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Preferences in Information Processing and Suicide:

Results from a Young Adult Health Survey in the United Kingdom

Robert J. Cramer, Ph.D.¹, Susan Rasmussen, Ph.D.², Wesley B. Webber, MA³, Victoria L. Sime, BSc²,
Caitlin Haile, BSc², Claire McFadden, BA², & Moira C. McManus, Ph.D.⁴

¹ Old Dominion University, School of Community & Environmental Health, 1014 W. 46th St., Norfolk
VA, 23509, USA

²University of Strathclyde, School of Psychological Sciences and Health, Graham Hills Building, 40
George Street, Glasgow, G1 1QE, United Kingdom

³The University of Alabama, Department of Educational Studies in Psychology, Research Methodology
and Counseling, The University of Alabama, Box 870231, Tuscaloosa, AL 35487, USA

⁴Old Dominion University, College of Health Sciences, 4608 Hampton Blvd, Norfolk, VA 23508, USA
Corresponding Author: Robert J. Cramer, rcramer@odu.edu, (757) 683-3350

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21 **Abstract**

22 Background: Suicide prevention literature currently suffers from inconsistent measurement and
23 incomplete theoretical development.

24 Aims: Using a recommended suicide measurement approach for epidemiological studies (i.e., the Suicidal
25 Behaviors Questionnaire-Revised; SBQ-R), the present investigation assessed United Kingdom young
26 adult suicide prevalence rates. This study also investigated the utility of a Preferences in Information
27 Processing (PIP) model of suicide in identifying those at increased odds for elevated suicide risk, as well
28 as lifetime ideation and attempt.

29 Method: A cross-sectional mental health and well-being survey study (n=414) was conducted.

30 Results: The prevalence rates of elevated risk (49.8%), lifetime ideation only (55.3%), and lifetime
31 attempt (13.5%) were high. Bivariate associations demonstrated that elevated depression, anxiety, and
32 Need for Affect (NFA) Avoidance were associated with worsened suicide outcomes, whereas elevated
33 Need for Cognition (NFC) was associated with decreased suicide risk. Logistic regression results
34 identified depression and NFA Avoidance as the strongest predictors of elevated suicide risk. Multinomial
35 logistic regression results established several PIP-based moderation effects for depression and anxiety in
36 which NFA Approach and NFC differentially influenced odds of suicide attempt group membership.

37 Conclusions: The SBQ-R is an appropriate tool for UK young adult suicide research. NFA and NFC
38 demonstrated potential for inclusion in young adult suicide prevention programming. Further research is
39 needed to fully evaluate the PIP model of suicide and effectiveness of proposed theory-based approaches
40 to suicide prevention.

41 Key Words: Suicide; Need for Affect; Need for Cognition; Depression; Anxiety; Young Adult

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Introduction

47 Suicide is a major public health problem. Globally, there were an estimated 788,000 suicide
48 deaths in 2015 (WHO, 2017a). The rate in the United Kingdom (UK) was 7.4/100,000 in 2015 (WHO
49 2017b). More recent non-age standardized data show a crude suicide rate of 8.9 in 2016 (WHO, 2018).
50 Recent population-based estimates for young adults aged 18-34 ranged from 5.3 to 12.0 per 100,000
51 individuals (ONHS, 2016). High risk for young adults mirror numerous studies that have found age to be
52 inversely related to suicidal ideation and behaviors (Bernal et al., 2007; Borges et al., 2008; Nock et al.,
53 2008). Identification of theoretically-based factors pertinent to risk and prevention is still lacking. The
54 present study sought to identify such factors within a public health-informed approach to quantifying
55 suicide. Batterham and colleagues (2015) conducted a systematic review of established suicide measures
56 for best use in health survey research. Among the criteria evaluated were utility, comprehensiveness,
57 psychometrics, and availability. The Suicidal Behaviors Questionnaire-Revised (SBQ-R; Osman et al.,
58 2001) strongly satisfied all criteria; further, the tool is flexible in its use (e.g., total score, cut-score,
59 individually usable items) and addresses four aspects of lifetime suicide-related behavior (Batterham et
60 al., 2013). Moreover, the SBQ-R is appropriate for the present study's sample of interest. For instance, the
61 total score has demonstrated acceptable internal consistency values in the young adult suicide literature
62 (Batterham et al., 2013; Cramer et al., 2016, 2017). Osman and colleagues (2001) also demonstrated the
63 value of a cut-off score for general population samples that differentiates no risk from elevated risk. This
64 approach has been used as a common outcome to differentiate suicide risk in various college and
65 community samples (Becker et al., 2018; Cramer et al., 2017). Individual items from the SBQ-R have
66 also been used in the ideation-to-action literature to identify factors distinguishing controls, ideators and
67 attempters (Gonzalez, 2012; Rimes et al., in press).

68 The present study is informed by a recent paradigmatic shift in understanding suicide: ideation-
69 to-action frameworks (Klonsky et al., 2018). Historically, suicide research has focused on singular
70 outcomes such as total score on an ideation measure or association with lifetime attempt history. More
71 recently, however, ideation-to-action approaches have sought to understand factors that may explain how

72 or under what conditions a person's suicidal thinking transitions to an attempt or, ultimately, death by
73 suicide. As such, ideation-to-action frameworks presume that risk/protective factors for suicide ideation
74 and attempt/death may differ, and that there are particular factors that can inform understanding of the
75 ideation-to-action pathway. For example, Klonsky and colleagues' (2018) literature review suggested that
76 the behavioral acquired capability for suicide meaningfully differentiates ideators from attempters.
77 Following this emerging pattern in suicide research, prevention and intervention efforts necessitate
78 identification of factors distinguishing controls (i.e., persons without a history of ideation or attempt),
79 ideators (i.e., persons with a history of suicide ideation but no attempts) and attempters. Such factors can
80 then become targets of prevention and intervention programs. The present study tests the Preferences in
81 Information Processing (PIP; Cramer et al., 2016) approach to suicide risk and ideation-to-action in a
82 young adult sample beyond the United States for the first time. In doing so, we seek to: (1) replicate and
83 extend PIP predictions of suicide risk level, and (2) examine for the first time whether PIP variables can
84 differentiate non-suicidal controls, suicide ideators, and suicide attempters. We briefly review depression-
85 and anxiety-based suicide literature in order to establish grounding for the present study.

