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Meaning Is About Mattering: Evaluating Coherence, Purpose, and Existential Mattering as
Precursors of Meaning in Life Judgments

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Abstract

When people judge their lives as meaningful, what is this judgment about? Drawing on recent tripartite theoretical accounts of meaning in life (MIL), we tested the separate contributions of coherence (or comprehension), purpose, and existential mattering (or significance) as potential precursors of people's self-reported evaluations of MIL. In Study 1 ($N = 314$ social media users), we developed brief acquiescence-free measures of these constructs, confirming that sense of coherence, purpose, mattering and MIL judgments were distinct from each other and from related constructs (sense of control, belonging, self-esteem, self-competence, mood). In Studies 2 ($N = 168$ students) and 3 ($N = 442$ Prolific Academic respondents; pre-registered), we collected longitudinal data to test temporal relationships between coherence, purpose, mattering, and MIL judgments over a one-month time lag. In both studies, sense of mattering consistently emerged as a significant precursor of MIL judgments, whereas sense of purpose and coherence did not. We conclude that researchers and practitioners should pay more attention to the relatively neglected dimension of existential mattering, beyond their more common emphases on coherence or purpose as bases of meaningfulness.

Keywords: meaning in life, purpose, coherence, existential mattering, well-being

Meaning Is About Mattering: Evaluating Coherence, Purpose, and Existential Mattering as Precursors of Meaning in Life Judgments

Experiencing one's life as meaningful is associated with measurable benefits. Self-reported meaning in life (MIL) has been linked to healthier eating, more physical activity, higher life satisfaction and lower depression (e.g., Brassai, Piko, & Steger, 2015; Steger, Oishi, & Kashdan, 2009; Zika & Chamberlain, 1992). MIL is distinct from other well-being constructs. For instance, Steger and Kashdan (2007) found that MIL recorded a year later was predicted by initial ratings of MIL, but not by life satisfaction. Despite its usefulness, the concept of MIL has raised challenges for empirical researchers trying to converge on a unitary definition (Leontiev, 2013). Psychologists have often focused on the subjective experience of MIL (e.g., Hicks & King, 2009a). However, treating MIL as a subjective judgment raises the question: What is this judgment about?

Meaning in Life as a Subjective Judgment

MIL is thought to be related to leading a "good life", perhaps according to some objective criteria (e.g., Wolf, 2010). However, some have pointed to the difficulty of defining such criteria, whilst others have questioned the utility of including objective components in definitions of MIL (e.g., Haidt, 2010; Koethe, 2010). Most psychological research has avoided such debates by focusing on subjective appraisals: *MIL judgments* (or *sense of MIL*). These are captured in people's responses to statements such as "My life is meaningful" (George & Park, 2016a; Heintzelman & King, 2014a). Measures of MIL judgments have been criticized for asking participants directly about meaningfulness when there is currently no consensually agreed definition of MIL (Leontiev, 2013). Yet, given the known psychological and health benefits of experiencing MIL, we believe that understanding the bases on which people judge that their own lives are more or less meaningful is an important

research question in its own right; bases of MIL judgments may or may not coincide with philosophical proposals of objective criteria for meaningfulness.

Meaning in Life as Coherence, Purpose and Mattering

Attempting to transcend the shortcomings of using explicit statements about MIL (George & Park, 2016a; Leontiev, 2013), researchers have suggested various facets relevant to the experience of MIL (e.g., Baumeister, 1991; Krause & Hayward, 2014). However, many of these facets seem to have a high degree of theoretical overlap with one another. For instance, it is unclear how the dimension of purpose (e.g., “I have discovered a satisfying life purpose”) is conceptually distinct from having goals (“I have a sense of direction and purpose in life”; see Krause & Hayward, 2014). Recently, researchers have converged on more parsimonious multi-faceted definitions of MIL. For example:

Meaning is the web of connections, understandings, and interpretations that help us comprehend our experience and formulate plans directing our energies to the achievement of our desired future. Meaning provides us with the sense that our lives matter, that they make sense, and that they are more than the sum of our seconds, days, and years. (Steger, 2012a, p. 165).

Such definitions suggest that a meaningful life is characterized by three dimensions: coherence, purpose, and mattering (King et al., 2006; Steger, Frazier, Oishi, & Kaler, 2006; see also Reker & Wong, 1988). Models of MIL based on these dimensions are sometimes referred to as *tripartite models* (see George & Park, 2016a; Martela & Steger, 2016).

Coherence (also called “comprehension”; George & Park, 2013; George & Park, 2016a) has been defined as the process of making sense of one’s experiences or the world more broadly (Heintzelman & King, 2014b). We use the term *sense of coherence* to refer to a

sense of order and comprehensibility. This is not to be confused with Antonovsky's (1987) multifaceted construct bearing the same name, which was intended to capture "a way of seeing the world which facilitated successful coping with the innumerable, complex stressors confronting us in the course of living" (Antonovsky, 1993, p.725).

Coherence has often been conflated with meaning (e.g., Heine, Proulx, & Vohs, 2006). For instance, absence of meaning has been described as resulting from perceived inconsistencies or an "awareness of *nonrelations*" (see Proulx & Heine, 2010; cf. Nagel, 1971). Furthermore, the widely used Meaning in Life Questionnaire – Presence subscale (MLQ-P; Steger et al., 2006) contains items related to comprehension and coherence such as "I understand my life's meaning." Evidence suggests that MIL might depend on perceiving regularities in one's environment (Heintzelman, Trent, & King, 2013), but if coherence predicts measures of a dependent variable that also captures coherence, then the finding is tautological. The link between experiences of coherence and meaningfulness should be tested empirically rather than assumed.

Different kinds of coherence (e.g., coherent self-views versus coherent views of the world) have been seen as equivalent (see Heine et al., 2006). When faced with information that undermines coherence, people often use strategies that are not specific to the type of coherence being undermined. Despite these fluid compensation mechanisms, however, different violations of coherence might be perceived differently. For instance, one can selectively induce feelings of uncertainty about the self without influencing general feelings of uncertainty (Costin & Vignoles, 2017). Given that sense of MIL is linked to identity processes (e.g., Vignoles, Regalia, Manzi, Golledge, & Scabini, 2006; see also Vignoles, 2011), and that MIL is personal, focusing on "my life," we suggest that self-related coherence (similar to life story schema construction; Bluck & Habermas, 2000) is the target sense-making dimension of MIL. Self-related sense of coherence will be henceforth simply called

sense of coherence, defined as the feeling of “making sense of one’s experiences in life” (Reker & Wong, 1988, p. 220).

Similar to coherence, *purpose* also has been conflated within earlier measures of MIL, e.g., “My personal existence is: (1) utterly meaningless, without purpose, (5) purposeful and meaningful” (Purpose in Life Test; Crumbaugh & Maholick, 1964). Three of the five MLQ-P items mention purpose (e.g., “My life has a clear sense of purpose”; Steger et al., 2006). Nevertheless, consensus is growing that purpose is a separate but related construct to MIL (George & Park, 2013; Kashdan, Rottenberg, Goodman, Disaboto, & Begovic, 2015; McKnight & Kashdan, 2009). George and Park (2013) found that sense of MIL and sense of purpose, despite being highly correlated ($r = .61$), showed somewhat different associations with external variables: MIL judgments were positively associated with religion and spirituality, when controlling for sense of purpose, whereas sense of purpose was positively correlated with optimism and negatively correlated with pessimism, stressful life experiences and goal violations, when controlling for MIL judgments. Both sense of MIL and sense of purpose were associated with higher subjective well-being.

We understand purpose as a motivational dimension (Martela & Steger, 2016), defined as “a central, self-organizing life aim that organizes and stimulates goals, [and] manages behaviors” (McKnight & Kashdan, 2009, p. 242). Consequently, sense of purpose is the feeling of having a life aim and working towards fulfilling it. As purpose is predominantly prescriptive and future-oriented, having a sense of purpose may be the feeling that one has a vision of how life *should* be. Existing research suggests that sense of purpose has been associated with important positive outcomes such as lower mortality rates (Boyle, Barnes, Buchnan, & Bennett, 2009; Hill & Turiano, 2014), and being able to engage and disengage with important goals may be important for well-being more broadly (Maes & Karoly, 2005).

Existential mattering (henceforth, *mattering*: George & Park, 2014; also known as “significance”: Martela & Steger, 2016), describes experiences of value, worth, and transcending “the trivial or momentary” conditions of our lives (George & Park, 2016a; Heintzelman & King, 2014b; King et al., 2006). In having a sense of mattering, one feels that one’s actions make a difference in the world and that life is worth living (Martela & Steger, 2016; George & Park, 2016a). While mattering has received much less empirical attention compared to the other two dimensions (George & Park, 2014), MIL researchers have previously hinted at similar MIL-related constructs such as the “valued life” (Morgan & Farsides, 2009) or generativity (Emmons, 1999; Schnell, 2009).

Generativity (i.e., “the concern in establishing and guiding the next generation”; Erikson 1963, p. 267) carries the sense that one’s life matters for something. Highly generative individuals are more likely to construct stories that involve awareness of the suffering of others, redeeming bad situations into good outcomes, and committing to goals that benefit others (McAdams, Diamond, de St. Aubin, & Mansfield, 1997). The question of why one’s life matters is closely linked to the question of why one should bother to keep on living (McDermott, 1991). As Martela and Steger (2016) put it: “finding one’s life worth living is a matter of life and death” (p. 6). To this end, generative concerns fulfil a need for symbolic immortality, creating legacies that live on past one’s death, as well as serving a “need to be needed,” or, in other words, a need to relate to others (McAdams & de St. Aubin, 1992; McAdams, Hart & Maruna, 1998). Previous research has shown that social relationships are strongly linked to MIL evaluations (e.g., Lambert et al., 2013), and we suggest that this effect could be largely explained through increased sense of mattering; people feel that their life matters because it matters to the people around them.

Coherence, Purpose, and Mattering as Potential Bases of MIL Judgments

When defining MIL as comprised of coherence, purpose and mattering, it has been suggested that researchers should consider measuring MIL using explicit judgments about these three dimensions: “The field needs to move beyond looking at meaning in life as an omnibus construct and instead to begin researching separately the three general facets that have been associated with it” (Martela & Steger, 2016, p. 11). Nevertheless, it is unclear how these dimensions relate to MIL judgments (George & Park, 2016a), which is an important issue when integrating previous findings with recent definitions of MIL. If MIL is about coherence, purpose and mattering, then we suggest that *evaluating* one’s life as coherent, purposeful and existentially significant should predict *evaluations* of MIL (i.e., MIL judgments). This suggests the proposition that experiences of coherence, purpose and mattering are potential *bases of MIL judgments*.

Providing initial support for this proposition, a recent correlational study showed that sense of coherence, purpose and mattering together accounted for 60-71% of the variance in MIL judgments (George & Park, 2016b). However, despite reporting correlations between the bases of MIL judgments and positive affect, the authors did not directly test whether mood explains the relationship between coherence, purpose, mattering, and MIL judgments. Positive affect informs MIL judgments (King, Hicks, Krull, & Del Gaiso, 2006), particularly when more relevant information is not accessible (Hicks & King, 2009b; Hicks, Schlegel, & King, 2010), and some have warned against “the technical impossibility to measure meaningfulness separated from the general positive affect accompanying it” (Leontiev, 2013; p. 468). Moreover, as we discuss below, the relationships observed in George and Park’s study could have been inflated by individual differences in response style. Furthermore, the cross-sectional research design leaves it unclear whether the feeling of meaningfulness is based on feelings of coherence, purpose, and mattering or vice versa. In the current paper, we

developed acquiescence-free measures, we controlled for positive affect (Study 1) and we employed a longitudinal design (Studies 2 and 3) in order to test adequately whether coherence, purpose, and mattering are indeed bases of MIL judgments.

