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Brief measures of physical and psychological distance to suicide methods as correlates and predictors of suicide risk: A multi-study prospective investigation

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ABSTRACT

A core component of suicide risk assessment and management is determining one's physical proximity to specific suicide means and counseling individuals to minimize their physical access to these means. However, this approach ignores other potentially relevant parameters, such as perceptions of how psychologically close/distant one feels to a particular suicide method. The present study examined the degree to which novel, brief measures of physical and psychological distance to suicide methods were associated with and prospectively predicted suicide-related outcomes at (1) two-month follow-up among 121 students with current/recent suicidality; and (2) one-week follow-up among 91 community-dwelling adults at high suicide risk. Results indicated that both physical and psychological distance to means were related to suicidal intent at baseline. Additionally, in Study 2, lower psychological distance, but not physical distance, predicted suicidal intent and increased likelihood of having made suicide plans and suicide preparations at one-week follow-up. Overall, these findings highlight the importance of considering not only physical proximity to suicide means, but also psychological distance, pointing to the potential import of assessing and intervening upon psychological distance during lethal means counseling. Our findings also highlight the potential clinical utility of two brief measures of physical and psychological closeness to suicide means.

With over 44,000 individuals dying by suicide each year in the United States (U.S.; Centers for Disease Control and Prevention [CDC], 2018), greater efforts are needed to provide empirically-supported risk mitigation strategies to at-risk individuals. One approach to suicide risk mitigation is through the delivery of lethal means counseling (Barber & Miller, 2014; Britton, Bryan, & Valenstein, 2014; Bryan, Stone, & Rudd, 2011; Chu et al., 2015; Jin, Khazem, & Anestis, 2016). Lethal means counseling is defined as a clinician-initiated, collaborative discussion whereby patients are encouraged to reduce their access to means for a suicide attempt (Bryan et al., 2011). Indeed, the National Strategy for Suicide Prevention has identified the delivery of lethal means counseling as a critical avenue for suicide prevention efforts (U.S. Department of Health and Human Services [HHS] Office of the Surgeon General and National Action Alliance for Suicide Prevention, 2012).

The goal of lethal means counseling is to create physical distance between a patient at elevated suicide risk and potential suicide methods—particularly, a patient's stated preferred method and/or method he or she plans to use for a suicide attempt (i.e., intervening on one's practical capability for suicide; see Klonsky & May 2015). Consider, for example, the case of firearms. Firearm lethal means counseling has immense clinical relevance, in part, because firearms suicide attempts are nearly always fatal (Anestis, 2016), firearms are the most common method in U.S. suicide fatalities (CDC, 2014), and the role of clinicians in asking about and providing lethal means counseling for firearms is contentious (Betz & Wintemute, 2015; I. H.; Stanley, Hom, Rogers, Anestis, & Joiner, 2016). Further, a nationally-representative survey indicated that among individuals with suicide plans, those in possession of a firearm are seven times more likely to report a plan using a firearm, as opposed to other methods (Betz, Barber, & Miller, 2011), highlighting the importance of lethal means counseling involving creating physical distance from particular methods. Examples of creating distance between an at-risk person and, in this case, firearms, include the following (Anestis, 2018): apply a gun lock, separate the firearm from its ammunition, store the firearm unloaded, move the firearm from one's bedside to another room in the house, and/or safely transfer the firearm to a trusted loved one (McCourt, Vernick, Betz, Brandspigel, & Runyan, 2016).

As reflected in these examples, historically, lethal means counseling

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has focused on creating *physical* distance between an at-risk individual and suicide methods (Barber & Miller, 2014). Although this approach is important and clinically indicated, the exclusive focus on physical distance inadvertently ignores other potentially relevant parameters in this domain, such as *psychological* distance. Psychological distance has been conceptualized as a subjective perception that something is close or far away from the self, or that something is not present in one's direct experience of reality (Liberman, Trope, & Stephan, 2007). Construal level theory (CLT) suggests that the more psychologically distant an object is from an individual—whether temporally, spatially, interpersonally, or hypothetically—the less accessible that object is to an individual's conscious (Trope & Liberman, 2010). More psychologically distant objects (i.e., objects with a higher construal) will be thought of by an individual in more uncertain, less detailed terms. In this regard, it is possible that when a suicide attempt method (e.g., a firearm) is more psychologically distant, its conceptualization as a desirable and plausible suicide attempt method is thwarted. Complementarily, psychological distance can also be conceptualized as akin to the inverse of attachment or feeling as though a particular method is foreign or alien. That is, greater psychological distance from an object (e.g., firearm, medications) might reflect less attachment to that object, and thus, the mere idea of that object might be less accessible and prominent in one's consciousness.

Although not specifically labeled as such in previous work, psychological distance may be one component comprising practical capability for suicide (Klonsky & May 2015). Practical capability encompasses factors that facilitate engagement in suicidal behavior, including familiarity with and access to lethal means (physical distance) and cognitive factors that make suicidal behavior more or less accessible and effortful. As noted by Van Orden et al. (2010), cognitive appraisals of the tolerability of the fear and pain associated with particular suicide methods, as well as habituation to this fear and pain, may facilitate or inhibit one's intentions to engage in suicidal actions. Indeed, a recent study indicated that increasing an individual's aversion to self-injurious thoughts and behaviors has notable impacts on self-injurious episodes, suicide plans, and suicidal behaviors among those with recent and severe histories of self-injurious thoughts and behaviors (Franklin et al., 2016). Increasing one's aversion to preferred suicide methods (i.e., increasing psychological distance) may similarly result in decreases in suicidal intentions and behaviors, particularly given the literature suggesting that there is relatively lower risk of means substitution within single suicidal episodes (Daigle, 2005; Sarchiapone, Mandelli, Iosue, Andrisano, & Roy, 2011). Notwithstanding, an investigation of all relevant factors comprising practical capability—including psychological distance—is relevant, as these facets may have differential impacts on overall suicide risk and have different mechanisms that can be acted upon through clinical intervention.

