The three-step theory of suicide: Description, evidence, and some useful points of clarification

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A B S T R A C T

There has been considerable uptake of the Three-Step Theory (3ST) of suicide since its publication in 2015. The 3ST is a concise, evidence-based, and actionable theory that explains suicide in terms of four factors: pain, hopelessness, connection, and capability for suicide. The 3ST has not only been cited in hundreds of scientific papers, but incorporated into continuing education programs, gatekeeper training, and self-help resources. In this context, it is useful to clarify the theory's content and review its scientific support. Thus, the present article describes the 3ST, provides an updated evidence review for each of its premises, and offers several points of clarification so that the claims of the 3ST may be better understood, evaluated, and applied. To date, research (including research on correlates, risk factors, motivations, warning signs, and means-safety interventions) supports the 3ST. At the same time, there are aspects of the theory that are challenging to operationalize and that require further testing.

Suicide is a significant global health problem. One approach for improving understanding and prevention of suicide is to advance suicide theory. A concise, evidence-based theory of suicide can help identify key treatment and prevention targets across populations and levels of intervention (Klonsky et al., 2020; Klonsky, 2020).

Suicidologists increasingly recognize that the development of suicidal ideation and the progression from suicidal ideation to suicide attempts are distinct processes requiring distinct explanations (Klonsky and May, 2014). As a result, more recent theories of suicide adopt an "ideation-to-action" framework, and offer separate explanations for suicide ideation and suicide attempts (Joiner, 2005; Klonsky et al., 2018; Van Orden et al., 2010). This paper focuses on the most recent ideation-to-action theory of suicide: the Three-Step Theory (3ST) of suicide.

Though published just a few years ago (Klonsky and May, 2015), the 3ST has generated considerable interest. The original 2015 paper on the 3ST has been cited by hundreds of researchers and designated by Web of Science as "top 1%" in the field of Psychiatry/Psychology based on citation rate. In addition, the 3ST has been applied by clinicians and preventionists, including in continuing education courses (Center for Deployment Psychology, 2020; Sommers-Flanagan, 2019; Walsh, 2016), self-help resources (Gordon, 2021), and gatekeeper training for university and college campuses (Mistler, 2018). In light of the theory's broad uptake, the current paper will: a) describe the 3ST, b) summarize the evidence supporting it, and c) clarify some key aspects so that its claims can be better understood, evaluated, and applied.

1. Description of the three-step theory of suicide

The 3ST (Klonsky and May, 2015) describes the conditions under which desire for suicide and suicide attempts occur. It is offered as a parsimonious theory that explains suicide in terms of just four factors: pain, hopelessness, connectedness, and capability for suicide (see Fig. 1).

1.1. Step 1: The combination of pain and hopelessness causes suicidal desire

Step 1 addresses the conditions under which desire for suicide develops, and suggests that suicidal desire results from the combination of pain and hopelessness. Though it is usually psychological pain that contributes to suicidal desire (Shneidman, 1993), pain of any form can contribute in Step 1. Diverse circumstances (e.g., relationship disruption, job loss, mental illness, medical conditions) cause pain for different individuals. Humans are deeply behavioral creatures and hard-wired to reduce pain and painful experiences. This instinct is critical for our survival, and in controlled experiments the avoidance of pain is documented across varied painful stimuli, including loud noises, social rejection, and electric shock, among many others (Alexander et al., 1973; Mazur, 2012; Watson and Rayner, 1920; Williams et al., 2000). Similarly, the 3ST suggests that if one experiences life as painful, miserable, or aversive, they will experience a powerful instinct to find a
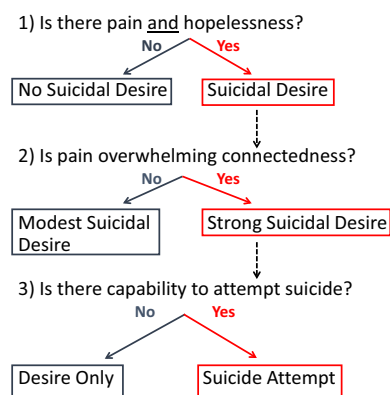

Fig. 1. The Three-Step Theory (3ST) of suicide. Figure adapted from Klonsky and May (2015).

way out.

Importantly, pain is not sufficient to produce suicidal desire. Hopelessness is also required. If an individual is experiencing intense pain but is hopeful that their situation will improve through time or effort, then their focus will be on achieving a better future or enduring the current moment. In contrast, if an individual experiencing intense pain is hopeless about their situation improving, they will begin to consider suicide as a way out. In short, the combination of intense pain and hopelessness causes suicidal desire.

1.2. Step 2: Suicidal desire intensifies when pain exceeds or overwhelms connectedness

Suicidal desire is most often moderate. For example, ecological momentary assessment data demonstrate that suicidal desire is most often experienced as mild or moderate, and less often as severe or strong in intensity (Kleiman et al., 2017; Nock et al., 2009). This raises the question: under what conditions does suicidal desire intensify? Step 2 of the 3ST states that if an individual's pain is greater than their connectedness, suicidal desire will intensify. Connectedness, as defined in the 3ST, is a broad construct and may include many different sources of connection, such as connection to close friends or family, the broader community, a job, the city one lives in, pets, a sports team, a valued identity or role, or any sense of purpose or meaning. Whereas pain provides the push away from life (Step 1), connectedness provides the pull toward life (Step 2). Thus, connectedness can make life worth living (despite the presence of pain that is not expected to abate). If connectedness exceeds pain, suicidal desire will remain modest or occasional, rather than strong or persistent. In contrast, if pain overwhelms or exceeds connectedness, desire for suicide will intensify.

There are different ways in which conditions for Step 2 may be met. One way is if an individual does not experience much connectedness to begin with; in this situation, the conditions of Step 2 will be met just about any time someone experiences both pain and hopelessness. A second way is if pain reaches peaks of extreme intensity; in this situation, pain can exceed connectedness even for someone with high levels of connectedness. A third way is that extreme pain can overwhelm one's connectedness or remove one's ability to appreciate or engage in connections they otherwise enjoy. Much as it is difficult to engage in valued social, recreational, or occupational activities while in the midst of food poisoning, someone in extreme psychological or physical pain may lose their ability to engage with connections they otherwise have. In this scenario, pain overwhelms connectedness, and the conditions for Step 2 are met. In summary, among those meeting the conditions described in Step 1, suicidal desire intensifies when pain exceeds or overwhelms connectedness.