Measuring Sense of Coherence, Purpose, and Mattering

George and Park (2016b) were the first researchers to attempt to separate coherence, purpose, and mattering empirically. In their Multidimensional Existential Meaning Scale (MEMS), each of the three dimensions showed a different pattern of correlations with theoretically-related constructs, providing evidence that they are distinct facets of MIL. However, the measure did not have a balanced set of positively and reverse-phrased items, which raises the possibility that relationships among the variables could be distorted by acquiescent response style (Winkler, Kanouse, & Ware, 1982, p. 555). As a first step in the research reported here, we sought to improve the measurement of coherence, purpose, mattering, and MIL judgments, by including a sufficient proportion of reverse-phrased items and controlling for a method factor of acquiescent response style.¹

Coherence, purpose, and mattering are conceptually related to previously studied constructs which have also been associated with MIL judgments. To establish the utility of

¹ Some writers suggest that reverse-phrased items might be a source of bias and advise against using them (e.g., Schriesheim & Hill, 1981). Nevertheless, the advantages of negative responses might outweigh the problems, especially if these are used in a balanced way (similar numbers of negatively and positively phrased items), are dispersed throughout the questionnaire, are carefully worded (e.g., avoid the use of negation) and use fully labelled response scales (Weijters & Baumgartner, 2012). One can control for acquiescent responding by including several reverse phrased items and modelling a common method variance factor (Welkenhuysen-Gybels, Billiet, & Cambré, 2003).

these new bases of MIL judgments, one would need to distinguish them from such theoretically-related constructs. For instance, mattering is a self-relevant evaluative construct, arguably similar to self-esteem (Rosenberg, 1965). Furthermore, previous researchers have hypothesized links between self-esteem and MIL judgments (Greenberg, Pyszczynski & Solomon, 1986), and have shown that identity aspects are rated as more central if they satisfied needs of both MIL and self-esteem (Vignoles et al., 2006). According to theory, however, self-esteem is an inadequate dimension of MIL because it operates at a lower level of abstraction compared to sense of mattering, construed as a “global evaluation from a spiritual or existential level” of one’s life (George & Park, 2014, p. 47).

Additionally, mattering needs to be separated from measures of social relatedness, which are also linked to self-worth (Baumeister & Leary, 1995; Leary, 2005). Close relationships have been consistently associated with sense of MIL across qualitative and quantitative studies (see O’Donnell et al., 2014). Specifically, belonging, defined as “a secure sense of fitting in” (Lambert et al., 2013, p. 1418), has been suggested as the key feature of social relationships that leads to perceiving life as meaningful.

Similarly, coherence has been associated with control. For instance, participants who received random feedback (lack of control) were more likely to identify an image within a grainy picture when no such image existed (searching for coherence; Whitson & Galinsky, 2008). While the two constructs are seen as separate, they are closely connected: sense of control has been described as “not an end in itself but may be one means for meeting the more fundamental need to view the world as orderly and non-random” (Kay, Whitson, Gaucher, & Galinsky, 2009, p. 264). In contrast, competence is related to having a sense of efficacy (Ryan & Deci, 2000) which is about feeling that one can attain desired outcomes and achieve goals (Bandura, 1977; Tafarodi & Swann, 2001). Consequently, competence would be more relevant to purpose. The distinction between control and competence is similar to

that between autonomy and competence within Self-Determination Theory (Ryan & Deci, 2000). Furthermore, a recent study found that feelings of autonomy (closely related to control), competence and relatedness (closely related to belonging) were positively predictive of MIL scores three days later (Martela, Ryan, & Steger, 2017).

In conclusion, the three posited bases of MIL judgments are more integrative life-appraisals than are the related constructs considered here. The usefulness of tripartite accounts of MIL depends on whether experiences of mattering, purpose and coherence are separable from each other, as well as distinct from, albeit likely related to, experiences of self-esteem, belonging, competence, and control.

Overview of the Present Studies

The current paper has four aims: (a) to develop improved, acquiescence-free measures of coherence, purpose, mattering, and MIL judgments; (b) to confirm that these are empirically distinct constructs that are also separable from theoretically-related predictors of MIL judgments; (c) to understand the unique contribution of each of coherence, purpose, and mattering to MIL judgments; (d) to test the prospective direction between each of the three bases and MIL judgments.

To address these aims, in Study 1, we developed a balanced set of items that could measure coherence, purpose, mattering, and MIL judgments, without overlap with other conceptually-related predictors of MIL, while controlling for acquiescent response style by modelling this as a common method variance factor. Additionally, Study 1 provided a cross-sectional test of the expected pathways from coherence, purpose, and mattering to MIL judgments, while controlling for mood. Studies 2 and 3 used longitudinal designs sensitive to temporal precedence to test whether MIL judgments were predicted by the three dimensions or vice versa. Although not providing causal certainty, temporal precedence is a necessary ingredient of most lay and scientific conceptions of causal direction (Granger, 1980). In both

studies, we used latent factors to account for measurement error while controlling for acquiescent responding. Data were analyzed using cross-lagged panel analysis, which controls for participants' responses at an earlier time point on the same measure. Based on findings from Study 2, we pre-registered Study 3 before data collection. All materials and data can be accessed at <https://doi.org/10.25377/sussex.7156526>.

Study 1

The first step was to create improved measures of sense of coherence, purpose, mattering, and MIL judgments, as well as to test whether these four constructs are distinguishable from one another. Our initial pool of items was adapted from the MEMS (George & Park, 2016b), with the addition of many reverse-worded items and some further items to ensure that we captured as fully as possible the breadth of each construct. We sought to create short measures that still retained desirable scale properties. In all analyses, we controlled for acquiescent responding. Unlike previous measures (e.g., George & Park, 2016a; Steger et al., 2006), we aimed to include a balanced set of positive and reverse-phrased items. Furthermore, we aimed to confirm that our measures were not confounded with theoretically-related constructs (self-esteem, self-competence, belonging and control) or positive affect.

Method

All studies in this paper received ethical approval from the Sciences & Technology Cross-Schools Research Ethics Committee (C-REC) of the University of Sussex under the protocol names “ER/VC69/3 Predictors of purpose and meaning in life; a longitudinal study” (Study 1), “ER/VC69/9 Sources and dimensions of meaning in life; a longitudinal study” (Study 2), and “ER/VC69/15 AMENDMENT and EXTENSION TO ER/VC69/9” (Study 3).

Participants and procedure. An online survey was created using Qualtrics (<https://www.qualtrics.com/>). Data were collected online through snowball sampling using

social networking websites (Facebook, Twitter). The study was advertised to people over the age of 18 who had “a good level of English” as a study about “how people experience their lives as having or not having meaning.” Participants’ mood was first measured, followed by MIL judgments. Subsequent measures were displayed in a randomized order for each participant. Finally, participants provided demographic information.²

Of the 403 individuals who accessed our questionnaire, 84 quit before proceeding to the questionnaire items, and 5 participants were excluded for giving the same response to all items of a measure (e.g., *Neither agree nor disagree* for all statements that formed a scale).

The final sample consisted of 314 participants (166 complete responses). Missing data were handled using full maximum likelihood estimation. Demographic information was recorded at the end of the questionnaire, so we only have complete demographics for complete responses. Participants were 116 females, 49 males, and 1 agender with ages ranging from 18 to 78 years old ($M = 31.77$, $SD = 10.97$). Participants were from a mix of countries, most were Romanian ($n = 70$), followed by British ($n = 41$), then from USA and Canada ($n = 23$). Most participants were Christian ($n = 87$) and 8 reported other religious backgrounds, while the rest ($n = 71$) did not have any religious affiliation. Participants were highly educated: 86 reported having a Master’s degree or higher, and just 21 participants were educated only to high-school level.

Measures. For all measures, participants were asked to indicate their “feelings at the present moment.” Unless otherwise specified, all responses were recorded on a 7-point scale (1 = *Strongly disagree*; 7 = *Strongly agree*). An item pool was created for MIL judgments,

² Participants were invited to provide their email address to be contacted for follow-up questionnaires. Because of the very low sign-up, data from these later time points were not included in the final analysis.

coherence, purpose, mattering, as well as for belonging and personal control (see Appendix A), whereas established measures were used for the remaining constructs.

MIL judgments. We included items to capture the overall evaluation of MIL. Six items (3 reversed) were inspired or adapted from the MLQ-P (Steger et al., 2006) and from the Perceived Personal Meaning Scale (PPMS; Wong, 1998). Items included: “My life as a whole has meaning” and “My existence is empty of meaning” (reverse-phrased).

Sense of coherence. We compiled a pool of 17 items pertaining to coherence (7 reversed). This included all comprehension items from the MEMS scale (George & Park, 2016b), e.g., “I can make sense of the things that happen in my life.” Additionally, we created items about life story schema coherence (Bluck & Habermas, 2000). These tapped into a sense of temporal coherence, e.g., “I can see a connection between past, present and future events in my life,” thematic coherence, e.g., “My experiences tend to have common themes,” and causal coherence, e.g., “I can see how my decisions are influenced by my previous experiences.” Seven reverse-phrased counterparts were also included, e.g., temporal coherence: “I see past, present and future events in my life as disconnected.”

Sense of purpose. We included 15 items related to purpose (6 reversed). As with coherence, we included items from the MEMS scale such as “I have overarching goals that guide me in my life.” We also adapted items from the purpose subscale of the Ryff Psychological Well-Being Scales (Ryff, 1989), e.g., “I often feel like I am wandering aimlessly through life” (reverse-phrased).

Sense of mattering. We included 9 items related to mattering (4 reversed) by adapting items from the MEMS scale (George & Park, 2016b) and creating corresponding reverse-phrased items, e.g., “Given the vastness of the universe, my life does not matter.” Additionally, we created an item and its reverse-phrased counterpart that did not make reference to grander notions of time or the universe, e.g., “My life is inherently valuable”.

Sense of control. Six items (3 reversed) were generated based on the personal control manipulation checks used in the compensatory control literature (e.g., Kay, Gaucher, Napier, Callan, & Laurin, 2008), e.g., “The events in my life are mainly determined by my own actions.”

Sense of belonging. We generated 10 items (5 reversed) to capture feelings of acceptance and fitting in rather than simply having close relationships (Lambert et al., 2013). We adapted items from the Sense of Belonging Inventory – psychological state (SOBI-P; Hagerty & Patusky, 1995), e.g., “I feel that I fit in,” and from Lee and Robbins' (1995) Social Connectedness Scale (e.g., “I don't feel that I participate with anyone or any group,” reverse-phrased).

Self-esteem and self-competence. The Self-liking/Self-competence Scale – Revised version (SLCS-R; Tatarodi & Swann Jr., 2001) had 16 items in total with 8 items (4 reversed) per scale. The self-liking scale included items such as “I am very comfortable with myself,” while the self-competence scale included items such as “I am highly effective at the things I do.”

Mood. The Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988) included 10 negative affect items (e.g., “Stressed”) and 10 positive affect items (e.g., “Excited”). For each item, participants were asked to respond about how they felt “at the present moment” on a scale from 1 = “Very slightly or not at all” to 5 = “Very much.”³

³ For exploratory purposes beyond the scope of the current article, we also measured: belief in freewill / determinism (FAD-Plus: Paulhus & Carey, 2011), religious belief (Steger & Frazier, 2005), belief in a controlling God (Kay et al., 2008), identification with family members, close friends and “important others” using the Inclusion of Others in Self scale

Results

Analytical approach. Analyses were performed using MPlus Version 6 (Muthén & Muthén, 2010). All models were estimated using full maximum likelihood. To assess the global fit of our models, we followed Hu and Bentler's (1999) criteria for considering a good fitting model to the data: (1) root mean square error of approximation (RMSEA) values close to .06 or below, (2) standardized root mean square residual (SRMR) close to .08 or below. Hu and Bentler (1999) recommend accepting models with a comparative fit index (CFI) value of .95 or greater, but others have criticized this standard as being too stringent for many models (Marsh, Hau, & Wen, 2004). As such, values of CFI higher than .90 were considered acceptable (Brown, 2015). We also report χ^2 , despite its many important shortcomings in assessing global fit (Brown, 2015; Kline, 2005). We used χ^2 for comparisons between nested models, where a statistically significant $\Delta\chi^2$ suggests that the more inclusive model is a better fit to the data. The same criteria were used in Studies 2 and 3.

Item selection and construct validation. We ran a confirmatory factor analysis (CFA) with 8 substantive factors: MIL judgments, coherence, purpose, mattering, belonging, control, self-liking and self-competence. Indicators corresponding to each predicted latent factor were an approximately balanced mix of positively and negatively worded items. Following the instructions of Welkenhuysen-Gybels et al. (2003), we controlled for acquiescence by modelling it as a common method variance (CMV) latent factor that loaded onto every item with a fixed loading of 1. The CMV factor was assumed to be uncorrelated with the target constructs: its covariances with other latent factors in the model were fixed to 0.

(IOS; Aron, Aron & Smollan, 1992), and government support (Kay, Shepherd, Blatz, Chua, & Galinsky, 2010).

