experiential avoidance and psychological inflexibility are close but not related theoretical constructs. Psychological inflexibility is a broader construct referring to the individual's inability to (i) focus on the present moment, and (ii) adapt to the various life conditions by disregarding their goals and/or values (e.g., DeBeer et al., 2018). However, we included both of these terms in our searches to ensure that all relevant studies examining the associations between experiential avoidance, NSSI and suicide acts will be identified and included in our quantitative synthesis.

1. To synthesize quantitatively evidence pertaining to the relationships between (a) EA and self-injury, and (b) EA and suicide ideation and behaviors;
2. To examine whether the strength of these relationships was affected by key methodological (e.g., research design, screening tools for measuring NSSI and suicide experiences) and participant-related characteristics (e.g., age and gender).

METHOD

Selection of papers

The criteria of both the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA; Moher et al., 2009) and the Meta-Analysis of Observational Studies in Epidemiology (Stroup et al., 2000) statements were used in this systematic review and meta-analysis. The strategy used to identify papers included (i) searching five bibliographic databases, namely, Medline, PsycINFO, Embase, Web of Science, and CINAHL, (ii) screening the reference lists of the studies which met the inclusion criteria, and (iii) contacting the authors in cases where additional information was needed to carry out meta-analyses. The searches were conducted from inception until the end of April 2020 and included three key terms: EA or psychological inflexibility (experient* avoid* OR psychology* inflexib*) together with NSSI, deliberate self-harm (self* injur* OR self* harm*), or suicide (suicid*). The titles and abstracts of the identified papers were screened by three independent raters, including the first author (IA) and two additional raters who determined the eligibility of the papers for inclusion in the current review. Interrater agreement was excellent ($\kappa = 100\%$).

Eligibility criteria

The studies were included that:

1. Reported a quantitative outcome of the links between EA, NSSI, and/or suicidal experiences;
2. Were focused on both children/adolescents and adult populations;
3. Used a quantitative research design and analysis;
4. Were written in English and published in peer-reviewed scientific journals

The studies were excluded that:

1. Were reviews, theses/dissertations, reports, theoretical papers, position papers, or any other papers which were unpublished or published in non-academic forums (e.g.,

- gray literature including reports for companies, governments, third sector organizations);
2. Did not provide data amendable for meta-analyses.²

Data extraction

A database was devised and piloted using five randomly selected papers to assess its efficacy to capture all the important and identified variables. Descriptive information was extracted including: country of study; mean age; proportion of participants self-identifying as male, female, or other; population targeted (e.g., community samples, those with a psychiatric diagnosis); research design; methods of measuring EA; and screening tools for self-injury and for suicide experiences. Quantitative data which reported associations between EA, NSSI, and suicide experiences were also extracted. All data extraction was performed by the first author (IA) and two independent raters. Interrater agreement was very high ($\kappa = 0.97$). Disagreements were resolved through discussions.

Critical evaluation of the methodological quality of the studies

The included studies were assessed for the quality of the methods employed against four criteria as adopted by the Centre for Reviews and Dissemination (CRD, 2010) guidance for undertaking reviews in health care. The first author (IA) together with two independent raters were involved and inter-rater agreement was excellent ($\kappa = 100\%$). The criteria to assess risk of bias were as follows: (i) methodological design (prospective/longitudinal/experimental = 2, cross-sectional = 1), (ii) response rate at baseline/follow-up ($\geq 70\% = 2$, $\leq 70\%$ or not reported = 1), (iii) measuring tools for self-injury and suicide experiences (structured or semi-structured interviews = 2; self-report scales or not reported = 1), and (iv) control for confounding factors in the analysis (controlled = 2, not controlled/not reported = 1). The overall quality assessment scores were entered into the meta-regression analyses to perform sensitivity analyses (Bown & Sutton, 2010).

Data analyses strategy

The Data Analysis Strategy had two subsections that concerned (i) the meta-analyses and (ii) the meta-regression analyses.

²Studies whose data could not be converted into standardized mean differences (SMD) and pooled in the meta-analyses.

Meta-analyses

The relationships between EA, NSSI, and suicide experiences were examined by calculating effect sizes in the form of standardized mean differences (SMDs) and their associated 95% confidence intervals (CI), which were, then, pooled in Stata 16[®] using the *metan* command (Kontopantelis & Reeves, 2010). To avoid discounting any effect sizes, we used a common strategy according to which an average effect size is computed and entered into the analysis (e.g., Siddaway et al., 2015) for those studies which contributed more than one effect size for the same relationship (Anderson & Crowther, 2012) or reported different modes of suicide behavior (DeBeer et al., 2018; Rogers & Joiner, 2018). Subgroup analyses were performed to examine different modes of suicide experiences (e.g., ideation, plans, and attempts), where possible, in relation to EA. According to published guidelines (Higgins et al., 2003; Hunter & Schmidt, 2000), random-effects models were utilized because they are less prone to false-positive conclusions (e.g., Type I bias). Publication bias was assessed through visual inspection of the funnel plots and by applying the Egger's test, for those comparisons that were based on nine or more independent effect sizes (Egger et al., 1997). We used the Duval and Tweedie's (2000) trim-and-fill method, which produces corrections to the estimated effect sizes by computing a probable number of missing studies when publication bias is present. The strength of the associations was interpreted by using Cohen's (1988) guidelines, where $d = 0.20$, $d = 0.50$, and $d = 0.80$ are considered low, medium, or large, respectively.

Meta-regression analyses

Univariate meta-regression analyses were performed, using the *metareg* command in Stata 16[®] (Harbord & Higgins, 2008), to examine whether participant-related characteristics, such as age as a continuous or dichotomous variable (1 indicates ≤ 18 ; 2, > 18); percentage of those identifying as male; type of population (1 indicates individuals from the general community [with or without diagnosed mental health problems]; 2, psychiatric in-patients/primary care individuals or other [e.g., veterans, inmates]; methodological factors, including percentage of response rates; research designs (1 indicates cross-sectional; 2, prospective/experimental); instruments used for measuring EA [1 indicates Acceptance & Action Questionnaire (AAQ); 2, AAQ-Revised; 3, other (e.g., the Multidimensional EA Questionnaire)]; screening tools for suicide thoughts and behaviors (1 indicates not reported or self-report scale; 2, structured or semi-structured clinical interview); and overall risk of bias scores, affected the strength of the observed

relationships between EA, NSSI, and suicide experiences. In the event that multiple moderators were identified, we planned to conduct multivariate meta-regression analyses. The meta-regression analyses were conducted only for comparisons which incorporated eight or more independent effect sizes (Thompson & Higgins, 2002).

RESULTS

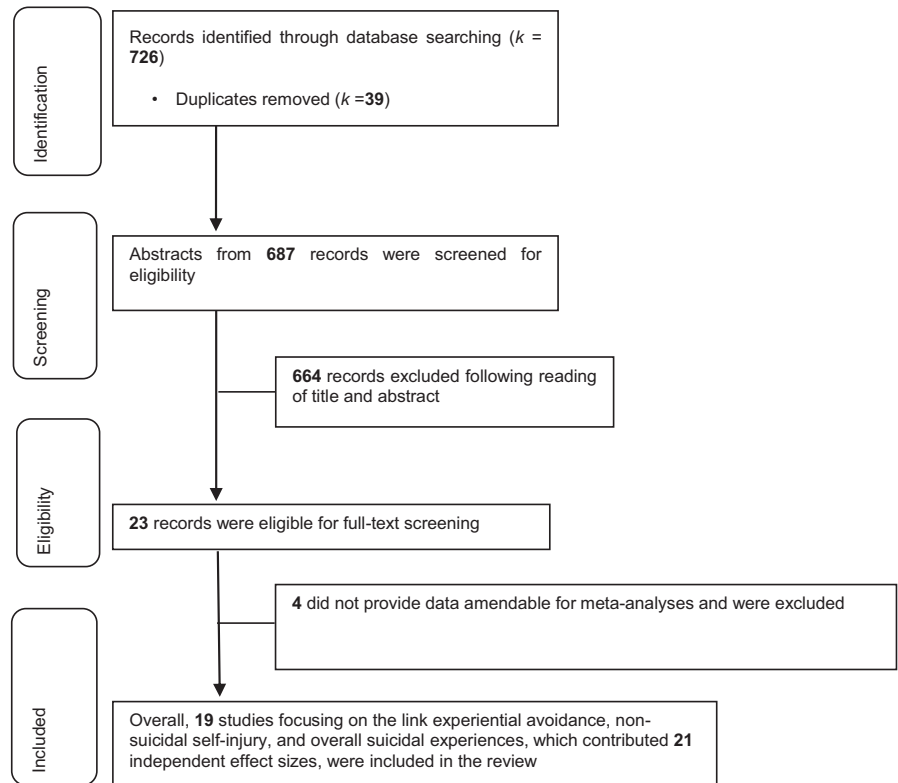
Our search yielded 726 papers, of which 39 were removed because they were duplicates. In total, we retrieved and screened full-text copies of 687 papers. Of those, 664 articles were removed because they did not fulfill the full inclusion criteria. Twenty-three studies met the eligibility criteria for inclusion. However, four studies, which did not provide data amendable for meta-analyses, were excluded because either the lead authors did not provide the required data or because these data were not available. Hence, this systematic review and meta-analysis was based on 19 independent studies (see Figure 1) as follows: 11 studies contributed a total number of 13 independent effect sizes and focused on the relationship between EA and NSSI; seven studies examined the relationship between EA and suicide experiences that comprised an amalgamation of suicide attempts, ideations and/or plans; and four studies examined the relationship between EA and suicide ideation. Notably, none of these studies investigated NSSI and suicide experiences using the same sample.