In their review of the state-of-the-science on lethal means counseling, Barber and Miller (2014) acknowledge that "reducing 'cognitive access'" to highly lethal means (p. S264) may be one fruitful avenue for suicide risk reduction efforts (Florentine & Crane, 2010); however, in part because there are heretofore no studies to our knowledge examining factors related to reducing psychological distance (cf. cognitive access), Barber and Miller's (2014) review focuses instead on reducing physical access. Thus, an empirical investigation examining psychological distance is indicated. If perceived psychological distance to a suicide attempt method provides incremental associations (above and beyond physical distance) with suicide-related outcomes, such as suicidal intent, suicide plans, and suicide preparations, then lethal means counseling efforts could be enhanced by the inclusion of discussions of psychological distance alongside discussions of physical distance. Moreover, the assessment of psychological distance via a brief measure may enhance suicide risk assessment and mitigation efforts (Bryan, 2018).

1. The present study

Utilizing a sample of young adults with current/recent suicidal thoughts (Study 1) and a sample of community-dwelling adults at high risk for suicide (i.e., Beck Scale for Suicide Ideation [BSS (Beck & Steer, 1991);] score ≥ 11; Study 2), the purpose of this investigation was to evaluate the degree to which novel, brief measures of (a) physical and (b) psychological distance to suicide methods are associated with and prospectively predict suicide-related outcomes. In Studies 1 and 2, we examined suicidal intent as the criterion variable, and in Study 2 we additionally examined suicide plans and preparations as criterion variables. In exploratory analyses, and as an initial, though imperfect, test of the clinical adage "out of sight, out of mind," we examined if psychological distance served as a statistical mediator of the association between physical distance and suicide-related outcomes.

2. Study 1

2.1. Methods

2.1.1. Participants

A sample of young adults ($N = 121$) at elevated suicide risk was recruited from a large public university in the Southeastern U.S. Three-fourths of the sample (76.9%) identified as female, and a majority identified as White/Caucasian (57.0%). Participants ranged in age from 18 to 36 years ($M = 19.55$, $SD = 2.46$). All participants (100%, $n = 121$) reported a lifetime history of suicidal ideation, 40.5% ($n = 49$) reported a lifetime history of suicide plans, and 18.2% ($n = 22$) reported a history of at least one suicide attempt. See Table 1 for detailed participant demographic and clinical characteristics.

Table 1
Study 1 demographic characteristics & psychiatric diagnosis history.

	n	Valid %
Gender		
Male	28	23.1%
Female	93	76.9%
Age ($M = 19.55$, SD 2.46, Range = 18–36)		
Race/Ethnicity		
White/Caucasian	69	57.0%
Black/African American	10	8.3%
Hispanic or Latino/a	29	24.0%
Asian/Pacific Islander	10	8.3%
Other	3	2.5%
Sexual Orientation		
Heterosexual/Straigh	85	70.2%
Gay/Lesbian/Homosexual	6	5.0%
Bisexual	25	20.7%
Not Sure	5	4.1%
Undergraduate Year		
First Year	50	41.3%
Second Year	34	28.1%
Third Year	23	19.0%
Fourth Year	11	9.1%
Fifth Year or More	3	2.5%
Prior Self-Reported Diagnoses[a]		
Anorexia Nervosa	2	1.7%
Anxiety Disorder	33	27.3%
Bipolar Disorder	3	2.5%
Bulimia Nervosa	3	2.5%
Depressive Disorder	39	32.2%
Insomnia	5	4.1%
Obsessive Compulsive Disorder	5	4.1%
Panic Disorder	15	12.4%
Posttraumatic Stress Disorder	2	1.7%
Substance Use Disorder	2	1.7%
No Psychiatric Diagnosis History	*63*	*52.1%*

[a] Categories are not mutually exclusive.

2.2.1. Measures

2.2.1.1. Demographics and psychiatric history. A brief self-report survey was utilized to assess demographic (e.g., age, sex) and clinical characteristics (e.g., history of psychiatric diagnoses).

2.2.1.2. Depressive Symptom Inventory—Suicidality Subscale (DSI-SS; Joiner, Pfaff, & Acres, 2002). The DSI-SS is a 4-item self-report measure that assesses the presence and severity of suicidal thoughts, plans, and urges. Each item consists of a group of statements that range in value from 0 to 3, with higher summed scores (range: 0 to 12) reflecting greater suicidal ideation severity. The DSI-SS has demonstrated strong psychometric properties in past research (Joiner et al., 2002; Metalsky & Joiner, 1997); in the present study, internal consistency was good across both assessment points (αs = 0.85 and 0.88), and there was moderate stability over time (r = 0.58).

2.2.1.3. Suicidal intent. Consistent with the suicide risk assessment approach utilized by the Decision Tree Framework (Chu et al., 2015; Joiner et al., 1999), participants were asked to rate their suicidal intent (*"How would you rate your current intent to make a suicide attempt in the near future?"*) on a 0 to 10 scale, with higher scores signaling greater suicidal intent. Ratings at the two assessment points were moderately stable (r = 0.51).

2.2.1.4. Physical and psychological distance to suicide methods. To assess physical and psychological distance to suicide methods, participants were first asked to select which suicide method they were primarily considering or had most recently considered (in the event that they were not experiencing current suicidal ideation). Possible suicide method options were drawn directly from those listed in the Self-Injurious Thoughts and Behaviors Interview-Short Form (SITBI-SF; Nock, Holmberg, Photos, & Michel, 2007). Participants then rated their typical physical (i.e., *"Indicate how physically close you typically are to the primary suicide method you are considering"*) and psychological (i.e., *"Indicate how psychologically close you typically are to the primary suicide method you are considering"*) distance to these methods utilizing a (1) 400 × 400 bullseye target paradigm and (2) a visual analog scale (VAS). Of note, all participants, including those who did not indicate having made a specific suicide plan, responded to these items. For each participant, the distance from the center of the target was calculated[1] and utilized as a measure of physical and psychological distance, respectively, from that method. Distances from the center of the target could theoretically range from 0 to 282.84, with higher values reflecting greater physical and psychological distance. VASs ranged from 0 to 100 and were utilized as an assessment of concurrent validity, with higher values reflecting lower physical and psychological distance. Each of these measures was developed by the authors specifically for the present study.

2.2.2. Procedures

These data were collected as part of a larger investigation of correlates and predictors of help-seeking and treatment engagement among at-risk undergraduates. Inclusion criteria for the main investigation were: (a) aged 18 years or older; (b) current undergraduate student; (c) English-speaking; and (d) a history of suicidal ideation since beginning undergraduate studies, as assessed by a modified self-report version of the SITBI-SF (Nock et al., 2007). Exclusion criteria were: (a) imminent suicide risk (i.e., risk warranting hospitalization); (b) current mental health service use, as defined by ongoing care with a provider to receive psychiatric medications, therapy, and/or counseling, and (c) completing last semester of undergraduate coursework within the following two months.