The initial CFA showed adequate values of RMSEA and SRMR, but the CFI was poor: $\chi^2(2973) = 5484.24, p < .001$; CFI = .791; RMSEA = .053 (90% CI [.051, .055]); SRMR = .074. To improve the model fit and reduce our total item pool to a manageable length for later studies, we excluded items from newly developed scales in the following order: (a) based on low factor loadings – $|\beta_s| < .40$ (6 items removed); (b) based on cross-loadings – if an item had a modification index (MI) of more than 10 and two or more other significant cross-loadings (MIs > 4), or two cross-loadings with MIs larger than 10, then that item was dropped (16 items removed); (c) if item removal produced only minimal loss of scale reliability while still maintaining reliability scores over .8 (7 items removed). In the third step, we also aimed to achieve a balance of positive and reverse-worded items. No items were removed from the previously validated SLCS-R.

The final model consisted of 4 items (2 reversed) measuring each factor, except for control with 5 items (2 reversed) and belonging with 6 items (3 reversed; see Table 1). The model showed adequate fit: $\chi^2(831) = 1414.37, p < .001$; CFI = .894; RMSEA = .048 (90% CI [.044, .053]); SRMR = .062.⁴ All items loaded significantly onto their respective latent factors ($|\beta_s| > .49, p < .001$) and MIs suggested no excessive cross-loadings (estimated standardized path coefficients < .30). We calculated composite reliabilities for each latent factor using the formula proposed by Raykov (1997) and, as shown in Table 1, all values were comfortably larger than the recommended value of .70 (Hair, Black, Babin & Anderson, 2010).

⁴ Even though the CFI was marginally below the suggested threshold of .90, CFI is known to decline in correctly specified models with larger numbers of variables, and it should be judged in conjunction with the RMSEA (Kenny & McCoach, 2003). Given that the other global and local fit indices suggested a good-fitting model, we consider it adequate.

[Insert Table 1 here]

All latent factors were significantly correlated ($ps < .001$). Critically, intercorrelations between the each of the three bases of MIL judgments and the other predictors of MIL ranged between .37 and .63 (see Table 2). Together with a clean factor structure described above, this suggests that the dimensions do not overlap excessively with other relevant concepts, supporting the separation between bases and predictors of MIL judgments.

[Insert Table 2 here]

Intercorrelations among MIL judgments and the three bases of MIL judgments were somewhat higher, ranging from .65 to .72. To confirm that none of these constructs could be redundant, we tested whether the obtained items for coherence, purpose, mattering, and MIL judgments would be explained better by a smaller number of factors. We ran a four-factor CFA on the meaning-related items. This model showed good fit: $\chi^2(97) = 179.97, p < .001$; CFI = .964; RMSEA = .054 (90% CI [.041, .066]); SRMR = .045. We conducted a nested-model comparison between this model and a one-factor model. The single-factor model fitted the data significantly worse than the four-factor model, $\Delta\chi^2(6) = 618.30, p < .001$. The one-factor model also showed inadequate fit in absolute terms: $\chi^2(103) = 798.27, p < .001$; CFI = .70; RMSEA = .151 (90% CI [.141, .160]); SRMR = .103. We then compared the four-factor model to all 6 three-factor models that could be created by collapsing any pair of factors into a single factor. Each of these three-factor models showed a significantly worse fit than the four-factor model—all $\Delta\chi^2(3) > 77.73$ and all $ps < .001$. Thus, despite being strongly intercorrelated—as would be theoretically expected—coherence, purpose, mattering, and MIL judgments are distinguishable constructs.

Structural equation model. We tested an initial structural model predicting MIL judgments as a function of the three bases. Positive and negative affect were also included in the model to ensure that relationships were not explained by mood. A six-factor measurement

model with coherence, purpose, mattering, MIL judgments, and positive and negative affect showed good fit: $\chi^2(579) = 1006.01, p < .001$; CFI = .924; RMSEA = .048 (90% CI [.043, .053]); SRMR = .053. Then, we modelled paths from each of the three bases and affect factors to MIL judgments. Bases of MIL judgments and affect factors were allowed to correlate (see Figure 1). As expected, there were significant paths from sense of mattering, ($\beta = .31, p < .001, 95\% \text{ CI } [.18, .44]$), and sense of purpose ($\beta = .38, p < .001, 95\% \text{ CI } [.20, .56]$) to MIL judgments. Interestingly, the path from coherence to MIL did not approach significance ($\beta = .15, p = .217, 95\% \text{ CI } [-.09, .38]$). This model accounted for 66.3% of the variance in MIL judgments. These findings support the idea that purpose and mattering are related to MIL judgments beyond what can be explained by mood. However, the expected unique relationship between coherence and MIL judgments was not supported.

Discussion

In Study 1, we successfully created a new set of short, balanced, and reliable measures of MIL and related constructs. Our final 16-item measure is provided in Appendix B. We found evidence that coherence, purpose, and mattering were distinct from one another and from MIL judgments. Moreover, these factors were distinct from theoretically related predictors of MIL: self-liking, belongingness, control, and self-competence.

We also found initial, cross-sectional support for mattering and purpose predicting MIL judgments. Unexpectedly, however, the path from sense of coherence to MIL judgments was not significant. George and Park (2016b) previously reported that all three bases significantly predicted MIL judgments, but their measures did not account for possible confounding effects of acquiescent responding, nor did they control for mood. In light of the current findings, their conclusion that experiences of MIL are partly grounded in feelings of coherence may need revisiting. Because Study 1 used a one-shot correlational design, we can

only speculatively infer the direction of the relationships observed. To address this, in Study 2, we sought to extend these findings using a longitudinal design.

Study 2

Study 2 aimed to clarify the directional relationships between coherence, purpose, and mattering and MIL judgments using a longitudinal design sensitive to temporal precedence. Measures of these four constructs developed in Study 1 were administered at two different time points to undergraduate students. A growing body of literature shows that MIL judgments can be susceptible to small short-term fluctuations (e.g., Heintzelman et al., 2013; Steger & Kashdan, 2013). However, if having a sense of meaningfulness is a product of reflective processes (i.e., involving active, effortful deliberation; Martela & Steger, 2016), then we would expect the three potential bases of MIL to influence MIL judgments over a longer period. Consequently, we chose a time lag of one month.

In Study 2, we made the following predictions: First, we expected that all four constructs would remain moderately stable even across this longer timespan. Second, we expected that purpose and mattering would predict MIL judgments a month later while controlling for earlier MIL scores. We also tested whether sense of coherence would predict MIL judgments across time, but we made this prediction more tentatively given the null results from Study 1. Third, we tentatively expected that coherence, purpose, and mattering might predict one another over time, but the direction of these relationships was less clear (George & Park, 2016a; Martela & Steger, 2016).⁵ A cross-lagged panel model with latent variables was used to test these predictions.

⁵ Martela and Steger (2016) proposed that the three dimensions will be closely interrelated. For instance, perceiving that one's life is fulfilling a broader purpose might engender a sense of mattering. This can be seen in the context of religious belief. Religion

Method

Participants and procedure. Participants were recruited among undergraduate students in exchange for course credit. The study was advertised as a longitudinal study with three waves, each one month apart. Students were given a link to the Qualtrics questionnaire and were asked to provide their email address in a separate survey, thereby allowing us to contact them anonymously for future waves. We allowed two weeks for data collection at Time 1 (T1), and one week at Time 2 (T2).⁶

can prescribe a sense of purpose consisting of “spiritual strivings” which involve transcending the self and forming a union with a higher power (Emmons, 2005). The contrast between the fleeting smallness of one’s life and the vastness of the Universe (e.g., George & Park, 2014) is then bridged by having a sacred purpose that makes one feel that life matters on a higher level. The reverse is also plausible: feeling that life matters would lead to a stronger sense that there are objectives worth pursuing (Martela & Steger, 2016). Similarly, if one believes that one’s life matters, then an individual might be more likely to project order onto life experiences, thus increasing one’s sense of coherence. In turn, sense of coherence seems necessary for seeing unifying themes in one’s goals and constructing future objectives.

⁶ We also collected a third wave of data, but participants’ responses were too stable from Time 2 to Time 3 to make a cross-lagged analysis meaningful. Critically, 82.5% of the variance of T3 MIL judgments was explained by T2 MIL judgments (i.e., $r = .92$), leaving insufficient variance in scores to be explained by our predictor variables. This might be due to participants remembering their responses from T2 and attempting to give consistent responses at T3. For simplicity, we therefore focus here on T1 and T2 data only. Analyses including T3 data are available from the first author on request.

Participants were asked to generate a unique identifying code so that their data could be matched across time points. We recorded 183 responses at T1. However, 15 entries were duplicates (i.e., matching identification codes). In these instances, the first entry was kept and the second entry was removed, unless the first entry contained little or no data (presumably, these were participants who quit the questionnaire almost immediately after accessing it and then came back to do it later). When merging the datasets from different time points, some codes did not readily match. Where it was reasonable to assume that participants made a mistake in writing the code (e.g., one character differed between codes and there were no alternative matching options), the cases were matched manually. Those T2 cases that could not be matched were excluded from the final analysis. After exclusions, we recorded 168 responses at T1 and 126 at T2 (42 were lost to follow-up). As in Study 1, missing data were handled using full maximum likelihood estimation.

The final sample consisted of 168 participants at T1 and 126 at T2, with ages ranging from 18 to 54 years ($M = 19.78$, $SD = 4.90$). There were 131 females, 20 males, 2 participants who described themselves as “gender fluid” or “non-binary,” and 15 participants who did not report their gender. Most participants reported being British nationals ($n = 131$), with the remainder coming from a mix of nationalities. In terms of religious affiliation, most participants did not identify with any religion ($n = 97$), followed by those who identified as Christian ($n = 42$), Muslim ($n = 5$), and Jewish ($n = 5$).

As in Study 1, we were truthful but non-specific about the purpose of our study, introducing it as being about “how people experience their lives as having or not having meaning across time.” We measured MIL judgments first, followed by coherence, purpose

and mattering presented in random order for each participant.⁷ Demographics were collected at the end of the questionnaire.

Measures. MIL judgments, coherence, purpose, and mattering were measured using the final selection of 16 items described in Study 1, using the same 7-point response scale (see Appendix B).

Results

Measurement invariance. Measurement invariance across time should be established before running structural equation modelling on longitudinal data; otherwise, the observed relationships might be due to the constructs naturally varying over time (Brown, 2015). For cross-lagged models where the analysis focuses on covariance relations, a minimum requirement is *loading invariance* (i.e., when the loading of corresponding indicators is the same at each time point; Little, Preacher, Selig, & Card, 2007). To test this, we first created an unconstrained measurement model with 8 latent variables: MIL judgments, coherence, purpose, and mattering at T1 and T2. All latent factors were allowed to correlate freely, and error terms for the same item at different time points were also allowed to correlate. We

⁷ Apart from the measures reported here, we also measured mood at all three time points using the International PANAS Short Form (I-PANAS-SF; Thompson, 2007). Additionally, at T1 only, we measured belief in freewill / determinism (FAD-Plus; Paulhus & Carey, 2001), religious belief (Steger & Frazier, 2005), belief in a controlling God (Kay et al., 2008), meritocratic beliefs (based on items from Zimmerman & Reyna, 2013), identification with family members and close friends (Inclusion of Others in Self scale; Aron et al., 1992), social values (Short Schwartz's Value Survey; Lindeman & Verkasalo, 2005), and national/ethnic/sexual identity (Postmes, Haslam, & Jans, 2013). Results from these measures are not reported here.

compared this model to a loading-invariant model (the two models are nested). The ΔCFI statistic has been recommended as superior to the $\Delta\chi^2$ for testing measurement invariance, where ΔCFI of .01 or smaller suggests that invariance is tenable (Cheung & Rensvold, 2002). We found that constraining the loadings over time did not substantially worsen the fit, $\Delta\text{CFI} = .001$. Moreover, the model with constrained loadings had an acceptable fit, $\chi^2(492) = 757.24, p < .001$; $\text{CFI} = .914$; $\text{RMSEA} = .067$ (90% CI [.060, .075]); $\text{SRMR} = .061$. Therefore, we could assume loading invariance (Brown, 2015) and all item loadings in subsequent models were constrained to be invariant over time. Correlations and descriptive statistics can be seen in Table 3.

[Insert Table 3 here]

Cross-lagged longitudinal model. To model the relationships between constructs across time, we used a cross-lagged panel model (Finkel, 1995) with the four constructs as latent factors at each of the two time points. All auto-regressive and cross-lagged paths were included between constructs at the two different time points. This model was statistically equivalent to our measurement model with constrained factor loadings and, consequently, had the same values on the global fit statistics.