1.3. Step 3: Strong suicidal desire progresses to suicide attempts if capability for suicide is present

Step 3 addresses the conditions under which strong suicidal desire progresses to a potentially lethal suicide attempt. Because most people with suicidal ideation do not attempt suicide (Nock et al., 2008), it is important for any suicide theory to specify the conditions under which suicide attempts occur. According to Step 3 of the 3ST, strong suicidal desire leads to a suicide attempt when there is also the capability to attempt suicide. The 3ST describes three types of contributors to suicide capability: acquired, dispositional, and practical.

Acquired capability was first described in the Interpersonal Psychological Theory of Suicide (IPTS; Joiner, 2005). Joiner noted that attempting suicide is fearsome, and that humans are evolutionarily and biologically disposed to fear and avoid pain, injury, and death (Joiner, 2005; Van Orden et al., 2008). Thus, attempting suicide requires overcoming these fears. Joiner suggested that the capability to overcome these fears can be acquired through life experiences (e.g., nonsuicidal self-injury, histories of physical or sexual abuse, intravenous drug use, working in emergency or medical professions, and many others) that facilitate habituation to fears of pain, injury, and death. The 3ST agrees that, for some people, these kinds of experiences can reduce fears of self-inflicted pain, injury, and death, and lead them to acquire a higher capability to attempt suicide.

Dispositional capability for suicide refers to temperamental, personality, or genetic factors that may decrease aversion to self-inflicted pain, injury, and death. For example, variables reflecting increased harm avoidance, such as neuroticism, may decrease the chances that someone with suicidal ideation progresses to a suicide attempt (Rappaport et al., 2017). Variables such as high pain sensitivity and squeamishness about injury or blood may also decrease capability for suicide. Conversely, dispositions such as low harm avoidance, low pain sensitivity, and low squeamishness about injury or blood can increase capability for suicide.

Finally, practical capability refers to a wide array of factors that increase an individual's access to and knowledge of lethal means. A salient example in the United States is access to firearms (Betz and Anestis, 2020). Practical capability can sometimes increase quickly. For example, if an individual learns online that an overdose of acetaminophen is lethal, whereas ibuprofen is not, their practical capability to attempt and die by suicide has meaningfully increased. Practical capability can also decrease quickly. For example, if someone who otherwise has sufficient suicidal desire and suicide capability lacks privacy, this practical circumstance may lower capability, and decrease the chances that an attempt will occur.

Importantly, the 3ST does not require each form of capability to be high. The key is whether total suicide capability in sufficient for an individual with strong suicidal desire to make an attempt. For example, high practical capability (e.g., privacy plus access to and expertise with a firearm) can be sufficient for strong suicidal desire to progress to an attempt even if dispositional or acquired contributors to capability are absent. In summary, strong suicidal desire progresses to a suicide attempt when capability for suicide is sufficient.

2. Evidence for the three step theory of suicide

A growing number of studies find support for the 3ST. These include studies conducted in different settings (community and clinical) and countries (US, Canada, UK, China). Importantly, the theory makes causal claims, but experimental designs that identify causal processes have practical and ethical limitations (e.g., we cannot randomly assign people to experience intense pain and hopelessness to see if they then feel suicidal). Consequently, we must obtain various kinds of imperfect data to make inferences about causality, and there is not just one kind of study that can test premises of the 3ST. Depending on the premise, different methodological designs can provide important and relevant

tests, including studies on correlates, predictors, motivations, and warning signs.

The theory's three steps each represent independent propositions. We thus summarize below the evidence for each step one at a time.

2.1. Evidence for Step 1

Evidence is perhaps strongest for Step 1 of the 3ST. Step 1 states that the combination of pain and hopelessness causes suicidal desire. One test of this step is to compute the statistical interaction between pain and hopelessness in the prediction of concurrent suicidal desire (in our view the absence of this interaction would refute Step 1). Notably, in direct tests of the 3ST this statistical interaction has been found in two community samples (Klonsky and May, 2015; Pachkowski et al., 2021), a psychiatric sample (Tsai et al., 2020), and among undergraduates in the UK (Dhingra et al., 2018) and China (Yang et al., 2018). In addition, the model including pain and hopelessness is found to account for a very large amount of variance in suicidal desire. For example, variance explained by the full model (pain, hopelessness, and their interaction) was 68% in psychiatric patients (Tsai et al., 2020), 41% in a US community sample (Klonsky and May, 2015), 47 and 52% at two-time points, respectively, in a Canadian community sample (Pachkowski et al., 2021), and 56% in UK undergraduates (Dhingra et al., 2018), though this figure was lower in Chinese undergraduates (12%; Yang et al., 2018).

There also is some evidence that the 3ST accounts for more variance in suicidal desire than the IPTS. For example, three studies examining both theories reported higher percentages of variance explained for the 3ST than IPTS – Tsai et al. (68% to 62%), Klonsky and May (41% to 30%), and Dhingra et al. (56% to 49%) – whereas Yang et al. (2018) found equivalent variance explained (12% to 12%). This potential pattern is consistent with data from a separate literature on motivations for suicide attempts. The Inventory of Motivations for Suicide Attempts (IMSA) was developed in 2013 (May and Klonsky, 2013), and assesses nine motivations for suicide emphasized in different theoretical and conceptual models of suicide. To date the IMSA has been administered to five samples with suicide attempt histories: undergraduates and outpatients (May and Klonsky, 2013), adolescent psychiatric patients (May et al., 2016), and online community participants and adult psychiatric patients (May et al., 2020). In our view, Step 1 of the 3ST would be refuted if pain and hopelessness were not among the strongest motivations for suicide.

In all five samples, the motivations receiving the strongest endorsement were overwhelming pain and hopelessness. In contrast, motivations related to perceived burdensomeness and thwarted belongingness, the constructs emphasized in the IPTS (Joiner, 2005), were only moderately endorsed. For example, in psychiatric patients with recent suicide attempts, pain and hopelessness were each rated as important motivations by 95% participants, whereas the corresponding figures for burdensomeness and belongingness were 61% and 54%, respectively (May et al., 2020). Similarly, in an online sample of US adults with suicide attempt histories, pain and hopelessness were rated as important motivations by 91% and 96% of participants, compared to 49% and 63% for burdensomeness and belongingness (May et al., 2020).