Participants were recruited through posted flyers, social media advertisements, and the University's Department of Psychology human subjects pool. Interested individuals attended an in-laboratory visit where they provided written informed consent and completed a brief self-report survey to confirm their eligibility. Following study enrollment, participants completed a battery of self-report measures via Qualtrics, a secure web-based survey platform. Two months later, participants were emailed a web link to complete the same battery of self-report measures from home. For compensation, participants were provided with the option of receiving either a $15 Amazon.com gift card or credits for a psychology course in which they were enrolled. The University's Institutional Review Board approved all study procedures. Of note, all participants received a list of local and national mental health resources at both assessment points. Participants reporting current suicidal intent at either study time point (n = 47) additionally received a safety plan.

2.2.3. Data analysis

First, descriptive statistics and bivariate correlations were utilized to characterize the sample. Study variables were also screened for outliers and violations of normality. Suicidal intent at baseline (T1) and two-month follow-up (T2) exhibited positive skew (i.e., skew > 2) and were leptokurtic (i.e., kurtosis > 3); thus, both variables underwent logarithmic transformations, resulting in diminishing skewness (1.46 and 1.97, respectively) and kurtosis (0.81 and 2.35, respectively), to correct for non-normality prior to conducting study analyses. Next, a hierarchical linear regression model was utilized to evaluate *correlates* of T1 suicidal intent. For this model, T1 physical distance and T1 psychological distance were entered in Step 1 in order to examine the full individual effects of physical and psychological distance, and T1 DSI-SS suicidal ideation severity was entered in Step 2 as a covariate to examine whether these effects remained significant beyond the inclusion of a robust covariate. A hierarchical linear regression model was also used to evaluate *predictors* of T2 suicidal intent. For this model, T1 physical distance and T1 psychological distance were entered in Step 1, and T1 DSI-SS suicidal ideation severity and T1 suicidal intent were entered in Step 2. All variance inflation factors (VIFs) within our regression models were within an acceptable range (i.e., all VIFs < 1.3), suggesting multicollinearity was not a problem in these data. Cohen's f^2 was included as a measure of local effect size; $f^2 \geq 0.02$, $f^2 \geq 0.15$, and $f^2 \geq 0.35$ represent small, medium, and large effect sizes, respectively (Selya, Rose, Dierker, Hedeker, & Mermelstein, 2012). Finally, we conducted bias-corrected bootstrap mediation analyses (5000 bootstrap resamples) to evaluate: (1) T1 psychological distance as a mediator of the relationship between T1 physical distance and T1 suicidal intent, controlling for T1 DSI-SS suicidal ideation severity and (2) T1 psychological distance as a mediator of the relationship between T1 physical distance and T2 suicidal intent, controlling for T1 DSI-SS suicidal ideation severity. Sensitivity analyses, with the independent and mediator variables reversed, were also conducted to examine the specificity of these models. Mediation analyses were conducted using the PROCESS macro (Hayes, 2013); indirect effects were considered significant

[1] All bullseyes were on a 400 × 400 grid (with 200, 200 reflecting the center of the bullseye). Distances from the center of the target were calculated using the following formula, which calculates the distance between two points. $\sqrt{(x-200)^2 + (y-200)^2}$

[2] We conducted follow-up analyses to examine whether recency of suicidal ideation moderated these findings. Results indicated that there was significant interaction between recency of suicidal ideation (1 = past-month ideation, 0 = no past-month ideation) and T1 physical distance (B = −0.002, SE = 0.001, p = .008) and T1 psychological distance (B = −0.002, SE = 0.001, p = .007) in predicting T1 suicidal intent, such that associations between T1 physical/psychological distance and T1 suicidal intent were only significant among those experiencing past-month ideation (p = .002 and < 0.001, respectively), as opposed to those not experiencing past-month ideation (ps = .668 and .491, respectively). These findings were not replicated among prospective associations examining T2 suicidal intent (ps = .529 and .887).

Table 2
Suicide attempt methods selected as preferred by participants.

Method	Study 1	Study 2
Medication Overdose	46 (38.0%)	27 (29.7%)
Own prescription drugs	*17 (14.0%)*	*13 (14.3%)*
Illicit drugs (not prescription)	*3 (2.5%)*	*4 (4.4%)*
Over-the-counter drugs	*15 (12.4%)*	*7 (7.7%)*
Other's prescription drugs	*11 (9.1%)*	*3 (3.3%)*
Firearms	8 (6.6%)	14 (15.4%)
Immolation	0 (0.0%)	1 (1.1%)
Hanging	3 (2.5%)	14 (15.4%)
Sharp object	10 (8.3%)	7 (7.7%)
Auto exhaust	3 (2.5%)	2 (2.2%)
Other gases	1 (0.8%)	2 (2.2%)
Train/car	10 (8.3%)	2 (2.2%)
Jump from height	21 (17.4%)	10 (11.0%)
Drowning	2 (1.7%)	1 (1.1%)
Suffocation	2 (1.7%)	3 (3.3%)
Other	13 (10.7%)	8 (8.8%)

if their 95% confidence interval (CI) did not cross zero. Missing data were minimal (5.5%) and handled via listwise deletion.

