

Meaning in life moderates the relationship between social connectedness and hopelessness

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Suicide is one of the leading causes of death worldwide. Men are significantly more likely to commit suicide yet are an understudied population in suicide research. Hopelessness has repeatedly been shown to be one of the strongest predictors of suicide ideation, attempt, and completion. Meaning in life and social connectedness have been shown to be inverse associates of hopelessness. In a sample of $n = 398$ males living in Aotearoa, New Zealand between the ages of 18-30, this study examined the relationship between social connectedness, meaning in life, and hopelessness. Meaning in life and social connectedness were hypothesized to be negatively associated with hopelessness and that the relationship between social connectedness and hopelessness would vary across different levels of meaning in life. Results revealed that meaning in life and social connectedness were negatively associated with hopelessness. Meaning in life moderated the relationship between social connectedness and hopelessness such that the effect meaning in life exerted on hopelessness was strongest when social connectedness was low.

Key words: *Suicide, Hopelessness, Meaning in life, Social connection, Young males*

INTRODUCTION

Globally, each year over 700,000 individuals die by suicide (World Health Organisation, 2019). Despite a small reduction in the global suicide rate across the 21st century, suicide remains a leading cause of preventable death (United Nations, 2019; World Health Organisation, 2014). In Aotearoa, New Zealand the suicide rate has increased by 6% in the past decade and the number of deaths caused by suicide has risen by 21% (Office of the Chief Coroner of New Zealand, 2020). Effective responses to this crisis require the identification of both risk and protective factors for suicide and an understanding of how these factors can be targeted to promote better outcomes (World Health Organisation, 2014). Past research has identified a number of psychological, neurobiological, psychosocial, social, and demographic risk factors for suicidal behaviour including major depression, impulsivity, dysregulated serotonin systems, historical abuse and unemployment (for reviews see O'Connor et al., 2023; Turecki et al., 2019).

Hopelessness has been repeatedly shown to be a robust predictor of suicidal behaviour, which consists of suicidal ideation, intent, attempt and completion (Beck et al., 1990; Ribeiro et al., 2018; Weishaar & Beck, 1992; Wetzell et al., 1980). A recent meta-analysis of 365 studies occurring over the last 50 years found that hopelessness was the second leading predictor of suicidal ideation (Franklin et al., 2017). Hopelessness has been shown to be both a proximal and distal predictor of suicidal behaviour (Beck et al., 1990; Ribeiro et al., 2018; Rudd et al., 2006) and the association between hopelessness and suicidal behaviour has been observed in children, adolescents, and adults and in both clinical and non-clinical populations (Beck et al., 1985; Nock & Kazdin, 2002; Sueki, 2020; Thompson et al., 2005). Given congruent empirical evidence, hopelessness has been included in several

causal models of suicide including the Interpersonal Theory of Suicide (Van Orden et al., 2010), the Hopelessness Theory of Suicidality (Abramson et al., 2002), the Cognitive Model of Suicidal Behaviour (Wenzel & Beck, 2008), and the Three-Step Theory of suicide (Klonsky & May, 2015).

Hopelessness can be defined as a cognitive orientation characterized by the presence of negative expectancies and the absence of positive expectancies regarding the self, the future, and the world (Beck et al., 1974; Becker-Weidman et al., 2009). Hopelessness develops when individuals experience negative events which influence the formation of cognitive expectancies (Morselli, 2016). Hopelessness is reinforced as further negative events occur which support hopelessness related cognitions, resulting in perceptions of negative events as unrelenting and uncontrollable (Morselli, 2016). These processes are associated with increasing feelings of helplessness and thoughts of giving up on goals and hopes for the future (Marchetti, 2018; Marchetti et al., 2019).

