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Exploring Risk-Taking Behaviours as Potential Warning Signs for Suicide in Adults

Submitted as part of the Master of Clinical Psychology

School of Psychology

The University of Newcastle

Submitted March 2014
Statement of Originality

This thesis contains no material which has been accepted for the award of any other degree or diploma in any university or other tertiary institution and, to the best of my knowledge and belief, contains no material previously published or written by another person, except where due reference has been made in the text. I give consent to this copy of my thesis, when deposited in the University Library, being made available for loan and photocopying subject to the provisions of the Copyright Act 1968.

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Acknowledgement of Authorship

I hereby certify that the work embodied in this thesis contains a published paper/scholarly work of which I am a joint author. I have included as part of the thesis a written statement, endorsed by my supervisor, attesting to my contribution to the joint publication/scholarly work.

……………………..

Ashleigh Pasculli
Acknowledgements

I would like to take the opportunity offer my heartfelt thanks to the people who supported me throughout this degree, particularly with the thesis component.

First and foremost, thank you to my supervisor, Keith Harris. Your enthusiasm and passion for this area of research has been inspiring, and your support throughout the whole process has been incredible. I would also like to Amy Seward for her contribution to the online survey and data clean-up process.

To Sam and my family and friends, thank you for your support, patience and especially your encouragement that has been so motivating throughout this process.

Thank you to the online community for their genuine interest in the prevention of suicide who participated in the online survey. I would like to dedicate my thesis to the memory of those who have been in such a dark place that they could not see a way out. I hope that this contribution to suicide research may be helpful in reducing such tragic events in future.
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Abstract

Scope: The present study investigated a broad range of risk-taking behaviours as risk factors and potential warning signs for suicidality in adult populations. Risky or reckless behaviours are warning signs for suicide in adolescents. However, risk-taking behaviours have not been well researched in adult populations to-date. In addition, investigating a broader scope of risk behaviours could reveal additional suicide risk factors and warning signs that are presently unknown.

Purpose: The purpose of the study was to contribute to early suicide intervention efforts by increasing knowledge of risk-taking behaviours as suicide risk factors and potential warning signs in adult populations. Gatekeepers, clinicians and the general public could be made aware of a new group of risk behaviours as warning signs for suicide. Valid warning signs should also be incorporated into clinical screening methods.

Methodology: Study participants were an anonymous sample of 713 internet users, predominantly female (77.1%), Caucasian (78.5%), and were aged 18 to 71. Using the Suicide Behaviors Questionnaire-Revised (SBQ-R), 401 were grouped as suicide-risk, and 312 as non-suicidal. Participants completed a 20-30 minute anonymous online survey, including items on five domains of risk behaviours and perceptions (i.e., Financial, Social, Ethical, Recreational, and Health/Safety), using the Domain-Specific Risk-Taking (Adult) Scale (DOSPERT). Demographic information included age, sex, education, and ethnicity. MANCOVA analyses were conducted to investigate group differences in risk perceptions and behaviours between suicide-risk and non-suicidal participants, controlling for age and education. A further MANCOVA assessed risk behaviour differences between participants who scored
high and those who scored low on an SBQ-R item relating to future suicidal intent, in order to better identify potential proximal behavioural warning signs.

**Results:** Several behavioural and perceptual differences were found between suicide-risk and non-suicidal participants. Suicidal participants reported greater likelihood to participate in the following behaviours: engaging in extra marital affairs, passing off someone else’s work as their own, keeping a wallet that they found containing $200, betting a day’s income at a high-stake poker game, riding in a car without a seatbelt or on a motorcycle without a helmet, walking home alone at night in an unsafe area and going bungee jumping. Analyses investigating more proximal warning signs found that participants with high suicidal intent were more likely to engage in extra-marital affairs, drive a car without a seatbelt, and walk home alone at night in an unsafe area, compared with participants with low suicidal intent.

**General conclusions and implications:** The implications of these findings are far-reaching in terms of their clinical utility; clinicians and gatekeepers can be alerted to a new range of risk factors and possible warning signs to indicate a distal or proximal suicide risk. Definite differences were found in risk behaviours between suicide-risk and non-suicidal adults, indicating that risk-taking is an important risk factor for suicide, beyond adolescence. These differences are broader and more complex than simply putting one’s life at risk. Further research in the area is needed to confirm the current findings, investigate a broader range of health risk behaviours, explore the meaning behind these findings and examine these behaviours as warning signs for people who have actually made a suicide attempt or completed suicide.
Critical Literature Review

The role of suicide risk identification

The World Health Organisation (2012) has identified suicide as one of the top causes of death worldwide, with an estimated one million people dying by suicide yearly. In spite of this, suicide remains one of the world’s most preventable causes of death, and suicide prevention research has produced tools and resources to reduce the number of suicides. Research in this area aims to identify those at risk for suicide, to provide evidence for the establishment and evaluation of early detection and intervention strategies, and to promote public awareness of warning signs and interventions (WHO, 2012). Informative risk factors need to be easily identifiable before the onset of serious suicidal behaviour (Burns & Paton, 2000). Recognising who is at risk of suicide is the first step towards early detection and intervention of suicidal behaviours.

Warning signs are the earliest detectable indication that someone may be experiencing suicidal ideation or intent (Rudd, 2008). Risk-taking behaviours have been repeatedly identified as an early warning sign for suicide, with the rationale that suicidal people may engage in life-threatening behaviours as an indirect method of taking one’s life (Adams, Giffen, & Garfield, 1973; Litman & Farberow, 1961; Mandrusiak et al., 2006). Literature currently identifies certain reckless behaviours as warning signs for suicide in adolescents, including substance use, getting into physical fights, unsafe sexual activities and dangerous driving (Flisher et al., 2000; King et al., 2001; Patton et al., 1997; Sosin, Koepsell, Rivara, & Mercy, 1995; Woods et al., 1997). However, a broader range of risk-taking behaviours as warning signs for suicide have not been thoroughly explored in adult populations. It is the aim of this researcher to investigate the nature of risk behaviours and risk perceptions in suicidal
and non-suicidal individuals, so that new behavioural warning signs for suicide in adult populations might be identified. This information can then be disseminated to clinicians and gatekeepers to contribute to suicide prevention efforts.

There are many competing theories on suicide which conceptualise the suicidal mind and processes in differing ways. This work was guided by Schneidman’s theory of suicide, which emphasises the 10 commonalities of the suicidal mind (Schneidman, 1996). Schneidman’s conceptualisation of the suicidal mind is that the suicidal individual is seeking a solution; experiences a cessation of consciousness; feels unendurable psychological pain; has frustrated psychological needs; has a fluctuating state between helplessness and hopelessness; feels ambivalence about the wish to live and the wish to die; has constricted cognitions (they cannot see other options); has a wish to escape; communicates their intention to suicide; and experiences a restricted pattern of lifelong coping mechanisms. This review of the literature will explore risk-taking behaviour as an indirect method of suicide, in accordance with Schneidman’s theory that suicidal individuals are ambivalent about life and death. Schneidman further theorised that ambivalent individuals engage in risky behaviour including dangerous driving or playing risky sports as an indirect form of suicide, which he referred to as subintentional death. Life-death ambivalence is also reflected in Kovacs and Beck’s (1977) study which revealed that suicidal individuals have both a wish to live and a wish to die; however Schneidman’s theory specifically addresses risk-taking behaviour as a as well as other commonalities that relate to suicide risk factors and warning signs, which are the focus of this work.

**Suicide Risk Assessment**

Most experts in the field of suicide research agree that there is a clear set of processes that most people undergo before attempting suicide. Suicide expert
Silverman (2004), theorises that the presence of risk factors and absence of protective factors, combined with distress, can result in suicidal ideation. If unresolved, this ideation can develop into suicidal intent, where the individual has some intent to end their own life. At this stage, suicidal gestures or warning signs for suicide become apparent, such as talking or writing about suicide, engaging in risky behaviours or giving away one’s possessions. These actions can be followed by a suicide attempt, which might result in a completed suicide. Suicide screening assessment attempts to identify known risk factors that can occur at any stage of the suicidal process; however it is important to note that the rate at which individuals progress through these stages is varied. In addition, some may skip some of the processes altogether (Silverman, 2004).

Screening tools have been developed to identify suicide-risk individuals through assessing known suicide risk factors, including depression, substance abuse problems, recent and frequent suicidal ideation, having a plan to attempt suicide, and past suicide attempts (Gould, Greenberg, Velting, & Shaffer, 2003; Wingate, Joiner, Walker, Rudd, & Jobes, 2004). Such suicide assessment tools include the Beck Scale for Suicidal Ideation (Beck, Brown, & Steer, 1997), The Beck Hopelessness Scale (Beck, Brown, Berchick, Stewart, & Steer, 1990; Beck & Weissman, 1974) and the Suicidal Behaviour Questionnaire-Revised (Osman et al., 2001). These tools have demonstrated success in identifying suicidal individuals and thus decreasing suicide rates when used in school-based intervention programs (e.g., Zenere & Lazarus, 1997), however programs are not commonly implemented in most settings, including the Australian school system. Suicide prevention programs are also rare in institutions housing adults on a day-to-day basis, such as tertiary education facilities and workplaces. Therefore, at-risk individuals need to be able to be identified by a broad
scope of gatekeepers including doctors, mental health professionals, friends and family, teachers and colleagues. This could be achievable through disseminating information about suicide risk factors and warning signs to the professionals and the general public, such that suicidal individuals can be better recognised and helped as early as possible.

Identifying Suicidal Individuals: Risk Factors, Protective Factors and Warning Signs

Studies have repeatedly shown that many people who become suicidal and experience suicidal ideation do not come into contact with mental health services (e.g. Kjoller & Helweg-Larsen, 2000; Sayer, Stewart, & Chipps, 1996). A follow-up study to a national survey in the US found that of over 400 participants who reported recent suicidal ideation, nearly half perceived no need for help, and 40% did not receive help (10% received help even though they did not perceive they needed it; Brook, Klap, Liao, & Wells, 2006). In addition, a pilot psychological autopsy study in Australia found that of 52 suicide cases examined, only 28 came into contact with a health provider in the 3 months prior to their death (Draper, Snowdon, & Wyder, 2008). Of those 28 help-seekers, 49% were diagnosed with depression, 38% were screened for suicidality, but none were assessed as being suicidal. It is therefore imperative for risk factors, warning signs and protective factors to be better identifiable by other people, such as family and gatekeepers. For example, if an individual was displaying specific risk factors, lacked protective factors and started to exhibit warning signs, such as depressive symptoms, or increasing their alcohol intake, gatekeepers may be alerted to potential suicidality.

Risk factors suggest a distal relationship to suicidal behaviours and are longer-term risks that are associated with suicidality. Risk factors are defined as any factor...
empirically shown to be associated with suicidal behaviour (Hendin, Maltsberger, Lipschitz, Haas, & Kyle, 2001; Rudd et al., 2006a). In contrast, protective factors are elements of one’s life that are thought to reduce the risk of suicidal ideation, attempts or completion of suicide. A mere absence of risk factors can be considered to be protective against suicidality; however additional distal factors have been associated with lower suicide risk (Beautrais, 2001). Warning signs are distinct from risk factors; risk factors imply a longer-term risk (a year to a lifetime), whereas warning signs are specific to the current state of the individual and imply more imminent suicide risk (i.e. within minutes, hours or days; Rudd et al., 2006a).

Warning signs are an early detectable indication that someone may be experiencing suicidal intent and are characterised by signs (behaviours observed in another person) and symptoms (something that the suicidal individual reports to another person) that could be indicative of acute suicide risk or a suicidal crisis (Rudd et al., 2006a). Warning signs are an important part of suicide risk assessment and can be integrated into a clinical suicide screening process, both through observable signs and disclosure of symptoms. In addition, being aware of the presence of warning signs could prompt a clinician to conduct a more comprehensive suicide assessment (Rudd, 2008).

