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Non-monotonic temporal variation in fearlessness about death: A latent class growth analysis

Kelly L. Zuromski[a,b,*], Ian Cero[b], Tracy K. Witte[b]

[a] Department of Psychology, Harvard University, 33 Kirkland Street, 1284, Cambridge, MA, 02138, United States
[b] Department of Psychology, Auburn University, 226 Thach Hall, 36849 AL, United States

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ABSTRACT

According to the Interpersonal-Psychological Theory of Suicide, fearlessness about death is proposed to increase *monotonically* (i.e., either increasing or remaining stable) and thus, not be amenable to intervention; however, this assumption has not been explicitly tested. We utilized latent class growth modeling to examine the trajectory of this construct over a brief interval (i.e., data collected every three days over a 15-day time period) among college students ($N = 716$), and found evidence that fearlessness does not monotonically increase. Specifically, our analyses revealed three classes, each with distinct trajectories over time: a *High/Increasing* class (i.e., high intercept, significantly increasing slope), *Average/Stable* class (i.e., average intercept, flat and non-significant slope), and *Low/Decreasing* class (i.e., low intercept, significantly decreasing slope). The emergence of a *Low/Decreasing* group is in contrast to the assertion that fearlessness cannot decrease over time. Exploratory results also indicated that lifetime exposure to certain events (e.g., abuse, injury) was associated with membership in the *Low/Decreasing* class, suggesting that some individuals may be responding differently to painful and/or fear-inducing stimuli than the IPTS predicts. Our findings contradict the current conceptualization of fearlessness about death, and suggest instead that this construct fluctuates upward and downward over a brief interval.

1. Introduction

At the forefront of theory-driven suicide research is the Interpersonal-Psychological Theory of Suicide (IPTS; Joiner, 2005; Van Orden et al., 2010). The IPTS proposes that the desire for suicide is etiologically distinct from capability for suicide (Van Orden et al., 2010). That is, though the synergistic relationship between the two interpersonal constructs (i.e., thwarted belongingness and perceived burdensomeness) is proposed to result in suicidal desire, the IPTS hypothesizes that capability for suicide develops separately through exposure to painful and provocative events (PPEs), which results in habituation to the fear and/or pain associated with death. The acquired capability for suicide (henceforth *capability*) consists of two facets: fearlessness about death (*fearlessness*) and heightened physical pain tolerance, which, according to the IPTS, must be present for fatal suicidal behavior to occur. Notably, as orthogonal constructs, the presence of capability does not imply presence of the other IPTS constructs related to *desire* for suicide; thus, according to the theory, someone can be capable of enacting of a lethal suicide attempt and have no elevations in suicidal ideation, plan, or intent. As such, suicide-related interventions are typically focused on reducing *desire* for suicide, given presence of capability is not, in isolation, suggestive of increased risk.

1.1. Assumptions about acquired capability for suicide

A growing empirical literature has demonstrated the relationship between PPEs and capability (e.g., Bender et al., 2011; Van Orden et al., 2008), suggesting that exposure to painful or fear-inducing life experiences (e.g., combat; non-suicidal self-injury; Bryan et al., 2010; Franklin et al., 2011) is positively associated with capability. Unfortunately, the research that exists on capability has been largely cross-sectional in nature, which precludes ability to test key assumptions regarding capability. Namely, as described in the original IPTS paper (Van Orden et al., 2010), capability is implied to increase steadily over time in a monotonic fashion; in other words, once someone has acquired the capability for suicide, this capability is retained, lasting, and does not decrease. However, this assumption about the increasing, monotonic nature of capability (the *monotonicity hypothesis*) has never been formally tested.

Though some additional theoretical work has called into question whether capability truly functions as an 'acquired,' static construct (Klonsky and May, 2015; Smith and Cukrowicz, 2010), to our

* Corresponding author at.
E-mail address: kelly_zuromski@fas.harvard.edu (K.L. Zuromski).

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knowledge, few studies have empirically examined longitudinal stability of capability (Bryan et al., 2015; George et al., 2016; Willoughby et al., 2015), compared to the dozens that have investigated this construct cross-sectionally. Of particular interest, Bryan et al. (2015) conducted a series of analyses informed by Dynamical Systems Theory to investigate patterns of change in capability in military personnel over a two-year period. Consistent with the IPTS, they predicted that capability would increase following exposure to PPEs (e.g., military training and combat), and subsequently, remain elevated given the capability cannot reverse. Contrary to this prediction, the authors instead found that though capability increased following training, it then returned to prior levels at the next assessment period during the deployment period. In separate analyses, Bryan et al. (2015) also modeled the stability of capability over time, using current capability score to predict amount of future change in capability. Results of these analyses provided evidence that capability is a temporally stable construct, in that scores fluctuate around a given set point, and, when perturbed, will continually return to this set point. Taken together, the series of analyses conducted by Bryan et al. (2015) call into question the monotonicity hypothesis of capability, suggesting that this construct may instead fluctuate over time, and that it may return to set point, suggesting it may also have static, trait-like properties.