The overall number of participants was 9900 with a mean age of 25.9 ($SD = 8.86$). This sample mainly comprised people from the general community and university students (see Table 1). The majority of the studies were conducted in the United States of America ($k = 14$; 73.68%), with two studies being conducted in the United Kingdom (10.53%), and a single (5.26%) study each conducted in Canada, Portugal, and Taiwan.

Meta-analyses of the link between EA and NSSI

The pooled effect size across 13 comparisons for the relationship between EA and NSSI was small but significant [SMD = 0.38, CI = 0.26 to 0.49, $p < 0.001$], and exhibited high heterogeneity ($I^2 = 89.7$; see forest plot in Figure 2). Of the 13 individual comparisons, eight had clear significant effects. The inspection of the funnel plot indicated publication bias, meaning that there was a tendency for studies reporting a negative relationship between EA and NSSI to remain unpublished. This was also confirmed by running the Egger's test for publication bias which was significant (Egger's regression $p = 0.001$; see Figure 3). To account for this, we applied the Duval and Tweedie's trim-and-fill method, which reduced the

FIGURE 1 PRISMA flow diagram for the entire review



effect size from $SMD = 0.38$ to 0.17 . This reduced effect size was based on a probable estimation of the unpublished studies which could not be included in the current meta-analysis. Therefore, it may indicate publication bias for this relationship and, as such, caution should be applied when interpreting this pattern of findings (Murad et al., 2018).

Meta-analyses of the link between EA and overall suicide experiences

In total, seven studies were identified examining the relationship between EA and overall suicide experiences that included suicide ideation, attempts and/or plans. The pooled effect size was medium ($SMD = 0.60$, $95\% CI = 0.29$ to 0.91), but heterogeneity was high ($I^2 = 96.8$; see the forest plot in Figure 4). Only one study reported non-significant effects. The limited number of studies prevented us from running formal publication bias tests for this relationship (Saveleva & Selinski, 2008). Therefore, these results should be interpreted with caution.

Subgroup analyses: meta-analyses of the link between EA and suicide ideation

Four independent studies provided data for the relationship between EA and suicide ideation (DeBeer et al., 2018; Ellis & Rufino, 2016; Rogers & Joiner, 2018; Roush et al., 2019).

The pooled effect size indicated a moderate to large association ($SMD = 0.71$, $CI = 0.57$ to 0.85 ; see the forest plot in Figure 5), with no substantial heterogeneity ($I^2 = 0$). These findings should be interpreted with caution because of the low number of comparisons.

Meta-regression analyses

Univariate meta-regression analyses were conducted only for the link between EA and NSSI because there were sufficient comparisons to justify this analysis (Thompson & Higgins, 2002). In total, we assessed nine moderators which included age as a continuous variable ($p = 0.72$), age as a categorical variable ($p = 0.30$), percentage of males ($p = 0.29$), percentage of response rate of those who completed the studies ($p = 0.51$), type of research design ($p = 0.49$), type of population ($p = 0.86$), type of instrument assessing EA ($p = 0.93$), screening tests for suicide thoughts and behaviors ($p = 0.86$), and overall quality appraisal score ($p = 0.40$; see Table 1). None of the moderators examined were found to affect the strength of the relationship between EA and NSSI (see Table 2).

DISCUSSION

This is, to our knowledge, the first systematic review with meta-analysis to examine the relationships between EA, NSSI, and suicide experiences which was based on 9900

TABLE 1 Descriptive characteristics of the included studies

Study	Country	Research design	Screening tool for EA	Screening tool for suicidal ideation and acts, and non-suicidal self-injury (NSSI)	Mode of suicidal ideation and acts, and non-suicidal self-injury (NSSI)
Anderson and Crowther (2012)	USA	CS	AAQ	DSHI	NSSI
Anderson et al. (2018)	USA	CS	AAQ	DSHI	NSSI
Angelakis and Gooding (2020)	UK	CS	AAQ-2	SBQ-R	SI & SB
Brausch and Woods, ()	USA	FU	AAQ-2	SIQ-JR	SI
Chapman et al. (2005)	USA	CS	AAQ	LPC-2 Interview	NSSI
Chou et al., (2018)	Taiwan	FU	AAQ	Questions from the Kiddie-SADS-E	SI & SA
DeBeer et al., (2018)	USA	FU	AAQ-2	The CSSRS Interview	SI & SA & NSSI
Ellis and Rufino (2016)	USA	CT	AAQ-2	SCS & BSSI	SI
Gratz et al., (2010)	USA	CS	AAQ	DSHI	NSSI
Greene et al., (2019)	USA	CS	BEAQ	ISAS	NSSI
Howe-Martin et al., (2012)	USA	CS	AFQ-Y	DSHI	NSSI
Nielsen et al., (2016)	UK	CS	AAQ-2	ISAS	NSSI
Rogers and Joiner (2018)	USA	CS	BEAQ	BSSI & SRS	SI & SA
Roush et al., (2019)	USA	CS	AAQ-2	BSSI	SI
Skinner et al., (2017)	USA	CS	MEAQ	SBQ-R	SI & SB
Turner et al., (2015)	Canada	CS	AAQ	DSHI	NSSI
Xavier et al., (2018)	Portugal	CS	AFQ-Y	RTSHIA	NSSI
Zvolensky et al., (2015)	USA	CS	AAQ-2	IDAS	SI & SB
Zvolensky et al., (2016)	USA	CS	MEAQ	IDAS	SI & SB

Abbreviations: AAQ, The Acceptance and Action Questionnaire; AAQ-2, The Acceptance and Action Questionnaire-Revised; AFQ-Y, The Avoidance and Fusion Questionnaire for Youth; BEAQ, The Brief Experiential Avoidance Questionnaire; BSSI, The Beck Scale for Suicide Ideation; CT, Clinical Trial; CS, Cross-Sectional; DSHI, The Deliberate Self-Harm Inventory; FU, Follow-Up; GC, General Community; IDAS, Inventory of Depression and Anxiety Symptoms; ISAS, The inventory of statements and self-injury; Kiddie-SADS-E, Kiddie Schedule for Affective Disorders and Schizophrenia; LPC-2, Lifetime Parasuicide Count-2 (LPC-2) interview; MEAQ, Multidimensional Experiential Avoidance Questionnaire; PCI, Primary Care Individuals; PI, Psychiatric Inpatient; SBQ-R, Suicidal Behaviors Questionnaire-Revised; SCS, The Suicide Cognitions Scale; SRS, Suicide Rumination Scale; SIQ-JR, Suicide Ideation Questionnaire-Junior; RTSHIA, The Risk-taking and Self-harm Inventory for Adolescents; US, University Students.

participants across 19 independent studies that provided a total of 21 effect sizes. This meta-analysis contributes to the extant literature by (i) quantifying the effect sizes for each of these relationships, (ii) examining potential moderating variables, and (iii) by applying formal publication bias tests when appropriate.