86 **Depression and Anxiety as Key Factors in Suicide**

87 Depression has been shown to be among disorders with the highest suicide risk (Brown et al.,
88 2000; Chesney et al., 2014; Large et al., 2011). The depression-suicide ideation/risk association has been
89 substantiated in several systematic reviews and meta-analyses (Harris & Barraclough, 1997; Johnson et
90 al., in press). Anxiety has also been shown to relate to suicide, both alone and in conjunction with
91 depression. Multiple reviews (Bentley et al., 2016; Kanwar et al., 2013) have found strong support for
92 several types of anxiety disorders being associated with greater risk for suicide ideation and attempts. In
93 regards to co-morbidity, risk of suicide has been found to be greater for those with diagnoses of
94 depression when they also have symptoms of anxiety (Hawton et al., 2013). From an ideation-to-action
95 purview, when suicide ideators were compared to suicide attempters, depression was found to be higher
96 for ideators whereas anxiety was higher for attempters (May & Klonsky, 2016).

97 The influences of depression and anxiety on suicidality have been further understood through
98 existing theories. For example, Beck's (1976) cognitive model emphasizes that dysfunctional attitudes
99 lead to cognitive errors (e.g., dichotomous thinking) which contributes to pervasive depressive/anxious
100 views. Depression and anxiety also fit within ideation-to-action perspectives such as the integrated
101 motivational-volitional model of suicidal behavior (IMV; O'Connor, 2011). The model consists of three
102 sequenced phases: (1) the pre-motivational phase describing background factors (e.g., biological
103 predisposition) and triggers (e.g., life events) for suicidal ideation; (2) the motivational phase articulating
104 how negative thinking styles (e.g., humiliation, defeat) give rise to suicidal ideation; and (3) the volitional
105 phase highlighting moderating factors (e.g., acquired capability for suicide) that facilitate or inhibit
106 ideation from being translated into behaviors. In the model's pre-motivational phase, depression and/or
107 anxiety could be viewed as diathesis/pre-dispositional factors that might affect subsequent movement
108 through stages. Moreover, depressive or anxious thinking may also capture motivational phase factors
109 such as rumination. However, gaps remain concerning evaluation of factors that may amplify or buffer
110 the effects of depression and anxiety on suicide. The present investigation fills this gap through the PIP
111 lens.

112 **Preferences in Information Processing: Theory and Application**

113 Dual process models of information processing underlie the PIP perspective. Such models
114 (Cacioppo & Petty, 1982; Kirkpatrick & Epstein, 1992) posit that decision-making is a function of two
115 parallel modes of thinking: a heuristic/emotional (i.e. system 1) and a rational/effortful (i.e., system 2)
116 pathway of decision-making. These models have demonstrated empirical utility in a range of topics such
117 as marketing (Petty & Briñol, 2016) and legal (Gunnell & Ceci, 2010) decision-making. Recent literature
118 has also measured proxies for these two streams of information processing: Need for Affect (NFA; Appel
119 et al., 2012; Maio & Esses, 2001) and Need for Cognition (NFC; Cacioppo & Petty, 1992, 1996). NFA
120 concerns the extent of one's preference for engaging with emotional experiences and information,
121 inclusive of both positive and negative affect (Maio & Esses, 2001). NFC is defined as the extent of
122 one's preference for effortful thinking, complexity, and mentalization (Cacioppo & Petty, 1996). NFA

123 and NFC, therefore, constitute attitudes or preferences concerning emotional (i.e., system 1) and cognitive
124 (i.e., system 2) information processing (Cramer et al., 2016). NFC and NFA have, independently and
125 jointly, been widely applied to a range of outcomes such as perceptions of hate crimes (Cramer et al.,
126 2013) and political beliefs (Arceneaux & Vander Wielen, 2013).

127 The PIP approach to understanding suicide risk (Cramer et al., 2016, 2017) draws on dual
128 process, NFA, and NFC theories to provide testable hypotheses. Consistent with a prominent dual process
129 perspective, namely the Elaboration Likelihood Model (ELM; Petty & Briñol, 2015), the extent of
130 effortful thinking is hypothesized to moderate the influence of affect (e.g., depression) or approach to
131 emotion (i.e., NFA) on subsequent outcomes (e.g., thinking patterns, decisions). For instance, where
132 preference for, or engaging in, mental effort is low, emotions directly impact attitudes and decisions via
133 heuristic streams in ways consistent with the positive or negative nature of the emotion. NFA theory and
134 research (Appel et al., 2012; Maio & Esses, 2001) hold that: (1) NFA is comprised of two distinct sub-
135 factors (Avoidance and Approach) that (2) can impact emotional states and decisions directly or via
136 interaction with other constructs. Finally, NFC literature (Cacioppo & Petty, 1996; Petty & Briñol, 2015;
137 Petty et al., 2007) suggests that high levels of mental effort are associated with susceptibility to
138 affectively-charged experiences and the tendency to excessively cogitate about one's own thinking.

139 Only recently have dual process or NFA/NFC studies been evaluated with mental health relevant
140 topics such as alcohol use (Lindgren et al., in press) and violence risk assessment (Cramer, Wevodau et
141 al., 2017). Two studies (Cramer et al., 2016, 2017) have tested one or both key PIP constructs with
142 respect to suicide in student and community samples. Key findings suggest that: (1) NFA Avoidance is
143 consistently associated with elevated suicide risk (as defined by the SBQ-R); (2) NFA Approach received
144 partial support as a risk factor for suicide; (3) NFC moderates the influence of NFA Approach such that
145 the positive approach-suicide association is most pronounced for those high in NFC, and (4) NFA
146 Avoidance may moderate the effect of depression on suicide risk in a manner consistent with depression
147 amplification models (Capron et al., 2014; Pennington et al., 2015) that suggest the influence of
148 depression on suicide may worsen for those preferring to avoid emotion (Cramer et al., 2016). A PIP view

149 of suicide presumes that it is necessary to examine both NFA and NFC in a model to fully understand
150 how PIP impact suicide. Gaps remain in the development of this theoretical perspective. For example,
151 NFA and NFC have only been evaluated with suicide in American young adults. Moreover, depression is
152 the only mental health topic addressed within this framework to date (Cramer et al., 2016). The present
153 study rectified these limitations through inclusion of anxiety, and testing the model in a UK young adult
154 sample.

