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Metaphors can give life meaning

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ABSTRACT

Conceptual metaphor theory offers a perspective on how and when people find meaning in life. Whereas life's meaning can be difficult to grasp, metaphor compares *life* to a relatively more concrete and structured concept. Supporting this account, American adults (Study 1) and German undergraduates (Study 2) who framed life as a journey reported more meaning in life. The *journey* metaphor was particularly beneficial for individuals with low levels of perceived coherence in life (Study 2). Study 3 further explored this pattern of moderation: An accessible metaphor, compared to other life framings, benefited participants who lack a strong meaning framework. Study 4 focused on the mechanism behind metaphor's influence. Participants who imagined events from their life journey perceived stronger interrelatedness among those events as measured with an analog spatial organization task. Perceived interrelatedness in turn predicted meaning in life, particularly for individuals with a strong preference for well-structured knowledge. Finally, participants who applied their own metaphor to life expressed greater meaning (Study 5), especially those high in personal need for structure (Study 6). An internal meta-analysis of these findings provides cumulative evidence for metaphor's influence on perceived meaning in life and reveals moderating features of the individual.

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The pursuit of meaning in life is considered a fundamental human motive (Frankl, 1985). It should come as no surprise, then, that the presence of meaning in life is linked to health and well-being, including improved relationship satisfaction and interpersonal skills (Baumeister, 1991; Steger, Frazier, Oishi, & Kaler, 2006), happiness (Zika & Chamberlain, 1992), and slower progression of physical illness and disease (Taylor, Kemeny, Reed, Bower, & Gruenewald, 2000). Uncovering the psychological tools that people use to find life's meaning is thus an important goal for social science (Hicks & Routledge, 2013).

Several meaning-making strategies have recently come to light. For example, people can step back from daily minutia to think about personal goals at an abstract level (Trope & Liberman, 2003). They can engage in various forms of mental simulation, such as waxing nostalgic (Baldwin, Biernat, & Landau, 2015; Sedikides & Wildschut, 2017), thinking counterfactually about their birth (Heintzelman, Christopher, Trent, & King, 2013), and imagining

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current events as if they were occurring in a different place (Waytz, Hershfield, & Tamir, 2015). Observing familiar patterns in nature, such as the changing seasons, can also give people the feeling that life is meaningful (Heintzelman, Trent, & King, 2013).

The current research contributes to this exciting area by testing the efficacy of a different strategy: Using metaphor to think about life in terms of superficially unrelated concepts. We start by observing that, across cultures and historical periods, people *talk* about life metaphorically as though it were different types of things (Kövecses, 2005, 2010). For example, English expressions like “I have *come a long way*” and “I *look forward* to my next *step*” compare life to a journey along a path. Other conventional linguistic metaphors compare life to a story (“I am *writing a new chapter*”), a war (“I continue to *battle* with these *demons*”), a game (“I am on the *winning team*”), and a building (“Her life was in *ruins*”), to name just a few.

It is possible that such expressions are merely figures of speech that reveal little about the cognitive mechanics of meaning making. But a more provocative possibility, suggested by conceptual metaphor theory (Lakoff & Johnson, 1980), is that people can use metaphor to comprehend their life, and not just to talk about it. As we elaborate below, this involves drawing on schematic knowledge of a concrete concept (like a *journey*) as a framework for structuring aspects of life. Although metaphoric thinking is recognized as playing an integral role in social cognition (Landau, 2017), experimental evidence that metaphor can promote meaning in life is lacking. The current research aims to fill this gap.

Theoretical framework

Researchers commonly treat meaning in life as a global subjective evaluation and operationalize it accordingly as a unidimensional self-report construct. The widely used Meaning in Life Questionnaire (Steger et al., 2006), for example, assesses the presence of meaning with such items as “I have a good sense of what makes my life meaningful.” Similar measures include the Purpose in Life test (Crumbaugh & Maholick, 1964) and the Life Regard Index (Debats, 1998). Some perspectives treat meaning as simply the experience of positive affect – when people feel good, they infer from those feelings that life is meaningful (Heintzelman & King, 2014a; King, Hicks, Krull, & Del Gaiso, 2006).