Overall, there were three key findings. First, the relationship between EA and NSSI was weak but significant. Of the 13 comparisons examined, eight contributed positive and significant effects. Furthermore, none of the potential moderators examined appeared to affect this relationship significantly, whereas there was an indication of publication bias suggesting that this relationship may be inflated. In other words, it seems that those studies that found a weaker or negative outcome remain unpublished, and, as such, were not included in the

current meta-analysis (see Thornton, & Lee, 2000). Second, the effect sizes between EA, suicide ideation, and behaviors were moderate to strong lending confidence to the proposition that EA may play a key role in the pathways to suicide experiences. We identified only two studies that have extended this relationship to suicide attempts. The study of DeBeer et al., (2018), which was focused on an American veteran sample, demonstrated a moderate relationship between EA and suicide attempts, whereas the study conducted by Rogers and Joiner (2018), which recruited community samples, failed to establish such a significant relationship. Therefore, more extensive research efforts are needed to examine this association in both community and/or targeted samples (e.g., individuals on psychiatric in-patient wards, veterans, prisoners). The third key finding was that the majority of the included studies

Sample size and response rate	Mean age	Male (%)	Population	Quality appraisal Scores
214, response rate = 100%	$M_{\text{age}} = 18.86; SD = 1.97$	30%	US	2
230, response rate = 100%	$M_{\text{age}} = 18.76; SD = 2.99$	0%	US	2
1046, response rate = 100%	$M_{\text{age}} = 34.27; SD = 12.51$	41.97%	GC	3
T1: 436; T2: 373, response rate = 85.5%; T3: 367, response rate = 84.2%	$M_{\text{age}} = 13.19; SD = 1.19; \text{Range: } 11\text{--}16 \text{ at baseline}$	46.4%	GC	3
117, response rate = 89.74	$M_{\text{age}} = 33.90; SD = 8.52$	0%	Inmates	2
T1:500; T2: 324, response rate = 65.8%	$M_{\text{age}} = 22.1; SD = 1.8$	47.6%	US	2
T1: 309; T2: 276, response rate = 89.3	$M_{\text{age}} = 38.8; SD = 9.8$	67.6%	Veterans	3
189, response rate = 82%	$M_{\text{age}} = 33.11; SD = 13.26; \text{Range: } 18\text{--}70$	43%	PI	2
392, response rate = 100%	$M_{\text{age}} = 20.25; SD = 2.46$	26%	US	2
778, response rate = 100%	$M_{\text{age}} = 22.27; SD = 6.71$	22.9%	US	1
211, response rate = 99.53%	$M_{\text{age}} = 16.22; SD = 1.23$	48.3%	Schoolchildren	1
1332, response rate = 100%	$M_{\text{age}} = 19.57; SD = 6.22; \text{Range: } 16\text{--}69$	75.2%	GC	2
540, response rate = 38.7%	$M_{\text{age}} = 36.12; SD = 12.02$	38.8%	US	0
118, response rate = 100%	$M_{\text{age}} = 36.17; SD = 15.30$	53.4%	PI	1
218, response rate = 100%	$M_{\text{age}} = 32.33; SD = 9.57$	33.9%	GC with NSSI and suicidal acts	0
931, response rate = 100%	$M_{\text{age}} = 20.26; SD = 3.22; \text{Range: } 17\text{--}54$	28.7%	US	2
776, response rate = 100%	$M_{\text{age}} = 14.55; SD = 1.76; \text{Range: } 12\text{--}18$	47.6%	Schoolchildren	1
138, response rate = 100%	$M_{\text{age}} = 38.4; SD = 10.8$	13.8%	PCI	1
1095, response rate = 64.75%	$M_{\text{age}} = 21.92; SD = 4.23; \text{Range: } 18\text{--}52$	21.9%	US	0

had adopted a cross-sectional design, had primarily recruited a community sample, and scored low in the methodological quality appraisal exercise, which may also account for the weak association between EA and NSSI.

It has been suggested that NSSI, and suicide thoughts and behaviors are highly associated (for a review see Hamza et al., 2012). Therefore, it was surprising that EA was weakly associated with NSSI yet more strongly associated with overall suicide experiences. This recommends that the differential emotional regulation functions of NSSI, and suicide thoughts and behaviors would benefit from qualitative work examining ways in which they interact, perhaps in a cyclical fashion. This finding that there was a weak association between EA and NSSI also calls for a crucial re-evaluation of the EA model (EAM; Chapman et al., 2006). According to

EAM, NSSI is maintained through negative reinforcement, meaning that individuals tend to terminate unpleasant emotions and/or thoughts by engaging in self-destructive forms of avoidance behavior. The EAM posits that there is almost always an external event which induces unpleasant emotional responses. The individual, who is mainly characterized by a low threshold of tolerance of such aversive emotional states, self-injures in an effort to escape their upsetting feelings and associated cognitions. This constitutes an example of negative reinforcement which appears to maintain their engagement in NSSI because such behaviors are effective in reducing the individual's unpleasant feelings (e.g., Nock, 2009). A vicious circle is, then, developed through which the relationship between unwelcome emotional arousal and NSSI is strengthened.

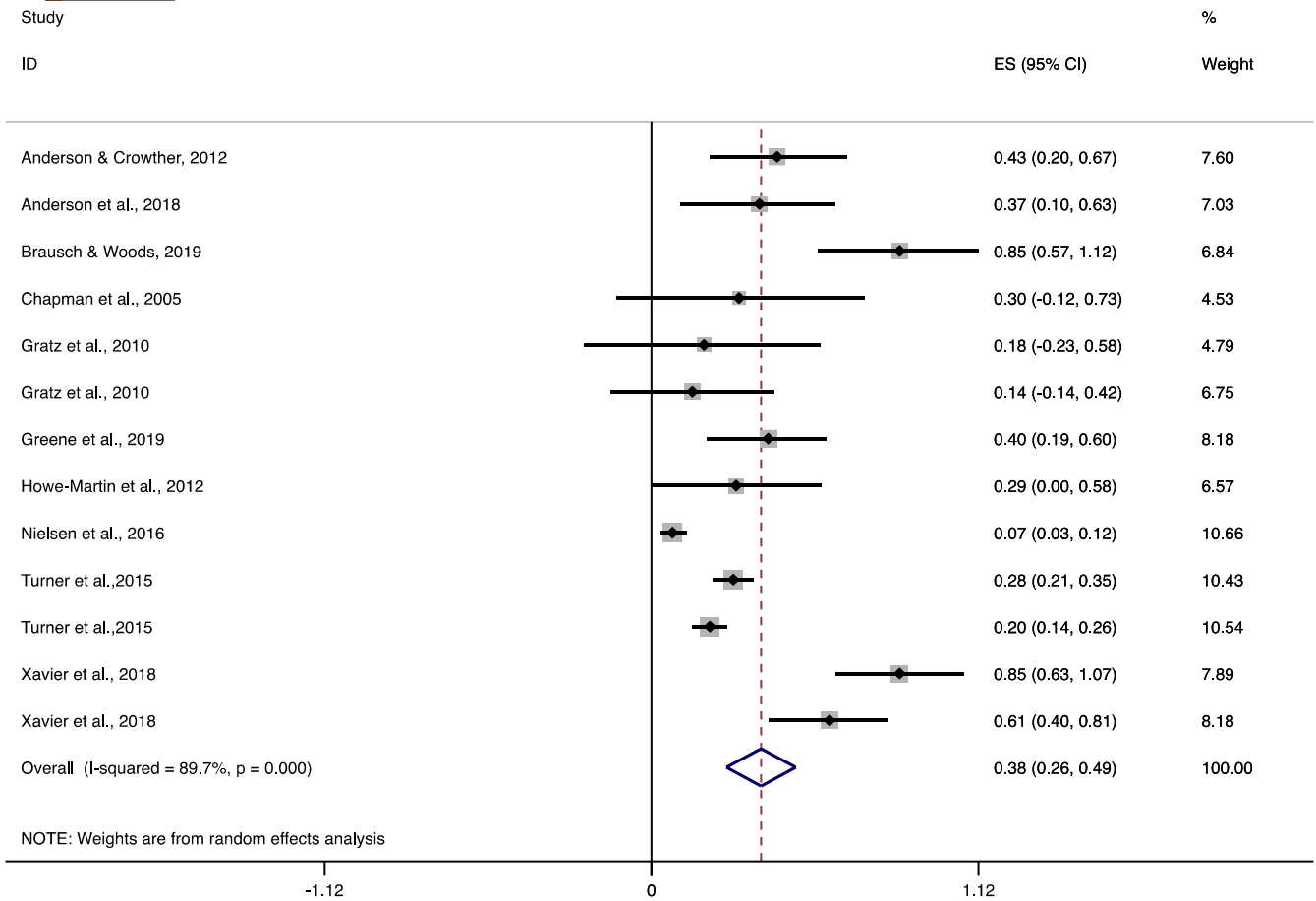


FIGURE 2 Forest plot of the main meta-analysis of the association between EA and NSSI. *Note:* Random-effects model used; 95% CI, 95% Confidence Interval; ES, Standardized Mean Difference (SMD)