A study of suicide warning signs provided an early and intriguing test of Step 1 of the 3ST. Shortly after the 3ST was first presented (Klonsky and May, 2013), author Klonsky was invited to participate in a meeting about suicide warning signs hosted by the US Substance Abuse and Mental Health Services Administration. In conjunction with this meeting, experts were asked to nominate possible warning signs for inclusion in surveys identifying factors that were "different in the days, hours, and minutes" leading up to suicide deaths (based on reports from loved ones) and non-fatal attempts (based on reports from adolescents who had been hospitalized for suicide attempts). Based on Step 1 of the 3ST, author Klonsky nominated pain and hopelessness. The full set of nominations was edited into a final list of 42 possible warning signs,

including diverse items such as agitation, giving away possessions, family conflict, disengagement from social activities, anger and hostility, and guilt or shame. Notably, across both groups, the two items most commonly reported to precede suicide attempts and deaths were the factors emphasized by Step 1 of the 3ST: "emotional misery or pain" and "feelings of hopelessness about the future" (Wintersteen, 2014).

This pattern aligns with an ecological momentary assessment study of suicidal thoughts in which hopelessness was a stronger predictor of suicidal desire than loneliness and burdensomeness (the study did not measure pain; Kleiman et al., 2017). To be sure, more work is needed to establish that pain and hopelessness are the most important proximal antecedents, predictors, and causes of desire for suicide. However, accumulating evidence to date appears to support the 3ST's premise that suicidal desire is caused by the combination of pain and hopelessness.

2.2. Evidence for Step 2

Research to date also supports Step 2 of the 3ST. Step 2 states that suicidal desire intensifies when pain exceeds or overwhelms connectedness. There is, of course, a robust literature linking connectedness and related variables to suicide risk (Zareian and Klonsky, 2020). However, this literature does not directly bear on Step 2. Instead, direct tests for Step 2 must in some way operationalize the extent to which pain exceeds connectedness, and examine the extent to which this gap predicts increased suicidal desire among those who have or who are likely to have suicidal desire. Five studies have sought to directly evaluate Step 2 (Dhingra et al., 2018; Klonsky and May, 2015; Pachkowski et al., 2021; Tsai et al., 2020; Yang et al., 2018). These studies measured pain and connectedness, standardized scores for each variable, and then subtracted one from the other to create a difference score. They then examined the correlation of this variable to suicidal desire in those likely to have at least some suicidal desire (i.e., those meeting Step 1 criteria for pain and hopelessness). In our view, a small or negligible correlation would refute Step 2.

Notably, each study found a robust correlation between the pain-connectedness differential and greater suicidal desire. The correlations were 0.47 in an online sample of US adults (Klonsky and May, 2015), 0.34 in Chinese undergraduates (Yang et al., 2018), 0.46 in UK undergraduates (Dhingra et al., 2018), 0.64 in Canadian psychiatric patients (Tsai et al., 2020), and 0.58 and 0.62 at two time-points in a Canadian adult community sample (Pachkowski et al., 2021). These correlations – ranging from 0.34 to 0.64 with a median of 0.52 – are very large in comparison to effect sizes typically reported in psychological individual differences research (Gignac and Szodorai, 2016). Thus, we interpret results to date to strongly support Step 2 of the 3ST.

2.3. Evidence for Step 3

Step 3 of the 3ST addresses when strong suicidal desire will progress to a potentially lethal suicide attempt. Step 3 states that a suicide attempt occurs when one has both strong suicidal desire and the capability to make a suicide attempt. In our view, Step 3 would be refuted if a valid measure of its capability construct could not distinguish the subset of individuals with strong suicidal desire who make potentially lethal attempts. A direct test of Step 3 is difficult, because it requires identifying times when individuals have both strong suicidal desire and capability for suicide, and demonstrating that suicide attempts occur at these times (i.e., high suicidal desire and capability for suicide), but not at others times (i.e., high suicidal desire, low capability; low suicidal desire, high capability; low suicidal desire and low capability). The ideal test requires intensive longitudinal work with repeated measurements, and are challenging logistically and even ethically (e.g., do we intervene when suicidal desire and capability are both high?). Thus, most tests of Step 3 examine whether measures of capability for suicide, as defined by the 3ST, predict a history of suicide attempts over and above suicidal ideation/desire. One exception to this included an analysis addressing

the ability of suicide capability to predict future attempts (Tsai et al., 2020).

A further challenge is that comprehensive, validated measures of suicide capability, as defined by the 3ST, have not yet been developed. Thus, studies on the 3ST have relied on a brief, 6-item measure, using two items to measure dispositional contributors to capability, two items for acquired contributors, and two items for practical contributors (Klonsky and May, 2015). With these caveats in mind, below we summarize evidence for Step 3 of the 3ST.

Three studies designed to evaluate the 3ST have examined whether suicide capability (as measured by the 6-item suicide capacity scale; Klonsky and May, 2015), distinguishes individuals with histories of suicide attempts from those with histories of suicidal ideation but not attempts. Notably, each of the three studies found moderate to large elevations on suicide capability in the attempter group relative to the ideator-only group: Cohen's ds were 0.42 in Klonsky and May (2015), 0.72 in Dhingra et al. (2018), and 0.52 in Yang et al. (2018). Interestingly, in the latter two studies the effect of suicide capability was driven by the two items indexing practical capability for suicide. A similar pattern was found in a retrospective and longitudinal study of psychiatric patients (Tsai et al., 2020): practical capability for suicide, but not dispositional or acquired contributors to capability, predicted both past and future suicide attempts over and above measures of suicidal ideation. Taken together, results support Step 3's premise that capability for suicide facilitates transition from strong suicidal desire to suicide attempts. Although not directly germane to testing Step 3, results also suggest that practical capability may be the most important form of suicide capability.

There is also a very large body of literature on practical contributors to suicide capability that supports the 3ST's inclusion of practical capability in its model. For example, past work has found that increased access to a variety of lethal means – guns, bridges, Tylenol, pesticides – increases suicide attempts and deaths, and that decreasing access to these lethal means decreases suicide attempts and deaths. A summary of this work is beyond the scope of this article, but for reviews see Anestis et al. (2017), Barber and Miller (2014), and Hawton (2007).

3. Useful points of clarification about the three step theory of suicide

As noted above, there has been substantial uptake of the 3ST in the research and prevention communities. Not surprisingly, there have also been some misunderstandings of the theory. For example, some studies purporting to address a 3ST premise have used inappropriate conceptualizations of pain (such as "schizophrenia liability", Schimanski et al., 2017), whereas others incorrectly interpret the 3ST to suggest that simple sets of variables should predict suicide-related outcomes as well as complex prediction algorithms (Huang et al., 2020). In what follows, we therefore describe some points of clarification meant to enhance efforts to understand, evaluate, and apply the 3ST.