**Suicide risk factors.** Large, systematic reviews of risk factor literature have summarised a broad range of life-areas including demographic factors and mental health factors and are important in identifying an at-risk individual (Beautrais, 2000; Brent, 1995; Gould et al., 2003; Kjoller & Helweg-Larsen, 2000). Demographic risk factors for suicide include social disadvantage, having a non-heterosexual orientation and being male, as males have been found to be five times more likely to die by
suicide than females (e.g., Remafedi, French, Story, Resnick, & Blum, 1998; Silenzio, Pena, Duberstein, Cerel, & Knox, 2007; Zhao, Montoro, Igartua, & Thombs, 2010). Mental health problems are perhaps the most obvious distal factor influencing suicidality; most commonly, mood and affective disorders such as depression and anxiety (Gould et al., 2003). Schizophrenia, conduct disorder, substance abuse disorders and personality disorders are also associated with increased risk of suicidality (Barlow, 2005; Brent, 1995; Brook et al., 2006; Gould et al., 2003; Hendin et al., 2001; Shaffer et al., 1996). Often, mental health problems arise following a history of physical and/or sexual abuse during childhood; therefore, it is somewhat unsurprising that these factors are also considered risk factors for suicide. However not all people who experience a suicidal crisis have a history of trauma or long-standing mental illness. Stress and distressing life events (such as the death of a loved one, having a sick child or the loss of a relationship), family factors and interpersonal factors also place a person at risk of suicide (Beautrais, 2000; Bolognini et al., 2002; Gould et al., 2003; King et al., 2001; Schwartz & Rogers, 2004; Stoelb & Chiriboga, 1998).

Some risk factors, such as demographics, cannot be easily changed. It is important to note that the presence of one or more risk factors does not mean that a person is necessarily suicidal; however, a higher number of present factors do indicate a higher risk (Beautrais, 2000; Bolognini et al., 2002; Brent, 1995; Granello, 2010; King, Vidourek, & Strader, 2008; Stoelb & Chiriboga, 1998). As many of these risk factors are too broad (e.g. male sex, low socio-economic status), it is important to go beyond distal risk factors when identifying a person at current risk of suicide. This involves consideration of protective factors and warning signs.
**Protective factors against suicide.** The presence of risk factors can be mitigated by protective factors, which decrease a person’s vulnerability to suicidality. Protective factors against suicidality include family factors such as being married, being a parent (Rudd et al., 2006a), and having good family cohesion (Beautrais, 2000). Protective personal characteristics include adequate coping skills, problem-solving skills and being religious or having a positive-life affirming belief and value system (Gould et al., 2003). Importantly, having access to prevention programs and treatments are protective factors against suicidality. These can include school-based prevention programs, community-based prevention programs, mental health hotlines, healthcare-based prevention programs, including GP and physician mental health training aimed at suicide screening, and engagement with a mental health facility for treatment (Beautrais, 2000; Gould et al., 2003).

Protective factors, such as those listed above, are sometimes less identifiable than risk factors and warning signs. For example, personal characteristics may not be immediately apparent to a gatekeeper who does not have a close personal relationship with the individual, or has not seen them in distress and therefore cannot assess their problem-solving skills. Likewise, families can appear to an outsider to have good cohesion, but are secretly dysfunctional. Like risk factors, protective factors are not always sufficiently discriminatory or visible to gatekeepers or the general public to be useful on their own in identifying at-risk individuals for suicide.

**Suicide warning signs.** As aforementioned, the presence of risk factors and/or absence of protective factors are insufficient in identifying proximal suicide risk, emphasising the importance of proximal warning signs. A working group of suicide experts (Rudd et al., 2006a), convened by the American Association of Suicidology, constructed a consensus of warning signs for suicide, including: threats to hurt or kill
oneself, looking for means to hurt or kill oneself (e.g. looking for pills, firearms or other means), as well as talking or writing about death, dying or suicide. Other identified warning signs included acting with rage, anger, seeking revenge, increasing alcohol or drug use, withdrawing from friends, family or society, anxiety-related behaviours, sleep disturbance, behaviours associated with dramatic changes in mood and having a sense of purposelessness or hopelessness (as reflected by behaviour). Of note, engaging in risky activities or acting recklessly were also listed as warning signs; however examples of such behaviours were not described (Rudd et al., 2006a).

These warning signs are disseminated in suicide prevention programs to the lay-public and gatekeepers for suicide (http://www.suicidology.org/resources/multimedia-resources/suicide-warning-signs). The warning signs list is aimed at family, friends, teachers, mental health professionals and medical practitioners; however, the inclusion of specific risk behaviours could strengthen such prevention efforts.

A study investigating the effects of disseminating warning signs to 90 college students in the US found that suicide warning signs are easy to recall, increase knowledge about and ability to recognise a suicidal crisis and do not cause any more emotional distress to those who read them than reading information about heart attacks or diabetes would (Rudd et al., 2006b). However this educated sample may not be representative of lay-people in the general public, meaning that any further findings about warning signs would need to be validated with a more representative group.

Risk-taking Behaviour as a Warning Sign for Suicide

The Rationale. In suicide research conducted through organisations such as the American Association for Suicidology, risk-taking behaviours have been described as self-destructive, reckless behaviour, sometimes associated with having a death wish.
Risk-taking behaviour has been identified as a suicide warning sign in adolescent populations (e.g. Boyer, 2006). However, are these behaviours pertinent only to adolescent risk? Recent trends in Australia show that the highest rates of suicide (27.8% of all deaths) occurred in 20-24 year olds (Australian Bureau of Statistics, 2012). Given the ageing population of many western countries, concerns for suicide in older adults are increasing (Beautrais, 2011). Therefore, the need for research on the association between risk-taking behaviours and suicide in adult populations is rising.

Do suicidal people take more risks, and if so, why? Current data may be insufficient in this area. For example, it has been suggested that many deaths classified as accidents are in fact suicides in which people have taken a gamble on their life through engaging in risky behaviour (Mandrusiak et al., 2006). In addition, ambivalence about living or dying has been repeatedly observed in suicidal individuals, to the extent that ambivalence about life or death has been described as a defining feature of the suicidal mind (Adams et al., 1973; Schneidman, 1996). Litman and Farberow (1961), two early and eminent suicide experts suggested that people who are ambivalent about life or death may engage in risk-taking behaviours as an indirect method of suicide:

Destructive behavior is often undertaken with ambivalent feelings. The wish to die is balanced by the wish to live and to be rescued and reunited with their loved one . . . on the other hand, in many of these gambles with death, death wins (p. 51).

Investigating links between risk-taking behaviour and suicide in adult populations, specifically identifying what types of behaviours may be indicative of proximal suicidality, is a worthwhile area for research.
The Current Evidence. Engaging in risky or reckless behaviours appears to be an under-researched risk factor for suicide in adult populations. In large (sample sizes > 1000) studies comparing behaviours between school-age adolescents both with and without suicidal ideation, correlations have been found between suicidality and the presence of risky behaviours, including: aggressive behaviours, cigarette use, substance use, unsafe sexual activities, using substances (e.g., alcohol, cigarettes, marijuana, and cocaine), physical fighting or assaultive behaviour, gun carrying, and dangerous driving. All of these studies limited their attention to a subset of risk behaviours, and all had school-based samples. (Flisher et al., 2000; King et al., 2001; Woods et al., 1997). Conversely, in a smaller study, Stanton, Spirito, Donaldson and Boergers (2003) compared risk-taking behaviours (e.g., stealing, riding in a car with a dangerous driver) in 109 adolescents who had made a suicide attempt against a control group of 218 adolescents who had not made an attempt and found no significant group differences. However, this study defined a suicide attempt as “any intentional self-injury, regardless of lethality, in which the adolescent stated a desire to hurt him/herself” (pp. 57), which does not seem to take into account suicidal intent. Such findings highlight the need for further research to help clarify which, if any, risk behaviours are associated with suicide risk.

Evidence for risk-taking behaviour as a warning sign for suicide is much scarcer in adult than adolescent populations. It is likely that this bias in research is due to an observed increased experimentation with risky behaviours in adolescence associated with increased independence, decreased parental supervision and developing decision-making skills (e.g., Boyer, 2006). However, an Iranian study found that of 200 adults who attempted suicide, those who attempted by self-poisoning were more likely to have displayed reckless behaviour as an early warning sign when compared
to people who attempted suicide by setting themselves on fire; though specific reckless behaviours were not measured (Rezaie, Khazaie, Soleiman, & Schwebel, 2011). Gunn, Lester and McSwain (2011) conducted a study using US national statistics, examining people who had made a suicide attempt within six months of the study’s data collection. Results indicated that engaging in reckless behaviour was predictive of suicidal ideation, but did not distinguish suicidal ideators from participants who had actually made a suicide attempt. However, the study did not employ a validated measure to assess suicidality and asked only one general question about engaging in mildly reckless behaviour (“how often do you test yourself by doing something a little risky?”), rather than questioning specific risky behaviours. This is problematic, as risk-taking has been found to be dependent on the type of risk (i.e. it is domain-specific); people who engage in one type of risk, such as gambling, may be risk-averse to another type of risk-taking such as engaging in risky sexual behaviour (Weber, Blais, & Betz, 2002).

Associations between dangerous driving and suicide are somewhat common. It is estimated that a proportion of single driver road traffic accidents are in fact suicides that are not reported as such (Routley, Staines, Brennan, Haworth, & Ozanne-Smith, 2003). A study in Finland investigated 190 deaths that were classified as “undetermined deaths” and estimated that 19.6% of all unconfirmed suspected suicides were vehicle-related deaths (Ohberg & Lonnqvist, 1998). As it is often difficult to determine whether a car accident was a suicide, it is possible that completing suicide via a car crash is a popular method in order to ensure life insurance claims are not voided through suicide exclusion. Wang and Chou (1997) have suggested that in Taiwan, it is common practice to classify a death as an accident unless it is very obviously a suicide (e.g. by hanging), so that families can receive life
insurance payments. A study examining 67 road traffic related deaths between 1991 and 1994 in A-Lein, Taiwan, found that found that 83.4% of those accidents were associated with not wearing a seatbelt and 64% of motorcycle deaths occurred when the rider was not wearing a helmet. This recklessness could be associated with the death-wish/ambivalence theory of risk-taking as indirect suicide.

The above findings are limited in terms of the types of risk behaviours explored and reliability and variability of suicide assessment. Investigating a broader range of risk behaviours as potential warning signs for suicide would confirm or disconfirm the validity and breadth of identifiable risk behaviours related to suicide risk.

**Risk Perceptions**

People’s likelihood to engage in risk behaviours is not thought to be dependent on a risk-seeking personality trait, as personality traits are thought to be stable and predictive of behaviour (e.g. Allport & Allport, 1921; Caspi et al., 1997). Low correlations between trait-related behaviour in different situations has led to a more complex understanding of the role situational determinants play in explaining personality trait-related behaviour (Mischel & Shoda, 1995). Weber et al. (2002) argue that people’s propensity to engage in risk-taking behaviours can be better understood through a risk-return framework, in which risk-taking is seen as dependent on the perceived level of risk.

Risk perception is based on an individual’s evaluation of benefits and risks for a given risky situation and has been shown to vary between cultures and individuals based on the type of risk and the contextual situation (Weber, 1998; Weber et al., 2002). Weber and colleagues (2002) measured 560 college students’ in the US reported likelihood to engage in various risk behaviours. Results indicated that reported likelihood to engage in risk behaviours differed between domains of risk-
taking behaviours, meaning that attitudes and likelihood to engage in risky behaviour is dependent on the type of risk, rather than being reflective of a stable personality trait. These domains include; financial (investments and gambling), health/safety, recreational, ethical, and social risk-taking.

The relationship between risk perception and suicide in adult populations is yet to be explored. However, given that previous research suggests people with suicidal ideation engage in destructive behaviour, possibly due to their internal debate about whether to live or die (Adams et al., 1973; Harris, McLean, Sheffield, & Jobes, 2010; Litman & Farberow, 1961; Mandrusiak et al., 2006), it is likely that suicidal people engage in behaviours that they perceive to be high-risk. Further investigations as to whether this is the case, and if so, what types of risk behaviours suicidal people are more likely to engage in is yet to be conducted. Such information could be valuable in contributing to the warning sign literature, which can then be used by clinicians in suicide risk assessment.