Predictors of hopelessness include negative internal attributional style, a strong desire to be liked by others, social problem-solving orientation, emotional abuse in childhood and decreased future orientation (Becker-Weidman et al., 2009; Gibb et al., 2001; Mac Giollabhui et al., 2018; Marchetti et al., 2019). Contextual factors such as socioeconomic conditions and emotional contexts are also an important component in predicting hopelessness (Morselli, 2016). Further, relationship status and employment have been tied to hopelessness, with an increased risk of stable hopelessness being found in unemployed, unmarried men (Haatainen et al., 2003).

The Expanded Hopelessness Theory of Depression posits that loneliness and reduced social support increase the likelihood of negative social events which lead to hopelessness (Panzarella et al., 2006). Relatedly,

supportive social factors such as relationships and community contexts buffer against the adverse impact of known risk factors (Beautrais et al., 2005). In addition, several known protective factors for hopelessness operate on an individuals' social context. For example, O'Connor and Pirkis (2016) report that relationship status and employment are protective against hopelessness through fostering social connection and belonging.

Social Connectedness

Social connectedness can be understood as the degree of closeness an individual perceives between themselves and their social world (Lee & Robbins, 2000). Social connectedness is considered a core facet of belonging, and the terms belonging and social connectedness are often used interchangeably (Bel et al., 2009).

Social connectedness (SC) has been shown to be negatively correlated with suicidal ideation (Arango et al., 2018; Reyes et al., 2020). The role of social connectedness in hopelessness has been explored empirically, though mostly through the lens of risk related to low connectedness. For example, Eraslan-Capan (2016) found that university students with low levels of social connectedness were more likely to be hopeless, which resulted in low flourishing. Similarly, social connectedness has been found to be an inverse determinant of hopelessness (Bolland, 2005; Choudhary et al., 2021). Relatedly, McCay et al. (2011) reported that a relationship-based intervention for homeless adolescents and young-adults significantly increased social connectedness with relative reductions in reported hopelessness.

Meaning in Life

Meaning in life (MIL) is the extent to which an individual perceives their existence makes sense, has purpose, and holds significance (George & Park, 2016; Martela & Steger, 2016). Individuals have been shown to create meaning through various processes such as social connection and involvement, religion, and personal performance (Zhang et al., 2018).

Meaning in life is associated with physical and psychological wellbeing, perceived freedom, optimism regarding oneself and future goals, coping, self-realization, life satisfaction, and autonomy (García-Alandete et al., 2014; Lambert et al., 2013). Individuals with high MIL are equipped to successfully navigate negative events, which may buffer against the formation of negative cognitions that lead to hopelessness (García-Alandete, 2014). Conversely, low MIL has been associated with adverse outcomes such as psychopathology and reduced psychosocial functioning (Dezutter et al., 2014; Kleftaras & Psarra, 2012). Suicidal ideation and suicide have also been associated with low MIL (Costanza et al., 2019). There is a growing literature on the relationship between MIL and hopelessness. Meaning in life was found to be a significant, negative predictor of hopelessness in individuals diagnosed with Borderline Personality Disorder (García-Alandete et al., 2014; Marco et al., 2016) and has been prospectively associated with decreased hopelessness in depressed US veterans (Braden, 2017). Further, among individuals diagnosed with a depressive disorder, meaning in life was found to mediate the relationship between hopelessness

and depression (Sun et al., 2016). As such, more research is needed to understand the role of meaning in life in buffering against hopelessness in both clinical and non-clinical populations.

Social Connectedness and Meaning in Life

Not surprisingly, social connectedness and meaning in life are related to one another (Stavrova & Luhmann, 2015). Empirical work suggests that a sense of belonging predicts meaning in life (Lambert, 2013). Additionally, when individuals are asked to consider what constitutes meaning in life, most refer to social relationships (Stillman & Lambert, 2013).