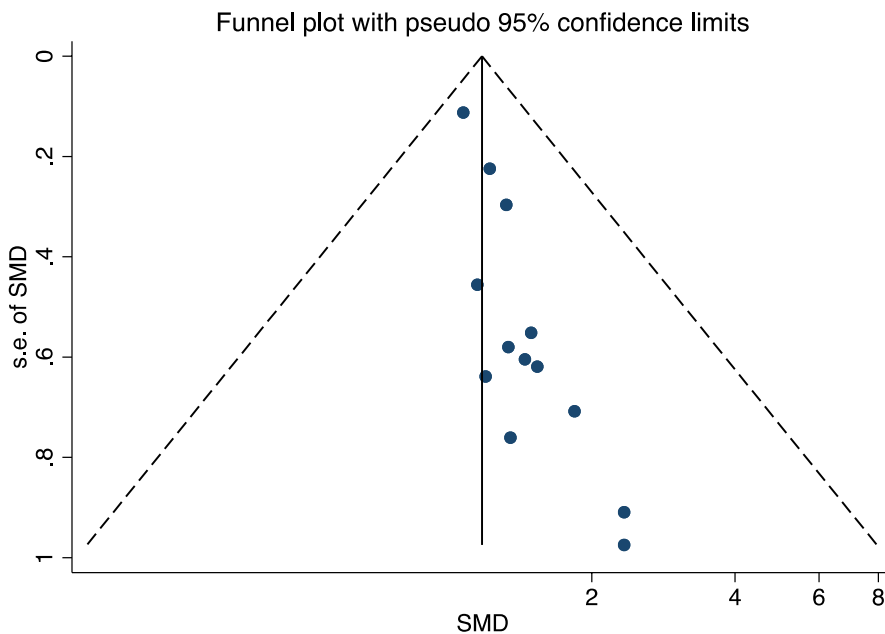


FIGURE 3 Publication bias funnel plot showing standard error by the SMD for the 13 comparisons examining the association between EA and NSSI. Egger's regression intercept, 4.81 ($SE = 0.14$), $p = 0.001$

Although research has corroborated the emotion changing function of NSSI using both subjective (e.g., self-reports) and objective (e.g., physiological) measures (Franklin, 2014; Franklin et al., 2010), there is contemporary evidence

suggesting that the actual removal and/or reduction of emotional pain produces *relief*, which comprises a powerful emotional reaction described in the existing literature as *pain offset relief* (Franklin et al., 2013). It appears that it can be the

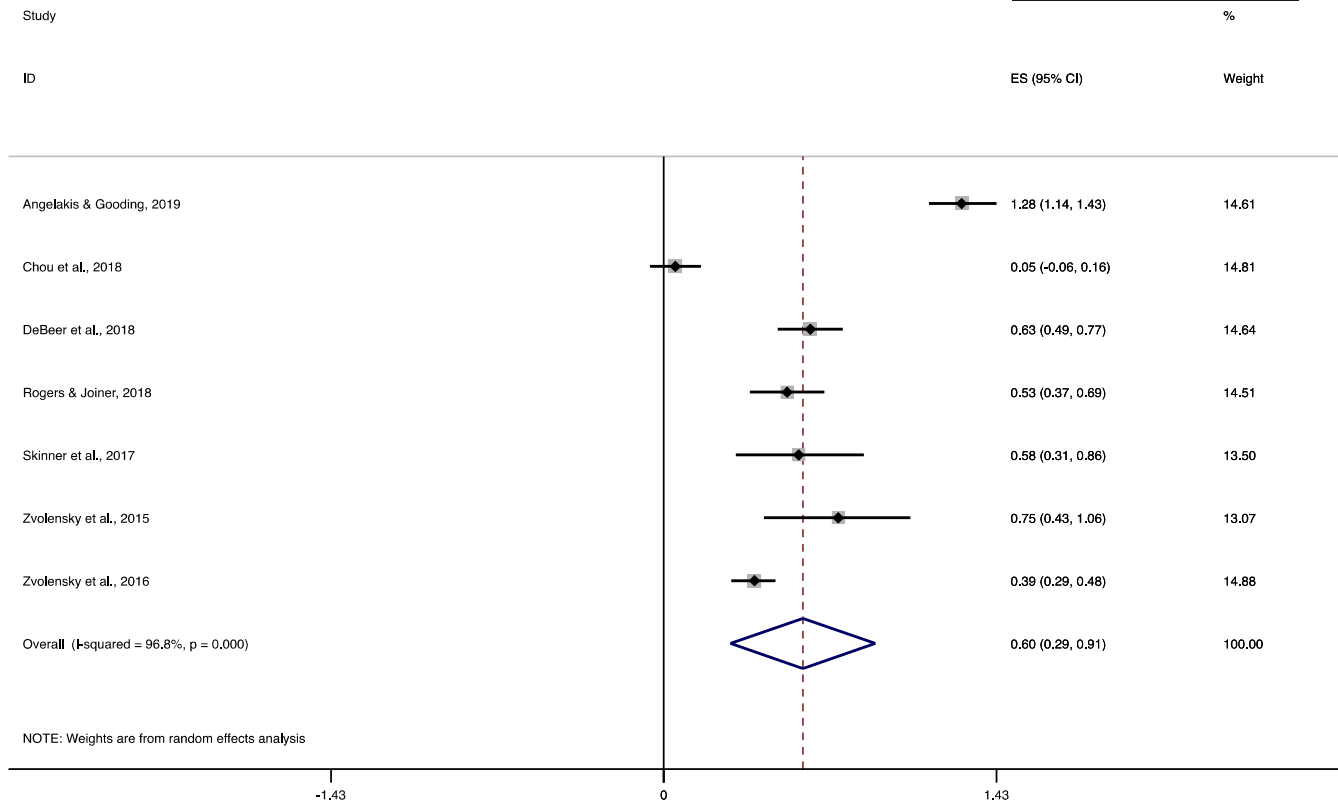


FIGURE 4 Forest plot of the main meta-analysis of the association between EA and overall suicide experiences. *Note:* Random-effects model used; 95% CI, 95% Confidence Interval; ES, Standardized Mean Difference (SMD)

production of this positive feeling of relief together with the reduction of their unpleasant emotional states, which compels people who self-injure to engage in such behaviors (for a review please see Edmondson et al., 2016). Furthermore, there is evidence suggesting that physical pain relief which is produced by NSSI is also associated with emotional pain relief because there exists a large degree of overlap between the neural systems involved in both physical and emotional pain (Eisenberger, 2012). The effects of the positive emotional states known as relief and/or safety in maintaining escape and/or avoidance behaviors have been reliably described within the literature (Angelakis & Austin, 2015a; Engelhard et al., 2015). However, only recently have there been extensive efforts in the application of these findings in understanding and/or treating mental health problems such as depression, anxiety, and obsessive-compulsive disorders which have been strongly associated with NSSI (Angelakis & Austin, 2018; Angelakis et al., 2018; Milosevic, & Radomsky, 2013; Newby, & Moulds, 2010; Olatunji et al., 2011). In accord with the *pain offset relief* interpretation, Angelakis and Austin (2015b) demonstrated that individuals who had been conditioned to avoid point losses in a computerized game by pressing a pedal which also produced a distressing noise tended to do so even in harmless conditions in which point losses had not been scheduled. These data were among the first to examine the reinforcing properties of relief sensations

to positively reinforce self-destructive forms of behavior (for reviews regarding the role of safety signals to reinforce the behaviors that produce them see Dinsmoor, 2001, and Lohr et al., 2007). Convergent evidence from the above studies together with our findings of a weak link between EA and NSSI suggests that the EA model would benefit from the inclusion of the pain offset relief function of NSSI in a revised format.

The effect sizes for the associations between EA, suicide ideation, and behaviors were moderate to large. This finding is in accord with experiencing intense and overwhelming feelings of being defeated and trapped, which is also in accord with psychological models of suicide behavior (Johnson et al., 2008; Williams, 1997; for a review see Taylor et al., 2011). Someone who perceives themselves as being overwhelmingly trapped by external stressors (e.g., financial debt; homelessness; relationship break-downs; criminal convictions; bullying) and/or by internal stressors (e.g., uncontrollable emotional fluctuations; emotional numbing; hallucinations; anxiety; being humiliated) can feel that there is no possibility of hope for the future and no avenue of realistic help (Williams et al., 2005). Therefore, engaging in suicide ideation and/or behaviors provides a way of escaping from such overwhelming negative emotions and/or thoughts that the individual experiences. A recent meta-analysis confirmed that there were strong relationships between perceptions of defeat and entrapment, depression, anxiety, PTSD,