**Relationships between Suicide Risk and Domains of Risk Behaviours**

The evidence surrounding risk-taking behaviours and suicide is varied. Most previous research has focused on health and safety behaviours, however little has been investigated in other areas of risk. In the field of decision sciences, Weber and colleagues (2002) developed the Domain-Specific Risk-Taking (DOSPERT) scale, which measures an individual’s propensity to engage in a broad range of risk-behaviours using a risk-return framework. The scale measures risk behaviours in a range of domains including social, ethical, financial, health/safety and recreational risks. Previous research using the scale has found that people’s propensity to engage in risky behaviours was highly domain-specific and that women are generally more risk-averse than men except in the social domain (Weber et al., 2002). This paper will
review the literature on risk-taking behaviours as warning signs for suicide using the DOSPERT domains of risk.

Health/safety risks. As was earlier discussed, there is a large evidence base demonstrating associations between suicidality in high school students and health-related risk-taking behaviours, such as engaging in unsafe sexual activities, using substances including alcohol, cigarettes, marijuana and cocaine; engaging in physical fighting or assaultive behaviour; gun possession and dangerous driving (Flisher et al., 2000; King et al., 2001; Woods et al., 1997). Many of these behaviours could be considered forms of escapism or self-medication. They could indicate a lack of regard for one’s own safety and well-being, or even could be considered a suicide attempt. Placing one’s life at risk through engaging in these types of risky behaviour strongly reflect Schneidman’s (1996) conceptualisation of the suicidal mind as ambivalent about living or dying.

Risk-taking sexual behaviours (e.g. engaging in condom-free sex or having multiple sexual partners) have not been identified as a warning sign for suicide in adult populations, however a large ($N = 2,312$) online study found elevated reported sexual risk-taking behaviours among homosexual males going online to find romantic partners (Ogilvie et al., 2008). This minority group have also been found to be at increased risk for suicide (e.g. Harris, 2013). As such, the area of risky health and safety behaviours as warning signs for suicide deserves more attention.

Financial risks: Gambling. Pathological or problematic gambling is considered a risky behaviour. A study investigating gambling behaviours amongst 1, 079 US College students (mean age = 19.9) found that suicidal ideation was twice as common in students with a gambling problem as those without (Stuhldreher, Stuhldreher, & Forrest, 2007). A study investigating risk-taking behaviours in a
sample of 156 hospitalised pathological gamblers found correlations between gambling and other suicide-related behaviours, including risky sexual behaviours, alcohol and drug abuse, riding in a car without a seatbelt and driving or riding with someone under the influence (Martins, Tavares, da Silva Lobo, Galetti, & Gentil, 2004). They found increased rates of suicide attempts amongst gamblers, particularly females.

It is unclear whether the links between suicide and gambling are due to financial loss that has occurred as a result of gambling or whether it is indicative of an underlying factor in suicidal people. Poor impulse control and mood disorders are common amongst both gamblers and suicidal people (Kim, Grant, Eckert, Faris, & Hartman, 2006; Wong, Chan, Conwell, Conner, & Yip, 2010). Investigating gambling as a warning sign for suicide, particularly whether suicidal people perceive gambling to be high-risk or low-risk may provide some insight into the suicidal mind, which would be of use to clinicians and gatekeepers.

**Financial risks: Investments.** Making risky financial investments, such as investing in speculative shares or investing in a risky business venture, has been identified as a characteristic of the hypomanic state of Bipolar and Bipolar II disorder (American Psychiatric Association, 2000). The ramifications of this behaviour including financial burden, feelings of guilt and shame and relationship consequences are thought to contribute to suicidal ideation in sufferers of the disorders (Fletcher, Parker, Paterson, & Synnott, 2013). Indeed, financial loss as a result of investments has been associated with high rates of suicide, as was particularly evident in the recent global financial crisis; Chang, Stuckler, Yip and Gunnell (2013) compared estimated suicides based on trends with actual suicide rates post-global financial crisis in 53 countries and found that suicide rates were 4-6% higher than predicted. However this
finding appears to be more related to financial loss and its repercussions, than to risk-taking behaviour as a warning sign for suicide. This literature review could not locate any further studies examining risky financial investment as a suicide risk factor, perhaps due to the fact that the majority of research in this area has focused on adolescents; a population that by and large do not engage in financial investment behaviours.

**Ethical risks.** Engaging in extramarital affairs, not returning a wallet you found or passing off someone else’s work as your own are examples of ethical risk behaviours, which have also been left unexplored as possible warning signs for suicide. Previous research has identified ethical risk-taking to be related to low levels of honesty, conscientiousness and emotionality (Weller & Tikir, 2011); however it is unclear how such behaviours may be related to suicide risk.

Having a spouse who has engaged in an extramarital affair has been found to be a risk factor for suicide (Aghanwa, 2004), but engaging in an affair oneself has not been investigated as an early warning sign. In contrast, being accused of engaging in unethical behaviour has been identified as a warning sign for suicide. For example, a study of 153 male adolescents who had been incarcerated in Scotland were found to have higher rates of suicide than are reported in general population statistics. Suicide rates were particularly high for individuals with additional risk factors including substance abuse and a psychiatric diagnosis (Kiriakidis, 2008). It is hypothesised that the stigma associated with being accused of engaging in unethical behaviour may contribute to suicidal ideation and behaviours. Engaging in unethical behaviour could potentially be a warning sign for suicide, as perhaps not caring whether you will live or die, or believing that you will not live to see the consequences of your actions.
could spur suicidal people to engage in unethical behaviour that they would usually avoid.

**Social risks.** Social risk behaviours, as defined by DOSPERT researchers include drinking heavily at a social function, disagreeing with others about an issue or choosing a career you enjoy over a more secure one (Weber et al., 2002). These behaviours have the potential to speak volumes about one’s attitude towards life, their self-perception, self-confidence, and how they value other’s opinions of themselves, which are relevant to suicidal individuals as they contribute to the psychosocial risk factors for suicide including depression, hopelessness and low self-worth (Gould et al., 2003). However, this literature review did not locate previous research investigating social risk-taking as a warning sign for suicide. Given that changes in self-worth and hopelessness that often precede suicide, it would be valuable to explore social risk-taking behaviours as a warning sign for suicide.

**Recreational risks.** High-risk activities, such as skydiving, bungee jumping or white-water rafting in dangerous conditions may appeal to people with a death wish or who are ambivalent about living or dying. Engaging in common sports has been shown to be a protective factor against suicidality and depressive thoughts in adolescents, however these findings are mediated by self-esteem, social support, depression, hopelessness and loneliness (Babiss & Gangwisch, 2009; Taliaferro, Rienzo, & Donovan, 2010). Again, there is little empirical evidence on these behaviours in relation to suicide risk.

**Online Suicide Research**

**Utility of online research.** Extensive research has investigated the reliability, validity, benefits and limitations of conducting online self-report research as compared to a traditional paper-and-pencil questionnaire. Obvious benefits include
reduced costs due to lack of physical materials needed, as well as wages paid for data input from paper questionnaires to databases. A review of nine randomised control trials (RCT’s) which compared paper-and-pencil questionnaires to hand-held computers in health-related data collection, found that online questionnaires were usually preferred by users, were more time-effective and often collected more accurate data than their paper-and-pencil counterparts (Lane, Heddie, Arnold, & Walker, 2006).

Comparative studies have found that online questionnaires achieve higher completion rates and lower levels of missing responses (Kongsved, Basnov, Holm-Christensen, & Hjollund, 2007; Lane et al., 2006; Raat, Mangunkusumo, Landgraf, Kloek, & Brug, 2007) than health-related paper-and-pencil questionnaires. Studies have also found no differences in mean scores between online and paper-and-pencil questionnaires in measures of heart failure, general health as well as substance use, panic, depression and suicide (Bonevski, Campbell, & Sanson-Fisher, 2010; Carlbring et al., 2005; Hollandare, Andersson, & Engstrom, 2010; Raat et al., 2007; Wijndaele et al., 2006; Wu et al., 2009).

Other benefits include accessing rural populations, hard to reach and stigmatised groups. Importantly, research has demonstrated that social desirability bias is less in anonymous surveys (Joinson, 1999), and is no worse for online compared with offline surveys (Crutzen & Goritz, 2010; Crutzen & Goritz, 2011). An obvious limitation for conducting online research is excluding individuals who do not use the internet, particularly older adults, as well as the near impossibility of obtaining a random sample of internet users (Galesic, Tourangeau, & Cooper, 2006).

**Addressing the potential risks of conducting online suicide research.** There has been some debate as to whether suicide research has iatrogenic effects on
participants. Recent studies have found suicide-related assessment brought no significant negative impact to participants, including individuals who displayed suicide-risk or depressive moods (Cukrowicz, Smith, & Poindexter, 2010; Gould, Marrocco, Kleinman, Thomas, Mostkoff, Cote & Davies, 2005; Reynolds, Lindenboim, Comtois, Murray, & Linehan, 2006). Instead, these studies found some at-risk and high-risk participants reported positive outcomes, including a general decline in distress levels (Gould et al., 2005; Reynolds et al., 2006), and suicidal ideation (reported in all three studies), after suicide assessment. Based on the current evidence base, this researcher determined an online survey would be best for the aims of this study.

**Summary and Purpose of the Present Study**

The present study will investigate the nature of risk-taking behaviours in an adult population. The theory of planned behaviour states that intentions to carry out a particular behaviour can be predicted with high accuracy according to the individual’s attitude about the behaviour, which accounts for considerable variance in actual behaviours (Ajzen, Joyce, Sheikh, & Gilbert Cote, 2011). Therefore, differences between risk perceptions and behaviours will be investigated between suicide-risk and non-suicidal participants within each of the five domains of the DOSPERT. This study uses the SBQ-R as a validated measure of suicide risk. The SBQ-R Question 4 “how likely is it that you will commit suicide someday” is thought to measure suicidal intent. In accordance with the theory of planned behaviour, this question is likely to capture a more proximal suicidal intent, and will be used as a first attempt to assess risky behaviours in relation to near-term suicide risk. Additional analyses will investigate which risk behaviours may be more proximal warning signs for suicide by
comparing risk behaviours of participants who scored low-risk and high-risk in item 4 of the SBQ-R.

Investigating these areas could identify previously unknown suicide warning signs and/or risk factors, which can then be used by gatekeepers and clinicians in their screening processes, as well as be identifiable by the general public. This study is undertaken with the hope that increased knowledge about suicidal warning signs may help to prevent suicidal behaviours.

**Hypotheses**

Based on previous research, it is hypothesised that suicidal adults will demonstrate their life-death ambivalence by reporting greater risk-taking behaviours, than non-suicidal participants, particularly in the health/safety, financial (gambling) and recreational domains of risk-taking. As a possible confounding factor, in accordance with previous research indicating that adolescents are more likely to engage in risky behaviours (Boyer, 2006), it is hypothesised that greater risk-taking will be associated with age, with younger adults engaging in more risks than older adults. Further, if suicidal adults do report greater risk-taking, it is predicted that suicidal adults will report engagement in risk behaviours that they perceive to be high risk, in accordance with the theory that high-risk behaviours are undertaken as a gamble with life or death.
Exploring risk-taking behaviours as potential warning signs for suicide in adults

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ABSTRACT

Objective: To increase knowledge about risk-taking behaviours as risk factors and potential warning signs for suicide in adults. Engaging in risky behaviour is an identified warning sign for suicide in adolescents, however has not yet been well researched in adults. Method: An anonymous sample of 713 Internet users (77.1% female; 78.5% Caucasian aged from 18 to 71) completed a 20-30 minute anonymous online survey measuring five domains of risk perceptions and behaviours using The Domain-Specific Risk-Taking (Adult) Scale (DOSPERT; see Appendix B). The Suicide Behaviours Questionnaire – Revised (SBQ-R; see Appendix C) was used to group participants as suicide-risk or non-suicidal. 401 participants were identified as suicide-risk. Analyses investigated group differences in risk perceptions and behaviours in suicide-risk and non-suicidal participants. Risk behaviour differences were also examined for participants who scored highly on an SBQ-R item relating to future suicidal intent, in order to identify potential proximal warning signs. Results: Behavioural and/or perceptual differences were found between suicide-risk and non-suicidal participants across all risk five domains. Potential proximal warning signs included engaging in extra-marital affairs, driving a car without a seatbelt and walking home alone at night in an unsafe area. Conclusions: The implications of these findings are far-reaching in terms of their clinical utility; clinicians and gatekeepers can be alerted to a new range of risk factors and warning signs to indicate a distal or proximal suicide risk. Definite differences were found in risk behaviours between suicide-risk and non-suicidal adults, indicating that risk-taking is important risk factor for suicide beyond adolescence.