Bryan et al. (2015) paper provides a solid basis from which to explore the temporal stability of capability, and to expand upon methodologically. For example, Bryan et al. (2015) used a measure of capability that conflates fearlessness and pain tolerance, preventing either facet of capability from being investigated individually. In addition, while use of several time points is a strength of Bryan et al. (2015) study, the long follow-up period employed (i.e., two years) is not suited to detect potential short-term (e.g., days to weeks) changes in capability. Along these lines, a recent meta-analysis has argued that longitudinal suicide research ought to focus on narrower temporal follow-up periods of months, weeks, or even days, given that these are the units of time most relevant for making applied clinical judgments regarding individual people at risk for suicide (Franklin et al., 2017). Thus, in examining the monotonicity hypothesis, though we now have reason to believe capability fluctuates over a two-year time period (Bryan et al., 2015), use of shorter follow-up time periods would enable observation of how quickly fluctuations in capability might be observed.

1.2. Current study

In light of the limited research on the temporal stability of capability, the current study sought to expand upon previous findings (Bryan et al., 2015) to more thoroughly examine the monotonicity hypothesis. Specifically, given assertions that fearlessness in particular is not malleable (Joiner, 2009) we focused on examining fearlessness changes over time using a more recently validated measure of this construct. We note that given the orthogonal nature of IPTS constructs, the focus in the current paper was strictly on capability, and not on suicidal desire or ideation, which is proposed to develop independently of one's ability to enact lethal suicidal behavior. We utilized a sample of college students to test our hypotheses, given the elevated rates of certain PPEs (e.g., sexual assault) among college students compared to the general population (Sinozich and Langton, 2014), which may contribute to increased variability in fearlessness within this sample. We utilized latent class growth analysis to not only examine trajectory of fearlessness over time, but also allow exploration of different groups (i.e., classes) that might emerge within our sample. Given recent recommendations by Franklin et al. (2017), we also utilized a brief follow-up interval (i.e., three days), spaced evenly over a 15-day time period.

We hypothesized that two latent classes would emerge: an increasing class and a stable class (in line with predictions of the IPTS). Consistent with findings from Bryan et al. (2015) suggesting that capability may return to a specific 'set point' even after observed increases, we also hypothesized the emergence of a *decreasing* class as well. In addition to testing the monotonicity hypothesis, we also sought to conduct exploratory analyses of predictors of class membership (e.g., lifetime PPE exposure).

2. Methods

2.1. Participants and procedure

Participants were undergraduates enrolled in psychology courses at a large, public university in the southeastern United States. All procedures were approved by the university's institutional review board. After signing up through the university's online participant pool, participants completed online questionnaires at six time points over a 15-day period. Participants received e-mail invitations to each follow-up wave of the study every three days, and had 24 h to complete the questionnaires upon receiving the invitation to each wave. Participants were compensated with course credit for their respective psychology courses. The final sample ($N = 716$) was primarily female (77.90%; $n = 558$) and non-Hispanic/Latino (97.20%; $n = 696$). Racial identity was as follows: White/European (87.40%; $n = 626$); 7.10% ($n = 51$) African-American/Black; 0.10% ($n = 1$) American Indian/Alaskan Native; 0.10% ($n = 1$) Native Hawaiian/Pacific Islander; 2.50% ($n = 18$) Asian; 2.70% ($n = 19$) Multiracial (participant selected several races). The average age of the sample was 20.24 (SD = 2.10).

2.2. Measures

2.2.1. Fearlessness about death (ACSS-FAD)

The ACSS-FAD is a 7-item, self-report scale used to measure fearlessness about death (Ribeiro et al., 2014). Items are typically rated on a five-point scale, but in the current study, items were rated on an expanded 0–100 scale to increase sensitivity to changes over time, using the same scale anchors as the original version (i.e., *Not at all like me* to *Very much like me*). Items were summed to create a total score, with higher scores indicating greater fearlessness. A subset of the sample ($N = 152$; 21.20% of sample) rated the items on both the original five-point scale and the 0–100 scale, and the correlation between total scores for items on these different scales was high ($r = 0.87$). Internal consistency for the 100-point ACSS-FAD was adequate across all waves (αs = 0.78–0.88).

2.2.2. Painful and provocative events scale (PPES)

The PPES (Bender et al., 2007) measures respondents' frequency of lifetime exposure to a variety of painful and/or provocative (i.e., fear-inducing) life experiences (e.g., abuse history; shot a gun; broken a bone). The PPES measure employed in the current study included the 25 original items from the PPES (Bender et al., 2007), along with two additional items assessing for history of non-suicidal self-injury and enactment of a suicide attempt plan without attempting (e.g., standing on a bridge but not jumping). Items were assessed dichotomously. Two scores were derived from responses for use in analyses by summing participants' responses to select items. Specifically, based on findings by Teismann et al. (2015), we calculated *Active PPEs* and *Passive PPEs* scores. According to Teismann et al. (2015), Active PPEs represent events that are actively approached (e.g., going rock climbing; participating in contact sports; shooting a gun) as opposed to other events more passively experienced (e.g., breaking a bone; experiencing physical or sexual abuse), grouped into Passive PPEs. Because of weak support for the full PPES (Teismann et al., 2015), we used these two subscales in our study, with higher scores indicating experience of more types of PPEs. Given the PPES is an index of disparate life events and does not assume a latent variable model, its internal consistency was not calculated (Streiner, 2003).