As shown in the upper part of Table 4, all constructs showed substantial stability across time (autoregressive paths: $\beta\text{s} = .56$ to $.75, p\text{s} < .001$). As expected, T1 mattering positively predicted T2 MIL judgments ($\beta = .22, p = .029, 95\% \text{ CI} [.02, .42]$). However, T1 purpose did not significantly predict T2 MIL judgments ($\beta = .12, p = .101, 95\% \text{ CI} [-.02, .26]$). Moreover, the relationship between sense of coherence and MIL judgments did not go in the expected temporal direction: T1 coherence did not significantly predict T2 MIL ($\beta = .08, p = .360, 95\% \text{ CI} [-.09, .24]$), but T2 coherence was significantly predicted by T1 MIL judgments ($\beta = .30, p = .021, 95\% \text{ CI} [.04, .55]$). Also, T2 purpose was significantly predicted by T1 mattering ($\beta = .22, p = .028, 95\% \text{ CI} [.02, .41]$).

[Insert Table 4 here]

We ran three additional models to test the temporal relationships between MIL judgments and each of the three potential bases of MIL separately. As in our main analysis, we found that T1 mattering significantly predicted T2 MIL judgments ($\beta = .22, p = .028, 95\% \text{ CI } [.05, .44]$), whereas T1 MIL judgments did not significantly predict T2 mattering ($\beta = .19, p = .088, 95\% \text{ CI } [-.03, .40]$). As in our main analysis, T1 coherence did not significantly predict T2 MIL judgments ($\beta = .14, p = .071, 95\% \text{ CI } [-.01, .29]$), whereas T1 MIL judgments significantly predicted T2 coherence ($\beta = .24, p = .007, 95\% \text{ CI } [.07, .42]$). Unlike in our main analyses, however, T1 purpose was now predictive of T2 MIL judgments ($\beta = .15, p = .035, 95\% \text{ CI } [.01, .29]$) and T1 MIL judgments predicted T2 purpose ($\beta = .25, p < .001, 95\% \text{ CI } [.11, .39]$).

Discussion

In Study 2, we further demonstrated the reliability of the newly developed scales of MIL judgments: our items captured the same target constructs across time. Furthermore, the four constructs were stable, such that scores at T1 highly predicted T2 scores.

Crucially, as expected, sense of mattering predicted MIL judgments a month later, supporting the theorized role of sense of mattering as a basis of MIL judgments. On the other hand, sense of purpose significantly predicted subsequent feelings of meaningfulness in a separate bivariate model, but not when all three potential bases of MIL were modeled together; this suggests that sense of purpose may not be uniquely important in shaping MIL judgments over and above its association with the other potential bases of MIL. Intriguingly, MIL judgments emerged as a precursor of coherence, which contradicts what would be implied by tripartite accounts. However, this is in line with Study 1 results where coherence and MIL judgments were highly correlated but the unique path from coherence to MIL judgments was non-significant; this pattern of results suggests that an inverse directional

relationship is possible—sense of coherence may be an outcome, rather than a cause, of experiencing life as meaningful.

Additionally, two bases of MIL judgments were related across time: sense of mattering predicted having a sense of purpose a month later. It makes conceptual sense that feeling that one's life matters would lead to being more committed to pursuing one's purpose (Martela & Steger, 2016) or to constructing/perceiving themes in one's goals.

Study 2 had a relatively small sample size relative to the number of items included in the model. Moreover, the precise pattern of cross-lagged effects – although consistent with the correlational findings of Study 1 – was not predicted in advance. We addressed these limitations by running a pre-registered replication in Study 3, using a larger sample.

Study 3

Study 3 aimed to replicate Study 2 findings using a large, community sample. We included two time points, administered again one month apart. We pre-registered Study 3 (<http://aspredicted.org/blind.php?x=5hk7hh>), committing to collect data from 500 participants at T1, hoping to retain at least 300 participants with complete T1-T2 responses. Based on Study 2 findings and consistent with original theorizing, our central hypothesis was that mattering would predict subsequent MIL judgments (H1). Three further hypotheses were more tentative: Although not included in our initial theorizing, we expected, based on Study 2 findings, that MIL judgments would predict subsequent sense of coherence (H2). Also based on Study 2 findings, we expected that mattering would predict purpose (H3). Based on tripartite accounts as well as Study 1 results, despite the lack of clear support for this prediction in Study 2, we tested once more whether purpose would predict subsequent MIL judgments (H4). Finally, given our larger projected sample size, we also explored whether the relationships would be moderated by key demographic factors: native language, religion, gender, relationship status, wealth, and political orientation. Furthermore, we tested whether

these relationships would vary for people experiencing lower, as opposed to higher, meaningfulness.

Method

Participants and procedure. We collected data from Prolific Academic (<https://www.prolific.ac/>) participants using a Qualtrics questionnaire. The study was advertised as a two-part longitudinal study about meaning in life, where only participants who completed our questionnaire at T1 were invited to complete the T2 questionnaire. Participants were paid £0.35 for completing T1 (approx. \$0.45) and £0.65 upon completing T2 (approx. \$0.83). T2 participation had a higher financial incentive to reduce dropout rates.

Participants were asked to enter the unique identifying code (series of numbers and digits) generated by Prolific Academic. This is the default procedure for anonymously paying respondents. We used this code to match data across time points. We recorded 509 responses at T1 and 379 responses at T2 (130 were lost to follow-up). As specified in our pre-registration, we removed participants who failed to respond correctly to one or more of 4 attention checks embedded within the questionnaire (e.g., “Please select somewhat agree”) (64 cases removed). Additionally, 3 participants were excluded for not engaging with the questionnaire items—giving the same response to all items on two or more scales. As in Study 1 and 2, missing data were handled using full maximum likelihood estimation.

The final sample at T1 consisted of 442 participants (326 at T2) aged between 18 and 70 years old ($M = 31.51$, $SD = 10.30$). Participants were 229 females and 205 males, as well as 8 participants who did not disclose their gender. The largest national group was British ($n = 127$), followed by US ($n = 86$) and Portuguese ($n = 42$), with the remaining 172 who answered this question coming from a mix of nations. Only 140 participants were in higher education. Most participants reported not belonging to any religious group ($n = 280$), and the second largest group was formed of Christians ($n = 129$), while other religious affiliations

formed a small subset of our sample ($n = 25$). Finally, most participants were not in a relationship ($n = 156$), followed by those in a committed relationship ($n = 132$), then by those who were married ($n = 125$).

Items were displayed following the sequence in Study 2: MIL judgment items, followed by MIL dimension items in randomized order for each participant, and finally demographics plus measures of relative wealth and political orientation.

Measures. We used the same measures of MIL, coherence, purpose and mattering as in Studies 1 and 2 (Appendix B). Relative wealth was measured by asking participants to rate their level of financial wealth, compared to other people in their country on a 7-point scale (1 = “Very poor,” 4 = “Average wealth,” 7 = “Very rich”). Political orientation was measured on an 11-point scale, 1 = “Left,” 6 = “Centre,” 11 = “Right”).

Results

Measurement invariance across time. Following our procedure from Study 2, we first created a measurement model with 8 latent variables corresponding to MIL judgments, coherence, purpose, and mattering at the two time points, with the residuals of the same observed variables at each of the two time points allowed to covary. Then, we tested loading invariance by comparing this initial model to a model where factor loadings were constrained to be invariant across time. A nested-model comparison showed that the constrained model did not significantly worsen the fit to the data, $\Delta CFI = .001$. The model with constrained factor loadings had a good fit, $\chi^2(429) = 946.423$, $p < .001$; CFI = .951; RMSEA = .052 (90% CI [.048, .057]); SRMR = .048. Consequently, we could assume loading invariance.

Correlations and descriptive statistics are shown in Table 5.

[Insert Table 5 here]

Cross-lagged longitudinal model. To test directional paths, we constructed an autoregressive cross-lagged model by adapting the loadings invariant measurement model

described earlier. As in Study 2, all auto-regressive paths and all potential cross-lagged paths were included between constructs at different time points. Results are shown in the lower part of Table 4. The constructs showed stability across the two time points (autoregressive paths: β s from .64 to .78, $ps < .001$). Importantly, our main prediction (H1) was supported: T1 mattering significantly predicted higher T2 MIL judgments ($\beta = .21, p < .001, 95\% \text{ CI } [.10, .32]$). Moreover, consistent with Study 2, T1 purpose did not predict T2 MIL judgments (H4), $\beta = .08, p = .193, 95\% \text{ CI } [-.05, .18]$, and T1 coherence did not predict T2 MIL judgments, $\beta = -.03, p = .601, 95\% \text{ CI } [-.14, .10]$. Unlike in Study 2, T1 MIL judgments did not predict T2 coherence (H2), $\beta = -.06, p = .517, 95\% \text{ CI } [-.26, .12]$, and T1 mattering did not predict T2 purpose (H3), $\beta = .06, p = .316, 95\% \text{ CI } [-.06, .17]$. However, T2 coherence was positively predicted by T1 mattering ($\beta = .16, p = .013, 95\% \text{ CI } [.04, .30]$) and marginally positively predicted by T1 purpose ($\beta = .14, p = .053, 95\% \text{ CI } [-.01, .28]$).

As in Study 2, we ran three additional models to test the temporal relationships between MIL judgments and each of the three potential bases of MIL separately. Consistent with our main analysis, T2 MIL judgments were significantly predicted by T1 mattering ($\beta = .21, p < .001, 95\% \text{ CI } [.11, .32]$), but not by T1 coherence ($\beta = -.04, p = .496, 95\% \text{ CI } [-.15, .08]$), or by T1 purpose ($\beta = .07, p = .199, 95\% \text{ CI } [-.04, .19]$). Conversely, T1 MIL judgments significantly predicted T2 coherence ($\beta = .15, p = .032, 95\% \text{ CI } [.01, .28]$) and T2 purpose ($\beta = .14, p = .016, 95\% \text{ CI } [.03, .25]$), but not T2 mattering ($\beta = .11, p = .061, 95\% \text{ CI } [-.01, .21]$).

Moderators. Given a relatively large and diverse sample, we explored whether the pattern of results would differ according to participants' backgrounds. This was achieved by splitting the data on each of the suggested moderating factors. Then, we tested loading invariance, as well as intercept invariance (necessary for comparing factor means), and performed multi-group comparisons on the split data.

Native language. Notably, a substantial proportion of participants came from non-English-speaking countries. We tested whether the pattern of findings would be different when accounting for the language spoken by participants. Where available, we used data provided through Prolific Academic about participants' first language to split the sample into native English speakers ($n = 198$) and non-native English speakers ($n = 190$). First, we tested measurement invariance across the two groups. Constraining factor loadings between native and non-native English speakers did not substantially worsen the unconstrained model, $\Delta\text{CFI} = .001$, and additionally constraining intercepts did not worsen the loading invariant model, $\Delta\text{CFI} = .001$. Thus, we could establish intercept invariance (Brown, 2015), which suggests that both associations and mean levels of corresponding factors across groups can validly be compared. The constrained measurement model showed good absolute fit: $\chi^2(892) = 1543.36, p < .001$; $\text{CFI} = .933$; $\text{RMSEA} = .061$ (90% CI [.056, .066]); $\text{SRMR} = .061$. There was no significant difference between native and non-native English speakers in their latent factor means ($ps > .050$). Then, we tested the structural model (with constrained item loadings and intercepts) and showed that additionally constraining the structural paths to be equal across groups did not significantly worsen the model fit, $\Delta\chi^2(16) = 22.00, p = .143$. Therefore, the pattern of findings did not differ significantly as a function of language proficiency.

Religious belief. Next, we tested the moderating effect of religious belief. Because few religious participants in our sample were non-Christian, we opted to split our sample into non-religious and religious, with the latter category including participants from all religions. We first established loading and intercept invariance ($\Delta\text{CFIs} < .01$). The constrained measurement model also showed good absolute fit: $\chi^2(892) = 1607.71, p < .001$; $\text{CFI} = .930$; $\text{RMSEA} = .061$ (90% CI [.056, .066]); $\text{SRMR} = .060$. Latent factor means were compared between the two groups showing that religious participants scored significantly higher on

MIL judgments and the three bases compared to the non-religious ($ps < .010$). Then, we specified the structural model (still with constrained loadings and intercepts) and found that constraining paths to be equal between religious and non-religious participants significantly worsened the model: $\Delta\chi^2(16) = 36.35, p = .003$. Consequently, we looked at the pattern of relationships for religious and non-religious people separately (see Table 6).