3. Results and discussion

The primary suicide attempt methods selected by participants are presented in Table 2; the most commonly selected options included (1) medication overdose (i.e., comprising one's own prescription medications, others' prescription medications, illicit drugs, and over-the-counter medications; $n = 46$, 38.0%), (2) jumping from a height ($n = 21$, 17.4%), (3) train/car collision ($n = 10$, 8.3%), and (4) sharp objects ($n = 10$, 8.3%). Means, standard deviations, ranges, and zero-order correlations for all self-report measures are reported in Table 3. Participants tended to select points above and to the right of the center of the bullseye. Assessments using target paradigms and VASs were highly correlated (rs = 0.84 and 0.91), providing evidence of concurrent validity. In the regression model evaluating *correlates* of T1 suicidal intent, lower T1 physical distance and lower T1 psychological distance were both significantly associated with greater T1 suicidal intent, controlling for T1 DSI-SS suicidal ideation severity ($\beta = -0.16$, $p = .035$, partial $r^2 = 0.04$; and $\beta = -0.26$, $p = .001$, partial $r^2 = 0.09$, respectively) in a model that explained 46.0% of the variance in T1 suicidal intent.[2] In the regression model examining *predictors* of T2 suicidal intent, lower T1 physical distance and lower T1 psychological distance both significantly predicted greater T2 suicidal intent ($\beta = -0.19$, $p = .040$, partial $r^2 = 0.04$; and $\beta = -0.25$, $p = .008$, partial $r^2 = 0.06$, respectively); however, neither remained significant predictors after controlling for T1 DSI-SS suicidal ideation severity and T1 suicidal intent ($ps > .05$); this model explained 30.0% of the variance in T2 suicidal intent. See Table 4 for detailed regression results. Regarding exploratory analyses, T1 psychological distance significantly accounted for the relationship between T1 physical distance and T1 suicidal intent, controlling for T1 DSI-SS suicidal ideation severity (95% CI: −0.001, −0.001); however, T1 psychological distance did not significantly account for the relationship between T1 physical distance and T2 suicidal intent, controlling for T1 suicidal intent and T1 DSI-SS suicidal ideation severity (95% CI: −0.001, 0.001). Alternative models did not support the specificity of this finding, however, as T1 physical distance also significantly accounted for the relationship between T1 psychological distance and T1 suicidal intent, controlling for T1 DSI-SS suicidal ideation severity (95% CI: −0.001, −0.0001). Further, T1 physical distance did not significantly account for the relationship between T1 psychological distance and T2 suicidal intent, controlling for T1 suicidal intent and T1 DSI-SS suicidal ideation severity (95% CI: −0.0004, 0.00).

This study was limited by its use of a lower risk sample (i.e., undergraduates selected for recent but not necessarily current and/or severe suicidal ideation) and a relatively long follow-up period (i.e., two months), especially given the dynamic nature of suicide risk (Bryan & Rudd, 2016). Accordingly, Study 2 aimed to address these limitations using a sample of adults at high risk for suicide and a briefer follow-up period.

4. Study 2

4.1. Methods

4.1.1. Participants

A sample of 91 community-dwelling adults at elevated suicide risk was recruited from a variety of online forums (e.g., Reddit) focused on discussions of self-injurious and suicidal thoughts and behaviors. Ages ranged from 18 to 60 years ($M = 27.03$, $SD = 8.64$). Approximately half of the sample (53.8%) identified as female, a majority identified as White/European American (78.0%), and slightly over half (58.2%) identified as heterosexual/straight. All participants (100%, $n = 91$) reported a lifetime history of suicidal ideation, 81.3% ($n = 74$) reported a lifetime history of suicide plans (59.5% of whom reporting making a plan within the past month), and 49.5% ($n = 45$) reported a history of at least one suicide attempt (51.1% of whom reporting requiring medical attention for their most recent attempt). Table 5 presents detailed participant demographic and clinical characteristics.

Table 3
Means, standard deviations, ranges, and intercorrelations for Study 1 measures.

	1	2	3	4	5	6	7	8
1. DSI-SS Suicidal Ideation (T1)	–							
2. DSI-SS Suicidal Ideation (T2)	.58**	–						
3. Suicidal Intent (T1)	.59**	.38**	–					
4. Suicidal Intent (T2)	.41**	.63**	.51**	–				
5. VAS Physical Distance (T1)[a]	.13	.15	.26**	.30**	–			
6. VAS Psychological Distance (T1)[a]	.38**	.26**	.48**	.33**	.47**	–		
7. Target Physical Distance (T1)[b]	-.14	-.13	-.33**	-.29**	-.91**	-.47**	–	
8. Target Psychological Distance (T1)[b]	-.26**	-.19*	-.45**	-.32**	-.34**	-.84**	.38**	–
M	2.17	1.56	0.78	0.50	39.73	32.35	126.71	142.92
SD	2.10	2.05	1.54	1.18	36.75	28.02	68.53	53.04
Range	0–8	0–9	0–8	0–7	0–100	0–100	1–267	2–268
Skew	0.50	1.23	2.34	3.49	0.31	0.37	−0.41	−0.41
Kurtosis	−0.69	0.95	5.51	13.95	−1.51	−1.08	−1.03	−0.12
α	.85	.88	–	–	–	–	–	–

Note. **$p < .001$; *T1* = Time 1; *T2* = Time 2; *DSI-SS* = Depressive Symptom Inventory—Suicidality Subscale; *VAS* = Visual Analog Scale; Means, standard deviations, ranges, skew, and kurtosis are reported for self-report measures prior to logarithmic transformations.

[a] Larger values indicate lower distance (i.e., participant rated a higher degree of closeness on a 1 to 100 scale).

[b] Smaller values indicate lower distance (i.e., participant selected an area closer to the center of the target).

Table 4
Study 1 linear regression analyses examining physical and psychological distance as correlates and predictors of suicidal intent.

Correlates of Suicidal Intent (T1)	*B*	*SE*	*β*	*t*	*p*	partial r^2	f^2	*95% CI [B]*
Step 1:								
Target Physical Distance (T1)	-.00	.00	-.18	−2.09	.038	.04	.04	-.00, .00
Target Psychological Distance (T1)	-.00	.00	-.38	−4.36	< .001	.14	.16	-.00, −.00
Step 2:								
Target Physical Distance (T1)	-.00	.00	-.16	−2.14	.035	.04	.04	-.00, .00
Target Psychological Distance (T1)	-.00	.00	-.26	−3.49	.001	.09	.10	-.00, −.00
DSI-SS Suicidal Ideation (T1)	.06	.01	.50	7.05	< .001	.30	.42	.04, .08
Predictors of Suicidal Intent (T2)								
Step 1:								
Target Physical Distance (T1)	-.00	.00	-.19	−2.08	.040	.04	.04	-.00, .00
Target Psychological Distance (T1)	-.00	.00	-.25	−2.72	.008	.06	.06	-.00, .00
Step 2:								
Target Physical Distance (T1)	.00	.00	-.12	−1.44	.152	.02	.02	-.00, .00
Target Psychological Distance (T1)	.00	.00	-.09	−0.95	.343	.01	.01	-.00, .00
DSI-SS Suicidal Ideation (T1)	.02	.01	.18	1.84	.068	.03	.03	-.00, .04
Suicidal Intent (T1)	.26	.09	.32	3.06	.003	.08	.08	.09, .43

Note. T1 = Time 1; *T2* = Time 2; *DSI-SS* = Depressive Symptom Inventory—Suicidality Subscale. Smaller values indicate lower physical/psychological distance (i.e., participant selected an area closer to the center of the target).