3.1. The 3ST accommodates biological, psychological, and sociological perspectives

The 3ST emphasizes individual-level psychological variables – pain, hopelessness, connectedness, and capability for suicide – because, ultimately, suicide is a decision and behavior carried out by an individual. However, the 3ST very much embraces a biopsychosocial perspective. It not only accommodates the full range of biological, psychological, and sociological factors that can influence suicide risk, but helps explain *why* such diverse factors influence suicide risk (see Table 1). For example, any factor would be expected to impact suicide risk to the extent that it impacts pain, hopelessness, connectedness, and/or capability for suicide. Thus, if a biological intervention such as an antidepressant was shown to reduce suicidal desire, we might hypothesize that this occurred because the antidepressant reduced depression and thereby

psychological pain. We might further hypothesize that the reduction in psychological pain caused subsequent increases in hope for recovery and an enhanced ability to engage with valued sources of connection. In short, the 3ST can provide specific, testable hypotheses regarding the mechanism by which an antidepressant (or any other biological intervention) can reduce suicide risk.

Likewise, the 3ST can accommodate and illuminate the potential contributions of sociological factors. For example, the 3ST provides testable explanations for why the experience of racism by a member of a historically marginalized racial or ethnic group is associated with suicidal desire (Walker et al., 2014). Racism is a painful experience, it can decrease hopes for success and acceptance, and it can harm or limit connections to people, community, and society that nonmarginalized individuals are free to make. Research using the 3ST can illuminate the extent to which pain, hopelessness, and disconnection explain the impact of racism on suicide risk, identify how these patterns differ across contexts and cultures, and provide guidance for population- and community-level interventions meant to reduce racism and thereby suicide risk.

3.2. Steps in the 3ST are presented in a logical order, not chronological order

One might assume that the "Steps" of the 3ST reference conditions that occur in chronological order: first come the conditions that cause

Table 1

Illustrating how 3ST pathways can organize (and motivate hypotheses about) the contributions of diverse variables to suicide risk.

Possible risk factors	Pain	Hopelessness	Connectedness	Capability for suicide
Psychache	X			
Depression	X			
General distress	X			
Most mental disorders	X			
Chronic physical pain	X	X		
Financial distress	X	X		
Beck hopelessness scale		X		
Pessimistic outlooks		X		
External locus of control		X		
Self-efficacy		X		
Future orientation		X		
Belongingness			X	
Valued job			X	
Burdensomeness	X		X	
Poor social support	X	X	X	
Lethal means access				X
Lethal means knowledge				X
Access to privacy				X
Acquired capability				X
Dispositional capability				X
Nonsuicidal self-injury	X			X

Note. The table is illustrative. It does not comprehensively portray suicide correlates, predictors, and risk factors, nor all the ways in which they can contribute to 3ST variables and suicide risk. For example, sources of pain, hopelessness, disconnection, and suicide capability can overlap and impact each other (e.g., pain that persists may lead to hopelessness, hopelessness and disconnection may be painful). Moreover, individual variables can impact suicide risk in multiple ways (e.g., depression may impact hopelessness and connectedness in addition to pain; absence of social support may increase suicide capability via increased privacy in addition to its impacts on pain, hopelessness, and connectedness). The point is that the 3ST can help organize the countless variables that have been linked to suicide risk, and for each offer explanations/hypotheses for how and why it increases suicide risk.

suicidal desire, then the conditions that cause suicidal desire to intensify, and finally the conditions that create the capability to act on suicidal desire. However, this characterization is inaccurate. Instead, the 3ST references steps in a logical order, by which a subsequent step is only relevant if the conditions from the previous step are met. The theory first addresses conditions that cause suicidal desire (Step 1), because if those conditions are not present, there will be no suicidal desire regardless of whether conditions for Step 2 or 3 are present.

Notably, it is common for conditions specified in later steps to be present before the conditions specified in earlier steps. For example, many people walk around with higher practical capability for suicide (e. g., those in professions or with hobbies that involve expertise in and access to firearms), thus meeting conditions for Step 3, whereas pain and hopelessness can develop later in life (or never). The same holds true for dispositional and acquired contributors to suicide capability. Similarly, many people may have low connectedness per Step 2, but if they are not in pain day to day, there will be no suicidal desire. Thus, the conditions in Steps 1, 2, and 3 can be met in any temporal order, though in understanding how someone comes to attempt suicide, it makes logical sense to consider them in the order in which the theory addresses them.

3.3. The 3ST explains suicide and can help prevent it, but does not necessarily predict it

A common misunderstanding is that an accurate explanation of suicide should lead to highly accurate longitudinal prediction of suicide in the naturalistic world. But this is not how the 3ST, or psychology, or science more generally, operates. Valid theory does not imply highly accurate longitudinal prediction under naturalistic conditions. For example, behavioral principles of learning such as reinforcement, punishment, and habituation can be used to make predictions about fear learning under specific conditions (Delgado et al., 2006), and to successfully treat a variety of disorders (Butler et al., 2006); yet, these same behavioral principles do not allow experts to predict under naturalistic conditions who will develop a phobia over the next week, month, or year. Similarly, basic laws of motion have high validity and numerous applications, yet NASA can only make probabilistic predictions about the movements of debris through space (see Klonsky, 2020 for elaboration as applied to suicide). Meteorologists understand how tornadoes start and can issue tornado watches/warnings when they see the conditions emerging, yet cannot predict when these conditions will occur days, weeks, or months in advance (Markowski, 2020; Miller et al., 2020).

Similarly, the 3ST identifies the principles of suicide and the conditions under which suicidal thoughts and actions occur. To the extent it is accurate, the 3ST has substantial utility. For example, from the perspective of the 3ST, any intervention meant to reduce suicide risk – whether administered at the level of neurotransmitters, an individual, a family, a community, or a population – will succeed to the extent it can decrease pain, increase hope, enhance connectedness, and/or reduce suicide capability. In addition, assessing 3ST variables in patients can help identify who may be in crisis or at imminent risk of a suicidal crisis. However, because the 3ST emphasizes factors that ebb and flow over time, a key implication is that highly accurate prediction over days, weeks, months, or years will remain elusive; life is too variable and unpredictable to know, for example, who will next develop unbearable pain and hopelessness, or whose unbearable pain or hopelessness will abate. Like many other scientific theories, the 3ST can help understand and prevent suicide, even though it will not yield highly accurate long-term prediction (Klonsky, 2020).