[Insert Table 6 here]

We constrained the lagged paths one at a time and performed nested model comparisons to see which relationships were significantly different between groups. Religious belief did not significantly moderate the relationship between T1 mattering and T2 MIL judgments, $\Delta\chi^2(1) = 2.29, p = .130$, such that sense of mattering predicted MIL judgments for both non-religious ($\beta = .14, p = .033, 95\% \text{ CI } [.01, .28]$) and religious participants ($\beta = .35, p < .001, 95\% \text{ CI } [.16, .54]$). However, religious belief significantly moderated the path from T1 purpose to T2 MIL judgments, $\Delta\chi^2(1) = 7.81, p = .005$, such that T1 purpose significantly positively predicted T2 MIL judgments for non-religious participants ($\beta = .17, p = .021, 95\% \text{ CI } [.03, .31]$), but not for religious participants ($\beta = -.18, p = .076, 95\% \text{ CI } [-.37, .02]$). Moreover, religious belief significantly moderated the path from T1 coherence to T2 MIL judgments, $\Delta\chi^2(1) = 6.77, p = .009$: T1 coherence significantly positively predicted T2 MIL judgments for religious participants ($\beta = .24, p = .047, 95\% \text{ CI } [.00, .47]$), but not for non-religious participants ($\beta = -.13, p = .078, 95\% \text{ CI } [-.28, .02]$). Interestingly, T1 MIL judgments predicted T2 purpose for religious participants ($\beta = .45, p = .017, 95\% \text{ CI } [.08, .82]$), but not for non-religious participants ($\beta = .01, p = .919, 95\% \text{ CI } [-.17, .19]$), and this difference was also statistically significant, $\Delta\chi^2(1) = 4.48, p = .034$.

The marginal negative effects of purpose for religious participants and coherence for non-religious participants raised the possibility of suppression effects, i.e., when one variable “increases the predictive validity of another variable (or set of variables) by its inclusion in a

regression equation” (Conger, 1974, p. 36-37). To explore this possibility, we ran two further models: In a model excluding sense of coherence, the path from T1 purpose to T2 MIL judgments became marginally significant among non-religious participants ($\beta = .12, p = .078$, 95% CIs [-.01, .24]) and non-significant among religious participants ($\beta = -.15, p = .148$, 95% CIs [-.35, .05]). Similarly, in a model excluding sense of purpose, the path from T1 coherence to T2 MIL judgments became marginally significant among religious participants ($\beta = .20, p = .095$, 95% CIs [-.04, .43]) and non-significant among non-religious participants, ($\beta = -.07, p = .289$, 95% CIs [-.21, .06]). Crucially, the path from T1 Mattering to T2 MIL judgments remained significant in both models across both groups, β s from .15 to .33, p s = .001 to .020.

Lower and higher MIL. We then tested the moderating effect of having lower vs. higher MIL. We calculated the observed mean of each participant’s MIL judgments across T1 and T2, and we split participants around the theoretical midpoint of the scale (i.e., 4). Thus, participants were grouped into those who on average did not agree that their lives were meaningful (lower MIL: $M \leq 4; n = 90$) and those who on average did agree that their lives were meaningful (higher MIL: $M > 4; n = 352$). Again, we first established loading and intercept invariance ($\Delta\text{CFIs} < .01$), and the constrained measurement model showed acceptable fit: $\chi^2(892) = 1696.56, p < .001$; CFI = .891; RMSEA = .064 (90% CI [.059, .068]); SRMR = .079. Comparing latent factor means between the two groups, lower-MIL participants unsurprisingly scored significantly lower on MIL judgments and the three bases compared to higher-MIL participants (p s < .001). Within our structural model (still with constrained loadings and intercepts), constraining paths to be equal between lower-MIL and higher-MIL participants significantly worsened the model: $\Delta\chi^2(16) = 27.74, p = .034$. As such, we looked at the pattern of relationships for participants with lower and higher MIL separately (see Table 7).

[insert Table 7]

Sense of mattering positively predicted MIL judgments for both lower-MIL participants ($\beta = .42, p = .015, 95\% \text{ CI } [.08, .76]$) and higher-MIL participants ($\beta = .23, p = .002, 95\% \text{ CI } [.08, .37]$), and the difference in this pathway between groups was not significant, $\Delta\chi^2(1) = 2.48, p = .115$. Across both groups, neither coherence nor purpose at T1 were significant predictors of T1 MIL judgments. Thus, the main pattern of results in Study 3 was found in both higher-MIL and lower-MIL participants within our sample.

Interestingly, the stability path between T1 and T2 MIL judgments was significant for higher-MIL participants ($\beta = .41, p < .001, 95\% \text{ CI } [.20, .62]$), but not significant for lower-MIL participants, ($\beta = .05, p = .776, 95\% \text{ CI } [-.31, .42]$), suggesting more fluctuations across time for the latter group. Nevertheless, this difference was only marginally significant, $\Delta\chi^2(1) = 2.99, p = .084$.

In addition, for lower-MIL participants, T2 sense of coherence emerged as a potential outcome of T1 mattering and MIL judgments. Notably, T1 sense of mattering significantly positively predicted T2 sense of coherence for lower-MIL participants ($\beta = .46, p = .003, 95\% \text{ CI } [.16, .77]$), but not for higher-MIL participants ($\beta = .10, p = .212, 95\% \text{ CI } [-.05, .24]$), $\Delta\chi^2(1) = 7.25, p = .007$. Surprisingly, T2 sense of coherence was negatively predicted by T1 MIL judgments for lower-MIL ($\beta = -.43, p = .005, 95\% \text{ CI } [-.74, -.13]$), but not for higher-MIL participants ($\beta = .02, p = .880, 95\% \text{ CI } [-.20, .23]$), $\Delta\chi^2(1) = 6.06, p = .013$. We tested whether the unexpected negative relationship could be explained by a suppression effect. Indeed, in a model excluding sense of mattering, we found that T2 coherence was no longer significantly predicted by T1 MIL judgments for lower-MIL participants ($\beta = -.17, p = .145, 95\% \text{ CI } [-.41, .06]$). However, in a model excluding MIL judgments, T1 mattering remained a significant predictor of T2 coherence for lower-MIL participants ($\beta = .23, p = .046, 95\% \text{ CI } [.00, .46]$).

Demographic characteristics and political orientation. A similar procedure was used for gender, relationship status, wealth and political orientation. Wealth was recoded into 3 categories: “Below average wealth” (Responses: 1-3, $n = 130$), “Average wealth” (Response: 4, $N = 180$), and “Above average” (Responses: 5-7, $n = 124$). Similarly, political orientation was recoded into 3 categories: “Left” (Responses: 1 to 4, $n = 177$), “Centre” (Responses: 5 to 7, $N = 175$), “Right” (Responses: 8 to 11, $n = 82$). For relationship status we only used the response categories “Not in a relationship” ($n = 156$), “Married” ($n = 125$), and “In a committed relationship” ($n = 132$) as very few participants reported other relationship statuses ($n = 21$). After establishing loading and intercept invariance between different groups within each category (all $\Delta CFI < .01$), constraining the paths to be equal in the corresponding structural models did not result in a significantly worse fit. Therefore, we can assume that the pattern of findings did not differ significantly by gender, relationship status, wealth or political orientation.

Discussion

As in Study 2, mattering predicted MIL judgments one month later (supporting H1) whereas the corresponding effects of coherence and purpose did not reach significance. Crucially, this pattern of findings replicated the findings in Study 2, suggesting that mattering is the most reliable precursor of MIL judgments among the three proposed bases of MIL judgments. Unlike Study 2, coherence was not predicted by MIL judgments (H2). Nevertheless, we found that coherence was predicted by mattering and, again, at each time point, coherence was correlated with concurrent MIL judgments. This suggests that sense of coherence might be a parallel construct to MIL judgments, rather than a precursor or an antecedent. As in Study 2, purpose failed to predict MIL judgments (H4), reinforcing the conclusion that sense of purpose is not a unique precursor of MIL judgments. Unlike Study 2,

matterings did not predict purpose (H3). This suggests that the interrelations among coherence, purpose, and mattering may vary as a consequence of contextual factors.

Finally, we explored whether participants' backgrounds would influence the pattern of relationships. We ruled out the possibility that the pattern of findings might be different according to participants' native language, gender, relationship status, wealth and political orientation. Furthermore, we found that regardless of whether participants agreed or not overall that their lives were meaningful, mattering consistently predicted MIL judgments. However, our results suggested that, in addition to mattering, non-religious participants may rely on purpose (more than coherence) to make MIL judgments whereas religious participants may rely on coherence (more than purpose). The moderating role of religion invites further research seeking to replicate, extend, and explain this complex and unpredicted pattern of findings. Nonetheless, the current results further support the role of mattering in predicting MIL judgments, above that of coherence and purpose.

General Discussion

Meaning is About Mattering

Evaluating one's life as meaningful has been linked to measurable psychological and physical benefits. However, debate continues about how MIL should be defined and measured. Recent influential accounts suggest that MIL is defined through coherence, purpose, and mattering (George & Park, 2016a; Martela & Steger, 2016), but it has remained unclear how these three dimensions relate to people's subjective evaluations of MIL. Across three studies, we aimed to test whether these three dimensions function as bases for making MIL judgments. In Study 1, we found evidence that coherence, purpose, mattering, and experienced MIL are distinct constructs that correlate with each other. We sought to extend George and Park's (2016b) finding that sense of coherence, purpose, and mattering had non-overlapping contributions to MIL judgments, by also ruling out two alternative explanations

in terms of (a) acquiescent responding or (b) mood effects. Study 1 results only partially supported their findings – showing that mattering and purpose, but not coherence, significantly contributed to a contemporaneous prediction of MIL.

Following these initial findings, Studies 2 and 3 were the first to test prospective relationships from coherence, purpose, and mattering to MIL judgments, using a longitudinal design sensitive to temporal precedence. Figure 2 summarizes the pattern of longitudinal findings. Of the three dimensions, only sense of mattering emerged consistently as a significant precursor of MIL judgments; this finding was supported across both studies and across subsamples within Study 3. Mattering was also a significant precursor of purpose in Study 2 and of coherence in Study 3. Thus, when deciding whether their life is meaningful or not, people seem to ask whether their life matters despite their smallness in time (homo sapiens have existed for over 200,000 years, and the Universe has existed for more than 13.73 billion years) and space (the vastness of the Universe). This finding held across gender, wealth, political orientation, relationship status, religion, and lower or higher overall meaningfulness. Thus, the link from mattering to MIL judgments seemingly holds regardless of whether one's life is seen to matter in a spiritual sense (e.g., by being God's creation) or in a secular sense (e.g., mattering to important others or to future generations), and regardless of whether one's life is seen as more or less meaningful.

[Insert Figure 2 here]

In contrast, the relationship between MIL judgments and either sense of coherence or sense of purpose was less straightforward. Across Studies 2 and 3, neither coherence nor purpose was a significant unique precursor of sense of MIL. These findings were seemingly qualified in Study 3 by a moderating effect of religious belief, but further analyses suggested that the observed effects may be attributable to statistical artifacts, and thus neither construct contributed unequivocally to predicting subsequent MIL judgments among religious or

among non-religious participants. On the other hand, sense of coherence was revealed as a significant outcome of MIL judgments in Study 2, as well as in bivariate analyses of Study 3. In multivariate analyses of Study 3, coherence was predicted by mattering and, among non-religious participants, by purpose, suggesting that sense of coherence might be a parallel outcome to sense of MIL, as well as a possible consequence of MIL. Sense of purpose significantly predicted MIL judgments in bivariate analyses of Study 2, but this effect was not replicated in Study 3, nor was it found in our main longitudinal analyses of Study 2 and 3. Thus, purpose was not a significant unique precursor of MIL judgments. Instead, purpose was a significant outcome of MIL judgments in bivariate analyses of both longitudinal studies; in multivariate analyses, purpose was significantly predicted by mattering in Study 2 and by MIL judgments among religious participants in Study 3. In sum, the current findings suggest that coherence and purpose may be better viewed as outcomes of mattering and/or MIL judgments, rather than precursors⁸.

The finding that sense of mattering, rather than coherence or purpose, emerged consistently as the strongest precursor of MIL judgments seems especially important given that both coherence and purpose have been long associated with MIL, and in some cases, seen as coterminous with MIL (e.g., Antonovsky, 1987; Crumbaugh & Maholick, 1964). By contrast, sense of mattering has been relatively neglected up to now within the psychological literature on MIL (George & Park, 2014). Our results therefore support calls to supplement the emphasis on coherence (e.g., Heine et al., 2006) or purpose (e.g., McKnight & Kashdan,

⁸ Further analyses revealed that modelling coherence and purpose as correlates or outcomes, rather than precursors, of MIL judgments also helps to make sense of the non-significant association of coherence with MIL in our original path analysis of Study 1 (see supplemental materials).