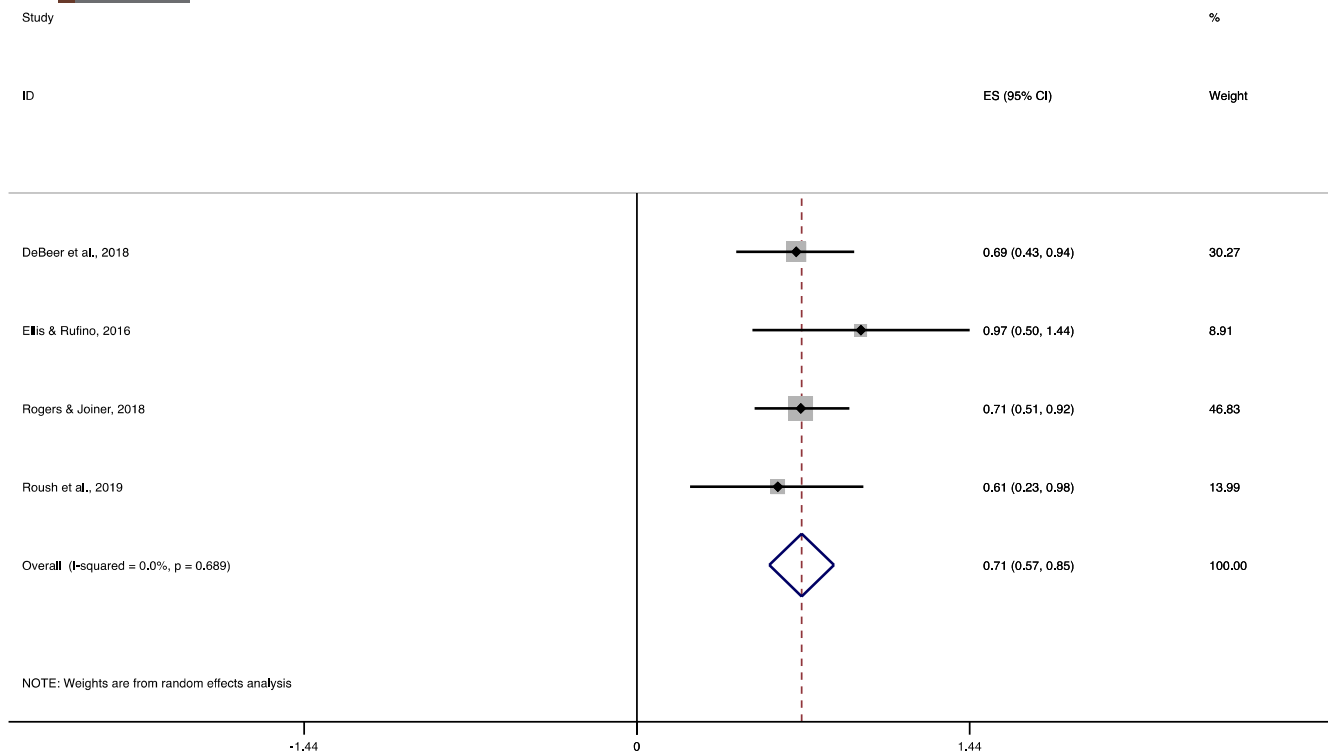


FIGURE 5 Forest plot of the subgroup analysis of the association between EA and suicide ideation. *Note:* Fixed effects model used; 95% CI, 95% Confidence Interval; ES, Standardized Mean Difference (SMD)

and suicide ideation and behaviors (Siddaway et al., 2015). However, to date there are no known studies that have examined the concurrent contribution of both EA and that of perceptions of defeat and entrapment on suicide acts. Therefore, we strongly recommend that future research should examine the interactive effects of EA, defeat, and entrapment in the pathways to suicide thoughts and acts. Such findings may have strong clinical implications because targeting EA (e.g., Kashdan et al., 2006) should also be embodied within suicide prevention protocols.

There were three key limitations which should be considered when interpreting the results of the current meta-analysis. First, because both NSSI, and suicide ideation and behaviors may be similar but distinct complex phenomena (e.g., Fox et al., 2019; Walsh et al., 2018), we anticipated high heterogeneity for the main comparisons, which was, indeed, found to be the case. To compensate, random-effect models were applied. Second, the limited number of individual effect sizes for the associations between EA, NSSI, and suicide experiences did not allow the generalization of these outcomes beyond the specific populations sampled that mainly comprised people from the community. This low number of comparisons may also explain the fact that the meta-regression analyses did not identify any significant moderators. Therefore, caution should be applied when interpreting these non-significant findings with respect to the moderators (Borenstein et al., 2009). Third, it should be noted

that four papers, which were identified and fulfilled our eligibility criteria, were excluded because they did not provide effect sizes which were amendable for meta-analyses, and the authors did not respond to our requests to grant access to these data or the data were not available (Bentley et al., 2015; Gratz et al., 2016; Hulbert & Thomas, 2010; Nielsen et al., 2017). We recommend that a meticulous effort is applied to ensure that all publishable outcomes are accompanied by accessible data (e.g., effect sizes with their associated confidence intervals) which could facilitate conversions among the different effect sizes, and meta-analyses. Last, although not a limitation of the current meta-analytic study, it should be noted that conceptualizations of EA differ as to whether it has a trait like role, a state like role, or, indeed, a more dynamic function with respect to NSSI, and suicide thoughts and behaviors. From a dynamic perspective of EA, it could be argued that it has a role in both the initiation of NSSI and suicide behaviors in addition to having a maintaining effect. However, the use of both qualitative and diary studies (Pindek et al., 2019) in commenting on how EA is conceptualized, operationalized and studied is needed to move this field of study forward.

To conclude, this is the first systematic review and meta-analysis to shed light on the EA models which examine pathways that lead to NSSI and/or suicide experiences (Angelakis & Gooding, 2020; Chapman et al., 2006). Our results indicated that the association between EA and NSSI

TABLE 2 Univariate meta-regression analyses

	<i>b</i> (SE)	<i>p</i> value
<i>Non-suicidal self-injury</i>		
Age (Continuous)	−0.02 (0.04)	0.72
Age (<i>1 = children/adolescents; 2 = adults</i>)	−0.41 (0.38)	0.30
Males (%)	−0.00 (0.00)	0.30
Response rate (%)	−0.03 (0.04)	0.51
Type of research design (<i>1 = individuals from the general community [with or without diagnosed mental health problems]; 2 = psychiatric in-patients/primary care individuals or other [e.g., veterans, inmates]</i>)	0.69 (0.98)	0.49
Type of population (<i>1 = cross-sectional, 2 = prospective/experimental</i>)	0.14 (0.77)	0.86
Type of instrument for EA (<i>1 = AAQ; 2 = AAQ-2; 3 = other</i>)	−0.01 (0.15)	0.93
Screening tools for suicide thoughts and behaviors (<i>1 = indicates not reported or self-report scale; 2 = structured or semi-structured clinical interview</i>)	0.14 (0.77)	0.86
Critical appraisal scores (<i>Continuous</i>)	0.15 (0.17)	0.40

Abbreviations: AAQ, The Acceptance and Action Questionnaire; AAQ-2, The Acceptance and Action Questionnaire-Revised; EA, Experiential Avoidance; SE, Standard Error.

was significant but weak, and most likely inflated, whereas a moderate to stronger significant relationship between EA, suicide ideation, and behaviors was supported. Future studies may benefit from advancing this line of research by focusing on two key priorities, namely, (i) the inclusion of recent advances which involve the pain offset relief function of NSSI, and (ii) the integration of quantitative and qualitative research methods together with diary studies. Diary studies reduce memory biases, especially when experiences of NSSIs are reported, and sample in-the-moment experiences thus increasing the accuracy of the data (Hepp et al., 2020).

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CONFLICT OF INTEREST

All the authors declare that they have no conflicts of interest.

ORCID

Ioannis Angelakis  <https://orcid.org/0000-0002-1493-7043>
Patricia Gooding  <https://orcid.org/0000-0002-7458-4462>

REFERENCES

*These are studies which have been included in the meta-analysis.

*Anderson, N., & Crowther, J. (2012). Using the experiential avoidance model of non-suicidal self-injury: Understanding who stops and who continues. *Archives of Suicide Research, 16*(2), 124–134. <https://doi.org/10.1080/13811118.2012.667329>

Angelakis I., & Austin J. L. (2015a). Maintenance of safety behaviors via response-produced stimuli. *Behavior Modification, 39*, (6), 932–954. <http://dx.doi.org/10.1177/0145445515610314>

Angelakis I., & Austin J. L. (2015b). Aversive events as positive reinforcers: An investigation of avoidance and safety signals in humans. *The Psychological Record, 65*, (4), 627–635. <http://dx.doi.org/10.1007/s40732-015-0133-4>

Angelakis I., & Austin J. L. (2018). The effects of the non-contingent presentation of safety signals on the elimination of safety behaviors: An experimental comparison between individuals with low and high obsessive-compulsive profiles. *Journal of Behavior Therapy and Experimental Psychiatry, 59*, 100–106. <http://dx.doi.org/10.1016/j.jbtep.2017.12.005>

Angelakis I., Gooding P., & Panagioti M. (2016). Suicidality in body dysmorphic disorder (BDD): A systematic review with meta-analysis. *Clinical Psychology Review, 49*, 55–66. <http://dx.doi.org/10.1016/j.cpr.2016.08.002>

Angelakis I., Gooding P., Tarrrier N., & Panagioti M. (2015). Suicidality in obsessive compulsive disorder (OCD): A systematic review and meta-analysis. *Clinical Psychology Review, 39*, 1–15. <http://dx.doi.org/10.1016/j.cpr.2015.03.002>

Angelakis I., Lewis V., Austin J. L., & Panagioti M. (2018). Examining the effects of punishment schedule density on the development and maintenance of avoidance and safety behaviours: Implications for exposure therapies. *Journal of Behavior Therapy and Experimental Psychiatry, 61*, 172–179. <http://dx.doi.org/10.1016/j.jbtep.2018.08.003>