155 **The Present Study**

156 The present study conducts the first PIP test of suicide beyond the United States. In doing so, we
157 control for two demographic correlates of suicide: age (Borges et al., 2010; Nock et al., 2008) and gender
158 (Antony et al., 1998; Liotta et al., 2015). We proffered the following hypotheses: (H1) NFA Avoidance
159 will display a significant positive association with suicide risk. (H2) NFA Approach will display a
160 significant positive association with suicide risk. (H3) In support of PIP and depression-amplification
161 models of suicide risk, the influence of depression on suicide risk will be strongest for those high in NFA
162 Avoidance. (H4) In support of a PIP approach to suicide risk, the influence of NFA Approach on suicide
163 risk (i.e., H2) will be strongest for those high in NFC. We also extend PIP approaches in two exploratory
164 research questions (RQs): (RQ1) Do PIP characteristics moderate the influence of anxiety on suicide-
165 related outcomes? (RQ2) Do PIP characteristics differentiate controls from suicide ideators and suicide
166 ideators from suicide attempters (i.e., ideation-to-action framework)?

167 **Method**

168 **Participants.** A total of 414 participants completed survey measures of interest.¹ The young adult
169 ($M_{age}=23.26$, $SD=3.75$) group reported gender as female (n=323, 78.0%), male (n=81, 19.6%), and
170 transgender (n=10, 2.4%). Race was relatively homogenous: White (n=387, 93.5%), Asian (n=8, 1.9%),
171 'other' (e.g., Black; n=18, 4.3%), and one person failed to list race.

¹ Four participants from the full 418 person pool were dropped because their reported ages fell beyond the young adult-defined range or they failed to report gender.

172 **Procedure.** Approved by two University Ethics Committees, the present investigation featured a cross-
173 sectional self-report public health surveillance design. A mental health and well-being Qualtrics survey
174 advertised specifically to young adults (ages 18-34) in the United Kingdom was distributed via a range of
175 recruitment streams. The National Health Service (NHS) offices, social media (e.g., Twitter, Facebook),
176 paper (e.g., flyers in community agencies), and in-person campus and community in-person approaches
177 were utilized. Each advertisement stream included a summary study description and survey link. No
178 inclusion or exclusion criteria were advertised with the exception of young adult age. Interested
179 participants visited the survey link at which time they were provided a standard participant information
180 sheet and e-consent form (e.g., including rights of a research participant, investigator and mental health
181 resource contact information). Checking a consent box prior to the survey battery indicated consent,
182 although participants were informed of the ability to withdraw at any time. Participants received a
183 debriefing form upon survey completion.

184 **Measures**

185 **Demographics.** Participants completed a standard demographic form requesting information such
186 as age, gender and race.

187 **Suicide risk.** Suicide-related outcomes were assessed with the SBQ-R (Osman et al., 2001). The
188 SBQ-R is a four-item screener of the following aspects of suicide-related behavior: lifetime behavior
189 (none, ideation, attempt), frequency of suicidal ideation in the last year, lifetime indication of suicidal
190 communications, and estimation of a future suicide attempt likelihood. The present study utilized both the
191 cut-score (to test clinical risk determination) and SBQ-R item to separate controls, ideators, and
192 attempters (to test the ideation-to-action perspective) (see literature review for details).

193 **Mental health.** The Depression Anxiety Stress Scale (DASS-21; Antony et al., 1998) examines
194 the degree of depression, anxiety, and stress symptoms an individual has felt during the past week. Each
195 statement is measured on a scale of 0-3. The DASS-21 provides subscale scores for depression, anxiety,
196 and stress. Internal consistency for all subscales has been high (Antony et al., 1998; Cramer et al., 2016).
197 Internal consistency values in the present study were: depression (.93), anxiety (.88), and stress (.88).

224 significantly lower levels of NFC (Cohen's $d=-0.29$; small effect). Ideation-to-action subgroups displayed
225 significant overall effects on depression, anxiety and NFA Avoidance. Inspection of Table 1 shows the
226 following depression patterns: attempters possessed significantly greater levels compared to both the none
227 group (Cohen's $d=1.78$; large effect) and ideators (Cohen's $d=0.40$; moderate effect). Further, ideators
228 reported significantly higher levels compared to the none group (Cohen's $d=1.25$; large effect). Anxiety
229 differentiated subgroups such that both attempters (Cohen's $d=1.15$; large effect) and ideators (Cohen's
230 $d=0.86$; large effect) displayed significantly higher levels than member of the none group. NFA
231 Avoidance differentiated subgroups such that both attempters (Cohen's $d=1.04$; large effect) and ideators
232 (Cohen's $d=0.75$; large effect) displayed significantly higher levels than members of the none group.

233 **Logistic regression predicting suicide risk group.** Hypotheses 1 through 4, and RQ1, were addressed
234 via the logistic regression model. Simultaneous entry of the following set of predictors classified suicide
235 risk level (0=no risk, 1=elevated risk): (a) control variable main effects for gender (transgender coded
236 reference group) and age; (b) mental health and PIP main effects for depression, anxiety, NFA
237 Avoidance, NFA Approach, and NFC, and; (c) PIP-supported interaction terms of depression-NFA
238 Avoidance, depression-NFA Approach, depression-NFC, anxiety-NFA Avoidance, anxiety-NFA
239 Approach, anxiety-NFC, NFA Avoidance-NFC, and NFA Approach-NFC.

240 Table 2 contains summary statistics for the full model. The set of predictors demonstrated
241 significant and large sized effects for classification of suicide risk level, $\chi^2(16)=189.97$, $p<.001$, Cox &
242 Snell $R^2=.37$, Nagelkerke $R^2=.49$. The model demonstrated acceptable fit, Hosmer & Lemeshow
243 $\chi^2(8)=4.25$, $p=.83$. In support of H1, NFA Avoidance demonstrated a small significant increased odds of
244 elevated suicide risk. Moreover, both depression (small-to-moderate) and anxiety (small) demonstrated
245 significant increased odds of elevated risk. Hypotheses 2 (NFA Approach main effect), 3 (depression-
246 NFA Avoidance interaction), and 4 (NFA Approach-NFC interaction) were all unsupported. Likewise,
247 RQ1 showed no anxiety-PIP interactions.