2009) in the psychological literature on meaning with a much stronger focus on understanding how people come to develop and maintain a sense of mattering in their lives, and the consequences of doing so or otherwise. Nonetheless, as we discuss shortly, it remains possible that effects of coherence or purpose on MIL may have been better captured with different methods or over a different time-frame. Thus, our results emphasize the importance of sense of mattering as a basis for MIL, but they do not necessarily rule out the possibility of a similar role for sense of coherence or purpose.

Future Directions

We succeeded in capturing coherence, purpose, and mattering as distinct from one another and from related constructs, while accounting for response style and controlling for important confounds such as mood. Subsequent work should aim to replicate our findings using alternative measures of potential bases of MIL judgments, while ensuring that they are rigorously specified and well-controlled. Sense of mattering may be measured as the extent to which someone feels that he or she is acting generatively or leaving a legacy that will transcend one's self (for recent measures of generativity, see Morselli & Passini, 2015). Similarly, personal, self-related coherence may be captured with measures of the related construct of self-concept clarity (e.g., "In general, I have a clear sense of who I am and what I am"; Campbell et al., 1996). In contrast, while some items from the Life Engagement Test (Scheier et al., 2006) capture sense of purpose (e.g., "There is not enough purpose in my life"; reverse-phrased), other items seem to overlap conceptually with mattering (e.g., "I have lots of reasons for living"; reverse-phrased). Therefore, we advise a careful item selection for any studies that employ alternative measures. Additionally, indirect measures could be created by asking participants to formulate life stories, which would then be scored by independent raters for coherence (e.g., Baerger & McAdams, 1999), as well as for expressions of purpose and mattering.

MIL has been conceptualized as an inherently human preoccupation, resulting from “deep, abstract, conceptual work” (Martela & Steger, 2016, p. 8), but there is mounting evidence that intuitive processes might also influence MIL judgments (e.g., Heintzelman & King, 2014a; Heintzelman & King, 2016; King et al., 2006). As a result, some have argued that MIL is a product of both intuitive and reflective processes (King, 2012). In the current paper, we measured target constructs using self-report items, which are better at capturing processes that involve effortful retrieval of information (e.g., Hoffman, Gawronski, Gschwendner, Le, & Schmitt, 2005). As such, constructs that are more readily accessed through effortful reflection, such as sense of mattering (Heintzelman & King, 2016), arguably may have been favored by the current design. In contrast, we might have underestimated the role of coherence, particularly if coherence is understood as resulting from the automatic detection of reliable connections (Heintzelman & King, 2014b). Future studies should focus on developing implicit measures or unobtrusive manipulations to capture the interplay between reflective and intuitive MIL-related processes.

Future research might also vary the time lag between measurement points. Despite making a theoretically-informed time lag choice, there are no studies suggesting over what span of time coherence, purpose, and mattering might inform MIL judgments. If this process occurs over a shorter or a longer span than the one-month lag chosen for Studies 2 and 3, our design could potentially underestimate these relationships (Taris & Kompier, 2014). Moreover, it is possible that coherence, purpose, and mattering each exert their influence on MIL judgments over different periods of time. Researchers could use multiple time points with varying lag times to investigate this possibility.

Finally, subsequent work might examine further the generality of our findings to different populations, including systematic cross-cultural comparisons as well as extending the work to clinical populations. In the current research, the finding that religious and non-

religious people differ in how they evaluate MIL was not predicted in advance and would benefit from replication and further elaboration. Future studies should explore finer-grained religious categories beyond the religious/non-religious dichotomy and could aim to capture the multidimensional nature of religiosity, such as extrinsic and intrinsic orientations (Allport & Ross, 1967), and quest orientation (Altemeyer & Hunsberger, 1992; Batson & Ventis, 1982), as well as comparing members of different religious traditions. Types of religious orientation have different associations with structure-seeking tendencies (Ladd, 2007), which could differently moderate the role of coherence for MIL judgments. Furthermore, future research should differentiate between different categories of non-religious individuals as there might be meaningful differences between people with varying degrees of atheistic commitment (e.g., Hood, Hill, & Spilka, 2009; Schnell & Keenan, 2011).

Implications

Psychological practitioners have previously acknowledged the role of meaningfulness in leading a positive, fulfilled life and have incorporated this insight into their practice (e.g., Frankl, 1956/2004; Wong, 1997; Yalom, 1980). Given the current findings, we suggest that practitioners who seek to foster a sense of meaningfulness should focus on bolstering a sense of mattering. In this sense, related psychological concepts about transcending self-interests and embedding the self into a broader picture may lend important insights. For instance, we expect that individuals may increase their sense of mattering by engaging in generative behaviors. While becoming a parent is a classic example of a generative behavior, non-parents can perform generative acts such as volunteering and civil engagement, or through passing on skills to others (An & Cooney, 2006; McAdams & de St. Aubin, 1992). Although prosocial behaviors in general have been previously associated with MIL judgments (e.g., Van Tongeren, Green, Davis, Hook, & Hulseley, 2016), generative actions in particular serve to extend the self through their contribution to others (McAdams & de St. Aubin, 1992). We

suspect that this specific characteristic of self-extension may be key to establishing a sense of existential mattering – that the importance of one’s life transcends the spatial and temporal limitations of one’s physical existence – and hence fostering a sense of MIL.

Conclusion

Our work was the first to test the extent to which MIL judgments are based on the dimensions suggested by tripartite models (coherence, purpose, mattering; George & Park, 2016a; Martela & Steger, 2016) using a research design sensitive to temporal precedence. When pondering their life’s meaning, some individuals may think about how their experiences make sense and coalesce into a cohesive whole. Others may think about what they would like to achieve in life — the aims that underlie their strivings and goals. However, in evaluating their life’s meaningfulness, most people seemingly think about whether their lives matter beyond the narrowness of their day-to-day existence.

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Table 1

Final selection of items in Study 1

Scale and Items	Reliability ^a	Standardized Factor Loading
MIL judgments (4 items)	.89	
My life as a whole has meaning.		.79
My entire existence is full of meaning.		.82
<i>My life is meaningless.</i>		-.81
<i>My existence is empty of meaning.</i>		-.83
Coherence (4 items)	.77	
I can make sense of the things that happen in my life.		.57
Looking at my life as a whole, things seem clear to me.		.75
<i>I can't make sense of events in my life.</i>		-.77
<i>My life feels like a sequence of unconnected events.</i>		-.60
Purpose (4 items)	.85	
I have a good sense of what I am trying to accomplish in life.		.83
I have certain life goals that compel me to keep going.		.72
<i>I don't know what I am trying to accomplish in life.</i>		-.81
<i>I don't have compelling life goals that keep me going.</i>		-.69
Mattering (4 items)	.92	
Whether my life ever existed matters even in the grand scheme of the universe.		.87
Even considering how big the universe is, I can say that my life matters.		.85
<i>My existence is not significant in the grand scheme of things.</i>		-.85
<i>Given the vastness of the universe, my life does not matter.</i>		-.89
Control (5 items)	.75	
The events in my life are mainly determined by my own actions.		.69
I feel like I am free to make my choices.		.71
I feel that I have complete control over my life.		.66
<i>I am not in control of most things that occur in my life</i>		-.49
<i>I feel constrained by things outside of my control.</i>		-.52
Belonging (6 items)	.90	
I feel included.		.86
I feel that I fit in.		.84
I feel accepted.		.78
<i>I don't feel that I participate with anyone or any group.</i>		-.61
<i>I feel excluded.</i>		-.77
<i>I feel like an outsider.</i>		-.77
Self-liking (8 items)	.93	
I am very comfortable with myself.		.84
I am secure in my sense of self-worth.		.83
I feel great about who I am.		.85
I never doubt my personal self-worth.		.71
<i>I tend to devalue myself.</i>		-.72
<i>It is sometimes unpleasant for me to think about myself.</i>		-.68
<i>I have a negative attitude towards myself.</i>		-.89
<i>I do not have enough respect for myself.</i>		-.74
Self-competence (8 items)	.83	
I am highly effective at the things I do.		.76
I am almost always able to accomplish what I try for.		.63
I perform very well at many things.		.67
I am very talented.		.53
<i>At times, I find it difficult to achieve the things that are important to me.</i>		-.60
<i>I sometimes deal poorly with challenges.</i>		-.66
<i>I sometimes fail to fulfil my goals.</i>		-.64
<i>I wish I were more skillful in my activities.</i>		-.46

Note. Reverse-phrased items are italicized. All factor loadings were significant at $p < .001$.

^aReliabilities calculated using Raykov's (1997) formula for latent factors

Table 2

Descriptive statistics and zero-order correlations between MIL judgments, bases of MIL judgments, and related constructs in Study 1

Factor	1	2	3	4	5	6	7	8	<i>M</i>	<i>SD</i>
1 MIL judgments	-	.55	.62	.60	.47	.45	.56	.38	5.48	1.31
2 Coherence	.65	-	.59	.42	.44	.41	.52	.45	5.15	1.11
3 Purpose	.71	.72	-	.42	.39	.28	.43	.34	5.24	1.30
4 Mattering	.65	.48	.49	-	.35	.40	.52	.37	4.38	1.78
5 Belonging	.54	.52	.45	.37	-	.40	.54	.32	4.95	1.25
6 Control	.56	.42	.39	.44	.44	-	.50	.40	4.50	1.03
7 Self-liking	.63	.63	.52	.57	.59	.58	-	.60	4.33	1.45
8 Self-competence	.45	.57	.41	.38	.35	.48	.68	-	4.11	1.02

Note. Descriptive statistics and correlations above the diagonal are for observed variables (theoretical range: 1 to 7); latent correlations from our measurement model are shown below the diagonal. All correlations are significant at $p < .001$.

Table 3

Descriptive statistics and zero-order correlations between MIL judgments and bases of MIL judgments across time points in Study 2

Factor	1	2	3	4	5	6	7	8	<i>M</i>	<i>SD</i>
1 MIL judgments T1	-	.79	.53	.57	.49	.54	.68	.65	5.31	1.34
2 MIL judgments T2	.83	-	.45	.62	.49	.57	.66	.72	5.26	1.26
3 Coherence T1	.58	.57	-	.69	.46	.43	.46	.35	4.79	1.06
4 Coherence T2	.63	.70	.83	-	.47	.54	.44	.45	4.73	1.06
5 Purpose T1	.52	.53	.51	.52	-	.76	.41	.37	4.76	1.47
6 Purpose T2	.57	.62	.49	.59	.81	-	.50	.46	4.79	1.35
7 Mattering T1	.74	.72	.53	.49	.44	.57	-	.77	4.12	1.56
8 Mattering T2	.85	.80	.45	.51	.45	.52	.85	-	4.21	1.34

Note. Descriptive statistics and correlations above the diagonal are for observed variables (theoretical range: 1 to 7); latent correlations from our measurement model are shown below the diagonal. All correlations are significant at $p < .001$.

Table 4

Lagged Relationships Between T1 and T2 Variables in Studies 2 and 3

	MIL judgments T2			Coherence T2			Purpose T2			Mattering T2		
	<i>b</i>	β [95% CI]	<i>p</i>	<i>b</i>	β [95% CI]	<i>p</i>	<i>b</i>	β [95% CI]	<i>p</i>	<i>b</i>	β [95% CI]	<i>p</i>
Study 2												
MIL judgments T1	.52	.56 [.36, .76]	<.001	.23	.30 [.04, .55]	.021	.09	.09 [-.13, .30]	.420	.15	.18 [-.05, .42]	.126
Coherence T1	.10	.08 [-.09, .24]	.360	.72	.69 [.51, .86]	<.001	-.05	-.04 [-.20, .13]	.660	-.08	-.07 [-.25, .10]	.413
Purpose T1	.10	.12 [-.02, .26]	.101	.05	.07 [-.10, .24]	.409	.65	.69 [.57, .81]	<.001	.06	.08 [-.07, .23]	.300
Mattering T1	.22	.22 [.02, .42]	.029	-.10	-.13 [-.36, .11]	.294	.25	.22 [.02, .41]	.030	.62	.71 [.51, .91]	<.001
Study 3												
MIL judgments T1	.63	.64 [.49, .78]	<.001	-.05	-.06 [-.26, .12]	.517	.09	.08 [-.08, .24]	.328	.15	.16 [.00, .33]	.050
Coherence T1	-.03	-.03 [-.14, .10]	.601	.71	.71 [.57, .85]	<.001	.05	.04 [-.09, .16]	.541	.00	.00 [-.12, .13]	.992
Purpose T1	.06	.08 [-.05, .18]	.193	.10	.14 [-.01, .28]	.053	.73	.71 [.61, .83]	<.001	-.08	-.08 [-.21, .02]	.164
Mattering T1	.22	.21 [.10, .32]	<.001	.14	.16 [.04, .30]	.013	.07	.06 [-.06, .17]	.316	.74	.78 [.68, .88]	<.001

Note. *b* = unstandardized path coefficient; *p* = significance value for the standardized path coefficient; β [95% CI] = standardized path coefficient and associated 95% confidence intervals.