A complementary approach treats meaning in life as an epistemic motive – a desire to achieve and maintain particular types of knowledge. Specifically, it represents a desire for a clear, confident understanding of related but distinct dimensions: Purpose (vs. pointlessness) is the degree to which day-to-day experiences are perceived as having some worthwhile end that one is making progress toward; value (vs. worthlessness) is the degree to which life is felt as having admirable or valuable qualities – that life is good; and coherence (vs. fragmentation) is the degree to which separate parts of life – personal history, current experiences, and envisioned future – are perceived to fit into a comprehensible whole. When epistemic needs are satisfied in these domains, a person is more likely to feel as though their life has meaning. As put by Steger (2012), “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” (p. 65). Under this definition, life’s purpose and value can be attained to the extent that one can confidently view life’s many different aspects as interrelated in a coherent manner.

Abstractness undermines access to life's meaning

A long-standing assumption in psychology and philosophy is that this web of connections that allows someone to perceive life as meaningful does not present itself in any direct, self-evident way. Rather, it is something that one must actively find or create, and is under continual assault from inklings of life's meaninglessness (Flanagan, 2009; Schlegel, Vess, & Arndt, 2012; Shaver & Mikulincer, 2012). Approaching meaning in life as an epistemic motive couches this assumption in the contemporary social cognition literature. People are motivated to reach conclusions about life's meaning that feel certain, or certain enough, as opposed to being uncertain or lost in equivocation. In the well-known terms of lay epistemology theory (Kruglanski, 2004), they seek *closure* on interpretations affirming of life's purpose, value, and coherence. Without this closure, the person is vulnerable to the perception that life is meaningless, or "no more than the sum of contingent facts, a chronicle of chance intersections, of flukes, of random events that divulge nothing but their own lack of purpose" (Auster, 1990, p. 256).

The current analysis is premised on the idea that achieving this closure is difficult in part because these dimensions are abstract. Such abstractness results when thinking about entities, forces, and relations that cannot be directly observed and seem removed from the practical realities of daily life (Trope & Liberman, 2010). The person may struggle, for example, to gain a clear mental picture of how her assorted daily activities (e.g., going to the bank) contribute to her life's ultimate purpose and worth. An important question then becomes: How do people gain a firm(er) grasp on these abstract dimensions of meaning in life so that they do not view it as a series of flukes and random events? One answer is provided by conceptual metaphor theory, summarized next.

Conceptual metaphor theory and research

Conceptual metaphor theory distinguishes between linguistic metaphor – a form of talk – and conceptual metaphor, a cognitive tool that people use to understand an abstract concept (called the *target*) in terms of a superficially unrelated concept (the *source*) that is relatively more concrete and easier to grasp, such as a familiar bodily sensation or well-scripted social activity (Kövecses, 2010; Lakoff & Johnson, 1980). At the level of mechanism, conceptual metaphor (hereafter: Metaphor) supports understanding by mentally mapping aspects of the target – select features and relations among them – onto analogous aspects of the source. In this way, thinking with metaphor allows the person to apply a familiar, often embodied, and easily-visualized source schema to structure their understanding of the target.

However, it is unlikely that metaphor use is inevitable or manifests in the same fashion across individuals and situations. Insight into moderating factors comes from conceptual metaphor theory's claim that metaphor use functions to support subjective comprehension by reducing abstractness. This claim goes back at least to Aristotle (ca. 330 BCE; trans. 1924), who said "it is from metaphor that we can best get hold of something fresh" (1.1410). James (1890/1983) similarly observed that people grasp elusive ideas by comparing them to intuitive concepts with parallel structure albeit different surface features. Contemporary cognitive research confirms that individuals seeking to grasp an abstract concept are highly receptive to concretizing metaphors (Low, 2008; Midgley, Trimmer, & Davies, 2013), and that

even intellectual elites rely on metaphor to get a handle on vague abstractions (Dunbar, 1997; Thagard & Beam, 2004).