248 **Multinomial logistic regression predicting ideation-to-action group.** RQ2 concerning application of
249 the PIP to an ideation-to-action suicide paradigm was addressed via a multinomial regression model. The

250 identical set of predictors were included via simultaneous entry. Suicide was coded as 0=control,
251 1=ideation only, and 2=attempters. Ideation was selected as the reference group because the central
252 question within an ideation-to-action framework (Klonsky et al., 2018) concerns what characteristics
253 differentiate controls from ideators and ideators from attempters.

254 The set of predictors demonstrates significant differentiation (large effect) of suicide ideation-to-
255 action groups, $\chi^2(32)=188.81, p<.001$, Cox & Snell $R^2=.37$, Nagelkerke $R^2=.43$. The model demonstrated
256 good fit to the data, $\chi^2(32)=737.72, p=.92$. The following predictors demonstrated significant overall
257 effects on the set of ideation-to-action groups: (1) Age: $\chi^2(2)=11.41, p=.003$; (2) depression: $\chi^2(2)=46.81,$
258 $p<.001$; (3) NFA Avoidance: $\chi^2(2)=12.52, p=.002$; (4) depression-NFA Approach interaction: $\chi^2(2)=6.06,$
259 $p=.048$; (5) anxiety-NFC interaction: $\chi^2(2)=7.36, p=.02$; and (6) NFA Avoidance-NFC interaction:
260 $\chi^2(2)=8.97, p=.01$. Table 3 contains full univariate model results. Depression (large effect) and NFA
261 Avoidance (small effect) demonstrated significantly increased odds of suicide ideation group membership
262 (this interpretation requires taking the inverse of odds ratios below 1.00 in Table 3).

263 In the ideator-attempter model, increases in age (small effect) demonstrated significantly
264 increased odds of suicide attempt group membership. Three two-way PIP-related interactions also
265 demonstrated significant, yet small, associations with ideation-attempt group status: Depression-NFA
266 Approach, anxiety-NFC, and NFA Avoidance-NFC. Inspection of the interactions suggests the following
267 patterns. First, an association of depression with increased likelihood of suicide attempt group
268 membership lessens as NFA Approach increases. In other words, NFA Approach is a protective factor for
269 a depression-suicide attempt link. Second, an association of anxiety with increased likelihood of suicide
270 attempt group membership lessens as NFC increases. In other words, NFC is a protective factor for an
271 anxiety-suicide attempt link. Finally, an association of NFA Avoidance with increased likelihood of
272 suicide attempt group membership worsens as NFC increases. In this instance, NFC is a risk factor for an
273 NFA Avoidance-suicide attempt link.

274 Discussion

275 NFA Avoidance demonstrated robust association with elevated suicide risk. NFC bivariate
276 differences by suicide risk level washed out in the full regression model. These findings suggest,
277 consistent with prior studies (Cramer et al., 2016, 2017), the primacy of NFA Avoidance when evaluating
278 suicide risk level. There were also no observed interaction patterns affecting clinical risk grouping, yet
279 two interactions were observed in one prior study using the SBQ-R total score. In a clinical risk
280 determination framework (Bryan & Rudd, 2006), PIP (Cramer et al., 2016) and depression-amplification
281 (Capron et al., 2014) based moderation effects have therefore yielded no value. When clinicians are
282 evaluating and treating along a suicide risk determination approach, NFA Avoidance may be a target of
283 assessment, formulation and intervention. For instance, NFA Avoidance may represent its own necessary
284 category of risk assessment inquiry beyond those articulated in prior literature (Bryan & Rudd, 2006).
285 Moreover, emotionally-avoidant attitudes may become a treatment goal within Collaborative Assessment
286 and Management of Suicide (CAMS; Jobes, 2012). CAMS is a leading evidence-based suicide-specific
287 therapy and risk management approach inclusive of mutually defined clinical goals between the patient
288 and therapist (Jobes, 2012). Where appropriate, emotionally-avoidant attitude reduction may become a
289 target of therapy in order to improve factors contributing to the patient's suicidality. Normative data and
290 psychometrics properties for the NAQ-S exist in non-clinical samples (Appel et al., 2012; Cramer,
291 Wevodau et al., 2017). A logical next step would be to establish norms and psychometrics in clinical or
292 high-risk populations in order to test the scale's utility in formal risk assessment and treatment
293 monitoring.

294 Present PIP-related findings demonstrated meaningful theory-based value as applied to the
295 ideation-to-action perspective of suicide (Klonsky et al., 2018). Contrary to regression results of the
296 clinical risk model, ideation-to-action framework results suggest that PIP/depression-amplification
297 propositions (Capron et al., 2014; Cramer et al., 2016) concerning the moderating influences of both NFA
298 and NFC are critical, specifically when applied to differentiating suicide ideators and attempters. Contrary
299 to any prior literature or expectations, NFA Approach served as a protective factor in the depression-
300 suicide attempt link. This finding is somewhat surprising given that NFA Approach has: (a) been

301 theorized to precede expression and management of negative emotionality (Maio & Esses, 2001); (b)
302 driven changes in hostility (Wevodau et al., 2014); and (c) demonstrated prior significant positive
303 association with trait neuroticism (Appel et al., 2012; Cramer, Wevodau et al., 2017). One might expect
304 NFA Approach to worsen the influence of depressive symptoms on transitioning suicide ideation to
305 attempts, especially in light of prior research suggesting depression plays a particularly important role in
306 the formation of suicidal ideation (May & Klonsky, 2016). NFA Approach serving a protective role may
307 suggest that a willingness to face affective depressive symptoms (e.g., sadness) reduces risk of the
308 ideation-to-behavior transition. NFA Approach may serve as a context-dependent protective factor
309 (against depression) in an ideation-to-action framework.

310 NFC operated as a protective factor in the anxiety-suicide attempt link. Prior literature has
311 implicated anxiety in the transition from ideation to attempt (Benley et al., 2016; May & Klonsky, 2016).
312 NFC attenuating this potential pathway makes sense when contextualized by dual process models. For
313 example, a basic assumption of ELM (Petty & Briñol, 2015) is that NFC can mitigate the influence of
314 emotion on decisions or behaviors. Such may be occurring in this instance; anxiety, or fear/worry
315 (negative emotions) out of proportion with actual threat, may be overridden or buffered by NFC. In other
316 words, the desire for cognitive complexity and understanding associated with higher NFC (Lord &
317 Putrevu, 2006) may buffer both the anxious affect and/or suicide ideation itself. Such a protective pattern
318 warrants further inspection.