3.4. Optimal timeframes for testing the 3ST

It is common in the suicide literature to assume that longitudinal studies are better than cross-sectional studies. However, it is critical to match the hypothesis of interest to the optimal timeframe for testing that

hypothesis. For example, Step 1 of the 3ST specifies the condition that cause suicidal desire: the combination of pain and hopelessness. It is tempting to view a longitudinal design as the ultimate test of this premise, but most longitudinal designs would be poorly matched to the content of Step 1. Consider a design that assesses whether pain and hopelessness at baseline predict suicidal desire six weeks later. This design is an inappropriate test of the 3ST. According to Step 1, what determines the presence of suicidal desire in six weeks is whether pain and hopelessness are present in six weeks; baseline pain and hopelessness are irrelevant (except to the extent that we expect them to be stable or re-occurring). What Step 1 does imply is that pain and hopelessness should predict concurrent suicidal desire, or suicidal desire over very short-time scales such as minutes.

It is certainly reasonable and useful to examine the utility of 3ST variables for predicting outcomes days, weeks, or months into the future. However, predictive utility is a separate question than theory validity. For example, both Pachkowski et al. (2021) and Tsai et al. (2020) examine the validity and predictive utility of 3ST premises within single studies, but treat these as separate research questions.

The same considerations are relevant for Steps 2 and 3. These steps specify the conditions under which suicidal desire intensifies and strong suicidal desire progresses to suicide attempts. Thus, an ideal test examines whether strong suicidal desire or suicide attempts occur when these conditions are met, but not at other times. In contrast, a longitudinal test in which baseline data are used to predict outcomes weeks or months later is likely to be inappropriate. According to the 3ST, suicide risk weeks or months later is determined by the conditions that are present at that time, not at baseline.

An overarching point is that the factors specified in the 3ST (pain, hopelessness, connectedness, and suicide capability) will ebb and flow over time (Kleiman et al., 2017). Thus, conditions measured at baseline should not be assumed to be relevant to future outcomes except to the extent that those conditions persist or re-occur.

3.5. Suicidal desire versus other forms of suicidal ideation

Steps 1 and 2 of the 3ST are best thought of as explaining suicidal desire, not other forms of suicidal ideation. Suicidal desire refers to direct indicators of desire for suicide, such as "wish to die" and "desire for suicide". In contrast, other forms of suicidal ideation assessed by standardized measures – such as plans, preparations, and courage to attempt suicide – are most relevant to Step 3, which explains the progression from suicidal desire to suicide attempts. This distinction between suicidal desire and other forms of suicidal ideation has been emphasized by numerous researchers and supported by numerous factor-analytic studies of both clinician-rated and self-rated measures of suicidal ideation (Beck et al., 1997; Beck et al., 1979; Dhingra et al., 2018; Joiner et al., 2003). For this reason, although the first 3ST study (Klonsky and May, 2015) assessed suicidal ideation broadly when testing Steps 1 and 2, subsequent 3ST studies (Dhingra et al., 2018; Pachkowski et al., 2021; Tsai et al., 2020) have assessed suicidal desire specifically. In short, tests of Steps 1 and 2 of the 3ST should utilize scales/subscales targeting suicidal desire, and not measures that include plans, preparations, or other forms of suicidal ideation.

3.6. Nature and measurement of pain and hopelessness

The first construct emphasized by the 3ST is pain. People are creatures of behavioral conditioning, and if something – including the experience of being alive – is paired with frequent or intense pain, we experience a powerful desire to avoid or escape it. Pain in the 3ST includes psychological pain and physical pain. Importantly, the 3ST does not provide a comprehensive list of variables that cause pain for the same reasons that behaviorists have not published comprehensive lists of variables that can provide punishment. Life is too varied and complex to list everything, and moreover, what is painful or punishing for one

person may be rewarding or reinforcing for another (e.g., the end of a difficult relationship, intense exercise).

While some may view pain as broader than constructs proposed in other theories, such as burdensomeness and belongingness in the IPTS (Van Orden et al., 2010), this is not our view. We view pain as a narrow construct. For example, unbearable psychological pain can be reliably and validly measured with as few as three items (Pachkowski et al., 2019). Moreover, we believe that the combination of pain and hopelessness as described in Step 1 is more specifically tied to suicidal desire than the constructs proposed in other theories. For example, in Tsai et al. (2020), four-item measures of pain and hopelessness accounted for slightly more variance in suicidal desire than longer measures of burdensomeness and belongingness.

Regarding the operationalization of pain in Step 1, it is important to directly measure the extent to which someone is in pain, with a focus on whether the pain is experienced as unbearable (Pachkowski et al., 2019). Measuring proxies for pain (e.g., depression, anxiety, etc.) is not recommended for testing Step 1. Although such measures tend to correlate 0.5–0.6 with psychological pain (Campos et al., 2017), and this range represents meaningful overlap, it does not justify treating the constructs as equivalent or interchangeable. In fact, important contributors to pain are likely missed by measures that focus on a specific psychological condition. Clarifying how psychological pain differs from other indices of psychological distress is a valuable aim for future research. Finally, 3ST studies to date have focused on psychological pain; it is important for future work to use or develop measures that aggregate psychological and physical pain into a single score indicating total pain.

The operationalization of hopelessness is more straightforward. Previous work on the 3ST has utilized the Beck Hopelessness Scale (Beck et al., 1974). Both the full (Klonsky and May, 2015) and short versions (Tsai et al., 2020) of this scale are valid ways to operationalize hopelessness in the context of the 3ST.

3.7. The nature and measure of connectedness

The 3ST defines connectedness broadly, including connections to people, communities, valued hobbies, roles, or jobs, and any sense of purpose or meaning. Most tests of the 3ST have measured connectedness narrowly, as a form of interpersonal belongingness with others. Such a test is relevant, as this is an important form of connection. However, there are other forms of connectedness that can potentially offset pain; for example, Pachkowski et al. (2021) used multiple measures to more comprehensively assess aspects of connectedness including presence of a meaningful relationship, belongingness to others and the world, attachment, and social integration. Future work could also incorporate measures of purpose and meaning as part of assessing connectedness (Kleiman and Beaver, 2013).