Relatively recent studies have demonstrated that the relationship between social connectedness and meaning in life is bidirectional (Stavrova and Luhmann, 2015). Across three studies comprised of young adults, Zhang et al (2018) found that the degree of social connectedness was related to the likelihood of using social connectedness as a primary source of meaning (Zhang et al., 2018). As individuals perceive the most accessible and affirming sources as the most important to them, those that are socially connected are more likely to base their sense of meaning on social connection. Further, Zhang and colleagues (2018) found social exclusion decreased both meaning in life and the importance individuals ascribed to social connectedness as a source of meaning. These findings suggest a compensatory process may be at work. Specifically, Zhang et al. (2018) demonstrated that socially excluded participants shifted from utilizing social connectedness to affirm meaning to using sense of autonomy. While there is no work to date that examines how social connectedness and meaning in life interact in relation to hopelessness, the work reviewed above suggests that meaning might moderate the relationship between social connectedness and hopelessness.

The present study

Worldwide, suicide is the second-leading cause of mortality for individuals aged 15 to 29 (World Health Organisation, 2019). Research indicates that young adults between 18-30 years old are particularly vulnerable to life stressors, and a critical period in which to study hopelessness (Medley, 2019).

The male-female ratio for suicide deaths is disproportionate, with up to three times as many males completing suicide relative to females globally (World Health Organisation, 2019). In 2019, 69% of individuals who died by suicide worldwide were men, with 15% of all suicides being men aged between 15 and 29 years old (Global Burden of Disease Collaborative Network, 2020). In Aotearoa, 72% of deaths by suicide in 2019-2020 were males, and 21% were males under the age 30 (Office of the Chief Coroner of New Zealand, 2020).

Despite being over-represented in these statistics, young adult males are often 'invisible' when it comes to their mental health, due in part to men's mental health having been under-researched, particularly when it comes to the way men approach interpersonal connection (McKenzie et al., 2018). While evidence is mixed, of the extant literature, several studies have found that, relative to females, males are more likely to experience hopelessness (Girgin, 2009; Bolland, 2005; Özmen, 2009), with one study finding that daily stress is a particularly salient

predictor of hopelessness in young men (Rodríguez-Naranjo & Caño, 2016).

The current study endeavoured to better understand the relationship between meaning in life, social connectedness and hopelessness in a sample of young-adult males living in Aotearoa, New Zealand. Based on the above evidence, we hypothesized that meaning and social connectedness would be significant, negative predictors of hopelessness (Hypothesis 1). We also expected that the relationship between social connectedness and hopelessness would be moderated by meaning in life (Hypothesis 2). Specifically, we expected that meaning in life would be most effective in reducing hopelessness in individuals with low social connectedness. At high levels of connectedness, meaning may not contribute a notable additive effect given that social connectedness would likely be a primary source of meaning in life. However, at low levels of social connectedness, alternate sources of meaning may be utilized by individuals to reaffirm meaning in life, facilitating its buffering effect on hopelessness.

METHOD

Participants

This study is part of a larger cross-sectional study measuring risk and protective factors associated with wellbeing in young adult males living in Aotearoa, New Zealand. Recruitment took place between December 2019 and April 2020. Participants were 440 individuals who self-identified as male, aged between 18-30 years old. The mean age was 23 ($M = 22.74$, $SD = 3.46$). Of the 440 participants, 398 completed all measures of interest for the current study.

Measures

The Beck Hopelessness Scale is considered a gold standard in suicide research (Kliem et al., 2018). This measure includes 20 true-false items (e.g. “*my future seems dark to me*”) which assess hopelessness through self-report of negative feelings about the future, loss of motivation and negative future expectations (Beck et al., 1974). The total hopelessness score is represented by the sum of scores across items, ranging from 0 to 20, where higher scores reflect greater hopelessness (Beck et al., 1974). Widely accepted norms for this measure suggest that scores between 0 and 3 signify a normal level of hopelessness, scores between 4 and 8 signify mild hopelessness, scores from 9 to 14 signify moderate hopelessness and scores over 14 signify severe hopelessness (Beck & Robert, 1993).