319 NFC operates as a context-dependent risk or protective factor, an increasingly strong PIP
320 theoretical premise. Whereas NFC was a protective factor against anxiety in the ideation-to-action
321 framework, it served as a risk factor in the NFA Avoidance-suicide attempt association. Cramer and
322 colleagues (2016) offer PIP-informed insight into what may be occurring here when they speculated that
323 NFA Avoidance might be conceptualized “as an internalizing process and these parallel internalizing
324 processes in combination elevate suicide risk” (p. 388). In this instance, internalizing or suppressing
325 emotional experience, in combination with extreme mental effort to the point of mental exhaustion, may

326 contribute to suicide ideation transitioning to attempt. Overall, NFC may mitigate or exacerbate risk for
327 suicide attempt depending on a range of other individual differences.

328 The broader body of suicide ideation-to-action literature (Dhingra et al., 2015; Klonsky et al.,
329 2018; O'Connor et al., 2012; Van Orden et al., 2008) has identified numerous factors associated with the
330 ideation-to-attempt pathway among young adult and other populations. These include impulsivity,
331 acquired capability for suicide (e.g., exposure to pain), and exposure to suicide. NFA Approach and NFC,
332 two core aspects of a PIP suicide model (Cramer et al., 2016), moderate the influence of mental health on
333 attempt status. It is noteworthy that NFA Approach and NFC are inconsistent with other moderators of
334 the ideation-to-attempt pathway in that they concern attitudes, as opposed to social learning or behavioral
335 characteristics. This broad set of factors associated with suicide attempt is of most potential value for
336 suicide prevention and intervention efforts when targeting those already experiencing suicide ideation.
337 For instance, public health approaches to prevention such as free community depression and suicide
338 screenings may also examine factors like NFA and NFC. Moreover, mental health education and training
339 for lay and healthcare professional audiences may include content on factors influencing the ideation-to-
340 attempt pathway. We tender these recommendations with the additional suggestion that future research is
341 needed to test long-term PIP-related influences on suicide.

342 Although not the central focus of the study, it is noteworthy that rates of elevated suicide risk,
343 lifetime ideation only and attempts among UK young adults were troublingly high. Granted, these
344 numbers should be interpreted with some caution due to the low sample size in the present study;
345 however, they represent a beginning point to understand the current scope of the suicide problem among
346 UK young adults using a psychometrically-supported measure of suicidality for large-scale survey
347 research (Batterham et al., 2015). Despite problems with defining suicidality noted in the literature
348 (Hasley et al., 2008; Silverman & De Leo, 2016), the SBQ-R (Osman et al., 2001) offers a brief, flexible
349 tool we strongly encourage use of in future UK young adult suicide surveillance work.

350 The present study contained several limitations. Sample size and restricted demographic diversity
351 limit extrapolation of findings to broader populations, an especially important constraint pertinent to

352 epidemiological conclusions concerning UK young adult suicide. Although this study was one of the first
353 and most thorough examinations of PIP constructs with suicide, the cross-sectional and self-report design
354 aspects also temper theoretical conclusions. Finally, as is common in suicide and other mental health
355 literatures, we examine only one theoretical framework in the present study. Moving forward, PIP
356 literature should be tested against or integrated with other prominent theories of suicide in prospective
357 designs.

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References

Antony, M.M., Bieling, P.J., Cox, B.J., Enns, M.W., & Swinson, R.P. (1998). Psychometric properties of the 42-item and 21-item versions of the Depression Anxiety Stress Scales in clinical groups and a community sample. *Psychological Assessment, 10*, 176–181.

Appel, M., Gnambs, T., & Maio, G.R. (2012). A short measure of the need for affect. *Journal of Personality Assessment, 94*, 418–426.

Arceneaux, K., & Vander Wielen, R.J. (2013). The effects of need for cognition and need for affect on partisan evaluations. *Political Psychology, 34*, 23–42

Batterham, P.J., Ftanou, M., Pirkis, J., Brewer, J.L., Mackinnon, A J.,...& Christensen, H. (2015). A systematic review and evaluation of measures for suicidal ideation and behaviors in population-based research. *Psychological Assessment, 27*, 501–512.

Beck, A.T. (1976). *Cognitive therapy and the emotional disorders*. New York: International University Press.

Becker, S.P., Dvorsky, M.R., Holdaway, A.S., & Luebke, A.M. (2018). Sleep problems and suicidal behaviors in college students. *Journal of Psychiatry Research, 99*, 122–128.

Bentley, K.H., Franklin, J.C., Ribeiro, J.D., Kleiman, E.M., Fox, K.R., & Nock, M.K. (2016). Anxiety and its disorders as risk factors for suicidal thoughts and behaviors: A meta-analytic review. *Clinical Psychology Review, 43*, 30-46.

Bernal, M., Haro, J.M., Bernert, S., Brugha, T., de Graaf, R., Bruffaerts, R., ... & Alonso, J. (2007). Risk factors for suicidality in Europe: Results from the ESEMED study. *Journal of Affective Disorders, 101*, 27–34.

Borges, G., Nock, M.K., Abad, J M.H., Hwang, I., Sampson, N.A., Alonso, J., ...& Kessler, R.C. (2010). Twelve month prevalence of and risk factors for suicide attempts in the WHO World Mental Health Surveys. *Journal of Clinical Psychiatry, 71*, 1617–1628.

Brown, G.K., Beck, A.T., Steer, R A., & Grisham, J.R. (2000). Risk factors for suicide in psychiatric outpatients: A 20-year prospective study. *Journal of Consulting and Clinical Psychology, 68*,

385 371–377.

386 Bryan, C.J., & Rudd, M.D. (2006). Advances in the assessment of suicide risk. *Journal of Clinical*
387 *Psychology: In Session*, 62, 185–200.

388 Cacioppo, J.T., & Petty, R.E. (1982). The need for cognition. *Journal of Personality and Social*
389 *Psychology*, 42, 116–131.