Table 5
Study 2 demographic characteristics & suicidality history.

	N	Valid %
Gender		
Male	40	44.0%
Female	49	53.8%
Transgender Female	1	1.1%
Non-Binary	1	1.1%
Age (*M* = 27.03, *SD* = 8.64, Range = 18–60)		
Race/Ethnicity[a]		
White/European American	71	78.0%
Black/African American	9	9.9%
Hispanic or Latino/a	10	11.0%
Asian/Pacific Islander	15	16.5%
American Indian/Native American	3	3.3%
Other	3	3.3%
Sexual Orientation		
Heterosexual/Straight	53	58.2%
Gay/Lesbian	5	5.5%
Bisexual/Pansexual	25	27.5%
Queer	2	2.2%
Asexual	6	6.6%
Marital Status		
Single/Never Married	68	74.7%
Cohabiting	7	7.7%
Married	12	13.2%
Divorced	4	4.4%
Suicidality History		
Lifetime Ideation	91	100.0%
Lifetime Plan	74	81.3%
Lifetime Attempt	45	49.5%
NSSI	59	64.8%

[a] Categories are not mutually exclusive.

4.2.1. Measures

4.2.1.1. Demographics and suicidality history. A brief self-report survey was utilized to assess sociodemographic characteristics and history of suicidality.

4.2.2.1. Suicidal intent and desire. As in Study 1, participants were asked to rate their suicidal intent (*"How would you rate your current intent to make a suicide attempt in the near future?"*) on a 0 to 10 scale, with higher scores signaling greater suicidal intent. They were additionally asked, as recommended by Chu et al. (2015), to rate their suicidal desire (*"How would you rate your current desire to make a suicide attempt in the near future?"*) on a 0 to 10 scale, with higher scores signaling greater suicidal desire. Participants' baseline intent and desire ratings were obtained through a phone call risk assessment with the study's first author; follow-up suicidal intent ratings were gathered via a self-report item utilizing the above wording.

4.2.2.2. Suicide plans and preparation. During the follow-up survey, participants were asked whether they had made any recent suicide plans (i.e., *"Since the last assessment, have you made any plans for suicide?"*) or preparations (i.e., *"Since the last assessment, have you made any preparations for suicide?"*).

4.2.2.3. Physical and psychological distance to suicide methods. See Study 1 for a description of the physical and psychological distance to suicide methods measures.

4.3.1. Procedures

These data were collected as part of a larger investigation of short-term risk factors for suicidal behavior. Inclusion criteria included: (a) aged 18 years or older; (b) English-speaking; and (c) significant suicidal ideation, as evidenced by a score of 11 or higher on the BSS (Beck & Steer, 1991). The sole exclusion criterion was imminent suicide risk (i.e., risk warranting immediate hospitalization); however, it is worth noting that no prospective participants in the current study were excluded based on this criterion. Participants were recruited through online forums centered on discussion of self-injurious and suicidal thoughts and behaviors. Interested participants were provided with a description of the study and a survey link to complete screening and baseline measures. Following study enrollment, participants provided informed consent and completed a battery of self-report measures via Qualtrics. In the 24 hours following baseline survey completion, they were contacted via phone by the study PI for an assessment of suicide risk and to be provided with information regarding mental health resources. These resources included an individualized safety plan and reference to local and national mental health resources. Next, participants were emailed a web link to complete a brief battery of follow-up measures every three days for 18 days (i.e., a total of 5 follow-up surveys). Because we were interested in short-term changes in suicide risk, yet wanted to allow for the accumulation of suicide-related outcomes (i.e., suicide plans/preparations) given its low base rate, the one-week follow-up was utilized a priori for the present study. Participants were compensated with $5 for baseline survey completion and $2 for each follow-up survey completion (with a bonus compensation of $5 for those who completed all five follow-up surveys within 48 hours of receiving them). The University's Institutional Review Board approved all study procedures.

Table 6
Means, standard deviations, ranges, and intercorrelations for study 2 measures.

	1	2	3	4	5	6	7
1. Suicidal Desire (T1)	–						
2. Suicidal Intent (T1)	.67***	–					
3. Suicidal Intent (T2)	.34**	.66***	–				
4. VAS Physical Distance (T1)[a]	-.03	.21	.07	–			
5. VAS Psychological Distance (T1)[a]	.37***	.45***	.49***	.11	–		
6. Target Physical Distance (T1)[b]	.03	-.18	.01	-.93***	-.11	–	
7. Target Psychological Distance (T1)[b]	-.32**	-.47***	-.47***	-.19	-.83***	.18	–
M	5.11	3.86	3.96	55.15	54.77	101.29	103.14
SD	2.56	2.42	2.26	35.29	24.91	65.05	51.87
Range	0–10	0–10	1–9	0–100	0–100	1.41–237.86	1.41–267.32
Skew	-.01	.25	.44	-.21	-.21	.16	.04
Kurtosis	-.91	-.76	-.82	−1.44	-.75	−1.05	-.01

Note. $^{**}p < .01$, $^{***}p < .001$; *T1* = Time 1; *T2* = Time 2; VAS = Visual Analog Scale.
[a] Larger values indicate lower distance (i.e., participant rated a higher degree of closeness on a 1 to 100 scale).
[b] Smaller values indicate lower distance (i.e., participant selected an area closer to the center of the target).

4.4.1. Data analysis

Descriptive statistics and bivariate correlations were first examined to characterize the sample. Study variables were also screened for outliers and violations of normality. There were no non-normal distributions among continuous study variables; thus, no variable transformations were conducted. Next, a hierarchical linear regression model was utilized to evaluate *correlates* of baseline (T1) suicidal intent. For this model, T1 physical distance and T1 psychological distance were entered in Step 1, and T1 suicidal desire was entered in Step 2. A hierarchical linear regression model was also used to evaluate *predictors* of suicidal intent at one-week follow-up (T2). For this model, T1 physical distance and T1 psychological distance were entered in Step 1, and T1 suicidal desire and T1 suicidal intent were entered in Step 2. Finally, two logistic regression models were conducted to evaluate *predictors* of T2 suicide plans and preparations. T1 physical distance and T1 psychological distance were entered as predictors in Step 1, with T1 suicidal intent and T1 suicidal desire entered as covariates in Step 2. Importantly, all VIF values were within normal limits. Cohen's f^2 was included as a metric of local effect size. Missing data were minimal (92.3% [n = 84] completed T2, with no missing values) and handled via listwise deletion.