Meaning in life was measured using the Meaning in Life Questionnaire (MLQ), which measures the perceived presence of and search for meaning in life (Steger et al., 2006). Individuals were responded to 10 items (e.g. “*I understand my life’s meaning*”) on a 7-point Likert Scale from 1 (absolutely untrue) to 7 (absolutely true) (Steger et al., 2006). Higher scores indicated stronger MIL.

Social Connectedness was measured using the Social Connectedness Scale (SCS). Developed by Lee and Robbins (1995), the SCS assesses the extent to which the individual perceives interpersonal, emotional distance between themselves and their social world and difficulty in maintaining a sense of closeness (Lee & Robbins, 1995, 2000). The scale is comprised of eight items (e.g. “*I feel*

so distant from people”) measured on a 6-point Likert-type scale from (1 = strongly agree to 6= strongly disagree) so that higher scores signify a stronger sense of belonging (Lee & Robbins, 1995).

Procedure

The questionnaire was hosted on Qualtrics, with participants from across Aotearoa, New Zealand accessing the questionnaire via a secure online link or QR code provided on advertisements. Before engaging in the questionnaire, participants read information about the study and electronically signed a consent form. Participants were provided with the opportunity to opt-in to a draw to win one of eight gift vouchers to be randomly selected at the conclusion of the study. Once the individual consented to participate, they were taken to a separate webpage to complete the questionnaire. The questionnaire took approximately 20 minutes to complete. A resource sheet was provided at the end of the questionnaire which outlined national helplines and resources.

Descriptive statistics were computed on relevant demographic and study variables. A Pearson product-moment correlation was constructed as an initial examination of the relationships between variables. A hierarchical linear regression, regressing hopelessness on social connectedness and then meaning in life was conducted, testing the hypothesis that both factors predicted BHS scores. An interaction term was created (SCSxMLQ) to examine meaning as a potential moderator of the relationship between connectedness and hopelessness. Age was included as a covariate and all predictor variables were mean-centred. Data were analysed using IBM SPSS Statistics version 25.0. ModGraph-I (Jose, 2013) was used to illustrate the results of the moderation analysis and perform calculations of simple slopes. Simple slopes analyses followed the process outlined by Aiken et al. (1991).

The current study was reviewed and approved by the Human Ethics Committee at the University of Canterbury (HEC 2019/69).

RESULTS

Descriptive statistics

Frequency analyses revealed that participants were normally distributed across the 18-30 age range. The majority of participants identified as urban ($n = 333$, 76%), single ($n = 250$, 57%), NZ European (88%; 9% Maori) with at least some tertiary credit ($n = 243$, 55%) and employed at least part time (93%).

In this sample of young adult males, 69% ($n = 303$) reported never having received a mental health diagnosis. The average hopelessness score was 5.90 ($SD = 5.17$) which falls within the mild category according to BHS normative data. Frequency analysis revealed that approximately three-quarters (74%) of the sample reported normal to mild levels of hopelessness (< 8), while the remaining 26% displayed moderate to severe hopelessness (≥ 9).

Results of the bivariate correlation revealed that social connectedness ($r = -.58$) and meaning in life ($r = -.43$)

Table 1. *Hierarchical Linear Regression Coefficients*

Block	IV	β	t	p	95% CI
1	Age	-.02	-.27	.79	-.14, .11
	SCS	-.26	-14.13	<.001	-.29, -.22
2	Age	-.01	-.08	.94	-.12, .11
	SCS	-.23	-13.08	<.001	-.26, -.19
3	MLQ	-.17	-8.27	<.001	-.21, -.13
	Age	-.02	-.36	.72	-.13, .09
	SCS	-.23	-13.24	<.001	-.26, -.20
	MLQ	-.17	-8.07	<.001	-.21, -.13
	SCSxMLQ	.01	2.72	<.01	.00, .01

Note: β (beta coefficients) and SE (standard error) are unstandardized. CI = Confidence Intervals, IV = Independent Variables, SC= Social Connectedness, MIL= Meaning in Life, SCxMIL= Social Connectedness and Meaning in Life Interaction