These converging insights into metaphor's epistemic function point to testable hypotheses about moderators of metaphor use. People's subjective comprehension is reduced when they perceive a target to be unfamiliar, abstract, complex, unstable, or obscure. This state may result from properties of the target itself, the situation, or, as focused on here, individual differences in the presence of, and need for, confident and clear knowledge. The resulting desire to restore a sense of understanding will increase reliance on an available metaphor comparing that target to a source perceived as concrete and structured. If, in contrast, people feel they have a satisfactory grasp of the target in its own terms – perhaps because they are by disposition relatively tolerant of uncertainty – they will be less likely to adopt an available metaphor.

Several studies support these hypotheses: Undergraduates applied *up/down* perceptual cues to evaluate their university when feeling uncertain (vs. certain) about the value of going to college (Keefer, Landau, Sullivan, & Rothschild, 2011); exposure to a *vehicle*-metaphoric framing of a corporate bankruptcy informed observers' blame attributions when they felt uncertain about bankruptcy (Landau, Keefer, & Rothschild, 2014); when the stock market appeared highly abstract, or when an inanimate object behaved unpredictably, participants applied an available metaphor comparing those targets to anthropomorphized agents (Jia & Smith, 2013; Waytz et al., 2010). In all these studies, participants who had a satisfactory subjective grasp of the target did not apply the available metaphor to interpret the target.

Metaphor and meaning in life

Drawing on conceptual metaphor theory and the evidence reviewed thus far, it is possible that metaphor use helps individuals to satisfy the epistemic motive to find meaning in life. To illustrate, consider how one might use the metaphor *life is a journey*. Life is not a journey in any literal sense (e.g., one can make major decisions without taking a single step). Nevertheless, this metaphor recruits knowledge about goal-directed motion along a path – knowledge acquired over years of routine bodily activity – and maps it onto aspects of life. This mapping enables the individual to understand herself as a traveler, her life goals as destinations, means of achieving those goals as paths, difficulties as obstacles, and so on. It is notable that some bits of journey knowledge (e.g., travel insurance, carpools) do not conventionally participate in this mapping. This fits the theoretical claim that metaphor operates as a *partial* mapping, highlighting and downplaying select target elements, in a manner that distinguishes it from a mere similarity relation. By bringing together certain aspects of life into a unified framework, metaphors lend structure especially where it may otherwise be lacking.

Indirect support for metaphor's impact on meaning perceptions comes from evidence that primed metaphors influence other perceptions related to self and identity. Studies show that people can represent their "true" or intrinsic self-concept metaphorically as though it were a core-like entity inside of a container representing their public self-concept (Landau et al., 2011; see also Schlegel et al., 2012). In one illustrative study, participants exposed to pictorial primes of an emerging core-like object felt more strongly that their "real" self is valuable, independent of social approval.

Activating metaphor can similarly bolster perceptions of continuity in experiences and identities separated in time. In one study (Landau, Oyserman, Keefer, & Smith, 2014), some students were exposed to imagery framing an abstract academic goal as a destination on a journey. This prompted them to apply their experience with motion along paths to visualize how that distant-future goal connects to academic activities in the present. Consequently, they were more intent on working hard in their classes in order to realize their future self.

In related findings, priming a *journey*-metaphor strengthened participants' perception that separate events from their past fit into a meaningful progression culminating in their current self-concept (Keefer et al., 2011). Consistent with the foregoing analysis of metaphor's epistemic function, this effect held only when participants were previously induced to feel uncertain about their current self-concept.

In sum, prior studies show that experimentally primed metaphors support comprehension of abstract aspects of self and identity, including the "true" self and the relation between temporally remote actions and outcomes. This work furthermore demonstrates the moderating role of uncertainty: If people lack a clear, confident conception of themselves, they are more likely to reach for a metaphor that organizes their self-concept around a well-structured source. But if their self-views already feel certain, they will be less likely to reach for an accessible metaphor to understand themselves and their experiences.