390 Cacioppo, J.T., & Petty, R.E. (1996). Dispositional differences in cognitive motivation: The life and times
391 of individuals varying in need for cognition. *Psychological Bulletin*, 119, 197–253.

392 Capron, D.W., Lamis, D.A., & Schmidt, N.B. (2014). Test of the depression amplification model in
393 young adults with elevated risk of current suicidality. *Psychiatry Research*, 219, 531–535.

394 Chen, H., Cohen, P., & Chen, S. (2010.) How big is a big odds ratio? Interpreting magnitudes of odds
395 ratios in epidemiological studies. *Communications in Statistics*, 39, 860–864.

396 Chesney, E., Goodwin, G.M., & Fazel, S. (2014). Risks of all-cause and suicide mortality in mental
397 disorders: A meta-review. *World Psychiatry*, 13, 153–160.

398 Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, N.J.:
399 Lawrence Earlbaum Associates.

400 Cohen, J., Cohen, P., West, S.G., & Aiken, L.S. (2003). *Applied multiple regression/correlation analysis*
401 *for the behavioral sciences* (3rd ed.). Hillsdale, N.J.: Lawrence Earlbaum Associates.

402 Cramer, R.J., Bryson, C.N., Gardner, B.O., & Webber, W.B. (2016). Can preferences in information
403 processing aid in understanding suicide risk among emerging adults? *Death Studies*, 40, 383–391.

404 Cramer, R.J., Kehn, A., Pennington, C.R., Wechsler, H.J., Clark, J.W., & Nagle, J. (2013). An
405 examination of sexual orientation and transgender-based hate crimes in the post-Matthew
406 Shepard era. *Psychology, Public Policy, and Law*, 19, 355–368.

407 Cramer, R.J., Mandracchia, J., Gemberling, T.M., Holley S.R., Wright, S., Moody, K., Nobles, M.R.,
408 2017. Can need for affect and sexuality differentiate suicide risk in three community samples?
409 *Journal of Social and Clinical Psychology*, 36, 704–722.

410 Cramer, R.J., Wevodau, A.L., Gardner, B.O., & Bryson, C.N. (2017). A validation study of the Need for
411 Affect Short Form in legal contexts. *Journal of Personality Assessment*, *99*, 66–77.

412 Dhingra, K., Boduszek, D., & O'Connor, R.C. (2015). Differentiating suicide attempters from suicide
413 ideators using the Integrated Motivational-Volitional model of suicidal behaviour. *Journal of*
414 *Affective Disorders*, *186*, 211–218.

415 Gonzalez, V.M. (2012). Association of solitary binge drinking and suicidal behavior among emerging
416 adult college students. *Psychology of Addictive Behaviors*, *26*, 609–614.

417 Gunnell, J.J., & Ceci, S.J. (2010). When emotionality trumps reason: A study of individual processing
418 style and juror bias. *Behavioral Sciences and the Law*, *28*, 850–877.

419 Harris, E.C., & Barraclough, B. (1997). Suicide as an outcome for mental disorders: A meta-analysis.
420 *British Journal of Psychiatry*, *170*, 205–228.

421 Hasley, J.P., Ghosh, B., Huggins, J., Bell, M.R., Adler, L.E., & Shroyer, A.L.W. (2008). A review of
422 “suicidal intent” within the existing suicide literature. *Suicide and Life-Threatening Behavior*, *38*,
423 576–591.

424 Hawton, K., Casañas, I.C.C., Haw, C., & Saunders, K. (2013). Risk factors for suicide in individuals with
425 depression: A systematic review. *Journal of Affective Disorders*, *147*, 17–28.

426 Hosmer, D.W., & Lemeshow, S. (2005). *Applied logistic regression*. New York: John Wiley and Sons.

427 Jobes, D.A. (2012). The Collaborative Assessment and Management of Suicide (CAMS): An evolving
428 evidence-based clinical approach to suicide risk. *Suicide and Life-Threatening Behavior*, *42*, 640–
429 653.

430 Jobes, D.A., Au, J.S., & Siegelman, A. (2015). Psychological approaches to suicide treatment and
431 prevention. *Current Treatment Options Psychiatry*, *2*, 363–370.

432 Johnson, D., Dupuis, G., Piche, J., Clayborne, Z., & Colman, I. (in press). Adult mental health outcomes
433 of adolescent depression: A systematic review. *Depression and Anxiety*.

434 Kanwar, A., Malik, S., Prokop, L.J., Sim, L.A., Feldstein, D., Wang, Z., & Murad, M.H. (2013). The
435 association between anxiety disorders and suicidal behaviors: A systematic review and meta-

436 analysis. *Depression and Anxiety*, 30, 917–929.

437 Kirkpatrick, L.A., & Epstein, S. (1992). Cognitive-Experiential Self- Theory and subjective probability:
438 Further evidence of two conceptual systems. *Journal of Personality and Social Psychology*, 63,
439 534–544.

440 Klonsky, E.D., Saffer, B.Y., & Bryan, C.J. (2018). Ideation-to-action theories of suicide: A conceptual
441 empirical update. *Current Opinion in Psychology*, 22, 38–43.

442 Large, M., Smith, G., Sharma, S., Nielssen, O., & Singh, S.P. (2011). Systematic review and meta-
443 analysis of the clinical factors associated with the suicide of psychiatric in-patients. *Acta*
444 *Psychiatrica Scandinavia*, 124, 18–29.

445 Liotta, M., Mento, C., & Settineri, S. (2015). Seriousness and lethality of attempted suicide: A systematic
446 review. *Aggression and Violent Behavior*, 21, 97–109.

447 Lindgren, K.P., Hendershort, C.S., Ramirez, J.J., Bernat, E., Rangel-Gomez, M.,... & Murphy, J.G. (in
448 press). A dual process perspective on advances in cognitive science and alcohol use disorder.
449 *Clinical Psychology Review*.

450 Lord, K.R., & Putrevu, S. (2006). Exploring the dimensionality of the need for cognition scale.
451 *Psychology and Marketing*, 23, 11–34.

452 Maio, G.R., & Esses, V.M. (2001). The need for affect: Individual differences in the motivation to
453 approach or avoid emotions. *Journal of Personality*, 69, 583–615.

454 May, A.M., & Klonsky, E.D. (2016). What distinguishes suicide attempters from suicide ideators? A
455 meta-analysis of potential factors. *Clinical Psychology: Science and Practice*, 23, 5–20.