Table 2. *Simple slopes for Meaning in Life (MIL) as a Moderator of the Relationship Between Social Connectedness and Hopelessness*

Level of MIL	B	SE	t	p
Low MIL	-0.27	0.02	-11.66	<.001
Medium MIL	-0.23	0.02	-13.26	<.001
High MIL	-0.18	0.02	-7.66	<.001

Note: MIL = Meaning in Life

were significantly associated with hopelessness with Pearson coefficients indicating moderate inverse relationships. A small significant association was seen between SCS and MLQ scores ($r = .22$).

Regression analysis

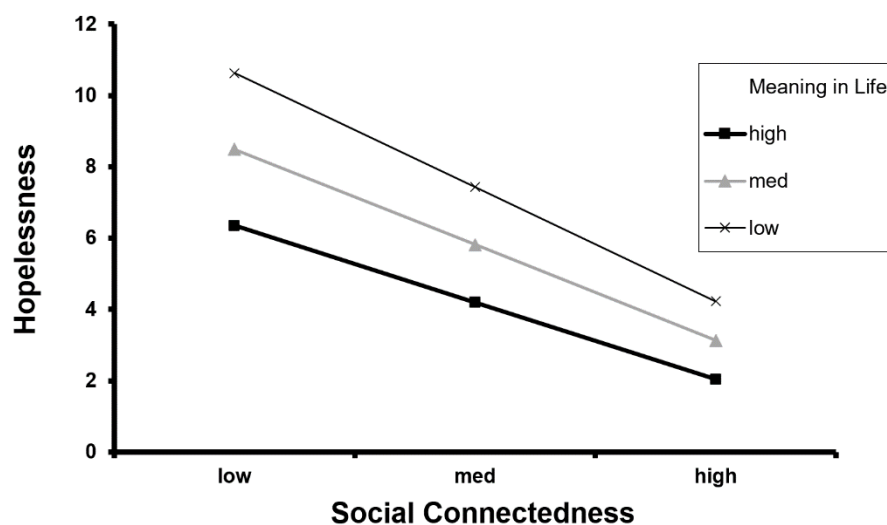
A hierarchical linear regression was conducted to further examine the relationship between social connectedness, meaning in life, and hopelessness. Results revealed that Block 1 was significant and explained 34% of variance in hopelessness, $R^2 = .34$, $F(2, 395) = 100.09$, $p < .001$. As shown in Table 1, social connectedness, but not age, was a significant, inverse predictor of hopelessness within this model. Block 2 was also significant and explained 44% of variance in hopelessness, $R^2 = .44$, $F(3, 394) = 100.94$, $p < .001$. Further, the increase in explained variance was found to be significant, $\Delta R^2 = .10$, $F(1, 395) = 68.72$, $p < .001$, such that MIL accounted for variance in hopelessness over and above social connectedness (See Table 1).

The MLQ x SCS interaction term was included in Block 3 to examine the relationship between meaning in life and

social connectedness as related to hopelessness. This block explained 45% of variance in hopelessness, $R^2 = .45$, $F(4, 394) = 78.84$, $p < .001$. Further, Block 3 was significantly more predictive than Block 2, $\Delta R^2 = .01$, $F(1, 394) = 7.41$, $p = .007$, indicating that the moderation effect was significant after controlling for SCS and MLQ as significant, independent predictors.

Figure 1 illustrates the moderation of meaning in life on the effect of social connectedness on hopelessness. Analysis of simple slopes revealed a significant negative relationship between connectedness and hopelessness across levels of meaning in life, as each slope was found to be significantly different from zero. Examination of standardized beta weights seen in Table 2 and consideration of relative slope differences seen in Figure 1, indicate revealed that the inverse association between social connectedness and hopelessness were most apparent when meaning in life was low. Further, when social connectedness was low, high meaning in life was associated with lower levels of hopelessness.