Still, no prior work (to our knowledge) assesses metaphor's potential influence on global perceptions of meaning in life, or whether epistemic motivation moderates people's use of metaphors of life as a whole. Also, prior studies focused on the effects of provided metaphors (e.g., the "inner core"), which may have influenced self-perceptions merely because of their familiarity in ordinary language. The current studies examine, in addition to the conventional *journey* metaphor, the influence of self-chosen metaphors that may be more idiosyncratic.

Overview of the current studies

Studies 1–3 test whether a salient life metaphor (*life is a journey*) increases global perceptions of meaning in life. Study 4 focuses on the proposed mechanism by which metaphor gives life meaning, namely, organizing life aspects around a concrete source schema. Studies 5 and 6 assess the scope of metaphor's influence on meaning in life by allowing participants to generate their own metaphors.

With the exception of Studies 1 and 5, the current studies also examine the potential moderating role of individual difference variables, testing interactive hypotheses derived from the foregoing account of metaphor's utility for supporting subjective comprehension. Studies 2 and 3 focused on chronic perceptions of life, specifically, assessing participants' sense that their lives are coherent (Study 2) and built around a clear framework (Study 3). Studies 4 and 6 broadened the methodological scope, using the validated Personal Need for Structure (PNS) Scale (Thompson, Naccarato, Parker, & Moskowitz, 2001) to assess participants' global dispositional preference for simple, clear-cut interpretations of social information. Together, these designs enabled us to test whether salient metaphor influences perceived meaning in life particularly when epistemic motivations are strong. Finally, an internal meta-analysis tests the magnitude of the main effect of metaphor across all of six studies and, when assessed, the magnitude of metaphor's interaction with individual differences in epistemic motivation.

Study 1

Study 1 was an initial test of the prediction that framing aspects of life using a metaphor would increase perceptions of meaning in life.

Method

Participants were 120 adults from Amazon.com's MTurk service who participated in an online survey about personal experiences (compensation = \$0.50).¹ We excluded data from 12 participants: 10 indicated that they had recently participated in a "metaphor and meaning" experiment and 2 failed to follow instructions on the life framing prompt (described shortly).² The final sample was 108 adults (57% female; $M_{\text{age}} = 36.75$, $SD_{\text{age}} = 12.89$) who identified as White (75%), Black (11%), Hispanic (6%), Asian (4%), American Indian (1%), and "other" (3%).

Life framing manipulation

Participants were randomly assigned to respond in writing to one of two prompts. In the metaphor condition, the prompt read:

Many people think about life using a metaphor that compares it to a journey. For instance, you might think of yourself as a traveler on a path. Like a journey, your life has a starting point and a destination, and it can stall or move in certain directions. The past is the part of your journey that you have traveled and the future is the road ahead. Take a moment to think about your life as a journey. What are some ways that your life has been a journey?

In the no-metaphor condition, the prompt read

People think about life in a variety of ways. For instance, you might focus on specific events and decisions in your life or simply consider how you feel about life in general. Sometimes you might think about the past while other times you might think about the future. You might even differ on whether you think about life in a positive or negative way. Take a moment to think about your own life. What aspects of your life do you tend to focus on?

We designed the prompts to be parallel on critical dimensions in order to minimize confounds and isolate the *journey* metaphor's effect. Specifically, both prompts asked participants to recall personally relevant aspects of their lives and to construe their lives broadly in terms of past and future, positive and negative.

Next, participants wrote about six different life aspects (*decisions, difficulties, relationships, goals, morals/values, and authenticity*) that have been shown to be factor strongly in meaning in life perceptions (Baumeister, 1991; Sedikides & Strube, 1997; Wong, 1998). Each aspect of life was presented on a separate screen, and participants were provided a text box in which to write about a relevant experience. For participants in the metaphor condition, the presentation of each aspect was paired with a sentence comparing that aspect to an analogous aspect of a journey (e.g., "In the journey metaphor, decisions in your life are like choosing among branching paths. Write a couple sentences about a branching path you have encountered in your life."). In the no-metaphor condition, each aspect was presented in non-metaphoric terms (e.g., "Write a couple sentences about a decision you have made in your life").