456 Nock, M.K., Borges, G., Bromet, E.J., Alonso, J., Angermeyer, M., Beautrais, A., ... & Williams, D.R.
457 (2008). Cross-national prevalence and risk factors for suicidal ideation, plans and attempts.
458 *British Journal of Psychiatry*, 192, 98–105.

459 O'Connor, R.C. (2011). Towards an integrated motivational-volitional model of suicidal behaviour. In R.
460 C. O'Connor, S. Platt, J. Gordon (Eds.), *International handbook of suicide prevention: Research,*
461 *policy and practice* (pp. 181–198). Chichester: Wiley Blackwell.

462 O'Connor, R.C., Rasmussen, S. & Hawton, K. (2012). Distinguishing adolescents who think about self-
463 harm from those who engage in self-harm. *British Journal of Psychiatry*, 200, 330–335.

464 Office of National Health Statistics. (2016). Suicide in the UK: 2016 registrations. Website:
465 [https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/bulleti](https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/bulletins/suicidesintheunitedkingdom/2016registrations#suicides-in-the-uk-by-age)
466 [ns/suicidesintheunitedkingdom/2016registrations#suicides-in-the-uk-by-age](https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/bulletins/suicidesintheunitedkingdom/2016registrations#suicides-in-the-uk-by-age) (accessed 20 August
467 2018)

468 Osman, A., Bagge, C.L., Gutierrez, P.M., Konick, L.C., Kopper, B.A., & Barrios, F. X. (2001). The
469 Suicidal Behaviors Questionnaire-Revised (SBQ-R): Validation with clinical and nonclinical
470 samples. *Assessment*, 8, 443–454.

471 Pennington, C.R., Cramer, R.J., Miller, H.A., & Anastasi, J.S. (2015). Psychopathy, depression, and
472 anxiety as predictors of suicidal ideation in offenders. *Death Studies*, 39, 288–295.

473 Petty, R.E., & Briñol, P. (2015). Emotion and persuasion: Cognitive and meta-cognitive processes impact
474 attitudes. *Cognition and Emotion*, 29, 1–26.

475 Petty, R.E., Briñol, P., Tormala, Z.L., & Wegener, D.T. (2007). The role of metacognition in social
476 judgment. In A.W. Kruglanski, E.T. Higgins (Eds.), *Social psychology: Handbook of basic*
477 *principles* (2nd ed., pp. 254–284). New York, NY: Guilford Press.

478 Rimes, K.A., Shivakumar, S., Ussher, G., Baker, D., Rahman, Q., & West, E. (in press). Psychosocial
479 factors associated with suicide attempts, ideation, and future risk in lesbian, gay, and bisexual
480 youth: The Youth Chances Study. *Crisis*.

481 Silverman, M.M., & De Leo, D. (2016). Why there is a need for an international nomenclature and
482 classification system for suicide. *Crisis*, 37, 83–87.

483 Van Orden, K.A., Witte, T.K., Gordon, K.H., Bender, T.W., & Joiner, T.E. (2008). Suicidal desire and the
484 capability for suicide: Tests of the Interpersonal-Psychological Theory of Suicidal Behavior
485 among adults. *Journal of Consulting and Clinical Psychology*, 76, 72–83.

486 Wevodau, A.L., Cramer, R.J., Clark, J.W., & Kehn, A. (2014). The role of emotion and cognition in juror
487 perceptions of victim impact statements. *Social Justice Research*, 27, 45–66.

488 Wevodau, A.L., Cramer, R.J., Kehn, A., & Clark, J.W. (2014). Why the impact? Negative affective
489 change as a mediator of the effects of victim impact statements. *Journal of Interpersonal*
490 *Violence, 29*, 2884-2903.

491 World Health Organization (2017a). Suicide rates (per 100 000 population). Website:
492 http://www.who.int/gho/mental_health/suicide_rates/en/ (accessed 20 August 2018)

493 World Health Organization. (2017b). Suicide rate estimates, age-standardized: Estimates by country.
494 Website: <http://apps.who.int/gho/data/node.main.MHSUICIDEASDR?lang=en> (accessed 20
495 August 2018)

496 World Health Organization. (2018). Suicide rate estimates, crude: Estimates by country. Website:
497 <http://apps.who.int/gho/data/view.main.MHSUICIDEv?lang=en> (accessed 20 August 2018)

Table 1. Preferences in Information Processing and Mental Health Comparisons by Suicide Risk and Ideation-to-Action Subgroups.

Outcome	T ¹	Suicide Risk Level Group		F ²	Suicide Ideation-to-Action Group		
		No risk	Elevated risk		None	Ideation Only	Attempt
Depression	14.34***	4.34 (4.60)	11.90 (6.03)	72.26***	3.30 (3.71) _{a,b}	9.78 (6.31) _{a,c}	12.32 (6.43) _{b,c}
Anxiety	10.87***	4.45 (4.57)	10.03 (5.65)	36.44***	4.04 (4.29) _{a,b}	8.37 (5.68) _a	10.21 (6.28) _b
Approach	-1.19	6.21 (4.84)	5.63 (4.96)	1.29	5.78 (4.97)	6.21 (4.70)	5.07 (5.52)
Avoidance	9.44***	-4.47 (6.40)	1.89 (7.19)	30.02***	-5.11 (6.33) _{a,b}	0.03 (7.24) _a	2.18 (7.58) _b
Need for Cognition	-3.01**	62.03 (11.67)	58.48 (12.34)	2.44	62.11 (12.27)	59.68 (11.73)	58.39 (13.01)

Notes: All values denote subscale or total score mean (standard deviation); Depression and Anxiety = DASS-21 subscales; Approach and Avoidance = NAQ-S subscales; Need for Cognition = NFC Scale total score; ¹ df = 412; ² df = 2, 411; *** $p \leq .001$; ** $p \leq .01$; For ANOVA results, subgroups in same row with matching subscripts denotes significant difference per Bonferroni post-hoc test (all $ps < .01$).

Table 2. Logistic Regression Model: Preferences in Information Processing Predicting of Suicide Risk Level Group.