Keywords: suicide, risk-taking, risk factors, warning signs, adults
Introduction

The World Health Organisation (2012) has identified suicide as one of the top causes of death worldwide, with an estimated one million people dying by suicide yearly. In spite of this, suicide remains one of the world’s most preventable causes of death, and suicide prevention research has produced tools and resources to reduce the number of suicides. Recognising who is at risk of suicide is the first step towards early detection and intervention of suicidal behaviours. It is the aim of this researcher to identify those at risk for suicide, to provide evidence for the establishment and evaluation of early detection and intervention strategies and to promote public awareness of warning signs and interventions.

Most experts in the field of suicide research agree that there is a clear set of processes that most people undergo before attempting suicide. The presence of risk factors and absence of protective factors, combined with distress, can result in suicidal ideation (Silverman, 2004). If unresolved, this ideation can develop into suicidal intent, where the individual has some intent to end their own life. At this stage, suicidal gestures or warning signs for suicide become apparent, such as talking or writing about suicide, engaging in risky behaviours or giving away one’s possessions. These actions can be followed a suicide attempt, which might result in a completed suicide (Silverman, 2004). Suicide risk assessment attempts to identify known risk factors that can occur at any stage of the suicidal process; however it is important to note that the rate at which individuals’ progress through these stages is varied. In addition, some may skip some of the processes altogether (Silverman, 2004).

Studies have repeatedly shown that many people who become suicidal and experience suicidal ideation do not come into contact with mental health services (e.g.
Kjoller & Helweg-Larsen, 2000; Sayer, Stewart, & Chipps, 1996), and those that do, are not often identified as suicidal (Draper, Snowdon, & Wyder, 2008). It is therefore imperative for risk factors, warning signs and protective factors to be better identifiable by other people, such as family and gatekeepers (Bolognini et al., 2002; Granello, 2010).

Risk factors suggest a distal relationship to suicidal behaviours and are longer-term or ongoing risks that are associated with suicidality (Hendin, Maltsberger, Lipschitz, Haas, & Kyle, 2001; Rudd et al., 2006a). Risk factors cover a broad range of life-areas and include demographic factors such as social disadvantage, having a non-heterosexual orientation (Beautrais, 2000; Brent, 1995; Gould, Greenberg, Velting, & Shaffer, 2003; Kjoller & Helweg-Larsen, 2000) and being male, as males have been found to be up to five times more likely to die by suicide than females (e.g. Remafedi, French, Story, Resnick, & Blum, 1998; Silenzio, Pena, Duberstein, Cerel, & Knox, 2007; Zhao, Montoro, Igartua, & Thombs, 2010). Having mental health problems, particularly depression and anxiety, a history of trauma and the presence of current psychosocial stressors are also risk factors for suicide (Beautrais, 2000; Bolognini et al., 2002; Gould et al., 2003; King et al., 2001; Schwartz & Rogers, 2004; Stoelb & Chiriboga, 1998).

In contrast, protective factors are elements of one’s life that are thought to reduce risk of suicidal ideation, attempts or completion of suicide (Rudd, 2008). A mere absence of risk factors can be considered to be protective against suicidality; however additional distal factors have been associated with lower suicide risk. Like with risk factors, protective factors can include demographic elements and personal characteristics (Gould et al., 2003). Importantly, having access to prevention programs and treatments are protective factors against suicidality. These can include
school-based prevention programs, community-based prevention programs, mental health hotlines, healthcare-based prevention programs, including GP and physician mental health training aimed at suicide screening, and engagement with a mental health facility for treatment (Beautrais, 2000; Gould et al., 2003).

Warning signs are specific to the current state of the individual and imply more imminent suicide risk (i.e. within minutes, hours or days; Rudd et al., 2006a). Warning signs are an important part of suicide risk assessment and have been shown to be easy to recall (Rudd et al., 2006b). A working group of suicide experts (Rudd et al., 2006a), convened by the American Association of Suicidology, constructed a consensus of warning signs for suicide; these included threats to hurt or kill oneself, looking for means to hurt or kill oneself (e.g. looking for pills, firearms or other means), talking or writing about death, dying or suicide, acting with rage, anger, seeking revenge, increasing alcohol or drug use, social isolation, behaviours associated with dramatic changes in mood and having a sense of purposelessness or hopelessness (as reflected by behaviour). Engaging in risky activities or acting recklessly was also listed, however examples of such behaviours were not described.

Do suicidal people take more risks, and if so, why? Current data may be insufficient in this area. For example, it has been suggested that many deaths classified as accidents are in fact suicides in which people have taken a gamble on their life through engaging in risky behaviour (Mandrusiak et al., 2006). This research follow’s Schneidman’s (1996) theory of suicide, which states that ambivalence about living or dying, is a defining feature of the suicidal mind. It is posited that suicide risk individuals engage in risky behaviour as an indirect method of suicide, or a gamble with life, based on their ambivalent attitude towards living.
Much of the present literature investigating risk-taking behaviour as a warning sign for suicide has focused on adolescent populations, due to increased experimentation with risky behaviour in adolescence associated with increased independence, decreased parental supervision and developing decision-making skills (Boyer, 2006). These behaviours include unsafe sexual activities, using substances (e.g., alcohol, cigarettes, marijuana, and cocaine), physical fighting or assaultive behaviour, gun carrying, and dangerous driving (Flisher et al., 2000; King et al., 2001). However, recent trends in Australia show that the highest rates of suicide (27.8% of all deaths) occurred in 20-24 year olds (Australian Bureau of Statistics). In addition, given the ageing population in many western countries, concerns for suicide in older adults are increasing (Beautrais, 2011), emphasising the need for research on the association between risk-taking behaviours and suicide in adult populations.

Evidence for risk-taking behaviour as a warning sign for suicide is much scarcer in adult than adolescent populations. An Iranian study found that of 200 adults who completed suicide, those who attempted by self-poisoning were significantly more likely to have displayed reckless behaviour as an early warning sign when compared to people who attempted suicide by setting themselves on fire (Rezaie, Khazaie, Soleiman, & Schwebel, 2011). It is also estimated that a proportion of single driver road traffic accidents are in fact suicides that are not reported as such (Ohberg & Lonnqvist, 1998; Routley, Staines, Brennan, Haworth, & Ozanne-Smith, 2003). A Taiwanese study examined 67 road traffic related deaths between 1991 and 1994 in A-Lien, and found that found that 83.4% of road-traffic accidents were associated with not wearing a seatbelt and 64% of motorcycle deaths occurred when the rider was not wearing a helmet (Wang & Chou, 1997). This recklessness could be
associated with Schneidman’s (1996) theory of ambivalence, such that driving recklessly is undertaken as a gamble with life, or as a form of indirect suicide.

People’s likelihood to engage in risk-taking behaviours can be understood through a risk-return framework, in which an individual’s evaluation of benefits and risks for a given risky situation determines their likelihood to engage in that behaviour. Weber and colleagues (1998; 2002) found that risk perceptions are specific to different domains of risk-taking behaviours, meaning that attitudes and likelihood to engage in risky behaviour is dependent on the type of risk, rather than being reflective of a stable personality trait. These domains include financial (investments and gambling), health/safety, recreational, ethical and social risk-taking, which are assessed using the Domain-Specific Risk-Taking (DOSPERT) scale. The evidence surrounding risk-taking behaviours and suicide in each of these domains is varied and will be discussed in turn.

Health and Safety Risks

Aside from the aforementioned evidence base demonstrating associations between adolescent suicidality and health related risk-taking behaviours, little evidence exists in adult populations. Risk-taking sexual behaviours (e.g. engaging in condom-free sex or having multiple sexual partners) have been found to be elevated among homosexual males going online to find romantic partners (Ogilvie et al., 2008); a minority group who have also been found to be at increased risk for suicide (Harris, 2013).

Financial Risks: Gambling

Pathological or problem gambling is a known risk factor for suicide; a study investigating gambling behaviours amongst 1,079 US College students found that suicide ideation was twice more common in students with a gambling problem than
those without (Stuhldreher, Stuhldreher, & Forrest, 2007). Gambling has been shown to correlate with other suicide-related risky behaviours, including risky sexual behaviours, alcohol and drug abuse, riding in a car without a seatbelt and driving or riding with someone under the influence (Martins, Tavares, da Silva Lobo, Galetti, & Gentil, 2004). Increased rates of suicide attempts have been found amongst gamblers, particularly females (Martins et al., 2004). It is unclear whether the links between suicide and gambling due to financial loss occurred as a result of gambling or whether it is indicative of an underlying factor common to suicidal people. Poor impulse control and mood disorders are common amongst both gamblers and suicidal people (Kim, Grant, Eckert, Faris, & Hartman, 2006; Wong, Chan, Conwell, Conner, & Yip, 2010).

**Financial Risks: Investments**

Making risky financial investments, such as investing in speculative shares or investing in a risky business venture, has been identified as a characteristic of the hypomanic state of Bipolar and Bipolar II disorders (American Psychiatric Association, 2000). The ramifications of this behaviour including financial burden, feelings of guilt and shame and relationship consequences are thought to contribute to suicidal ideation in sufferers of the disorders (Fletcher, Parker, Paterson, & Synnott, 2013). Indeed, financial loss as a result of investments has been associated with high rates of suicide, as was particularly evident in the recent global financial crisis (Chang, Stuckler, Yip, & Gunnell, 2013); however this finding appears to be more related to loss than to risk-taking behaviour as a warning sign for suicide.

**Ethical Risks**

Being accused of engaging in unethical behaviour has been identified as a warning sign for suicide, for example people who have been incarcerated have been
shown to be high risk for suicide, particularly in the presence of other suicide risk factors including substance abuse and the presence of a psychiatric diagnosis (Fazel, Cartwright, Norman-Nott, & Hawton, 2008; Kiriakidis, 2008). In addition, previous research has identified ethical risk-taking to be related to low levels of honesty, conscientiousness and emotionality (Weller & Tikir, 2011) however it is unclear how such behaviours may be related to suicide risk.

**Social Risks**

Social risk behaviours, including drinking heavily at a social function, disagreeing with others about an issue or choosing a career you enjoy over a more secure one, have the potential to speak volumes about one’s attitude towards life, their self-perception, including self-confidence as well as how they value other’s opinions of themselves. All of these factors are relevant to suicidal individuals as they contribute to the psychosocial risk factors for suicide including depression, hopelessness and low self-worth (Gould et al., 2003). However, in a review of the literature, it does not seem that social risks have been investigated as a warning sign for suicide. Given that changes in self-worth and hopelessness often precede suicide, it would be valuable to explore social risk-taking behaviours as a warning sign for suicide.

**Recreational Risks**

High-risk activities, such as skydiving, bungee jumping or white-water rafting in dangerous conditions may appeal to people with an ambivalent attitude towards living or dying. Engaging in common sports has been shown to be a protective factor against suicidality and depressive thoughts in adolescents however these findings are mediated by self-esteem, social support, depression, hopelessness and loneliness.
EXPLORING RISK-TAKING BEHAVIOURS

(Taliaferro, Rienzo, & Donovan, 2010). Again, there is little empirical evidence on these behaviours in relation to suicide risk.