Familiarity and enjoyment

Next, participants responded to two items assessing how frequently they think about their own lives in the way they had just done (1 = *rarely or never*; 5 = *very often*; $M = 3.16$, $SD = 1.22$) and how much they enjoyed the task (1 = *not at all*; 5 = *very much*; $M = 3.39$, $SD = 1.20$). We

assessed these variables as potential covariates. The familiarity item would test whether participants were differentially familiar with journey-metaphoric and non-metaphoric conceptions of their lives. Because *life is a journey* is a conventional metaphor (Kövecses, 2010; Lakoff & Johnson, 1980), we wanted to assess the alternative possibility that it boosts meaning simply by virtue of its familiarity. Although we did not anticipate a difference, we also considered the possibility that the journey framing condition would be more enjoyable, and aimed to control for that difference if it emerged.

Meaning in life

Participants then completed Crumbaugh and Maholick's (1964) 20-items Purpose in Life Test ($\alpha = .93$; $M = 3.62$, $SD = .67$). Each item consists of a root statement that participants complete on a 5-point scale, and items capture aspects of meaning such as purpose (e.g., "My personal existence is: 1 = *utterly meaningless and without purpose*; 5 = *purposeful and meaningful*"), significance and value (e.g., "If I should die today, I'd feel that my life has been: 1 = *completely worthless*; 5 = *very worthwhile*), and satisfaction (e.g., Facing my daily tasks is: 1 = *a painful and boring experience*; 5 = *a source of pleasure & satisfaction*). A couple items also tap into perceptions of comprehensibility (e.g., As I view the world in relation to my life, the world: 1 = *completely confuses me*; 5 = *fits meaningfully with my life*). This scale captures all of the dimensions of meaning we discussed previously and is thus an appropriate measure of global meaning in life.

Results and discussion

Preliminary analyses

First, we tested for differences in participants' familiarity and enjoyment. Unexpectedly, an independent-samples *t*-test revealed that participants were less familiar with the *journey-metaphoric* framing compared to the non-metaphoric framing ($M_{\text{metaphor}} = 2.80$, $SD = 1.23$ vs. $M_{\text{no-metaphor}} = 3.47$, $SD = 1.14$), $t(106) = 2.91$, $p = .004$, $d = -.57$, 95% $CI_d = [-.95, -.18]$. Given that familiarity was significantly correlated with meaning in life, $r(107) = .34$, $p < .001$, 95% $CI [.16, .50]$, we included familiarity as a covariate in the primary analyses. Enjoyment of the task did not significantly differ across conditions ($p = .70$).

To ensure that participants' written responses to the life framing prompts were comparable across conditions on other relevant dimensions, we analyzed their writing samples with the Linguistic Inquiry and Word Count Software (LIWC; Pennebaker, Francis, & Booth, 2001). Specifically, we chose to examine overall word count, words associated with temporal scope (e.g., *past*, *future*), words associated with cognitive processes such as insight and causation (e.g., *because*), and positive emotion words (e.g., *happy*, *excited*). A writing sample with frequent use of words in these categories would indicate a high degree of fluency (word count), a global temporal focus (temporal scope), a high degree of elaboration and cognition (cognitive processes), and a generally positive mindset (positive emotions). If participants' expressions were comparable on these dimensions, it would lend support to the notion that it is the metaphoric framing, and not differences in other cognitive and affective processes, that explain our findings. We did not observe any significant differences on these outcomes ($ps > .19$).