In addition, there are a few ways that Step 2 conditions can be met. One is simply that connectedness is absent or low, and thus lower than pain. A second is that connectedness is experienced as medium or high, but still exceeded by higher pain. A third is that intense pain can impede one's ability to appreciate or engage with connections that otherwise exist. As a result, it can be difficult to operationalize Step 2. Tests so far compute the difference between standardized scores of pain and standardized scores of connectedness to approximate the extent to which "pain exceeds or overwhelms connectedness". However, there may be additional ways to operationalize Step 2 that have not yet been pursued.

3.8. The nature and measurement of capability for suicide

Research on Step 3 of the 3ST has been limited by poor measurement of suicide capability. Studies to date have utilized a brief, 6-item measure improvised for the original 3ST study (Klonsky and May, 2015). However, this measure does not assess the construct of suicide capability comprehensively, and it is not a properly validated measure. It is vital

for future work to improve the measurement of suicide capability.

It is also important to clarify how capability operates according to the 3ST. Given that the 3ST describes three kinds of contributors to suicide capability (acquired, dispositional, and practical), one may assume that all three are needed for progression to suicide attempts. However, according to Step 3 of the 3ST, "the key determinant is whether the individual has the capability to make a suicide attempt" (Klonsky and May, 2015, p. 118). Sufficient capability for suicide can be achieved through one, two, or all three contributors to capability. For example, very high practical capability (e.g., knowledge of and access to firearms) can provide sufficient overall capability for suicide even in the absence of dispositional or acquired contributors. The key is whether, all things considered, a person has the capability to act on strong suicidal desire, and it will be important for the field to develop valid measures of this construct.

Finally, there is a form of practical capability that has not been fully explicated. Suicide capability is primarily about a) managing the fear of attempting suicide (including fears of pain, injury, death, dying, and performing the act itself) and b) having the practical means and ability to make the suicide attempt. Therefore, forms of capability such as access to and knowledge about lethal means have obvious relevance. However, there is a practical way in which intense pain can increase capability for suicide. Specifically, if the pain of being alive exceeds the fear of attempting and dying by suicide, then staying alive becomes the more fearsome option, and attempting suicide the easier option in comparison. As a result, capability for suicide becomes high. In support of this premise, pain exhibits moderate positive correlations with capability for suicide generally and practical capability specifically (Dhingra et al., 2018; Klonsky and May, 2015).

3.9. What are the most important causes of pain, hopelessness, disconnection, and suicide capability?

Some may wonder if it is useful or important to identify the most potent causes of the factors emphasized by the 3ST: pain, hopelessness, disconnection, and suicide capability. We view this question as similar to asking, in the context of behavioral theory, what factors offer the greatest reinforcement. There are so many possible answers that will vary greatly for different populations: ice cream, stickers, social inclusion, sexual gratification, money, self-efficacy/mastery, laughter, and so on. Similarly, causes of pain, hopelessness, disconnection, and suicide capability will vary across and intersect with culture, gender, age, and numerous other factors. Thus, research on this question does not inform the 3ST directly. However, such research does represent an important application of the 3ST. Specifically, the 3ST can be applied to improve understanding and prevention of suicide in particular populations (e.g., to understand suicide risk in US-based white male adolescents, we can examine what factors cause the most pain, hopelessness, disconnection, and suicide capability in this group).

3.10. Use of statistical interactions to evaluate the 3ST

Statistical interactions have been used to operationalize parts of the 3ST and other ideation-to-action theories, such as the IPTS (Van Orden et al., 2008). For example, the statistical interaction between thwarted belongingness and perceived burdensomeness is commonly used to evaluate the first part of the IPTS, and the statistical interaction between pain and hopelessness is used to evaluate the first Step of the 3ST. It is therefore important to consider which parts of the 3ST are appropriately operationalized as statistical interactions and which are not. In short, a statistical interaction in a full sample including those without suicidal desire is appropriate for evaluating Step 1 (i.e., that pain and hopelessness should interact to predict suicidal desire), but not Steps 2 or 3. This is because statistical interactions take into account data from all participants in the analysis. This makes sense for tests of Step 1, which uses pain and hopelessness to distinguish those with suicidal desire from

those without.

In contrast, for both Steps 2 and 3 the appropriate analyses compute direct effects (not interactions) in relevant subgroups. For Step 2, this means starting with those who have or are expected to have suicidal desire, and examining whether stronger suicidal desire correlates with a pain-connectedness difference score (i.e., a variable indexing the extent to which pain exceeds connectedness). For Step 3, the ideal analysis is not possible in most study designs (see section titled "Optimal Time-frames for Testing the 3ST"), but a reasonable analytic approach is to start with those who have suicidal desire or strong suicidal desire, and examine whether suicide capability distinguishes those who have gone on or will go on to make suicide attempts. Fortunately, all papers to date examining Steps 2 and 3 of the 3ST have reported appropriate analyses and effect-sizes for the appropriate subgroups. Some papers (e.g., the original 3ST paper; Klonsky and May, 2015) have additionally included a statistical interaction analysis in the full sample including ideators for Step 2; in hindsight, this was a mistake and remains so.

3.11. The 3ST does not view suicide as a symptom of mental illness

Finally, an important implication of the 3ST is that suicide is about more than mental illness. There is a debate in the field about whether suicide should fundamentally be viewed as a consequence of mental illness. Those viewing suicide as a symptom of mental illness point to data suggesting that 90% or more of suicide decedents met criteria for one or more psychiatric diagnoses at the time of their death. Those disputing a mental illness perspective point to data suggesting that more than half of those who died by suicide did not have a psychiatric diagnosis (Center for Disease Control, 2018) or disorder (Zhang et al., 2010) at the time of their death.

The 3ST does not require mental illness for suicide to occur. For example, while mental illness *can* be an important cause of the pain and hopelessness that motivate suicide, there are many other causes of pain and hopelessness, such as seemingly intractable interpersonal struggles (Bagge et al., 2013), overwhelming financial problems (Elbogen et al., 2020), chronic or terminal medical conditions (Druss and Pincus, 2000), memberships in groups that are marginalized and targets for discrimination (McNeil et al., 2017), and many others. Similar statements can be made about connectedness and suicide capability. From the perspective of the 3ST, mental illness is one of several experiences and contexts that increase suicide risk.