The present study investigates the nature of risk-taking behaviours in an adult population. The theory of planned behaviour states that intentions to carry out a particular behaviour can be predicted with high accuracy according to the individual’s attitude about the behaviour, which accounts for considerable variance in actual behaviours (Ajzen, Joyce, Sheikh, & Gilbert Cote, 2011). Therefore, differences between risk perceptions and behaviours will be investigated between suicide-risk and non-suicidal participants within each of the five domains of the DOSPERT. This study uses the Suicide Behaviors Questionnaire-Revised (SBQ-R; Osman et al., 2001) as a validated measure of suicide risk. The SBQ-R Question 4 “how likely is it that you will commit suicide someday” is thought to measure suicidal intent. In accordance with the theory of planned behaviour, this question is likely to capture a more proximal suicidal intent, and will be used as a first attempt to assess risky behaviours in relation to near-term suicide risk. Additional analyses examine which risk behaviours may be more proximal warning signs for suicide by comparing risk behaviours of participants who scored low-risk and high-risk in item 4 of the SBQ-R.

Investigating these areas potentially could identify previously unknown suicide warning signs, which can provide tools to be used by gatekeepers and clinicians in their screening processes, as well as be identifiable by the general public. This study is undertaken with the hope that increased knowledge and awareness concerning suicidal warning signs may help to prevent suicidal behaviours.

Based on previous research, it is hypothesised that suicidal adults will demonstrate their life-death ambivalence by reporting greater risk-taking behaviours, than non-suicidal participants, particularly in the health/safety, financial (gambling)
and recreational domains of risk-taking. As a possible confounding factor, it is hypothesised that greater risk-taking will be associated with age, with younger adults engaging in more risks than older adults. Further, if suicidal adults do report greater risk-taking, it is predicted that suicidal adults will report engagement in risk behaviours that they perceive to be high risk, in accordance with the theory that high-risk behaviours are undertaken as a gamble with life or death.

Method

Participants

Participants in this study were an anonymous sample of Internet users, recruited using links placed through Facebook and other online sites, excluding professional support sites, as well as snowball recruitment. To engage suicide-risk participants, advertisements were placed with Google, which appeared when Internet users entered search terms including “suicide” and “about suicide.” No incentives were offered for participation, and no student groups were used or specifically solicited for participation.

The survey was accessed by 1353 people over a 3.5-month timeframe. Of this number, 713 provided adequate responses for analysis (52.7% completion rate). Participants’ ages ranged from 18 to 71 years old ($M = 31.48$, $SD = 13.53$), 77.1% were female, and 78.5% were Caucasian. As this study was concerned with people who might be even moderately suicide-risk, the SBQ-R clinical cut-off score of 7, rather than the community cut off score of 8, was used to categorise participants as suicide-risk or non-suicidal. One-way ANOVAs tested group differences on demographic variables. Sex and ethnicity did not statistically significantly differ by suicide-risk status ($ps > .05$), however statistically significant differences between
groups were found in age $F(1,711) = 19.38, p < .001$; and education $F(1,711) = 29.30, p < .001$. As such, these variables were controlled for in subsequent analyses.

**Measures**

The *Domain-Specific Risk-Taking (Adult) Scale* (DOSPERT; Blais & Weber, 2006) was used to identify group differences in perceptions of risks (how risky the behaviour is) and attitudes towards risk (likelihood to engage in risk behaviours) for five domains of risk-taking: Financial decisions (separately for Investing versus Gambling), Social, Ethical, Recreational, and Health/Safety decisions.

The DOSPERT included 30 risk behaviours, such as “drinking heavily at a social function” and “driving a car without wearing a seatbelt.” The DOSPERT Risk-Taking (DOSPERT-RT) scale asked participants to rate the likelihood that they would engage in the risk behaviours on a 7-point Likert scale ($1 = \text{extremely unlikely}$ to $7 = \text{extremely likely}$). The DOSPERT Risk-Perception (DOSPERT-RP) scale then asked participants to rate the same 30 behaviours along a 7-point scale according to how risky they believe the behaviours to be, from $1 = \text{not at all risky}$ to $7 = \text{extremely risky}$. Each subscale has six items with possible scores ranging from 6 to 42. The mean value of total scores was calculated, with higher scores indicating an increased likelihood to engage in the behaviours or perception of the behaviours as risky for the DOSPERT-RT and DOSPERT-RP, respectively.

The two included scales have shown good internal reliability for each domain of risk within the DOSPERT-RT and DOSPERT-RP scales (Blais & Weber, 2006). The original DOSPERT scale had adequate validity, achieving positive correlations with similar scales including Budner’s (1962) Scale for Intolerance of Ambiguity and Zuckerman’s (1994) Sensation Seeking Scale. The cronbach’s alphas for DOSPERT domains in this study are presented in Appendix D.
The Suicide Behaviors Questionnaire – Revised (SBQ-R) was used to group participants as suicide-risk or non-suicidal (Osman et al., 2001). The questionnaire is a revised version of the original 34-item Suicidal Behaviors Questionnaire (Linehan, Goldstein, & Chiles, 1983) and is comprised of four items, each assessing different dimensions of suicidality including participants’ history of: lifetime suicide ideation (History), frequency of suicidal ideation for the past year (Ideation Frequency), disclosure of suicidal behaviour to a third party (Disclose) and likelihood of future suicidal behaviour (Intent). Possible scores range from 3-18; a cut-off score of 7 was used to group participants into suicide-risk and non-suicidal categories, as researchers found that this score was most useful in identifying suicide-risk in a clinical sample (Osman et al., 2001).

Moderate to high correlations between SBQ-R items were found in a psychiatric adult inpatient (clinical) sample, with an adequate coefficient alpha. Correlations between items in an undergraduate student (non-clinical) sample were low to moderate, with an adequate coefficient alpha (Osman et al., 2001). The SBQ-R has demonstrated adequate validity, with suicidal adults scoring significantly higher than non-suicidal adults in both psychiatric inpatients and an undergraduate student (non-clinical) sample (Osman et al., 2001). This measure has been previously used in a similar online study and demonstrated good internal reliability (Harris, McLean, & Sheffield, 2009). The cronbach’s alpha for the SBQ-R for this study was .83.

Procedure

Ethics approval was obtained from the University of Newcastle’s Human Research Ethics Committee (H-2012-0299), requiring participants to be 18 years or older. Participation involved completing a 30-minute online survey and was entirely anonymous; no IP addresses or other identifying information was collected. This was
an important decision as increased anonymity has been associated with higher completion rates of online surveys for stigmatised issues such as mental health (Joinson, 1999).

This author participated in a focus group discussion involving one psychology academic with a PhD, two postgraduate clinical students and one undergraduate student discussing ethics, survey design, scale and item inclusion and exclusion, resulting in elimination of some survey items and modification of others.

After a gateway information page, participants were asked a question on age. When participants confirmed that they were over age 18, they were asked to complete the above items, demographic questions, as well as other measures being used in a related project. When participants exited the survey at any stage (i.e. even if they did not complete the survey), an exit page provided Australian and international phone numbers and websites for free support and counselling services (e.g. Lifeline).

**Results**

Data was analysed using SPSS version 21. Cases with excessive missing values were deleted, resulting in our final sample size of 713. Data clean up closely followed Tabachnick and Fidel’s guidelines with respect to normality, univariate and multivariate outliers (2007). Missing values for all variables were found to be missing completely at random (MCAR), making the data well suited for the Expectation Maximisation replacement method.

Outliers in the data for the DOSPERT scale were identified using boxplots and recoded to the nearest non-outlying value. Following Tabachnick and Fidel’s guidelines (2007), some variables within the DOSPERT data set, as well as age, were transformed to better approximate a normal distribution for MANCOVA analyses. All
analyses were conducted with both transformed and non-transformed variables, however no significant differences in results were found.

Cronbach’s alphas were conducted to examine the internal reliability of DOSPERT subscales (see Appendix D). Due to inadequate internal reliability of some subscales (i.e., < .70), DOSPERT items were analysed individually using MANCOVAs and ANCOVAs, within their subscale domains, rather than analysing subscale total scores.

MANCOVA analyses were chosen to test the hypotheses that suicide-risk participants would differ from non-suicidal participants in domains of risk behaviours and risk perceptions. These analyses controlled for group differences on age and education.

Box’s M test of normality and variance-covariance equality was violated \( (p < .001) \); however, Box’s M is very sensitive to departures from normality, such that it is not a useful test to assess normality of covariance. As the sample size difference between groups was not large, it is commonly accepted that Box’s M test can be ignored under these conditions (Layard, 1974; Tabachnick & Fidel, 2007).

The MANCOVA for the Behaviour Health and Safety subscale showed a statistically significant result, Hotelling’s trace = .08, \( F(6, 704) = 8.80, p < .001 \). Within the Perception Health and Safety Subscale, the MANCOVA also showed a statistically significant result, Hotelling’s trace = .03, \( F(6, 704) = 3.70, p = .001 \). Follow up one-way ANCOVAs shown in Table 1 revealed that suicide-risk participants were significantly less likely to report that they would drink heavily at a social function. There was no difference in risk perception for this item. Suicide-risk participants were more likely to report that they would ride in a car without a seatbelt or on a motorcycle without a helmet, behaviours which they viewed as less risky than
did non-suicidal participants. They were also more likely to report that they would walk home alone in an unsafe area.

Effect sizes for one-way ANOVAs are considered medium at .25 and large at .4 (Cohen, 1992), which is strengthened by the similar sample sizes of the suicide-risk and non-suicidal groups. Using the appropriate effect size makes these findings more likely to be replicable in future research and would apply to greater populations beyond this sample. Therefore gatekeepers and clinicians may be likely to see these behaviours as warning signs in the public.

Table 1

**ANCOVA Comparisons of Suicide-Risk and Non-suicidal Participants on DOSPERT**

*Behaviour Health and Safety Subscale Items*

<table>
<thead>
<tr>
<th>Risk Behaviour</th>
<th>Risk Behaviour</th>
<th>Risk Perception</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Suicide-risk</td>
<td>Non-suicidal</td>
</tr>
<tr>
<td></td>
<td>(n = 401)</td>
<td>(n = 312)</td>
</tr>
<tr>
<td></td>
<td>(M)</td>
<td>(SD)</td>
</tr>
<tr>
<td>No helmet</td>
<td>3.74</td>
<td>2.40</td>
</tr>
<tr>
<td>Walk unsafe area</td>
<td>4.32</td>
<td>2.09</td>
</tr>
<tr>
<td>No seatbelt</td>
<td>2.68</td>
<td>2.12</td>
</tr>
<tr>
<td>Drink heavily social</td>
<td>2.88</td>
<td>2.34</td>
</tr>
<tr>
<td>Unprotected sex</td>
<td>2.88</td>
<td>2.22</td>
</tr>
<tr>
<td>No sunscreen</td>
<td>3.44</td>
<td>2.35</td>
</tr>
</tbody>
</table>

*Note.* \(d\) = Cohen’s \(d\). DOSPERT = Domain Specific Risk Taking (Adult) Scale. *\(p < .008\). **\(p < .002\). ***\(p < .0008\) (Bonferroni adjusted, \(\alpha/6\)).
The MANCOVA for the Behaviour Financial Gambling subscale showed a statistically significant result, Hotelling’s trace = .02, $F(3, 707) = 4.00, p = .008$.

Within the Perception Financial Gambling subscale, the MANCOVA also showed a statistically significant result, Hotelling’s trace = .02, $F(3, 707) = 3.87, p = .009$.

Follow up one-way ANCOVAs were conducted for each of the gambling subscale items, as shown in Table 2. Suicide-risk participants were significantly more likely to report that they would bet a day’s income a high-stake poker game, which they perceived as less risky than did non-suicidal participants. Suicide-risk participants also perceived betting a day’s income on the outcome of a sporting event as less risky than did non-suicidal participants.