Predictor	B (seB)	Wald χ^2 (df)	<i>p</i>	Odd Ratio	Odds Ratio 95% CI
Male gender	1.15 (0.83)	1.90 (1)	.17	3.16	0.61-16.27
Female gender	0.68 (0.79)	0.74 (1)	.39	1.97	0.42-9.25
Age	-0.11 (0.15)	0.54 (1)	.46	0.90	0.67-1.20
Depression	1.12 (0.19)	34.79 (1)	< .001	3.07	2.11-4.46
Anxiety	0.48 (0.19)	6.66 (1)	.01	1.62	1.12-2.33
NFA Approach	0.12 (0.15)	0.63 (1)	.43	1.13	0.84-1.52
NFA Avoidance	0.66 (0.16)	15.81 (1)	< .001	1.93	1.39-2.67
Need for Cognition	0.22 (0.15)	2.13 (1)	.14	1.24	0.93-1.66
Depression x NFA Approach	-0.12 (0.19)	0.42 (1)	.52	0.88	0.61-1.29
Depression x NFA Avoidance	-0.10 (0.21)	0.22 (1)	.64	0.91	0.60-1.36
Depression x Need for Cognition	0.03 (0.19)	0.03 (1)	.86	1.03	0.71-1.50
Anxiety X NFA Approach	-0.13 (0.19)	0.45 (1)	.50	0.88	0.60-1.28
Anxiety X NFA Avoidance	0.17 (0.20)	0.75 (1)	.39	1.19	0.80-1.77
Anxiety X Need for Cognition	-0.02 (0.18)	0.01 (1)	.90	0.98	0.68-1.41
NFA Avoidance X Need for Cognition	0.21 (0.17)	1.52 (1)	.22	1.23	0.88-1.72
NFA Approach X Need for Cognition	0.14 (0.16)	0.73 (1)	.39	1.15	0.84-1.57
Constant	-0.62 (0.77)	0.65 (1)	.42	0.54	-

Notes: B = Regression coefficient; se = Standard error; df = Degrees of freedom; CI = Confidence interval; NFA = Need for Affect; x = Interaction term multiplicative; Transgender coded as reference group for gender main effects; **Bold font** denotes significant predictor.

Table 3. Multinomial Regression Model: Preferences in Information Processing Predicting Suicide Ideation-to-Action Group.

Predictor	B (seB)	Wald χ^2 (df)	<i>p</i>	Odd Ratio	Odds Ratio 95% CI
<u>Control Group Model (Ideator reference group)</u>					
Male gender	-0.38 (1.07)	0.13 (1)	.72	0.68	0.08-5.54
Female gender	-0.11 (1.03)	0.01 (1)	.91	0.89	0.12-6.74
Age	0.23 (0.15)	2.36 (1)	.12	1.26	0.94-1.68
Depression	-1.49 (0.28)	28.71 (1)	< .001	0.22	0.13-0.39
Anxiety	-0.24 (0.19)	1.13 (1)	.29	0.78	0.50-1.23
NFA Approach	-0.27 (0.19)	2.03 (1)	.15	0.77	0.53-1.10
NFA Avoidance	-0.62 (0.22)	8.00 (1)	.005	0.54	0.35-0.83
Need for Cognition	-0.33 (0.20)	2.80 (1)	.09	0.72	0.49-1.06
Depression x NFA Approach	-0.36 (0.23)	2.44 (1)	.12	0.69	0.44-1.10
Depression x NFA Avoidance	-0.38 (0.29)	1.71 (1)	.19	0.69	0.39-1.21
Depression x Need for Cognition	0.18 (0.25)	0.54 (1)	.46	1.20	0.73-1.96
Anxiety X NFA Approach	0.48 (0.22)	4.61 (1)	.03	1.62	1.04-2.51
Anxiety X NFA Avoidance	0.03 (0.25)	0.01 (1)	.92	1.03	0.63-1.68
Anxiety X Need for Cognition	-0.34 (0.22)	2.30 (1)	.13	0.71	0.46-1.10
NFA Avoidance X Need for Cognition	-0.17 (0.19)	0.81 (1)	.37	0.84	0.57-1.23
NFA Approach X Need for Cognition	0.11 (0.16)	0.46 (1)	.50	1.12	0.82-1.54
Intercept	-1.12 (1.02)	0.65 (1)	.27	-	-
<u>Suicide Attempter Model (Ideator reference group)</u>					
Male gender	-1.10 (0.86)	1.63 (1)	.20	0.33	0.06-1.80
Female gender	-0.84 (0.78)	1.17 (1)	.28	0.43	0.09-1.98
Age	0.61 (0.19)	10.73 (1)	.001	1.84	1.23-2.66
Depression	0.39 (0.24)	2.56 (1)	.11	1.48	0.92-2.39
Anxiety	-0.10 (0.25)	0.17 (1)	.68	0.90	0.56-1.46
NFA Approach	0.08 (0.22)	0.12 (1)	.72	1.08	0.71-1.65
NFA Avoidance	0.33 (0.23)	2.15 (1)	.14	1.39	0.89-2.17
Need for Cognition	0.06 (0.20)	0.09 (1)	.77	1.06	0.71-1.58
Depression x NFA Approach	-0.49 (0.23)	4.60 (1)	.03	0.61	0.39-0.96
Depression x NFA Avoidance	-0.33 (0.23)	2.05 (1)	.15	0.72	0.46-1.13
Depression x Need for Cognition	0.23 (0.23)	1.00 (1)	.32	1.26	0.80-2.00
Anxiety X NFA Approach	0.22 (0.20)	1.20 (1)	.27	1.25	0.84-1.86
Anxiety X NFA Avoidance	0.46 (0.22)	4.59 (1)	.03	1.59	1.04-2.43
Anxiety X Need for Cognition	-0.58 (0.24)	5.89 (1)	.01	0.56	0.35-0.89

NFA Avoidance X Need for Cognition	0.47 (0.18)	6.59 (1)	.01	1.61	1.12-2.31
NFA Approach X Need for Cognition	0.07 (0.20)	0.12 (1)	.73	1.07	0.72-1.59
Intercept	-0.98 (0.77)	1.63 (1)	.20	-	-

Notes: B = Regression coefficient; se = Standard error; df = Degrees of freedom; CI = Confidence interval; NFA = Need for Affect; x = Interaction term multiplicative; Transgender coded as reference group for gender main effects; **Bold font** denotes significant predictor for which overall test was also significant.