Table 5

Descriptive statistics and zero-order correlations between MIL judgments and bases of MIL judgments across time points in Study 3

Factor	1	2	3	4	5	6	7	8	<i>M</i>	<i>SD</i>
1 MIL judgments T1	-	.78	.62	.58	.66	.61	.67	.61	5.16	1.47
2 MIL judgments T2	.82	-	.48	.60	.57	.63	.65	.73	5.18	1.43
3 Coherence T1	.70	.56	-	.72	.56	.50	.39	.32	4.88	1.14
4 Coherence T2	.65	.67	.82	-	.55	.56	.42	.42	4.83	1.15
5 Purpose T1	.72	.63	.65	.65	-	.76	.51	.40	4.89	1.44
6 Purpose T2	.66	.67	.59	.65	.83	-	.46	.46	4.92	1.45
7 Mattering T1	.72	.70	.44	.51	.57	.54	-	.80	4.14	1.65
8 Mattering T2	.67	.78	.40	.50	.47	.53	.85	-	4.13	1.58

Note. Descriptive statistics and correlations above the diagonal are for observed variables

(theoretical range: 1 to 7); latent correlations from our measurement model are shown below

the diagonal. All correlations are significant at $p < .001$.

Table 6

Lagged relationships between T1 and T2 variables for non-religious and religious participants in Study 3

	MIL judgments T2			Coherence T2			Purpose T2			Mattering T2		
	<i>b</i>	β [95% CI]	<i>p</i>	<i>b</i>	β [95% CI]	<i>p</i>	<i>b</i>	β [95% CI]	<i>p</i>	<i>b</i>	β [95% CI]	<i>p</i>
Non-Religious Participants												
MIL judgments T1	.67	.69 [.52, .86]	<.001	-.08	-.12 [-.34, .10]	.281	.01	.01 [-.17, .19]	.919	.14	.17 [-.02, .36]	.082
Coherence T1	-.18	-.13 [-.28, .02]	.078	.63	.67 [.50, .84]	<.001	-.09	-.06 [-.21, .08]	.399	-.05	-.04 [-.20, .11]	.607
Purpose T1	.16	.17 [.03, .31]	.021	.17	.26 [.09, .43]	.003	.88	.86 [.75, .98]	<.001	-.06	-.08 [-.22, .07]	.300
Mattering T1	.16	.14 [.01, .27]	.033	.10	.13 [-.02, .28]	.097	.05	.04 [-.08, .17]	.508	.73	.77 [.65, .88]	<.001
Religious Participants												
MIL judgments T1	.55	.53 [.21, .85]	.001	.25	.24 [-.14, .62]	.209	.53	.45 [.08, .82]	.017	.19	.19 [-.18, .55]	.316
Coherence T1	.27	.24 [.00, .47]	.047	.70	.63 [.35, .90]	<.001	.15	.11 [-.16, .39]	.423	.08	.07 [-.20, .34]	.606
Purpose T1	-.16	-.18 [-.37, .02]	.076	-.11	-.12 [-.35, .11]	.290	.32	.31 [.08, .54]	.007	-.10	-.11 [-.33, .11]	.338
Mattering T1	.35	.35 [.16, .54]	<.001	.18	.19 [-.04, .41]	.098	.03	.03 [-.20, .25]	.819	.69	.72 [.53, .92]	<.001

Note. *b* = unstandardized path coefficient; *p* = significance value for the standardized path coefficient; β [95% CI] = standardized path coefficient and associated 95% confidence intervals

Table 7

Lagged relationships between T1 and T2 variables for lower- and higher-MIL participants in Study 3

	MIL judgments T2			Coherence T2			Purpose T2			Mattering T2		
	<i>b</i>	β [95% CI]	<i>p</i>	<i>b</i>	β [95% CI]	<i>p</i>	<i>b</i>	β [95% CI]	<i>p</i>	<i>b</i>	β [95% CI]	<i>p</i>
Lower-MIL Participants												
MIL judgments T1	.05	.05 [-.31, .42]	.776	-.48	-.43 [-.74, -.13]	.005	-.03	-.02 [-.35, .30]	.891	-.10	-.14 [-.44, .16]	.375
Coherence T1	-.15	-.16 [-.50, .19]	.366	.91	.83 [.56, 1.09]	< .001	.13	.09 [-.22, .40]	.569	-.03	-.04 [-.34, .25]	.774
Purpose T1	.08	.12 [-.14, .37]	.381	.17	.21 [-.02, .44]	.068	.58	.59 [.38, .79]	<.001	.02	.04 [-.18, .25]	.751
Mattering T1	.52	.42 [.08, .76]	.015	.69	.46 [.16, .77]	.003	.08	.04 [-.28, .36]	.807	.82	.80 [.54, 1.05]	<.001
Higher-MIL Participants												
MIL judgments T1	.40	.41 [.20, .62]	<.001	.02	.02 [-.20, .23]	.880	.08	.05 [-.12, .22]	.563	.10	.08 [-.10, .26]	.399
Coherence T1	.02	.02 [-.17, .20]	.846	.66	.68 [.50, .86]	<.001	-.02	-.01 [-.16, .14]	.860	.05	.04 [-.12, .20]	.646
Purpose T1	.06	.09 [-.08, .27]	.289	.05	.08 [-.10, .26]	.381	.81	.76 [.63, .88]	<.001	-.14	-.15 [-.30, .00]	.054
Mattering T1	.16	.23 [.08, .37]	.002	.07	.10 [-.05, .24]	.212	.05	.05 [-.07, .16]	.458	.73	.78 [.68, .89]	<.001

Note. *b* = unstandardized path coefficient; *p* = significance value for the standardized path coefficient; β [95% CI] = standardized path coefficient and associated 95% confidence intervals

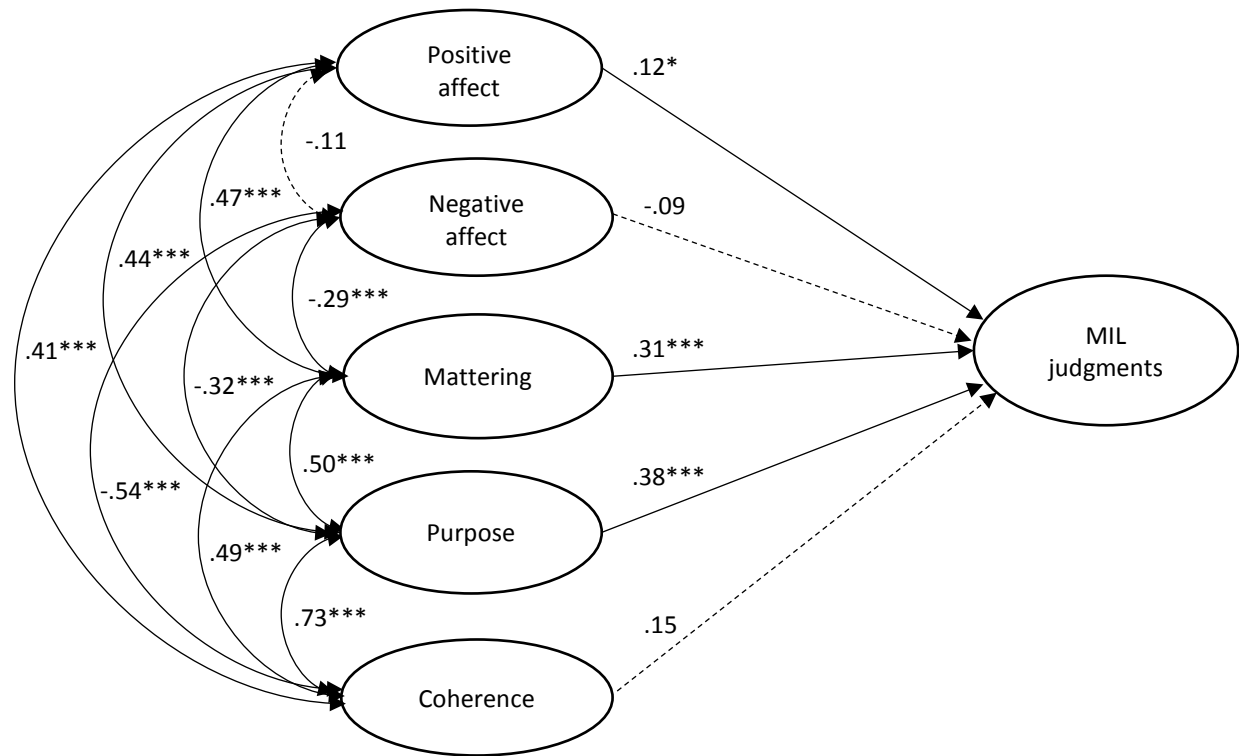


Figure 1. MIL judgments as an outcome of coherence, purpose, and mattering as well as affect in Study 1. Structural equation model with latent factors showing standardized estimates of correlations and paths from bases, and positive and negative affect to MIL judgments. Solid lines show significant paths and dotted lines show non-significant paths. * $p < .05$, ** $p < .01$, *** $p < .001$.

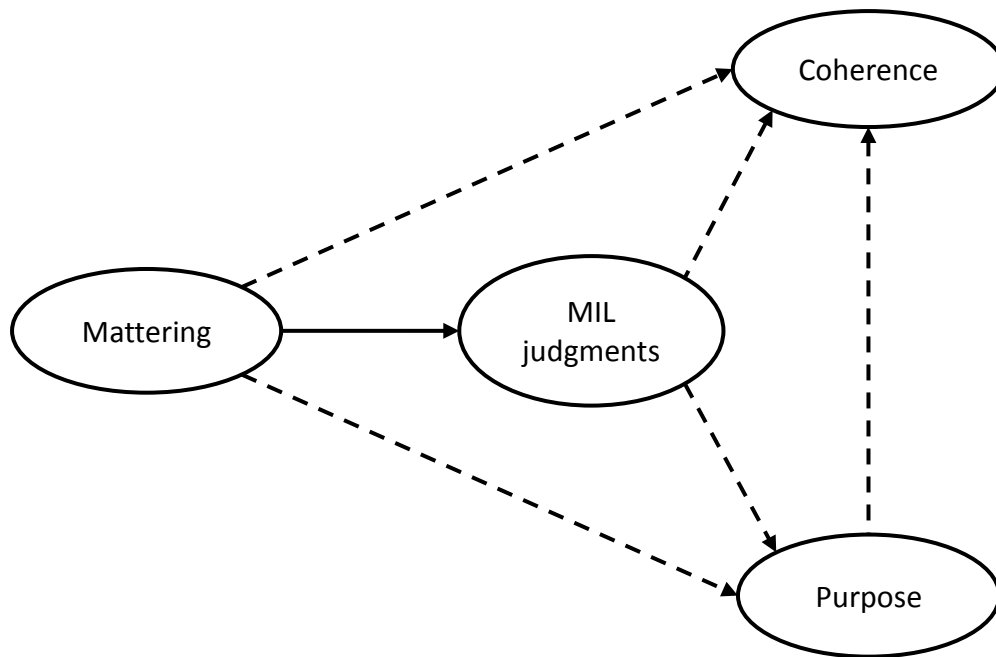


Figure 2. Summary of lagged paths found among coherence, purpose, mattering, and MIL judgments in Studies 2 and 3. Dotted paths were found in a subset of analyses.