**Table 2**

*ANCOVA Comparisons of Suicide-Risk and Non-suicidal Participants on DOSPERT*

*Financial Gambling Subscale Items*

<table>
<thead>
<tr>
<th>Risk Behaviour</th>
<th>Risk Perception</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suicide-risk $(n = 401)$</td>
<td>Non-suicidal $(n = 312)$</td>
</tr>
<tr>
<td>$M$</td>
<td>$SD$</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Poker</td>
<td>2.56</td>
</tr>
<tr>
<td>Sporting event</td>
<td>2.85</td>
</tr>
<tr>
<td>Horse races</td>
<td>2.54</td>
</tr>
</tbody>
</table>

*Note. $d = $ Cohen’s $d$. DOSPERT = Domain Specific Risk Taking (Adult) Scale.*

* $p < .17$. ** $p < .003$. *** $p < .0003$ (Bonferroni adjusted, $\alpha/3$).

† $p < .01$ (unadjusted)
The MANCOVA for the Behaviour Financial Investment subscale showed a statistically significant result, Hotelling’s trace = .02, $F(3, 707) = 3.81$, $p = .009$. However the Perception Financial Investment subscale did not show a statistically significant result, Hotelling’s trace $< .01$, $F(3, 707) = 0.41$, $p = .74$. Follow-up one-way ANCOVAs revealed only one behaviour that significantly differed between groups on financial investment behaviours; suicidal participants were significantly less likely to report that they would invest 10% of their annual income in a moderate growth mutual fund (Table 3).

Table 3

**ANCOVA Comparisons of Suicide-Risk and Non-suicidal Participants on DOSPERT**

**Behaviour Financial Investment Subscale Items**

<table>
<thead>
<tr>
<th></th>
<th>Suicide-risk $(n = 401)$</th>
<th>Non-suicidal $(n = 312)$</th>
<th>$M$</th>
<th>$SD$</th>
<th>$M$</th>
<th>$SD$</th>
<th>$F$</th>
<th>$d$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mutual fund</td>
<td>3.42</td>
<td>2.08</td>
<td>3.85</td>
<td>1.88</td>
<td></td>
<td></td>
<td>9.16**</td>
<td>.22</td>
</tr>
<tr>
<td>New business</td>
<td>3.93</td>
<td>2.40</td>
<td>3.60</td>
<td>2.11</td>
<td></td>
<td></td>
<td>0.26</td>
<td>.15</td>
</tr>
<tr>
<td>Speculative stock</td>
<td>3.17</td>
<td>2.16</td>
<td>2.87</td>
<td>1.98</td>
<td></td>
<td></td>
<td>&lt; 0.01</td>
<td>.14</td>
</tr>
</tbody>
</table>

*Note. $d =$ Cohen’s $d$. DOSPERT = Domain Specific Risk Taking (Adult) Scale.*

* $p < .017$. ** $p < .003$. *** $p < .0003$ (Bonferroni adjusted, $\alpha/3$).

The MANCOVA for the Behaviour Ethic subscale showed a statistically significant result, Hotelling’s trace $= .08$, $F(6, 704) = 8.81$, $p < .001$. Within the Perception Ethical subscale, the MANCOVA showed a statistically significant result Hotelling’s trace $= .04$, $F(6, 704) = 4.47$, $p < .001$. As the MANCOVAs were significant, follow up one-way ANCOVAs were conducted for each set of ethic
subscale items. As shown in Table 4, suicidal participants were significantly more likely to report engaging in extra marital affairs and passing off someone else’s work as their own, which they reported perceiving as less risky than did non-suicidal participants. Suicide-risk participants were also significantly more likely to report that they would keep a wallet that they found containing $200, however there was no difference in risk perception between groups for this item.

Table 4

ANCOVA Comparisons of Suicide-Risk and Non-suicidal Participants on DOSPERT

Ethic Subscale Items

<table>
<thead>
<tr>
<th>Risk area</th>
<th>Risk behaviour</th>
<th>Risk perception</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Suicide-risk</td>
<td>Non-suicidal</td>
</tr>
<tr>
<td></td>
<td>(n = 401)</td>
<td>(n = 312)</td>
</tr>
<tr>
<td>Keep wallet</td>
<td>4.10 2.43 2.79</td>
<td>2.17 3.39 2.16</td>
</tr>
<tr>
<td>Affair</td>
<td>3.56 2.40 2.35</td>
<td>1.85 4.11 2.44</td>
</tr>
<tr>
<td>Plagiarism</td>
<td>3.03 2.12 2.21</td>
<td>1.84 5.32 1.89</td>
</tr>
<tr>
<td>Reveal secret</td>
<td>3.91 2.30 3.26</td>
<td>2.07 4.51 1.98</td>
</tr>
<tr>
<td>Cheat taxes</td>
<td>3.71 2.32 3.29</td>
<td>2.15 4.36 2.02</td>
</tr>
<tr>
<td>Leave children</td>
<td>2.74 2.05 2.38</td>
<td>1.85 4.54 2.32</td>
</tr>
<tr>
<td>home</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note.* \(d\) = Cohen’s \(d\). DOSPERT = Domain Specific Risk Taking (Adult) Scale.

\(*p < .008.**p < .002.***p < .0008 (Bonferroni adjusted, \(\alpha/6\)).
The MANCOVA for the Behavioural Social subscale did not show a statistically significant result, Hotelling’s trace = .02, \( F(6, 704) = 1.94, p = .07 \).

Within the Perception Social subscale, the MANCOVA showed a statistically significant result, Hotelling’s trace = .04, \( F(6, 704) = 4.32, p < .001 \). As the Perception subscale MANCOVA was significant, follow up one-way ANCOVAs were conducted for each of the ethic subscale items, as shown in Table 5. Suicide-risk participants perceived moving to a city far away from their extended family as less risky than did non-suicidal participants, however the low effect size for this item indicates that this should be interpreted with caution. Admitting different tastes to a friend was perceived as more risky by suicide-risk participants.

Table 5

**ANCOVA Comparisons of Suicide-Risk and Non-suicidal Participants on DOSPERT**

**Perception Social Subscale Items**

<table>
<thead>
<tr>
<th></th>
<th>Suicide-risk</th>
<th>Non-suicidal</th>
<th>( M )</th>
<th>( SD )</th>
<th>( M )</th>
<th>( SD )</th>
<th>( F )</th>
<th>( d )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Move away from family</td>
<td>2.47</td>
<td>1.80</td>
<td>2.71</td>
<td>1.61</td>
<td>9.51*</td>
<td>.14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Admit different taste</td>
<td>2.51</td>
<td>1.74</td>
<td>2.02</td>
<td>1.38</td>
<td>8.21*</td>
<td>.31</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Speak mind at work</td>
<td>4.40</td>
<td>1.96</td>
<td>3.93</td>
<td>1.80</td>
<td>4.92</td>
<td>.25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Start new career in 30’s</td>
<td>4.22</td>
<td>2.17</td>
<td>3.59</td>
<td>2.87</td>
<td>3.83</td>
<td>.25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Choose enjoyable career</td>
<td>3.75</td>
<td>2.03</td>
<td>3.43</td>
<td>1.74</td>
<td>1.33</td>
<td>.12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disagree with authority</td>
<td>3.77</td>
<td>2.19</td>
<td>3.71</td>
<td>1.96</td>
<td>0.12</td>
<td>.02</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note. \( d \) = Cohen’s \( d \). DOSPERT = Domain Specific Risk Taking (Adult) Scale.

\*\( p < .008 \). **\( p < .002 \). ***\( p < .0008 \) (Bonferroni adjusted, \( \alpha/6 \)).
The MANCOVA for the Behavioural Recreational subscale showed a statistically significant result Hotelling’s trace = .04, \( F(6, 704) = 4.57, p < .001 \). Follow up one-way ANCOVAs revealed that suicide-risk participants were significantly less likely to report that they would go camping in the wilderness but more likely to report that they would go bungee jumping. There was no difference in risk perception for these items (Table 6).

Table 6

**ANCOVA Comparisons of Suicide-Risk and Non-suicidal Participants on DOSPERT**

*Recreational Subscale Items*

<table>
<thead>
<tr>
<th>Risk Behaviour</th>
<th>Suicide-risk (n = 401)</th>
<th>Non-suicidal (n = 312)</th>
<th>M</th>
<th>SD</th>
<th>M</th>
<th>SD</th>
<th>F</th>
<th>d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Camping</td>
<td>3.43</td>
<td>2.23</td>
<td>4.02</td>
<td>2.25</td>
<td></td>
<td></td>
<td>9.65**</td>
<td>.26</td>
</tr>
<tr>
<td>Bungee jump</td>
<td>4.00</td>
<td>2.23</td>
<td>3.19</td>
<td>2.23</td>
<td></td>
<td></td>
<td>8.90*</td>
<td>.36</td>
</tr>
<tr>
<td>Pilot plane</td>
<td>3.21</td>
<td>2.23</td>
<td>2.78</td>
<td>2.09</td>
<td></td>
<td></td>
<td>2.55</td>
<td>.20</td>
</tr>
<tr>
<td>Skydiving</td>
<td>2.92</td>
<td>2.21</td>
<td>2.92</td>
<td>2.13</td>
<td></td>
<td></td>
<td>&lt; .01</td>
<td></td>
</tr>
<tr>
<td>White-water raft</td>
<td>3.59</td>
<td>2.19</td>
<td>3.55</td>
<td>2.07</td>
<td></td>
<td></td>
<td>0.70</td>
<td>.02</td>
</tr>
<tr>
<td>Ski run</td>
<td>2.43</td>
<td>1.84</td>
<td>2.49</td>
<td>1.91</td>
<td></td>
<td></td>
<td>0.14</td>
<td>.03</td>
</tr>
</tbody>
</table>

*Note. d = Cohen’s d. DOSPERT = Domain Specific Risk Taking (Adult) Scale.*

*\( p < .008 \). **\( p < .002 \). ***\( p < .0008 \) (Bonferroni adjusted, \( \alpha/6 \)).

In accordance with the Theory of Planned Behaviour (Ajzen et al., 2011), further analyses were conducted to investigate which risk behaviours may be more proximal warning signs for suicide. Responses for question 4 of the SBQ-R were separated into low-risk (participants who scored 0-2 on this item) and high-risk
participants (scoring 5-6 on this item). Participants who scored 3-4 were omitted from this analysis in order to better compare low- and high-intent for suicide. A MANCOVA was conducted, comparing risk behaviours of participants who scored low-risk and high-risk in item 4 of the SBQ-R, which showed a statistically significant result Hotelling’s trace = .24, $F(1, 546) = 4.09, p < .001$. Follow up one-way ANCOVAs revealed several behaviours which significantly distinguished the high suicidal intent participants from low intent, as can be seen in Table 7.

Table 7

**ANOVA Comparisons of High and Low Suicide Intent Participants on DOSPERT**

<table>
<thead>
<tr>
<th>Behaviour Items</th>
<th>Suicide-intent</th>
<th>No intent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$(n = 95)$</td>
<td>$(n = 453)$</td>
</tr>
<tr>
<td>Drive without seatbelt</td>
<td>3.11 2.31</td>
<td>2.07 1.72</td>
</tr>
<tr>
<td>Extra marital affair</td>
<td>3.80 2.58</td>
<td>2.63 2.01</td>
</tr>
<tr>
<td>Admit different taste</td>
<td>5.14 2.03</td>
<td>5.86 1.47</td>
</tr>
<tr>
<td>Walk in unsafe area</td>
<td>4.59 2.24</td>
<td>3.67 2.12</td>
</tr>
<tr>
<td>Ride motorcycle without helmet</td>
<td>3.79 2.37</td>
<td>2.83 2.26</td>
</tr>
<tr>
<td>Invest in mutual fund</td>
<td>3.05 2.16</td>
<td>3.73 1.93</td>
</tr>
</tbody>
</table>

Note. $d$ = Cohen’s $d$. DOSPERT = Domain Specific Risk Taking (Adult) Scale.

*p < .0003. **p < .000003. (Bonferroni adjusted, $a/30$). †p < .01 (unadjusted).

**Discussion**

This study’s survey of anonymous internet users produced empirical evidence of previously undocumented risk behaviours as possible risk factors and potential
early warning signs for suicide. As hypothesised, younger people reported being more likely to engage in risky behaviour, and lower levels of education was associated with higher levels of risk-taking. Therefore, additional analyses controlled for those factors when examining risk-taking in relation to suicide-risk status.