Figure 1. Moderation of the Effect of Social Connectedness on Hopelessness by Meaning in Life



DISCUSSION

The current study examined the relationship between meaning in life and social connectedness and their association with hopelessness in young-adult males. The primary aim of this research was to examine these relations given the robust association between hopelessness and suicidal behaviour. Additionally, young adult men are a cohort both understudied and at heightened risk of suicide. Based on the current literature, we expected that meaning in life and social connectedness would have significant, inverse associations with hopelessness, and that meaning in life would moderate this relationship. Results supported these hypotheses and simple slopes analysis indicated that the association between connectedness and hopelessness was significant across all levels of meaning in life.

The average level of hopelessness in this study (mild hopelessness) is in line with previous literature on non-clinical populations (Chioqueta & Stiles, 2007; Kocalevent et al., 2017). However, it is notable that moderate-to-severe ratings were approximately twice as high as rates seen in previous studies with Spanish university student and American adult samples (Mair, 2012; Viñas, 2004). Such elevated rates of clinically significant hopelessness among this at-risk sample is a concern and may reflect the current difficulties in mental health shown to exist in Aotearoa, New Zealand (Every-Palmer et al., 2022; Mulder et al., 2022).

To our knowledge, there is no work to date examining both social connectedness and meaning in life in relation to hopelessness. Regression analyses revealed that the hypothesized inverse relationship between social connectedness and hopelessness remained significant when meaning in life was introduced to the model. As shown in the previous literature and reflected in the change in the SC beta with the introduction of MIL, there is some shared variance between these factors. However, in the current study, and supported by the small association seen in the correlation analysis, SC and MIL

are independent factors, both inversely related with hopelessness.

This study also sought to examine meaning in life as a moderator of the relation between connectedness and hopelessness. Inclusion of the interaction term in the third block of the model resulted in significant associations for all included variables. Not surprisingly, analysis of simple slopes revealed that that hopelessness was lowest when both meaning in life and social connectedness were high and highest when both factors were low. Examination of simple slopes further revealed that meaning in life differences

were most apparent when connectedness was low. Notably, when social connectedness was low, high meaning in life was associated with low levels of hopelessness (See Figure 1). In the instance of low connectedness, meaning is likely sourced from other domains (e.g. faith or work performance) as posited by Zhang et al (2018).

Our findings have broad implications for positive psychology, the study of hopelessness and suicidology, and for literature focused on young-adult males. This study has highlighted the importance of both social connectedness and meaning in life in relation to hopelessness and adds distinct value to the emerging resiliency literature in the study of hopelessness. This work is the first known study that has examined the interaction between established factors associated with hopelessness, providing a more nuanced understanding of the construct. For the field of suicidology, results demonstrate the value in contextualizing key predictors of suicide, with the overarching aim of being able to intervene to prevent suicide and at an earlier stage, where interventions may be better able to target hopelessness.

Real-world Applications

The Government Inquiry into Mental Health and Addiction, (2018) has recommended a 20% reduction in suicide rates by 2030. Similarly, the United Nations have called for a worldwide reduction of non-communicable diseases (including suicide) of one-third by 2030 (United Nations, 2015). Reaching these goals necessitates the application of novel evidence-based intervention that target suicide antecedents. While there are a number of evidence-based cognitive and behavioural interventions designed to address moderate and severe depression, targeting hopelessness in interventions has largely been unsystematic (for review, see Marchetti, 2023).