Angelakis I., & Pseftogianni F. (2021). Association between obsessive-compulsive and related disorders and experiential avoidance: A systematic review and meta-analysis. *Journal of Psychiatric Research, 138*, 228–239. <http://dx.doi.org/10.1016/j.jpsyc.2021.03.062>

*Anderson, N. L., Smith, K. E., Mason, T. B., & Crowther, J. H. (2018). Testing an integrative model of affect regulation and avoidance in non-suicidal self-injury and disordered eating. *Archives of*

- Suicide Research*, 22, 295–310. <https://doi.org/10.1080/1381118.2017.1340854>
- Anestis, M. D., Pennings, S. M., Lavender, J. M., Tull, M. T., & Gratz, K. L. (2013). Low distress tolerance as an indirect risk factor for suicidal behavior: Considering the explanatory role of non-suicidal self-injury. *Comprehensive Psychiatry*, 54(7), 996–1002. <https://doi.org/10.1016/j.comppsy.2013.04.005>
- *Angelakis, I., & Gooding, P. (2020). Obsessive-compulsive disorder and suicidal experiences: The role of experiential avoidance. *Suicide & Life-Threatening Behavior*, 50(2), 359–371. <https://doi.org/10.1111/sltb.12593>
- Bentley, K. H., Sauer-Zavala, S., & Wilner, J. (2015). The unique contributions of distinct experiential avoidance domains to severity and functionality of non-suicidal self-injury. *Journal of Experimental Psychopathology*, 6(1), 40–57. <https://doi.org/10.5127/jep.040613>
- Borenstein, M., Hedges, L., Higgins, J., & Higgins, D. (2009). *Introduction to meta-analysis*, 2nd ed. Wiley.
- Bown, M., & Sutton, A. (2010). Quality control in systematic reviews and meta-analyses. *European Journal of Vascular & Endovascular Surgery*, 40(5), 669–677. <https://doi.org/10.1016/j.ejvs.2010.07.011>
- Brausch, A. M., & Gutierrez, P. M. (2010). Differences in non-suicidal self-injury and suicide attempts in adolescents. *Journal of Youth and Adolescence*, 39, 233–242. <https://doi.org/10.1016/j.jad.2013.11.015>
- *Brausch, A. M., & Woods, S. E. (2019). Emotion regulation deficits and nonsuicidal self-injury prospectively predict suicide ideation in adolescents. *Suicide and Life-Threatening Behavior*, 49(3), 868–880. <https://doi.org/10.1111/sltb.12478>
- Brereton, A., & McGlinchey, E. (2020). Self-harm, emotion regulation, and experiential avoidance: A systematic review. *Archives of Suicide Research*, 24(supp. 1), 1–24. <https://doi.org/10.1080/1381118.2018.1563575>
- Briere, J., & Gil, E. (1998). Self-mutilation in clinical and general population samples: Prevalence, correlates, and functions. *American Journal of Orthopsychiatry*, 68, 609–620. <https://doi.org/10.1037/h0080369>
- Brown, M. Z., Comtois, K. A., & Linehan, M. M. (2002). Reasons for suicide attempts and nonsuicidal self-injury in women with borderline personality disorder. *Journal of Abnormal Psychology*, 111, 198–202. <https://doi.org/10.1037/0021-843X.111.1.198>
- Centre for reviews and dissemination (CRD). (2010). *CRD's guidance for undertaking reviews in health care*. CRD, University of York.
- Chapman, A. L., Gratz, K. L., & Brown, M. Z. (2006). Solving the puzzle of deliberate self-harm: The experiential avoidance model. *Behaviour Research and Therapy*, 44, 371–394. <https://doi.org/10.1016/j.brat.2005.03.005>
- *Chapman, A. L., Specht, M. W., & Cellucci, T. (2005). Borderline personality disorder and deliberate self-harm: Does experiential avoidance play a role? *Suicide & Life-Threatening Behavior*, 35(4), 388–399. <https://doi.org/10.1521/suli.2005.35.4.388>
- *Chou, W. P., Yen, C. F., & Liu, T. L. (2018). Predicting effects of psychological inflexibility/experiential avoidance and stress coping strategies for internet addiction, significant depression, and suicidality in college students: A prospective study. *International Journal of Environmental Research and Public Health*, 15(4), E788. <https://doi.org/10.3390/ijerph15040788>
- Claes, L., & Vandereycken, W. (2007). Self-injurious behavior: Differential diagnosis and functional differentiation. *Comprehensive Psychiatry*, 48(2), 137–144. <https://doi.org/10.1016/j.comppsy.2006.10.009>
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*, 2nd ed. Lawrence Erlbaum Associates.
- Creighton, G., Oliffe, J., Matthews, J., & Saewyc, E. (2016). “Dulling the Edges”: Young men’s use of alcohol to deal with grief following the death of a male friend. *Health Education & Behavior*, 43(1), 54–60. <https://doi.org/10.1177/1090198115596164>
- *DeBeer, B., Meyer, E., Kimbrel, N., Kittel, J., Gulliver, S., & Morissette, S. (2018). Psychological inflexibility predicts of suicidal ideation over time in veterans of the conflicts in Iraq and Afghanistan. *Suicide & Life-Threatening Behavior*, 48(6), 627–641. <https://doi.org/10.1111/sltb.12388>
- Dinsmoor, J. A. (2001). Stimuli inevitably generated by behavior that avoids electric shock are inherently reinforcing. *Journal of the Experimental Analysis of Behavior*, 75, 311–333. <https://doi.org/10.1901/jeab.2001.75-311>
- Duval, S., & Tweedie, R. (2000). Trim and fill: A simple funnel-plot-based method for testing and adjusting for publication bias in meta-analysis. *Biometrics*, 56(2), 455–463. <https://doi.org/10.1111/j.0006-341x.2000.00455.x>
- Edmondson, A., Brennan, C., & House, A. (2016). Non-suicidal reasons for self-harm: A systematic review of self-reported accounts. *Journal of Affective Disorders*, 191, 109–117. <https://doi.org/10.1016/j.jad.2015.11.043>
- Egger, M., Smith, G., Schneider, M., & Minder, C. (1997). Bias in meta-analysis detected by a simple, graphical test. *BMJ*, 315(7109), 629–634. <https://doi.org/10.1136/bmj.315.7109.629>
- Eisenberger, N. (2012). The pain of social disconnection: Examining the shared neural underpinnings of physical and social pain. *Nature Reviews. Neuroscience*, 13(6), 421–434. <https://doi.org/10.1038/nrn3231>
- *Ellis, T. E., & Rufino, K. A. (2016). Change in experiential avoidance is associated with reduced suicidal ideation over the course of psychiatric hospitalization. *Archives of Suicide Research*, 20(3), 426–437. <https://doi.org/10.1080/1381118.2015.1093983>
- Engelhard, I. M., van Uijen, S. L., van Seters, N., & Velu, N. (2015). The effects of safety behaviors directed towards a safety cue on perceptions of threat. *Behavior Therapy*, 46, 604–610. <https://doi.org/10.1016/j.beth.2014.12.006>
- Fox, K., Huang, X., Linthicum, K., Wang, S., Franklin, J., Ribeiro, J., & Fox, K. (2019). Model complexity improves the prediction of nonsuicidal self-injury. *Journal of Consulting and Clinical Psychology*, 87(8), 684–692. <https://doi.org/10.1037/ccp0000421>
- Franklin, J. (2014). *How does self-injury change feelings? The Fact Sheet Series, Cornell Research Program on Self-Injury and Recovery*. Cornell University, Ithaca, NY.
- Franklin, J. C., Hessel, E. T., Aaron, R. V., Arthur, M. S., Heilbron, N., & Prinstein, M. J. (2010). The functions of nonsuicidal self-injury: Support for cognitive–affective regulation and opponent processes from a novel psychophysiological paradigm. *Journal of Abnormal Psychology*, 119(4), 850–862. <https://doi.org/10.1037/a0020896>
- Franklin, J. C., Puzia, M. E., Lee, K. M., Lee, G. E., Hanna, E. K., Spring, V. L., & Prinstein, M. J. (2013). The nature of pain offset relief in nonsuicidal self-injury: A laboratory study. *Clinical Psychological Science*, 1(2), 110–119. <https://doi.org/10.1177/2167702612474440>
- Gooding, P., Tarrier, N., Dunn, G., Shaw, J., Awenat, Y., Ulph, F., & Pratt, D. (2015). The moderating effects of coping and self-esteem on the relationship between defeat, entrapment and suicidality in a sample of prisoners at high risk of suicide. *European Psychiatry*, 30(8), 988–994. <https://doi.org/10.1016/j.eurpsy.2015.09.002>