Beyond demographic factors, differences were observed in risk behaviours and risk-perceptions between suicide-risk and non-suicidal adults. As hypothesised, suicidal adults reported greater risk-taking behaviours in the health/safety, financial and recreational domains of risk-taking. However, significant differences were found for some, but not all of the risk behaviours. In addition, suicidal participants reported greater likelihood to engage in some ethical risk behaviours. These findings show solid evidence that some risky behaviours are more likely to occur in suicidal adults. Mixed support was found for the theory that suicide-risk people engage in risky behaviours as a gamble with life and death. Not wearing a seatbelt or walking home alone at night in an unsafe area sit well with this theory, however engaging in an extramarital affair and keeping a wallet they found containing $200, do not seem to fit well with the theory. It was thought that the study’s findings would support Schneidman’s theory that the suicidal mind is ambivalent towards life and death, however these findings seem to portray a more complex picture. Nonetheless, these behaviours could make significant additions to the list of suicide risk factors, and more importantly, might become an important part of suicide warning signs. Of course, some of the behavioural and perception differences between suicidal and non-suicidal adults are more important for suicide prevention than others.

Health and Safety Risks

To aid suicide prevention efforts, specific risk behaviours were closely examined. Suicide-risk participants were more likely to report that they would ride in
a car without a seatbelt or on a motorcycle without a helmet, which they viewed as less risky. They were also more likely to report that they would walk home alone in an unsafe area. These findings support the theory that suicidal people are more likely to engage in risky behaviours that put one’s life at risk either as a form of indirect suicide, or a gamble with death for those ambivalent about living or dying. In particular, the finding about riding in a car without a seatbelt supports previous literature that single-car motor vehicle accidents may be disguised suicides (Routley et al., 2003). Riding a motorcycle without a helmet and walking home alone in an unsafe area also align with Schneidman’s theory of ambivalence being a key feature of the suicidal mind (1996). These behaviours were also highlighted as more proximal warning signs among participants who reported being likely to attempt suicide someday. This provides further support for additional research to determine if these behaviours may be considered proximal warning signs for suicide, and to be used by gatekeepers to identify suicidal individuals.

The hypothesis that suicide-risk participants would report that they would be more likely to engage in high-risk health and safety behaviours was not supported. In fact, suicide-risk participants viewed these behaviours as less risky than did non-suicidal participants. This may reflect a fundamental difference in how suicide-risk individuals value their health and safety; a lower perception of risk may indicate lower importance placed on their own health and safety as compared to non-suicidal people. Although open to interpretation, these findings appear to provide further evidence of Schneidman’s (1996) theory on the ambivalent nature of the suicidal mind.

Although no specific hypotheses were made, interesting group differences were found in other items of the health and safety this domain. Suicide-risk
participants were significantly less likely to report that they would drink heavily at a social function. This could be considered more of a social risk than a health and safety risk; it is less life threatening than any of the behaviours that suicide-risk participants reported they would be more likely to engage in. Whilst many suicidal acts occur under the influence of alcohol, these behaviours are usually more private. Further investigation to explore this finding is required to identify whether it is drinking or socialising that is the more informative factor about the suicidal mind.

Given previous research has found a correlation between risky sexual behaviours and suicide in adolescents and non-heterosexual individuals, it was hypothesised that suicide-risk participants would be more likely to report that they would engage in unprotected sex than non-suicidal participants. However, no group differences were found for this item. It is likely that nothing was found in this study as participants were over the age of 18 with a low proportion of non-heterosexual participants.

Further research into other health and safety behaviours that have not been investigated in adult populations is warranted. This could include substance use and abuse (alone or in a social situation), risky sexual behaviours such as going home from a party with a stranger, other risky driving behaviours, swimming or surfing in dangerous waters or engaging in physical fights.

Financial Risks: Gambling

It was hypothesised that suicide-risk participants would report greater likelihood to engage in gambling behaviours than non-suicidal participants. This was confirmed for certain items, with suicide-risk participants reporting that they were more likely to bet a day’s income at a high-stake poker game, which they perceived as less risky than were non-suicidal participants. Suicide-risk participants also perceived
betting a day’s income on the outcome of a sporting event as less risky than did non-suicidal participants. These findings indicate that suicide-risk people may perceive certain gambling behaviours as lower-risk, which is consistent with previous findings that gambling is associated with a risk-accepting attitude (Mishra, Lalumière, & Williams, 2010). These findings support previous research that gambling could be considered a warning sign for suicide, particularly when present with other suicide risk factors (Kim et al., 2006; Stuhldreher, Stuhldreher, & Forrest, 2007).

**Financial Risks: Investments**

Due to a lack of previous research in the area, no hypotheses were made about financial investment behaviours. Results indicated that suicide-risk participants were significantly less likely to report that they would invest 10% of their annual income in a moderate growth mutual fund than non-suicidal participants. This behaviour also emerged as a significant proximal warning sign for participants with suicidal intent when using an uncorrected Bonferroni cut-off. Perhaps suicide-risk individuals are less likely to engage in financial risks with longer-term benefits than behaviours such as gambling, which are have the potential to be immediately gratifying.

**Ethical Risks**

Again, as this researcher could not locate previous research in the area of ethical risk taking as a warning sign for suicide, no hypotheses were made for this domain of risk. Analyses showed that suicide-risk participants were more likely to report engaging in extra marital affairs and passing off someone else’s work as their own, which they also reported perceiving as less risky than did non-suicidal participants. Engaging in extra marital affairs also emerged as a more proximal warning sign through analyses of participants with suicidal intent.
Suicide-risk participants were also significantly more likely to report that they would keep a wallet that they found containing $200, however there was no difference in risk perception between groups for this item. All results had a large effect size, except for keeping a wallet, for which the effect size was moderate, indicating that these findings would be replicable in future studies.

Whilst the theory of risk-taking as indirect suicide does not apply to this domain of risk behaviours, these findings seem to indicate that suicidal people may live less in accordance with common values than do non-suicidal people. This could indicate that suicide-risk people may care less about the consequences of engaging in unethical behaviour, as they believe they may die soon, or that their life could not get worse. When considering the cost-benefit theory of risk-taking (Weber et al., 2002), these findings indicate that suicide-risk people would consider these unethical behaviours as having benefits that are outweighed by the risk of getting caught. For example, engaging in extramarital affairs has been associated with relationship dissatisfaction, prompting individuals to seek intimacy elsewhere (Treas & Giesen, 2000). Relationship dissatisfaction or a recent, major deterioration in relationships (intimate or familial) has been associated with suicide; therefore the benefits of having one’s intimate needs met may, for suicidal people, outweigh the risk of getting caught. The values of fidelity and honesty could be overshadowed by desperation to have one’s psychological needs met, which according to Schneidman (1996), is a commonality of the suicidal mind.

Social Risks

Again, no hypotheses were made for social risks as warning signs for suicide. Results did not show a significant difference between suicide-risk and non-suicidal participants’ likelihood to report that they would engage in social risks, however there
were differences in risk perception. Non-suicidal participants perceived moving to a city far away from their extended family as less risky than did suicidal participants. This could suggest non-suicidal people are more secure in their relationships than non-suicidal people, or that suicidal people may be less willing to abandon their social supports when they are feeling vulnerable.

Suicide-risk participants also perceived admitting that their tastes were different to a friend as more risky than did non-suicidal participants. This likely indicates that suicidal individuals have low confidence and self-esteem, such that they do not feel that they can voice their own opinions to their friends. This is reflective of a depressed mind-state, which is a proximal suicide risk factor (Beautrais, 2000). Looking for behaviours that reflect low confidence could be an important suicide risk-factor for clinicians to be aware of.

**Recreational Risks**

Results revealed that suicide-risk participants were significantly less likely to report that they would go camping in the wilderness but more likely to report that they would go bungee jumping; although they did not perceive these behaviours differently from non-suicidal participants. Findings in this area would support Schneidman’s ambivalence theory that suicidal individuals engage in activities that put one’s life at risk; however of the behaviours measured in the DOSPERT, bungee jumping is perhaps safer than others presented (e.g., skydiving, or going white water rafting in dangerous conditions). These behaviours may be associated more with thrill seeking than suicide. Bungee jumping has emerged as risk factor, which warrants further investigation about how and why suicidal people are more likely to engage in this behaviour.
Strengths and Limitations

There were several strengths and limitations of this study. Most importantly, the study investigated risk-taking behaviours as risk factors or likely warning signs for suicide; however, actual risky behaviours were not measured. Participants were asked to state their likelihood of engaging in the behaviours. In addition, actual behaviours proximal to suicide attempts or completions were not assessed; therefore any interpretations about warning signs must be made with caution.

Additional limitations include a sample bias; the population had a high proportion of females, Caucasians and young adults. The target group for the study was suicide-risk, English speaking Internet users, as well as a comparison group of non-suicidal, English speaking Internet users. When conducting online research through online advertising and snowballing, it is very difficult to obtain a true random sample (Ogletree, Dinger, & Vesley, 2001; Ohberg & Lonnqvist, 1998; Routley et al., 2003). Therefore, these sampling limitations need to be taken into consideration, and future research is required to assess risk-taking and suicide risk in relation to various demographic factors.

The online questionnaire completion rate was lower than ideal, likely due to the length of the survey. There can be important differences between those who do and don’t complete surveys, although such differences may not greatly affect results (Krosnick, 1999). Future researchers should therefore consider a shorter survey length to encourage greater survey completion.

With respect to the measures used within the study, the DOSPERT had too few questions on health risks, which could be considered a limitation as literature shows that health risks are a warning sign for suicide in adolescents (Kraut et al., 2004). However, we used the best available tool to measure a breadth of risk domains.
In addition, this research was considered to be a preliminary study looking at different areas. Further follow-up research may be undertaken to investigate the nuances of health risks and suicide in adults.

Finally, the study did not address impulsivity; research indicates that risk-taking behaviours in adolescents can be related to impulsivity (Gould et al., 2003), and is therefore something that people may not be able to respond to with perfect accuracy in a questionnaire format. Also, impulsivity is a symptom of many mental health disorders, including Borderline Personality Disorder and Bipolar II and II Disorders, which are also associated with high suicide rates (Horvath & Zuckerman, 1993). As the online questionnaire was already lengthy, not all relevant variables could be included and still obtain a reasonable volunteer sample size. Further analyses could investigate relationships between risk-taking and impulsivity in suicide-risk individuals, using a measure such as the Barratt Impulsiveness Scale (American Psychiatric Association, 2000).

The study also had several strengths, bolstering the findings of the research. These included the large sample size, in which the target group of suicide-risk, English speaking, Internet users was well represented. Targeted online recruitment proved to be an effective method of accessing this stigmatised group, who may have been difficult or impossible to access through other channels. Research has shown that people within stigmatised groups, such as suicidal people, prefer anonymity and are more likely to disclose sensitive information in a de-identified format (Joinson, 1999). In addition, previous research suggests that responding to questions about suicide have positive therapeutic outcomes for suicide-risk or depressed people, including a decline in distress and suicidal ideation (Gould, Marrocco, Kleinman, Thomas, Mostkoff, Cote & Davies, 2005; Reynolds, Lindenboim, Comtois, Murray,
& Linehan, 2006). A further advantage of this study was the use of standardised scales to measure suicide-risk and risk-taking behaviours and perceptions. It is important to utilise standardised measures of suicide risk to make more accurate attributions.

**Conclusions**

This study yielded interesting findings about suicide risk and risk-taking behaviours. Analyses differentiating participants with suicidal intent from those without intent identified four behaviours as possible risk factors for suicide, which future research could assess for additional evidence as proximal warning signs. High suicide-risk participants reported greater likelihood to: drive a car without wearing a seatbelt, walk home alone in an unsafe area at night, and engage in extra-marital affairs. They reported lower likelihood to admit their tastes are different from a friend. Strong evidence was also found to suggest that suicidal people might be more likely to ride a motorcycle without a helmet, or invest 10% of their annual income in a moderate growth mutual fund.