5. Results

Table 2 presents the primary suicide attempt methods selected by each participant; medication overdose (n = 27, 29.7%), (2) firearms (n = 14, 15.4%), and (3) hanging (n = 14, 15.4%) were the most commonly selected options. Descriptive statistics and zero-order correlations for all measures are presented in Table 6. Participants in this sample tended to select points on the target that were above and to the right of the bullseye. As in Study 1, the target paradigm and VAS measures of physical and psychological distance were highly correlated (rs = 0.83 and 0.93), further supporting the target paradigm's concurrent validity. Notably, however, ratings of physical and psychological distance were not significantly related for either assessment method (rs = 0.11 and 0.18). First, the regression model examining *correlates* of T1 suicidal intent explained 54.9% of the variance in T1 suicidal intent; lower T1 physical distance and lower T1 psychological distance were both significantly associated with greater T1 suicidal intent, controlling for T1 suicidal desire ($\beta = -0.15$, $p = .044$, partial $r^2 = 0.02$; and $\beta = -0.25$, $p = .001$, partial $r^2 = 0.06$, respectively). In the regression model examining *predictors* of T2 suicidal intent ($R^2 = 0.49$), lower T1 psychological distance ($\beta = -0.23$, $p = .027$, partial $r^2 = 0.04$), but not T1 physical distance ($\beta = 0.08$, $p = .392$, partial $r^2 = 0.01$), significantly predicted greater T2 suicidal intent, controlling for T1 suicidal intent and T1 suicidal desire.[3] These results are presented in detail in Table 7. Regarding our exploratory analyses, T1 psychological distance did not significantly account for the relationship between T1 physical distance and T1 suicidal intent (95% CI: −0.005, 0.0001), controlling for T1 suicidal desire, nor did it account for the relationship between T1 physical distance and T2 suicidal intent (95% CI: −0.003, 0.0003), controlling for T1 suicidal intent and T1 suicidal desire. Likewise, tests of alternative models indicated that T1 physical distance did not account for the relationship between T1 psychological distance and T1 suicidal intent (95% CI: −0.004, 0.0001), controlling for T1 suicidal desire, or the relationship between T1 psychological distance and T2 suicidal intent (95% CI: −0.003, 0.001), controlling for T1 suicidal intent and T1 suicidal desire.

Logistic regression models (see Table 8) indicated that lower T1 psychological distance (OR = 0.98, $p = .027$), but not lower T1 physical distance (OR = 1.00, $p = .920$), predicted increased odds of making a suicide plan during the one-week follow-up period. Similarly, lower T1 psychological distance (OR = 0.95, $p = .045$) predicted increased odds of making preparations for suicide during the one-week follow-up period, whereas lower T1 physical distance (OR = 0.99, $p = .640$) did not. However, the psychological distance effects were non-significant (ps = .518 and .070) following the inclusion of T1 suicidal intent ($p = .004$ and .441) and T1 suicidal desire ($p = .511$ and .255) in the models.

6. Discussion

This multi-sample investigation aimed to investigate whether novel, brief measures of perceived physical and psychological distance to suicide methods may be correlated with and predict suicide-related outcomes among young adults with recent/current suicidal ideation (Study 1) and community-dwelling adults at high risk for suicide (Study 2). Both studies found that lower perceived physical distance and lower perceived psychological distance were significantly associated with greater suicidal intent. Notably, Study 2 additionally found that lower *psychological* distance, specifically, predicted greater suicidal intent at one-week follow-up and an increased likelihood of having made suicide plans and suicide preparations in the past week. These findings have implications for the assessment and management of suicide risk among individuals at elevated suicide risk.

First, these findings are consistent with aforementioned lethal

[3] Recency of suicide plans (1 = past-month plans, 0 = no past-month plans) did not moderate any of these associations (ps = .219 to .887).

Table 7
Study 2 linear regression analyses examining physical and psychological distance as correlates and predictors of suicidal intent.

Correlates of Suicidal Intent (T1)	*B*	*SE*	*β*	*t*	*p*	partial r^2	f^2	*95% CI [B]*
Step 1:								
Target Physical Distance (T1)	-.00	.00	-.09	-.99	.325	.01	.01	-.01, .00
Target Psychological Distance (T1)	-.02	.00	-.46	−4.79	< .001	.20	.26	-.03, −.01
Step 2:								
Target Physical Distance (T1)	-.01	.00	-.15	−2.04	.044	.02	.05	-.01, .00
Target Psychological Distance (T1)	-.01	.00	-.25	−3.28	.001	.06	.12	-.02, −.01
Suicidal Desire (T1)	.57	.07	.60	7.83	< .001	.32	.71	.42, .71
Predictors of Suicidal Intent (T2)								
Step 1:								
Target Physical Distance (T1)	.00	.00	.05	.42	.676	.00	.01	-.01, .01
Target Psychological Distance (T1)	-.02	.01	-.48	−4.38	< .001	.22	.17	-.03, −.01
Step 2:								
Target Physical Distance (T1)	.00	.00	.08	.86	.392	.01	.00	-.00, .01
Target Psychological Distance (T1)	-.01	.01	-.23	−2.26	.027	.04	.04	-.02, −.00
Suicidal Desire (T1)	-.12	.11	-.13	−1.05	.297	.01	.01	-.34, .10
Suicidal Intent (T1)	.64	.13	.65	5.03	< .001	.20	.41	.38, .89

Note: Smaller values indicate lower physical/psychological distance (i.e., participant selected an area closer to the center of the target).

Table 8
Study 2 logistic regression analyses examining physical and psychological distance as predictors of suicide plans and preparations.