4. Conclusion

The 3ST is a concise, evidence-based theory of suicide with promise for advancing understanding and prevention. Converging evidence to date (on correlates, risk factors, warning signs, motivations, and means-safety interventions) supports the validity of the 3ST. When evaluating or applying the 3ST, it is important not to misunderstand or misrepresent its content and implications. Careful work is needed to further evaluate the theory, including better measurement and research designs that are well-matched to the theory's claims.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References

Alexander, A.B., Chai, H., Creer, T.L., Miklich, D.R., Renne, C.M., de A. Cardoso, R. R., 1973. The elimination of chronic cough by response suppression shaping. J. Behav. Ther. Exp. Psychiatry 4 (1), 75–80.

Anestis, M.D., Law, K.C., Jin, H., Houtsma, C., Khazem, L.R., Assavedo, B.L., 2017. Treating the capability for suicide: A vital and understudied frontier in suicide prevention. Suicide Life Threat. Behav. 47 (5), 523–537.

Bagge, C.L., Glenn, C.R., Lee, H.J., 2013. Quantifying the impact of recent negative life events on suicide attempts. J. Abnorm. Psychol. 122 (2), 359–368.

Barber, C.W., Miller, M.J., 2014. Reducing a suicidal person's access to lethal means of suicide: a research agenda. Am. J. Prev. Med. 47 (3), S264–S272.

Beck, A.T., Weissman, A., Lester, D., Trexler, L., 1974. The measurement of pessimism: the hopelessness scale. J. Consult. Clin. Psychol. 47, 861–863.

Beck, A.T., Kovacs, M., Weissman, A., 1979. Assessment of suicidal intention: the scale for suicide ideation. J. Consult. Clin. Psychol. 47, 343–352.

Beck, A.T., Brown, G.K., Steer, R.A., 1997. Psychometric characteristics of the scale for suicide ideation with psychiatric outpatients. Behav. Res. Ther. 35, 1039–1046.

Betz, M.E., Anestis, M.D., 2020. Firearms, pesticides, and suicide: a look back for a way forward. Prev. Med. 138, 106144.

Butler, A.C., Chapman, J.E., Forman, E.M., Beck, A.T., 2006. The empirical status of cognitive-behavioral therapy: a review of meta-analyses. Clin. Psychol. Rev. 26, 17–31.

Campos, R.C., Gomes, M., Holden, R.R., Piteira, M., Rainha, A., 2017. Does psychache mediate the relationship between general distress and suicide ideation? Death Stud. 41, 241–245.

Center for Deployment Psychology, 2020. Cognitive Behavioral Therapy for Suicide Prevention. Retrieved November 23, 2020 from. https://deploymentpsych.org/sites /default/files/course_outline_pdf/Ad_Memo_CBTSP_9-10-Dec-20_0.pdf.

Center for Disease Control, 2018. Suicide rising across the US: More than a mental health concern. Retrieved November 27, 2020 from. https://www.cdc.gov/vitalsigns/pdf/ vs-0618-suicide-H.pdf.

Delgado, M.R., Olsson, A., Phelps, E.A., 2006. Extending animal models of fear conditioning to humans. Biol. Psychol. 73, 39–48.

Dhingra, K., Klonsky, E.D., Tapola, V., 2018. An empirical test of the three-step theory of suicide in U.K. university students. Suicide Life Threat. Behav. 49 (2), 1–10. https:// doi.org/10.1111/sltb.12437.

Druss, B., Pincus, H., 2000. Suicidal ideation and suicide attempts in general medical illnesses. Arch. Intern. Med. 160 (10), 1522–1526.

Elbogen, E.B., Lanier, M., Montgomery, A.E., Strickland, S., Wagner, H.R., Tsai, J., 2020. Financial strain and suicide attempts in a nationally representative sample of US adults. Am. J. Epidemiol. 189 (11), 1266–1274.

Gignac, G.E., Szodorai, E.T., 2016. Effect size guidelines for individual differences researchers. Personal. Individ. Differ. 102, 74–78.

Gordon, K.H., 2021. The Suicidal Thoughts Workbook: CBT Skills to Reduce Emotional Pain, Increase Hope, and Prevent Suicide. New Harbinger Publications.

Hawton, K., 2007. Restricting access to methods of suicide: rationale and evaluation of this approach to suicide prevention. Crisis 28 (S1), 4–9.

Huang, X., Ribeiro, J.D., Franklin, J.C., 2020. The differences between suicide ideators and suicide attempters: simple, complicated, or complex? J. Consult. Clin. Psychol. 88, 554–569.

Joiner, T.E., 2005. Why People Die by Suicide. Harvard University Press.

Joiner Jr., T.E., Steer, R.A., Brown, G., Beck, A.T., Pettit, J.W., Rudd, M.D., 2003. Worst-point suicidal plans: a dimension of suicidality predictive of past suicide attempts and eventual death by suicide. Behav. Res. Ther. 41, 1469–1480.

Kleiman, E.M., Beaver, J.K., 2013. A meaningful life is worth living: meaning in life as a suicide resiliency factor. Psychiatry Res. 210, 934–939.

Kleiman, E.M., Turner, B.J., Fedor, S., Beale, E.E., Huffman, J.C., Nock, M.K., 2017. Examination of real-time fluctuations in suicidal ideation and its risk factors: results from two ecological momentary assessment studies. J. Abnorm. Psychol. https://doi. org/10.1037/abn0000273.

Klonsky, E.D., 2020. The role of theory for understanding and preventing suicide (but not predicting it): a commentary on Hjelmeland and Knizek. Death Stud. 44, 459–452.

Klonsky, E.D., May, A.M., 2013. The transition from suicidal thoughts to attempts (and back again). In: Presentation at the 46th Annual Meeting of the American Association of Suicidology (AAS). Austin, TX.

Klonsky, E.D., May, A.M., 2014. Differentiating suicide attempters from suicide ideators: a critical frontier for suicidology research. Suicide Life Threat. Behav. 44 (1), 1–5. https://doi.org/10.1111/sltb.12068.

Klonsky, E.D., May, A.M., 2015. The three-step theory (3ST): A new theory of suicide rooted in the "ideation-to-action" framework. Int. J. Cogn. Ther. 8 (2), 114–129. https://doi.org/10.1521/ijct.2015.8.2.114.

Klonsky, E.D., Pachkowski, M.C., Shahnaz, A., 2020. Understanding suicide to prevent suicide. Behav. Ther. 43, 339–343.