Appendix A

Complete Study 1 pool of items for MIL judgments, coherence, purpose and mattering, and belonging and control

MIL judgments

- (1) My life is meaningful
- (2) **My life as a whole has meaning**
- (3) **My entire existence is full of meaning**
- (4) *My life is meaningless*
- (5) *My existence is empty of meaning*
- (6) *I feel that there is no meaning in my life*

Coherence

- (7) I feel that events in my life follow a certain order
- (8) I often feel that I can predict what is going to happen next
- (9) I can see a connection between past, present and future events in my life
- (10) My experiences tend to have common themes
- (11) I can see how my decisions are influenced by my previous experiences
- (12) My life makes sense
- (13) I know what my life is about
- (14) **I can make sense of the things that happen in my life**
- (15) I understand my life
- (16) **Looking at my life as a whole, things seem clear to me**
- (17) *I don't understand what my life is about*
- (18) *I can't make sense of events in my life*
- (19) *I often feel that my life is chaotic*
- (20) *My life feels like a sequence of unconnected events*

- (21) *I see past, present and future events in my life as disconnected*
- (22) *I struggle to find common themes that tie my experiences together*
- (23) *I don't understand how my past decisions have led to where I am now*

Purpose

- (24) I have a good sense of what I am trying to accomplish in life**
- (25) I have a sense of direction and purpose in life
- (26) I always have a series of goals to pursue
- (27) I often feel like I am following a path in life
- (28) I have overarching goals that guide me in my life
- (29) I have aims in my life that are worth striving for
- (30) I have certain life goals that compel me to keep going**
- (31) I have goals in life that are very important to me
- (32) My direction in life is motivating to me
- (33) *I often feel like I am wandering aimlessly through life*
- (34) *My life has no purpose*
- (35) I don't know what I am trying to accomplish in life**
- (36) *My goals don't seem connected to one another*
- (37) *My current life course is not motivating*
- (38) I don't have compelling life goals that keep me going**

Mattering

- (39) My life is inherently valuable
- (40) Even a thousand years from now, it would still matter whether I existed or not
- (41) Whether my life ever existed matters even in the grand scheme of the universe**
- (42) I am certain that my life is of importance
- (43) Even considering how big the universe is, I can say that my life matters**

- (44) *There is nothing special about my existence*
- (45) **My existence is not significant in the grand scheme of things**
- (46) **Given the vastness of the universe, my life does not matter**
- (47) *My life has no objective value*

Belonging

- (48) **I feel included**
- (49) **I feel that I fit in**
- (50) **I feel accepted**
- (51) I have many experiences in common with those around me
- (52) I feel a sense of togetherness with my peers
- (53) *I feel rejected by others*
- (54) **I don't feel that I participate with anyone or any group**
- (55) **I feel excluded**
- (56) *My experiences are very different from those who are usually around me*
- (57) **I feel like an outsider**

Control

- (58) **The events in my life are mainly determined by my own actions**
- (59) **I feel like I am free to make my choices**
- (60) **I feel that I have complete control over my life**
- (61) **I am not in control of most things that occur in my life**
- (62) *What I do has very little effect on what happens to me*
- (63) **I feel constrained by things outside of my control**

Retained items in bold.

Reverse-phrased items are italicized

Appendix B

Multidimensional MIL Scale

Using the scale, please indicate your current feelings by selecting how much you agree or disagree with the following statements:

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
1	2	3	4	5	6	7

- 1 My life as a whole has meaning.
- 2 My entire existence is full of meaning.
- 3 *My life is meaningless.*
- 4 *My existence is empty of meaning.*
- 5 I can make sense of the things that happen in my life.
- 6 Looking at my life as a whole, things seem clear to me.
- 7 *I can't make sense of events in my life.*
- 8 *My life feels like a sequence of unconnected events.*
- 9 I have a good sense of what I am trying to accomplish in life.
- 10 I have certain life goals that compel me to keep going.
- 11 *I don't know what I am trying to accomplish in life.*
- 12 *I don't have compelling life goals that keep me going.*
- 13 Whether my life ever existed matters even in the grand scheme of the universe.
- 14 Even considering how big the universe is, I can say that my life matters.
- 15 *My existence is not significant in the grand scheme of things.*
- 16 *Given the vastness of the universe, my life does not matter.*

MIL judgments = 1, 2, 3, 4

Coherence = 5, 6, 7, 8

Purpose = 9, 10, 11, 12

Mattering = 13, 14, 15, 16

Italicized items are reverse-scored

Supplemental Materials:

Alternative Study 1 models to account for results obtained in Studies 2 and 3

Using Study 1 data, we explored three alternative structural models that closer reflect the pattern of relationships obtained in Studies 2 and 3. In these models, we were interested to shed further light on the relationship between MIL judgments and coherence, which was non-significant in our main Study 1 analysis (see Figure 1 of the main paper). As in the original model, mattering was modelled as a precursor of MIL judgments, and positive and negative affect were again included to control for effects of mood. Because the correlational design of Study 1 was insensitive to causal direction, the fit of all three models was identical to the Study 1 measurement model and path model reported in the main paper: $\chi^2(579) = 1006.01, p < .001$; CFI = .924; RMSEA = .048 (90% CI [.043, .053]); SRMR = .053.

In the first model, depicted in Figure S1, MIL judgments predicted purpose which, in turn, predicted coherence. MIL judgments did not significantly predict coherence directly ($\beta = .14, p = .312, 95\% \text{ CI } [-.09, .37]$), but indirectly predicted coherence through purpose ($\beta = .30, p = .001, 95\% \text{ CI } [.12, .48]$). In the second model, shown in Figure S2, coherence and purpose were parallel covarying outcomes of MIL judgments. In this case, MIL judgments were significantly predictive of coherence ($\beta = .45, p < .001, 95\% \text{ CI } [.26, .63]$). We also ran a final model where purpose and coherence are parallel outcomes, alongside MIL judgments, as shown in Figure S3. Here, coherence showed a significant residual covariance with MIL judgments ($r = .42, p < .001, 95\% \text{ CI } [.25, .59]$). These results are consistent with our longitudinal findings that coherence is not a precursor of MIL judgments, but may be a consequence of, or a parallel experience to, MIL judgments.

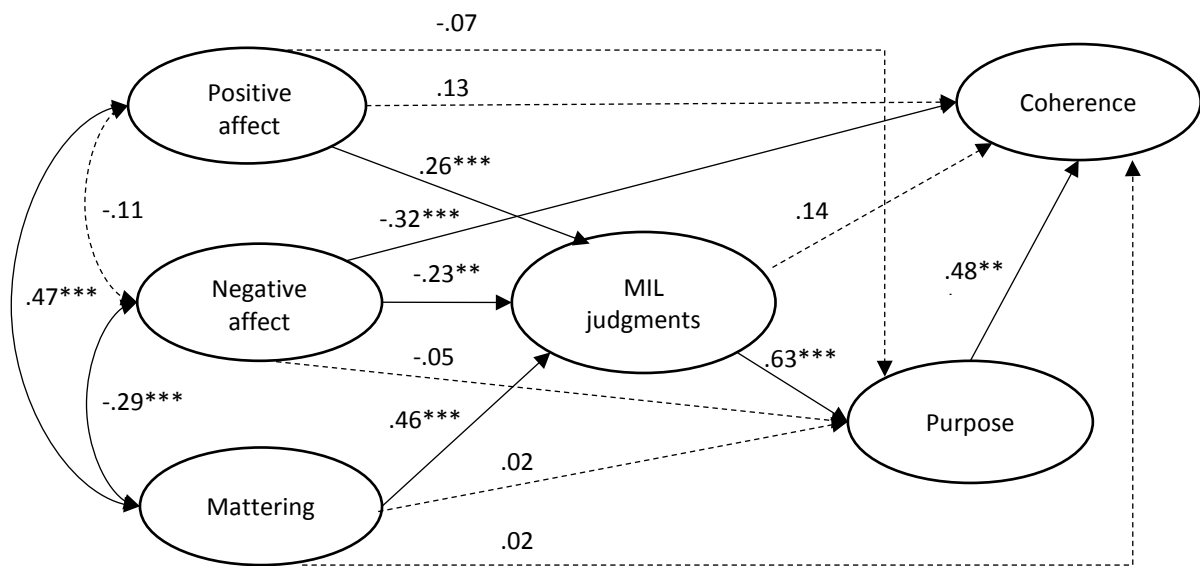


Figure S2. Alternative Study 1 model with MIL judgments predicting purpose, and purpose predicting coherence. Structural equation model with latent factors showing standardized estimates of correlations and paths. Solid lines show significant paths and dotted lines show non-significant paths. * $p < .05$, ** $p < .01$, *** $p < .001$.

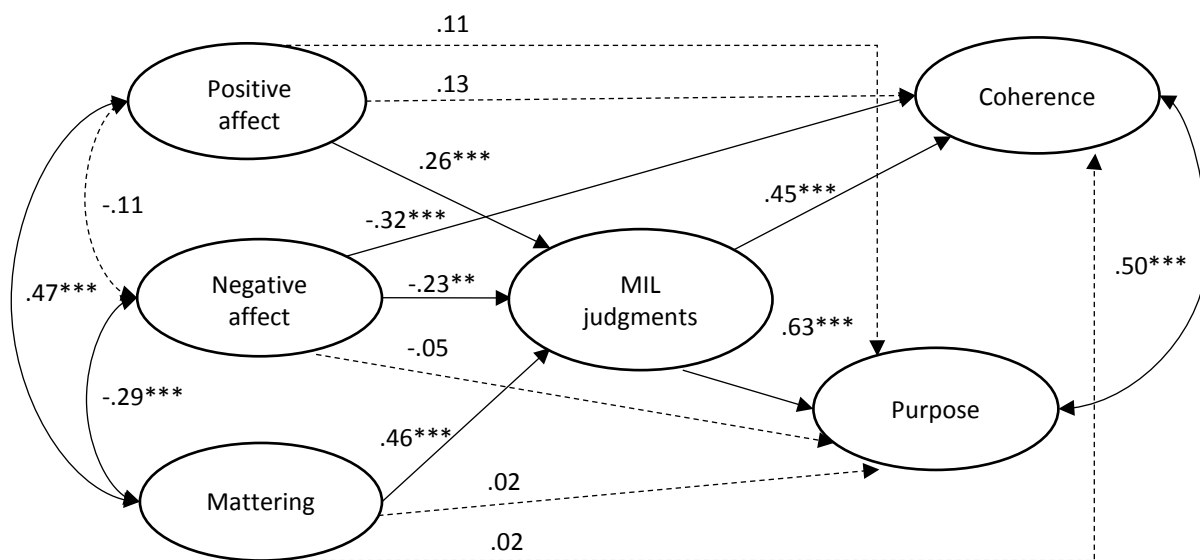


Figure S2. Alternative Study 1 model with coherence and purpose as concurrent outcomes of MIL judgments. Structural equation model with latent factors showing standardized estimates of correlations and paths. Solid lines show significant paths and dotted lines show non-significant paths. * $p < .05$, ** $p < .01$, *** $p < .001$.

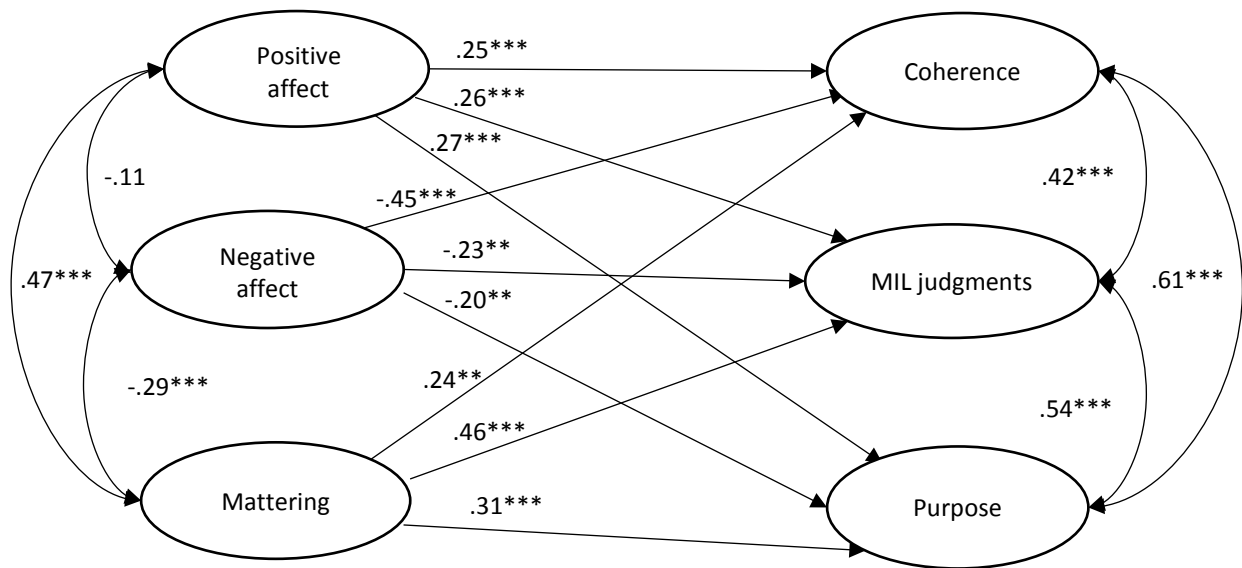


Figure S3. Alternative Study 1 model with. Structural equation model with latent factors showing standardized estimates of correlations and paths. Solid lines show significant paths and dotted lines show non-significant paths. * $p < .05$, ** $p < .01$, *** $p < .001$.