The practice of suicide prevention may benefit from deeper consideration of interventions that build resiliency against key predictors of suicidal ideation, attempt and completion, such as hopelessness. Work in this area is

growing and shows promise. For example, increasing social connectedness among older individuals has been shown to reduce hopelessness (Choudhary et al., 2021) and McCay et al. (2011) found that a relationship-based group intervention improved social connectedness and reduced hopelessness among a group of homeless late adolescents/young adults. Therapeutic interventions have been shown to raise meaning in life and reduce hopelessness. For example, Brietbart and Heller (2003) developed a meaning-centred psychotherapy to reduce feelings of hopelessness and increase meaning among terminally ill patients and recently, Sun et al. (2022) found that logotherapy helped reduce feelings of hopelessness and increase a sense of meaning among individuals with depression. Currently, there are no interventions specifically targeting meaning in life to reduce hopelessness. However, a recent meta-analysis reported overall moderate effects across a variety of interventions targeting increased meaning (Manco et al., 2021) and Luz et al. (2017) found that a six-week intervention targeting meaning in life resulted in increased positive affect and decreased negative affect. As such, future research examining how these factors may be increased to reduce hopelessness may provide a foundation for the development of interventions targeting a salient predictor of suicidal behaviour.

Beyond interventions by mental health practitioners, business, social groups and individuals can promote the emerging idea of “the social cure”, which emphasizes that identity and behaviour is influenced deeply by group membership and social connectedness which are vital to general wellbeing (Jetten et al., 2017). Groups that are free of stigma, promote healthy norms and provide social support can increase social connectedness, meaning in life and myriad other positive outcomes (Jetten et al., 2017). Initiatives like ‘Surfing for Farmers’ (Star News, 2020), Menz Sheds New Zealand (Holden, 2020) and the weekly “yarnologist/peer support appointments” at Benny’s Barber Shop (Northcott 2019) are several examples of social groups that engage young-adult men in Aotearoa in activities and conversations about mental wellbeing, and foster meaning in life through social connection.

This study is not without limitations and caution should be taken when interpreting findings. Given that this was a sample recruited from the community, a large proportion of individuals reported normal to minimal hopelessness. Also, while Māori make up 16.5% of Aotearoa and 19% of males between 15 and 29 years-old, 9% of participants in this study identified as Māori. Further work in this area would benefit from increased ethnic representativeness. Lastly, the cross-sectional nature of this study limits the

ability to assess directionality of findings. Examination of the relationships between hopelessness, meaning in life and social connectedness with longitudinal methods would be beneficial in corroborating these findings.

The current study provides a springboard for future research across several domains. This study was conducted with young adult males. Future work may seek to replicate these findings across gender identities. Given that meaning in life stems from multiple avenues, research may wish to explore the extent with which meaning in life moderates the relationship between hopelessness and social and vocational outcomes such as work satisfaction, educational achievement, and sense of faith. An emerging body of research such as the qualitative work with New Zealand men aged 20-40 year-old by from McKenzie et al. (2018) shows that young-adult males value different forms of social connection compared to females, and have diverse patterns of connection. Lee and Robbins (2000) also found that social connectedness for men was based in differentiation of the self from connected individuals and groups, a unique source compared with women who prefer physical closeness and opportunity for nurturance. Future work could explore whether different types of social connection and support are predictive of hopelessness in this cohort and if the moderation effect remains. With increased ethnic representativeness, further work should also consider how Māori conceptualizations of meaning and connectedness affect hopelessness. Meaning in life and social connectedness could be examined as moderators between known risk factors and hopelessness, extending knowledge of resilience regarding hopelessness. Future research should also seek to consider how this knowledge can be applied to interventions for suicide prevention and in working with individuals who experience feeling suicidal.

In summary, the current study sought to address a critical gap in literature by exploring social connectedness and meaning in life as psychological buffers of hopelessness. Results indicated that these factors were independently associated with hopelessness. Further, meaning in life was found to moderate the relationship between social connectedness and hopelessness, indicating that high meaning in life was associated with reduced hopelessness when social connectedness was low. To our knowledge, this is the first study that has looked at these relationships and done so in a sample of individuals at risk for suicidal thoughts and behaviours. These findings have broad implications for future exploratory work on psychological buffers of hopelessness, as well as practical applicability to suicide prevention.

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The authors have no conflict of interest to declare.

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Data Availability

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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