The implications of these findings are far-reaching in terms of their clinical utility. With substantiating evidence, clinicians and gatekeepers could be alerted to a new range of warning signs to indicate a proximal suicide risk in individuals with identified risk factors and an absence of protective factors. Therefore, this author proposes research, for example utilising the psychological autopsy approach and hospital data (Schneidman, 1969; Wong et al., 2008), to determine if suicide victims engaged in any specific risky behaviours soon before their deaths. Informants could be asked about the risky behaviours identified through this study, and additional behaviours, to test for new warning sings.
Definite differences in risk behaviours between suicide-risk and non-suicidal adults were found, indicating that risk-taking is an important risk factor for suicide beyond adolescence. These differences are broader and more complex than simply putting one’s life at risk. Warning signs provide some of our best opportunities to prevent suicide and treat suicidal people. The findings of this study, and in conjunction with follow-up research, will help practitioners and other gatekeepers save and improve lives. Suicidal people are communicating their life-death ambivalence to others around them; we just need to know better what to look for.
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EXPLORING RISK-TAKING BEHAVIOURS


Appendix A

Author Guidelines for the Journal of Consulting and Clinical Psychology

Source: http://www.apa.org/pubs/journals/ccp/

Scope

The Journal of Consulting and Clinical Psychology® (JCCP) publishes original contributions on the following topics:

- the development, validity, and use of techniques of diagnosis and treatment of disordered behavior;
- studies of a variety of populations that have clinical interest, including but not limited to medical patients, ethnic minorities, persons with serious mental illness, and community samples;
- studies that have a cross-cultural or demographic focus and are of interest for treating behavior disorders;
- studies of personality and of its assessment and development where these have a clear bearing on problems of clinical dysfunction and treatment;
- studies of gender, ethnicity, or sexual orientation that have a clear bearing on diagnosis, assessment, and treatment;
- studies of psychosocial aspects of health behaviors; and
- methodologically sound case studies pertinent to the preceding topics.

Studies that focus on populations that fall anywhere within the lifespan are considered. JCCP welcomes submissions on treatment and prevention in all areas of clinical and clinical–health psychology and especially on topics that appeal to a broad clinical–scientist and practitioner audience. JCCP encourages the submission of theory–based interventions, studies that investigate mechanisms of change, and studies of the effectiveness of treatments in real-world settings. Studies on the following topics will be considered if they have clear implications for clinical research and practice:

- epidemiology;
- use of psychological services;
- health care economics for behavioral disorders;
- theoretical papers;
- critical analyses and meta-analyses of treatment approaches on topics of broad theoretical, methodological, or practical interest to the field of clinical psychology.

JCCP does not consider manuscripts dealing with the etiology or descriptive pathology of abnormal behavior (which are more appropriate for the Journal of Abnormal Psychology). Similarly, the journal does not consider articles focusing primarily on assessment, measurement, and diagnostic procedures and concepts (which are more appropriate for Psychological Assessment). Editors reserve the right to determine the most appropriate location of a manuscript.

Length and Style of Manuscripts

Full-length manuscripts should not exceed 35 pages total (including cover page, abstract, text, references, tables, and figures), with margins of at least 1 inch on all sides and a standard font (e.g., Times New Roman) of 12 points (no smaller). The entire paper (text, references, tables, etc.) must be double spaced.

Authors submitting manuscripts that report new data collection, especially randomized clinical trials (RCTs), should comply with the newly developed APA Journal Article Reporting Standards (PDF, 98KB) (JARS; see American Psychologist, 2008, 63, 839–851 or Appendix in the APA Publication Manual).

For papers that exceed 35 pages, authors must justify the extended length in their cover letter (e.g., reporting of multiple studies), and in no case should the paper exceed 45 pages total. Papers that do not conform to these guidelines may be returned without review.

The References section should immediately follow a page break.

**Title of Manuscript**
The title of a manuscript should be accurate, fully explanatory, and preferably no longer than 12 words. The title should reflect the content and population studied (e.g., "treatment of generalized anxiety disorders in adults").

If the paper reports a randomized clinical trial (RCT), this should be indicated in the title. Note that JARS criteria must be used for reporting purposes.

**Abstract and Keywords**
Starting in 2010, all manuscripts published in the Journal of Consulting and Clinical Psychology will include a structured abstract of up to 250 words.

For studies that report randomized clinical trials or meta-analyses, the abstract also must be consistent with the guidelines set forth by JARS or MARS (Meta-Analysis Reporting Standards) guidelines, respectively. Thus, in preparing a manuscript, please ensure that it is consistent with the guidelines stated below.

Please include an Abstract of up to 250 words, presented in paragraph form. The Abstract should be typed on a separate page (page 2 of the manuscript), and must include each of the following sections:

- **Objective:** A brief statement of the purpose of the study
- **Method:** A detailed summary of the participants (N, age, gender, ethnicity) as well as descriptions of the study design, measures (including names of measures), and procedures
- **Results:** A detailed summary of the primary findings that clearly articulate comparison groups (if relevant), and that indicate significance or confidence intervals for the main findings
- **Conclusions:** A description of the research and clinical implications of the findings

After the abstract, please supply up to five keywords or short phrases.

**Participants: Description and Informed Consent**
The Method section of each empirical report must contain a detailed description of the study participants, including (but not limited to) the following: age, gender, ethnicity, SES, clinical diagnoses and comorbidities (as appropriate), and any other relevant demographics.

In the Discussion section of the manuscript, authors should discuss the diversity of their study samples and the generalizability of their findings.

The Method section also must include a statement describing how informed consent was obtained from the participants (or their parents/guardians) and indicate that the study was conducted in compliance with an appropriate Internal Review Board.

**Measures**
The Method section of empirical reports must contain a sufficiently detailed description of the measures used so that the reader understands the item content, scoring procedures, and total scores or subscales. Evidence of reliability and validity with similar populations should be provided.

**Statistical Reporting of Clinical Significance**
*JCCP* requires the statistical reporting of measures that convey clinical significance. Authors should report means and standard deviations for all continuous study variables and the effect sizes for the primary study findings. (If effect sizes are not available for a particular test, authors should convey this in their cover letter at the time of submission.)


In addition, when reporting the results of interventions, authors should include indicators of clinically significant change. Authors may use one of several approaches that have been recommended for capturing clinical significance, including (but not limited to) the reliable change index (i.e., whether the amount of change displayed by a treated individual is large enough to be meaningful; see Jacobson et


**Discussion of Clinical Implications**

Articles must include a discussion of the clinical implications of the study findings or analytic review. The Discussion section should contain a clear statement of the extent of clinical application of the current assessment, prevention, or treatment methods. The extent of application to clinical practice may range from suggestions that the data are too preliminary to support widespread dissemination to descriptions of existing manuals available from the authors or archived materials that would allow full implementation at present.

**Manuscript Preparation**

Prepare manuscripts according to the *Publication Manual of the American Psychological Association* (6th edition). Manuscripts may be copyedited for bias-free language (see Chapter 3 of the *Publication Manual*).

Review APA’s Checklist for Manuscript Submission before submitting your article. Double-space all copy. Other formatting instructions, as well as instructions on preparing tables, figures, references, metrics, and abstracts, appear in the *Manual*. 
Appendix B

The Domain Specific Risk-taking (Adult) Scale (DOSPERT)

DOSPERT Risk-Taking Scale

For each of the following statements, please indicate the likelihood that you would engage in the described activity or behaviour if you were to find yourself in that situation (1 = Extremely Unlikely; 2 = Moderately Unlikely; 3 = Somewhat Unlikely; 4 = Not Sure; 5 = Somewhat Likely; 6 = Moderately Likely; 7 = Extremely Likely).

1. Admitting that your tastes are different from those of a friend
2. Going camping in the wilderness
3. Betting a day's income at the horse races
4. Investing 10% of your annual income in a moderate growth mutual fund
5. Drinking heavily at a social function
6. Taking some questionable deductions on your income tax return
7. Disagreeing with an authority figure on a major issue
8. Betting a day's income at a high-stake poker game
9. Having an affair with a married man/woman
10. Passing off somebody else's work as your own
11. Going down a ski run that is beyond your ability
12. Investing 5% of your annual income in a very speculative stock
13. Going whitewater rafting at high water in the spring
14. Betting a day's income on the outcome of a sporting event
15. Engaging in unprotected sex
16. Revealing a friend's secret to someone else
17. Driving a car without wearing a seatbelt
18. Investing 10% of your annual income in a new business venture
19. Taking a skydiving class
20. Riding a motorcycle without a helmet
21. Choosing a career that you truly enjoy over a more secure one
22. Speaking your mind about an unpopular issue in a meeting at work
23. Sunbathing without sunscreen
24. Bungee jumping off a tall bridge
25. Piloting a small plane
26. Moving to a city far away from your extended family
27. Walking home at night in an unsafe area of town
28. Starting a new career in your mid-thirties
29. Leaving your young children alone at home while running an errand
30. Not returning a wallet you found that contains $200
DOSPERT Risk-Perception Scale

People often see some risk in situations that contain uncertainty about what the outcome or consequences will be and for which there is the possibility of negative consequences. However, riskiness is a very personal and intuitive notion, and we are interested in your gut level assessment of how risky each situation or behaviour is.

For each of the following statements, please indicate how risky you perceive each situation (1 = Not at all Risky; 2 = Slightly Risky; 3 = Somewhat Risky; 4 = Moderately Risky; 5 = Risky; 6 = Very Risky; 7 = Extremely Risky).

1. Admitting that your tastes are different from those of a friend
2. Going camping in the wilderness
3. Betting a day's income at the horse races
4. Investing 10% of your annual income in a moderate growth mutual fund
5. Drinking heavily at a social function
6. Taking some questionable deductions on your income tax return
7. Disagreeing with an authority figure on a major issue
8. Betting a day's income at a high-stake poker game
9. Having an affair with a married man/woman
10. Passing off somebody else's work as your own
11. Going down a ski run that is beyond your ability
12. Investing 5% of your annual income in a very speculative stock
13. Going whitewater rafting at high water in the spring
14. Betting a day's income on the outcome of a sporting event
15. Engaging in unprotected sex
16. Revealing a friend's secret to someone else
17. Driving a car without wearing a seatbelt
18. Investing 10% of your annual income in a new business venture
19. Taking a skydiving class
20. Riding a motorcycle without a helmet
21. Choosing a career that you truly enjoy over a more secure one
22. Speaking your mind about an unpopular issue in a meeting at work
23. Sunbathing without sunscreen
24. Bungee jumping off a tall bridge
25. Piloting a small plane
26. Moving to a city far away from your extended family
27. Walking home at night in an unsafe area of town
28. Starting a new career in your mid-thirties
29. Leaving your young children alone at home while running an errand
30. Not returning a wallet you found that contains $200
Appendix C

The Suicide Behaviors Questionnaire-Revised (SBQ-R)

1. Have you ever thought about or attempted to kill yourself?
   1 = Never
   2 = It was just a brief passing thought
   3 = I have had a plan at least once to kill myself but did not try to do it
   4 = I have had a plan at least once to kill myself and really wanted to die
   5 = I have attempted to kill myself, but did not want to die
   6 = I have attempted to kill myself, and really hoped to die

2. How often have you thought about killing yourself in the past year?
   1 = Never
   2 = Rarely (1 time)
   3 = Sometimes (2 times)
   4 = Often (3-4 times)
   5 = Very Often (5 or more times)

3. Have you ever told someone that you were going to commit suicide, or that you might do it?
   1 = No
   2 = Yes, at one time, but did not really want to die
   3 = Yes, at one time, and really wanted to do it
   4 = Yes, more than once, but did not want to do it
   5 = Yes, more than once, and really wanted to do it

4. How likely is it that you will attempt suicide someday
   1 = Never; 7 = Very Likely
### Appendix D

**DOSPERT Subscale Descriptive Statistics and Cronbach’s Alpha’s**

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<tr>
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*Note. α = Cronbach’s α. DOSPERT = Domain Specific Risk Taking (Adult) Scale.*