Klonsky, E.D., Saffer, B.Y., Bryan, C.J., 2018. Ideation-to-action theories of suicide: A conceptual and empirical update. Curr. Opin. Psychol. 22, 38–43.

Markowski, P.M., 2020. What is the intrinsic predictability of tornadic supercell thunderstorms? Mon. Weather Rev. 148 (8), 3157–3180.

May, A.M., Klonsky, E.D., 2013. Assessing motivations for suicide attempts: development and psychometric properties of the inventory of motivations for suicide attempts. Suicide Life Threat. Behav. 43 (5), 532–546. https://doi.org/10.1111/sltb.12037.

May, A.M., O'Brien, K.H.M., Liu, R.T., Klonsky, E.D., 2016. Descriptive and psychometric properties of the inventory of motivations for suicide attempts (IMSA) in an inpatient adolescent sample. Arch. Suicide Res. 20 (3), 476–482. https://doi.org/10.1080/ 13811118.2015.1095688.

May, A.M., Pachkowski, M.C., Klonsky, E.D., 2020. Motivations for suicide: converging evidence from clinical and community samples. J. Psychiatr. Res. 123, 171–177. https://doi.org/10.1016/j.jpsychires.2020.02.010.

Mazur, J.E., 2012. Learning and behavior, 7th ed. Prentice-Hall, Englewood Cliffs, NJ.

McNeil, J., Ellis, S.J., Eccles, F.J., 2017. Suicide in trans populations: A systematic review of prevalence and correlates. Psychol. Sex. Orientat. Gend. Divers. 4 (3), 341–353.

Miller, D.E., Wang, Z., Trapp, R.J., Harnos, D.S., 2020. Hybrid prediction of weekly tornado activity out to week 3: utilizing weather regimes. Geophys. Res. Lett. 47 (9) e2020GL087253.

Mistler, B., 2018. *Three Step Theory of Suicide: Applications for Campus-Based Suicide Prevention*. Presented at the Mental Health Conference of the National Association of Student Personnel Administrators the, Portland, OR, USA.

Nock, M.K., Borges, G., Bromet, E.J., Alonso, J., Angermeyer, M., Beautrais, A., Williams, D., 2008. Cross-national prevalence and risk factors for suicide ideation, plans and attempts. Br. J. Psychiatry 192, 98–105.

Nock, M.K., Prinstein, M.J., Sterba, S.K., 2009. Revealing the form and function of self-injurious thoughts and behaviors: a real-time ecological assessment study among adolescents and young adults. J. Abnorm. Psychol. 118 (4), 816–827. https://doi.org/10.1037/a0016948.

Pachkowski, M.C., May, A.M., Tsai, M., Klonsky, E.D., 2019. A brief measure of unbearable psychache. Suicide Life Threat. Behav. 49 (6), 1721–1734.

Pachkowski, M.C., Hewitt, P.L., Klonsky, E.D., 2021. Examining suicidal desire through the lens of the Three-Step Theory: a cross-sectional and longitudinal investigation in a community sample. J. Consult. Clin. Psychol. 89, 1–10.

Rappaport, L.M., Flint, J., Kendler, K.S., 2017. Clarifying the role of neuroticism in suicidal ideation and suicide attempt among women with major depressive disorder. Psychol. Med. 47 (13), 2334–2344.

Schimanski, I.D., Mouat, K.L., Billinghurst, B.L., Linscott, R.J., 2017. Preliminary evidence that schizophrenia liability at age 15 predicts suicidal ideation two years later. Schizophr. Res. 181, 60–62.

Shneidman, E.S., 1993. Commentary: suicide as psychache. J. Nerv. Ment. Dis. 181 (3), 145–147. https://doi.org/10.1097/00005053-199303000-00001.

Sommers-Flanagan, J., 2019. Suicide assessment for clinicians: A strengths-based model. ContinuingEdCourses.net. Retrieved November 27, 2020 from. http://www.continuingedcourses.net/active/courses/course114.php.

Tsai, M., Lari, H., Saffy, S., Klonsky, E.D., 2020. Examining the three-step theory (3ST) of suicide in a prospective study of adult psychiatric inpatients. Behav. Ther. https://doi.org/10.1016/j.beth.2020.08.007.

Van Orden, K.A., Witte, T.K., Gordon, K.H., Bender, T.W., Joiner, T.E., 2008. Suicidal desire and the capability for suicide: tests of the interpersonal-psychological theory of suicidal behavior among adults. J. Consult. Clin. Psychol. 76 (1), 72–83. https://doi.org/10.1037/0022-006X.76.1.72.

Van Orden, K.A., Witte, T.K., Cukrowicz, K.C., Braithwaite, S.R., Selby, E.A., Joiner Jr., T.E., 2010. The interpersonal theory of suicide. Psychol. Rev. 117, 575–600.

Walker, R.L., Salami, T.K., Carter, S.E., Flowers, K., 2014. Perceived racism and suicide ideation: mediating role of depression but moderating role of religiosity among African American adults. Suicide Life Threat. Behav. 44 (5), 548–559.

Walsh, B., 2016. Meeting the Challenge of Suicidal and Self Injurious Behaviors:Updating Our Toolkit to Include the Most Current Theories and Interventions. Retrieved November 23, 2020 from. http://thebridgetraininginstitute.org/training_institue_2016_-_2017_brochure_v2.pdf.

Watson, J.B., Rayner, R., 1920. Conditioned emotional reactions. J. Exp. Psychol. 3, 1–14.

Williams, K.D., Cheung, C.K., Choi, W., 2000. Cyberostracism: effects of being ignored over the internet. J. Pers. Soc. Psychol. 79, 748–762.

Wintersteen, M.B., 2014. A retrospective account of youth suicide warning signs and its impact on prevention efforts. In: Presented at the 48th Annual Meeting of the Association for Cognitive and Behavioral Therapies. PA, USA, Philadelphia.

Yang, L., Liu, X., Chen, W., Li, L., 2018. A test of the three-step theory of suicide among Chinese people: A study based on the ideation-to-action framework. Arch. Suicide Res. 23 (4), 1–14. https://doi.org/10.1080/13811118.2018.1497563.

Zareian, B., Klonsky, E.D., 2020. Connectedness and suicide. In: Alternatives to Suicide: Beyond Risk and Toward a Life Worth Living.

Zhang, J., Xiao, S., Zhou, L., 2010. Mental disorders and suicide among young rural Chinese: a case-control psychological autopsy study. Am. J. Psychiatr. 167 (7), 773–781.