- *Gratz, K. L., Breetz, A., & Tull, M. T. (2010). The moderating role of borderline personality in the relationships between deliberate self-harm and emotion-related factors. *Personality and Mental Health, 4*(2), 96–107. <https://doi.org/10.1002/pmh.102>
- Gratz, K. L., Chapman, A. L., Dixon-Gordon, K. L., & Tull, M. T. (2016). Exploring the association of deliberate self-harm with emotional relief using a novel implicit association test. *Personality Disorders, 7*(1), 91–102. <https://doi.org/10.1037/per000013>
- Gratz, K. L., Conrad, S. D., & Roemer, L. (2002). Risk factors for deliberate self-harm among college students. *American Journal of Orthopsychiatry, 72*, 128–140. <https://doi.org/10.1037//0002-9432.72.1.128>
- *Greene, D., Hasking, P., & Boyes, M. (2019). The associations between alexithymia, non-suicidal self-injury, and risky drinking: The moderating roles of experiential avoidance and biological sex. *Stress and Health, 35*(4), 457–467. <https://doi.org/10.1002/smi.2879>
- Hamza, C., Stewart, S., & Willoughby, T. (2012). Examining the link between nonsuicidal self-injury and suicidal behavior: A review of the literature and an integrated model. *Clinical Psychology Review, 32*(6), 482–495. <https://doi.org/10.1016/j.cpr.2012.05.003>
- Harbord, R., & Higgins, J. P. T. (2008). Meta-Regression in Stata. *The Stata Journal, 8*(4), 493–519. <https://doi.org/10.1177/1536867X0800800403>
- Hawton, K., Saunders, K. E., & Connor, R. (2012). Self-harm and suicide in adolescents. *The Lancet, 379*, 2373–2382. [https://doi.org/10.1016/S0140-6736\(12\)60322-5](https://doi.org/10.1016/S0140-6736(12)60322-5)
- Hayes, S. C., Wilson, K. G., Gifford, E. V., Follette, V. M., & Strosahl, K. (1996). Experiential avoidance and behavioral disorders: A functional dimensional approach to diagnosis and treatment. *Journal of Consulting and Clinical Psychology, 64*, 1152–1168. <https://doi.org/10.1037/0022-006X.64.6.1152>
- Heath, N., Toste, J., Nedecheva, T., & Charlebois, A. (2008). An examination of nonsuicidal self-injury among college students. *Journal of Mental Health Counseling, 30*(2), 137–156. <https://doi.org/10.17744/mehc.30.2.8p879p3443514678>
- Hepp, J., Carpenter, R., Störkel, L., Schmitz, S., Schmah, C., & Niedtfeld, I. (2020). A systematic review of daily life studies on non-suicidal self-injury based on the four-function model. *Clinical Psychology Review, 82*, 101888. <https://doi.org/10.1016/j.cpr.2020.101888>
- Higgins, J., Thompson, S., Deeks, J., & Altman, D. (2003). Measuring inconsistency in meta-analyses. *British Medical Journal, 327*(7414), 557–560. <https://doi.org/10.1136/bmj.327.7414.557>
- *Howe-Martin, L., Murrell, A., & Guarnaccia, C. (2012). Repetitive nonsuicidal self-injury as experiential avoidance among a community sample of adolescents. *Journal of Clinical Psychology, 68*(7), 809–829. <https://doi.org/10.1002/jclp.21868>
- Hulbert, C., & Thomas, R. (2010). Predicting self-injury in BPD: An investigation of the experiential avoidance model. *Journal of Personality Disorders, 24*(5), 651–663. <https://doi.org/10.1521/pedi.2010.24.5.651>
- Hunter, J. E., & Schmidt, F. L. (2000). Fixed effects vs. random effects meta-analysis models: Implications for cumulative research knowledge. *International Journal of Selection and Assessment, 8*, 275–292. <https://doi.org/10.1111/1468-2389.00156>
- Jadidi, F., Mohammadkhani, S., & Tajrishi, K. (2011). Perfectionism and academic procrastination. *Procedia - Social and Behavioral Sciences, 30*, 534–537. <https://doi.org/10.1016/j.sbspro.2011.10.104>
- Johnson, J., Gooding, P., & Tarrier, N. (2008). Suicide risk in schizophrenia: Explanatory models and clinical implications, The Schematic Appraisal Model of Suicide (SAMS). *Psychology and Psychotherapy: Theory, Research and Practice, 81*(1), 55–77. <https://doi.org/10.1348/147608307X244996>
- Johnson, J., Gooding, P. A., Wood, A. M., Taylor, P. J., Pratt, D., & Tarrier, N. (2010). Resilience to suicidal ideation in psychosis: Positive self-appraisals buffer the impact of hopelessness. *Behaviour Research Therapy, 48*, 883–889. <https://doi.org/10.1016/j.brat.2010.05.013>
- Joiner, T. (2005). *Why people die by suicide*. Harvard University Press.
- Kapur, N., Steeg, S., Turnbull, P., Webb, R., Bergen, H., Hawton, K., Geulaov, G., Townsend, E., Ness, J., Waters, K., & Cooper, J. (2015). Hospital management of suicidal behaviour and subsequent mortality: A prospective cohort study. *The Lancet Psychiatry, 2*(9), 809–816. [https://doi.org/10.1016/S2215-0366\(15\)00169-8](https://doi.org/10.1016/S2215-0366(15)00169-8)
- Kashdan, T., Barrios, V., Forsyth, J., & Steger, M. (2006). Experiential avoidance as a generalized psychological vulnerability: Comparisons with coping and emotion regulation strategies. *Behaviour Research and Therapy, 44*(9), 1301–1320. <https://doi.org/10.1016/j.brat.2005.10.003>
- Klonsky, E. (2007). The functions of deliberate self-injury: A review of the evidence. *Clinical Psychology Review, 27*(2), 226–239. <https://doi.org/10.1016/j.cpr.2006.08.002>
- Klonsky, E. (2009). The functions of self-injury in young adults who cut themselves: Clarifying the evidence for affect-regulation. *Psychiatry Research, 166*(2–3), 260–268. <https://doi.org/10.1016/j.psychres.2008.02.008>
- Klonsky, E. D. (2011). Non-suicidal self-injury in United States adults: Prevalence, sociodemographics, topography, and functions. *Psychological Medicine, 41*, 1981–1986. <https://doi.org/10.1017/S0033291710002497>
- Klonsky, E. D., May, A. M., & Glenn, C. R. (2013). The relationship between nonsuicidal self-injury and attempted suicide: Converging evidence from four samples. *Journal of Abnormal Psychology, 122*, 231–237. <https://doi.org/10.1037/a0030278>
- Klonsky, E. D., May, A. M., & Saffer, B. Y. (2016). Suicide, suicide attempts, and suicidal ideation. *Annual Review of Clinical Psychology, 12*, 307–330. <https://doi.org/10.1146/annurev-clinpsy-021815-093204>
- Kontopantelis, E., & Reeves, D. (2010). Metaan: Random-effects meta-analysis. *The Stata Journal, 10*(3), 395–407. <https://doi.org/10.1177/1536867X1001000307>
- Lohr, J., Olatunji, B., & Sawchuk, C. (2007). A functional analysis of danger and safety signals in anxiety disorders. *Clinical Psychology Review, 27*(1), 114–126. <https://doi.org/10.1016/j.cpr.2006.07.005>
- Milosevic, I., & Radomsky, A. S. (2013). Incorporating the judicious use of safety behavior into exposure-based treatments for anxiety disorders: A study of treatment acceptability. *Journal of Cognitive Psychotherapy: International Quarterly, 27*, 155–174. <https://doi.org/10.1891/00889-8391.27.2.155>
- Moher, D., Liberati, A., Tetzlaff, J., & Altman, D. G. (2009). Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *Volucella, 339*(7), e1000097. <https://doi.org/10.1371/journal.pmed.1000097>
- Muehlenkamp, J. J., Claes, L., Havertape, L., & Plener, P. L. (2012). International prevalence of adolescent non-suicidal self-injury and deliberate self-harm. *Child and Adolescent Psychiatry and Mental Health, 6*, 10. <https://doi.org/10.1186/1753-2000-6-10>