Suicide Plans (T2)	*B*	*SE*	*Wald*	*p*	*OR*	*95% CI*
Step 1:						
Target Physical Distance (T1)	-.00	.01	.01	.920	.999	.986, 1.013
Target Psychological Distance (T1)	-.02	.01	4.89	.027	.980	.962, .998
Step 2:						
Target Physical Distance (T1)	.01	.01	.53	.466	1.005	.991, 1.020
Target Psychological Distance (T1)	-.01	.01	.42	.518	.994	.976, 1.012
Suicidal Intent (T1)	1.13	.40	8.19	.004	3.107	1.429, 6.754
Suicidal Desire (T1)	-.16	.24	.43	.511	.857	.540, 1.359
Suicide Preparations (T2)						
Step 1:						
Target Physical Distance (T1)	-.00	.01	.04	.839	.999	.988, 1.010
Target Psychological Distance (T1)	-.02	.01	7.81	.005	.978	.964, .993
Step 2:						
Target Physical Distance (T1)	-.00	.01	.13	.722	.998	.985, 1.011
Target Psychological Distance (T1)	-.02	.01	3.27	.070	.984	.968, 1.001
Suicidal Intent (T1)	.20	.26	.59	.441	1.219	.736, 2.019
Suicidal Desire (T1)	.26	.23	1.30	.255	1.302	.827, 2.049

Note: Smaller values indicate lower physical/psychological distance (i.e., participant selected an area closer to the center of the target).

means counseling approaches that emphasize the importance of creating physical distance between at-risk individuals and the suicide methods they are considering (Barber & Miller, 2014; Betz et al., 2011). As noted, both of our studies found that lower *physical* distance to suicide methods was significantly associated with greater suicidal intent at baseline, even after accounting for the effects of suicidal ideation severity (Study 1) and suicidal desire (Study 2). Thus, our results suggest that lower perceived distance to suicide methods uniquely contributes to increased intentions to engage in suicidal behaviors, supporting the utility of assessing and reducing access to suicide methods as a complement to enhancing individuals' skills to cope with suicidal thoughts (B. Stanley & Brown, 2012). Though lethal means counseling, for clear practical reasons, often focuses on a precise assessment of where a suicide method is located relative to the individual (e.g., a firearm on an individuals' nightstand vs. in a locked safe in the basement), our findings also indicate that individuals' *perceived* distance to suicide methods may be clinically useful.

Interestingly, however, physical distance to suicide methods did not predict greater suicidal intent either at two-month (Study 1) or one-week (Study 2) follow-up, controlling for baseline intent and other suicide-related metrics. We strongly caution against interpreting these prospective findings as an indicator that physical access to means is not an important contributor to suicide risk over time. Indeed, in Study 1, lower physical distance remained a significant predictor of subsequent suicidal intent without the inclusion of our potentially conceptually overlapping covariates (e.g., DSI-SS suicidal ideation severity, which is a construct that likely highly overlaps with other indices of suicide risk; Rogers et al., 2016). Instead, we recommend further study of these constructs across larger high-risk samples utilizing varying assessment time frames and a more comprehensive assessment of practical capability for suicide (Klonsky & May 2015).

Second, our findings highlight perceived *psychological* distance as a novel, potentially clinically useful construct to consider when working with at-risk individuals, especially those at high risk for suicide. As previously discussed, psychological distance has remained a largely understudied topic within the suicide research literature. This study represents the first study, to our knowledge, to demonstrate that lower psychological distance to suicide means predicts subsequent greater suicidal intent and an increased likelihood of having engaged in suicide plans and preparations one week later, above and beyond the effects of physical distance from suicide methods. We did not assess what participants interpreted the term “psychologically close” to mean or further probe why, precisely, this metric might be a particularly informative suicide risk indicator. However, based on CLT (Trope & Liberman,

2010), it is possible that an individual may experience greater psychological distance from a suicide method—even a "preferred" method—if that method is not particularly desirable or if it is difficult for the individual to imagine utilizing. Further, in the context of capability for suicide, a method at greater psychological distance from an individual may be laden with cognitive appraisals regarding low tolerability of the fear and pain associated with that method (Van Orden et al., 2010). Thus, greater psychological distance from a suicide method, even in the context of strong suicidal desire, may mitigate, to an extent, an individual's suicide risk.

Our psychological distance results also align with a broader literature suggesting that individuals may have certain preferences for suicide methods and be unlikely to engage in "means substitution" (i.e., electing to use another suicide method when they are unable to use and/or do not have access to their preferred method; see Daigle, 2005). Though this concept of means substitution has been largely used to justify the utility of reducing *physical* access to suicide methods, our findings also signal the importance of considering and even therapeutically addressing *psychological* closeness to suicide methods. It may be possible, for instance, to increase an individual's aversion to a specific suicide method utilizing behavioral conditioning principles (Franklin et al., 2016), though this approach remains to be tested. Finally, it is critical note that, given that the vast majority of previous suicide risk factors have focused on relatively long follow-up periods (Franklin et al., 2017), our psychological distance findings are particularly useful in informing our understanding of short-term and acute suicide risk factors. Ultimately, though, further research is needed to replicate these findings, delineate how individuals conceptualize "psychological distance," and explore how we might therapeutically impact psychological distance to a preferred suicide method.

Third, and importantly, our study provides preliminary evidence that both physical and psychological distance to suicide means can be assessed with a relatively brief bullseye target paradigm. This assessment format may be advantageous both for research and clinical practice settings, as it is low in time burden, inexpensive to administer (i.e., individuals simply make a single mark on a target image), and may offer incremental clinical information (Bryan, 2018). Although, in both studies, this target paradigm evinced significant correlations with VAS ratings of physical and psychological distance to suicide methods, additional empirical support for its reliability and validity is needed before we can definitively recommend its use in research and clinical assessment.

Moreover, given that the participants in these samples reported a diverse set of preferred suicide attempt methods, it is possible that these findings are generalizable across suicide methods, although there were differences across samples. Namely, the most commonly selected preferred suicide attempt methods among Study 1 participants included medication overdose (i.e., using one's own or others' prescription medications, over-the-counter medications, or illicit drugs), jumping from a height, train/car collision, and sharp objects. In contrast, among Study 2 participants, who were at higher current risk for suicidal behavior, there was a more even spread of preferred methods, with medication overdose, firearms, and hanging reflecting the most commonly selected options. As Study 2 exhibited slightly stronger effects for psychological distance than Study 1, descriptively, it may be worth examining whether effects are stronger for certain methods (e.g., firearms, hanging) than others (e.g., medications), or whether some other moderating variables play a role in these relationships. In particular, one possibility is that the recency of suicidal ideation (as seen by the moderating effect of recency of suicidal ideation on these relationships at the cross-sectional level in Study 1) and/or plans, or the use of a particular method in previous suicide attempts, may impact either (1) the degree to which individuals are physically or psychologically close to a given method; or (2) the trajectory of the relationship between physical/psychological distance and subsequent suicide risk.