- Murad, M. H., Chu, H., Lin, L., & Wang, Z. (2018). The effect of publication bias magnitude and direction on the certainty in evidence. *BMJ Evidence-Based Medicine*, 23, 84–86. <https://doi.org/10.1136/bmjebm-2018-110891>
- Newby, J., & Moulds, M. (2010). Negative intrusive memories in depression: The role of maladaptive appraisals and safety behaviours. *Journal of Affective Disorders*, 126(1–2), 147–154. <https://doi.org/10.1016/j.jad.2010.03.012>
- *Nielsen, E., Sayal, K., & Townsend, E. (2016). Exploring the relationship between experiential avoidance, coping functions and the recency and frequency of self-harm. *PLoS One*, 11(7), e0159854. <https://doi.org/10.1371/journal.pone.0159854>
- Nielsen, E., Sayal, K., & Townsend, E. (2017). Functional coping dynamics and experiential avoidance in a community sample with no self-injury vs. non-suicidal self-injury only vs. those with both non-suicidal self-injury and suicidal behaviour. *International Journal of Environmental Research and Public Health*, 14(6), 575. <https://doi.org/10.3390/ijerph14060575>
- Nock, M. K. (2009). Why do people hurt themselves? New insights into the nature and functions of self-injury. *Current Directions in Psychological Science: a Journal of the American Psychological Society*, 18(2), 78–83. <https://doi.org/10.1111/j.1467-8721.2009.01613.x>
- Nock, M., Borges, G., Bromet, E., Alonso, J., Angermeyer, M., Beautrais, A., Bruffaerts, R., Chiu, W. T., de Girolamo, G., Gluzman, S., de Graaf, R., Gureje, O., Haro, J. M., Huang, Y., Karam, E., Kessler, R. C., Lepine, J. P., Levinson, D., Medina-Mora, M. E., ... Williams, D. (2008). Cross-national prevalence and risk factors for suicidal ideation, plans and attempts. *The British Journal of Psychiatry*, 192, 98–105. <https://doi.org/10.1192/bjp.bp.107.040113>
- O'Connor, R. C. (2011). The integrated motivational-volitional model of suicidal behavior. *Crisis*, 32(6), 295–298. <https://doi.org/10.1027/0227-5910/a000120>
- Olatunji, B. O., Etzel, E. N., Tomarken, A. J., Ciesielski, B. G., & Deacon, B. (2011). The effects of safety behaviours on health anxiety: An experimental investigation. *Behaviour Research and Therapy*, 49, 719–728. <https://doi.org/10.1016/j.brat.2011.07.008>
- Owen, R., Dempsey, R., Jones, S., & Gooding, P. (2018). Defeat and entrapment in bipolar disorder: Exploring the relationship with suicidal ideation from a psychological theoretical perspective. *Suicide and Life-Threatening Behavior*, 48(1), 116–128. <https://doi.org/10.1111/sltb.12343>
- Owen, R., Gooding, P., Dempsey, R., & Jones, S. (2015). A qualitative investigation into the relationships between social factors and suicidal thoughts and acts experienced by people with a bipolar disorder diagnosis. *Journal of Affective Disorders*, 176, 133–140. <https://doi.org/10.1016/j.jad.2015.02.002>
- Panagioti, M., Gooding, P., Taylor, P. J., & Tarrier, N. (2013). A model of suicidal behavior in posttraumatic stress disorder (PTSD): The mediating role of defeat and entrapment. *Psychiatry Research*, 209(1), 55–59. <https://doi.org/10.1016/j.psychres.2013.02.018>
- Pindek, S., Arvan, M., & Spector, P. (2019). The stressor–strain relationship in diary studies: A meta-analysis of the within and between levels. *Work & Stress*, 33(1), 1–21. <https://doi.org/10.1080/02678373.2018.1445672>
- *Rogers, M., & Joiner, T. (2018). Suicide-specific rumination relates to lifetime suicide attempts above and beyond a variety of other suicide risk factors. *Journal of Psychiatric Research*, 98, 78–86. <https://doi.org/10.1016/j.jpsychires.2017.12.017>
- *Roush, J. F., Brown, S. L., Mitchell, S. M., & Cukrowicz, K. C. (2019). Experiential avoidance, cognitive fusion, and suicide ideation among psychiatric inpatients: The role of thwarted interpersonal needs. *Psychotherapy Research*, 29(4), 514–523. <https://doi.org/10.1080/10503307.2017.1395923>
- Saveleva, E., & Selinski, S. (2008). Meta-analyses with binary outcomes: How many studies need to be omitted to detect a publication bias? *Journal of Toxicology and Environmental Health, Part A*, 71(13–14), 845–850. <https://doi.org/10.1080/15287390801985844>
- Shelef, L., Levi-Belz, Y., Fruchter, E., Santo, Y., & Dahan, E. (2016). No way out: Entrapment as a moderator of suicide ideation among military personnel. *Journal of Clinical Psychology*, 72(10), 1049–1063. <https://doi.org/10.1002/jclp.22304>
- Siddaway, A., Taylor, P., Wood, A., & Schulz, J. (2015). A meta-analysis of perceptions of defeat and entrapment in depression, anxiety problems, posttraumatic stress disorder, and suicidality. *Journal of Affective Disorders*, 184, 149–159. <https://doi.org/10.1016/j.jad.2015.05.046>
- *Skinner, K., Rojas, S., & Veilleux, J. (2017). Connecting eating pathology with risk for engaging in suicidal behavior: The mediating role of experiential avoidance. *Suicide & Life-Threatening Behavior*, 47(1), 3–13. <https://doi.org/10.1111/sltb.12249>
- Stroup, D. F., Berlin, J. A., Morton, S. C., Olkin, I., Williamson, G. D., Rennie, D., Moher, D., Becker, B. J., Sipe, T. A., & Thacker, S. B. (2000). Meta-analysis of observational studies in epidemiology: A proposal for reporting. Meta-analysis of observational studies in epidemiology (MOOSE) group. *JAMA*, 283(15), 2008–2012. <https://doi.org/10.1001/jama.283.15.2008>
- Taylor, P. J., Gooding, P., Wood, A. M., & Tarrier, N. (2011). The role of defeat and entrapment in depression, anxiety, and suicide. *Psychological Bulletin*, 137(3), 391–420. <https://doi.org/10.1037/a0022935>
- Thompson, S. G., & Higgins, J. P. (2002). How should meta-regression analyses be undertaken and interpreted? *Statistics in Medicine*, 21, 1559–1573. <https://doi.org/10.1002/sim.1187>
- Thornton, A., & Lee, P. (2000). Publication bias in meta-analysis: Its causes and consequences. *Journal of Clinical Epidemiology*, 53(2), 207–216. [https://doi.org/10.1016/S0895-4356\(99\)00161-4](https://doi.org/10.1016/S0895-4356(99)00161-4)
- *Turner, B., Arya, S., & Chapman, A. (2015). Nonsuicidal self-injury in Asian Versus Caucasian University Students: Who, how, and why? *Suicide & Life-Threatening Behavior*, 45(2), 199–216. <https://doi.org/10.1111/sltb.12113>
- Walsh, C., Ribeiro, J., & Franklin, J. (2018). Predicting suicide attempts in adolescents with longitudinal clinical data and machine learning. *Journal of Child Psychology & Psychiatry*, 59(12), 1261–1270. <https://doi.org/10.1111/jcpp.12916>
- Williams, J. M. G. (1997). *Cry of pain: Understanding suicide and self-harm*. Penguin.
- Williams, J. M. G., Crane, C., Barnhofer, T., & Duggan, D. S. (2005). Psychology and suicidal behaviour: Elaborating the entrapment model. In K. Hawton (Ed.), *Prevention and treatment of suicidal behaviour: From science to practice* (pp. 71–89). Oxford University Press.
- Wolitzky-Taylor, K. B., Ruggiero, K. J., McCart, M. R., Smith, D. W., Hanson, R. F., Resnick, H. S., de Arellano, M. A., Saunders, B. E., & Kilpatrick, D. G. (2010). Has adolescent suicidality decreased in the United States? Data from two national samples of adolescents interviewed in 1995 and 2005. *Journal of Clinical Child &*

Adolescent Psychology, 39, 64–76. <https://doi.org/10.1080/15374410903401146>

*Xavier, A., Cunha, M., & Pinto-Gouveia, J. (2018). Daily peer hassles and non-suicidal self-injury in adolescence: Gender differences in avoidance-focused emotion regulation processes. *Journal of Child and Family Studies*, 27, 59–68. <https://doi.org/10.1007/s10826-017-0871-9>

Zatterqvist, M. (2015). The DSM-5 diagnosis of nonsuicidal self-injury disorder: A review of the empirical literature. *Child and Adolescent Psychiatry and Mental Health*, 9, 31. <https://doi.org/10.1186/s13034-015-0062-7>

*Zvolensky, M. J., Bakhshaie, J., Garza, M., Valdivieso, J., Ortiz, M., Bogiaizian, D., Robles, Z., Schmidt, N. B., & Vujanovic, A. (2015). The role of anxiety sensitivity in the relation between experiential avoidance and anxious arousal, depressive, and suicidal symptoms among Latinos in primary care. *Cognitive Therapy and Research*, 39(5), 688–696. <https://doi.org/10.1007/s10608-015-9696-2>

*Zvolensky, M. J., Jardin, C., Garey, L., Robles, Z., & Sharp, C. (2016). Acculturative stress and experiential avoidance: Relations to depression, suicide, and anxiety symptoms among minority college students. *Cognitive Behaviour Therapy*, 45(6), 501–517. <https://doi.org/10.1080/16506073.2016.1205658>

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