Finally, our exploratory analyses were inconsistent. Study 1 findings suggested that, at least cross-sectionally, lower psychological distance to a suicide method may explain the relationship between lower physical distance to that method and greater suicidal intent; indeed, these same analyses were marginally, yet not statistically, significant in Study 2. These findings offer a possible explanation for why, beyond the simple explanation of decreasing convenience and ready physical access, increasing physical distance from suicide methods may reduce suicide risk. Harkening back to the principles of CLT (Trope & Liberman, 2010), increasing physical distance from suicide methods may result in a suicide method being less "cognitively available," salient, and desirable, ultimately decreasing suicide risk. Our findings also align with and provide empirical support for a common view of how to approach lethal means counseling. In lethal means counseling, at-risk individuals are encouraged to make even minor adjustments to their access to means—for example, moving a firearm to from one's bedside to another room in the house (Anestis, 2018). Though individuals may still have ready access to the firearm, even the act of moving the firearm to another room where they may not see it as frequently may create greater psychological distance and emotional detachment from the firearm, decreasing suicide intent, plans, and preparations. Nonetheless, our exploratory analyses were non-significant at the prospective level, indicating that there may not be causal influences on these constructs over time, and did not demonstrate evidence of specificity, indicating that this proposed path should be replicated prior to making definitive determinations of these relationships. Further studies assessing these indices should include at least three assessment points in a sufficiently powered sample to adequately test these hypothesized mediation pathways.

Likewise, as physical and psychological distance ratings were not significantly correlated in Study 2 ($rs = 0.11$ and 0.18, $ps > .05$), it is possible that these dimensions become more nuanced and disparate at higher levels of suicide risk (for instance, such contrasting ratings might be akin to an individual residing in the Midwest U.S. ideating about the Golden Gate bridge, or an individual without access to a firearm ideating about the use of one). At higher levels of suicide risk, it is possible that individuals might perseverate on potential methods that they do not have access to, or that greater psychological distance from physically accessible methods might be inhibiting engagement in suicidal behavior—particularly given that no participants made a suicide attempt during this investigation.

7. Limitations and future directions

This multi-study investigation was not without limitations. Most importantly, participants were not provided with an explanation of the terms "psychologically close" and "physically close; " further, they were not asked to provide feedback on their interpretations of these terms. Given the novelty of these assessments, particularly psychological distance, this limits the degree to which conclusions can be drawn about these findings and potential clinical implications of our study, although this study still provides important preliminary data. Research is needed to understand how individuals interpret the terms "psychologically close" and "physically close," particularly as lethal means counseling related to physical distance focuses on the *accessibility* of means, rather than their actual physical proximity (e.g., a firearm in a locked safe next to a person versus a firearm on a table in the next room). In particular, it would be beneficial for future research to provide further instruction to participants when answering these items (e.g., that psychological distance refers to a subjective perception that something is close or far away from the self).

Second though we endeavored to examine physical and psychological distance as predictors of various suicide-related outcomes using a shorter follow-up period than the vast majority of previous studies seeking to identify suicide risk factors (Franklin et al., 2017), the use of two-month and one-week follow-up periods may still not have had sufficient temporal resolution to detect acute changes in suicide risk.

Indeed, research suggests that suicide risk is dynamic (Bryan, Rudd, Peterson, Young-McCaughan, & Wertenberger, 2016) and that the frequency and intensity of suicidal thoughts may change markedly even within hours and days (Kleiman et al., 2017). Thus, similar studies utilizing shorter and multiple follow-up periods are needed. Relatedly, it would be informative to replicate our findings in even higher-risk samples to examine whether physical and psychological distance from suicide means predicts other suicidal behaviors (e.g., attempts). For instance, a replication of our study among psychiatric inpatients prior to and following discharge from hospitalization may be particularly informative, especially given the ability to then examine whether changes in physical access to means prior to and following discharge may impact psychological distance to means. This study design would allow further testing of the hypothesis that psychological distance explains the relationship between physical distance and suicidal intent. Additional prospective studies utilizing multiple time points would also facilitate a more rigorous test of mechanisms that underlie the relationship between both physical and psychological distance and suicide risk.

It is also worth noting that in both of our samples, participants received mental health resources at baseline based on their current suicide risk. These resources included not only lists of local and national resources, but also the creation of individualized safety plans in many cases (all, in Study 2). Consequently, these resources may have influenced participants' subsequent ratings of suicidal intent and/or creation of suicide plans and preparations, given that suicidality was direct intervened upon. Nonetheless, that our findings still emerged despite use of a validated intervention represents evidence for this effect in an ecologically valid setting.

Another limitation of our studies is that our findings may not be generalizable to other populations (e.g., military service members, psychiatric inpatients) or sociodemographic groups (e.g., adolescents, older adults, ethnic minorities). Our Study 1 sample, in particular, was restricted to individuals not currently engaged in any form of treatment, further limiting generalizability. Therefore, studies are needed to test the utility of our target paradigm in other samples. Finally, participants in both of our studies completed the target paradigm via a web-based survey as part of a research study. It is possible that individuals may respond more or less accurately to this paradigm in another setting or if presented with it in another format. Psychometric evaluation of our novel paradigm is needed, including evaluation of this paradigm in different settings and utilizing different formats. In particular, research is needed to understand how these target-assessed variables relate to other indices of suicide risk.

8. Conclusions

In sum, this multi-study investigation aimed to evaluate perceived physical and psychological distance to suicide methods as both correlates and predictors of suicide risk among two samples of individuals at elevated suicide risk. We found that lower *psychological* distance may be a useful predictor of suicidal intent and likelihood of making suicide plans and preparations among high-risk individuals, above and beyond lower *physical* distance to suicide methods in these at-risk samples. Findings suggest that there may be utility in both assessing and therapeutically targeting both physical and psychological distance to an at-risk individual's preferred suicide method. Though further research is needed to replicate our results in other at-risk samples, this investigation offers preliminary evidence for the merits of a novel, brief assessment of physical and psychological distance to suicide methods.

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