We also used LIWC to test if the *journey* metaphor, as it implies motion across space and time, facilitated participants' use of words related to embodied experiences (relativity words;

e.g., *arrive, down, end*). This predicted difference emerged: $M_{\text{metaphor}} = 15.47$, $SD = 3.53$ vs. $M_{\text{no-metaphor}} = 12.95$, $SD = 2.64$, $t(106) = 4.23$, $p < .001$, $d = .82$, 95% $CI_d [.42, 1.21]$. Thus, although the writing prompts were comparable on other related dimensions, the metaphor condition differed specifically in the extent to which a familiar, embodied schema was applied to life.

Primary analyses

We submitted meaning in life scores to an Analysis of Covariance (ANCOVA; controlling for differences in framing familiarity). As predicted, participants who framed their life with a *journey* metaphor (vs. without a provided metaphor) perceived more meaning in life ($M_{\text{metaphor}} = 3.77$, $SE = .09$ vs. $M_{\text{no-metaphor}} = 3.50$, $SE = .08$), $F(1, 105) = 4.75$, $p = .03$, $d = .43$, 95% $CI_d [.05, .81]$.³

The results of Study 1 support our hypothesis that framing life experiences using a metaphor boosts perceived meaning in life. However, because the *journey* metaphor is conventional in the American context from which participants were sampled (McAdams, 1993, 2005), the metaphoric framing could have increased meaning simply because it primed a familiar cultural worldview. This alternative is weakened when considering that participants' familiarity with the *journey* framing was relatively low, and that we controlled for differences in familiarity in our primary analysis. Nevertheless, it is unclear to what extent the value ascribed to the *journey* metaphor influenced perceptions of meaning. Study 2 aimed to replicate the effect found in Study 1, and to assess the generalizability of the effect cross-culturally in a sample of German university students. Study 2 also goes further to begin testing the potential moderating role of individual differences in the presence of, and desire for, well-structured knowledge (i.e., epistemic motivations).

Study 2

Conceptual metaphor theory suggests that people will reach for metaphor especially when they perceive a target to be unfamiliar, abstract, complex, unstable, or obscure. On this basis, we expect people to assimilate a metaphor of life if they are disposed to see life as lacking a clear, coherent structure, but not if they have a strong preexisting sense of life's coherence. Although we expect metaphor to have a positive influence on global meaning in life, this main effect should be qualified by dispositional perceptions of life coherence. We tested these hypotheses in Study 2 with German participants.

Method

Participants were 139 German university students who participated in the laboratory for compensation (a chocolate bar or coffee voucher).⁴ Responses from 7 participants were determined to be invalid based on notes taken by the research assistants during the experimental sessions (e.g., participants who were talking to a friend during the experiment). These data were excluded from analyses, leaving a final sample of 132 participants (59% female; $M_{\text{age}} = 24.42$, $SD_{\text{age}} = 5.83$). A qualified, native German research assistant translated all materials from Study 1 into German. Back translations were conducted in person with supervision by the first author, and any translation issues or questions were resolved with approval from the first author.

Life coherence

Perceived life coherence was measured with the 11-items comprehensibility subscale of Antonovsky's (1987) Sense of Coherence Scale. This subscale measures the extent to which life is felt to have a clear and predictable order.⁵ Each item consisted of a root statement that participants completed by selecting an appropriate response on a 7-point scale (e.g., in English, "In the past ten years your life has been: 1 = *full of changes without your knowing what will happen next*; 7 = *completely consistent and clear*"). Responses were averaged to create a single score, with higher scores indicating greater perceived life coherence ($\alpha = .76$; $M = 4.02$, $SD = .84$).

Life framing manipulation

Participants were randomly assigned to the same *journey* metaphor and no-metaphor conditions as in Study 1. The cover story, materials, and procedure were the same as Study 1 with one exception: Due to time constraints, participants in this study did not apply the *journey* metaphor to the life aspect *authenticity*.⁶ Thus, they wrote about *decisions, difficulties, relationships, goals, and morals/values*.

Meaning in life

Meaning in life was measured using the same scale from Study 1, which was reliable in the German sample ($\alpha = .84$; $M = 3.77$, $SD = .49$).

Results and discussion

We submitted participants' meaning in life scores to an independent samples *t*-test. As in Study 1, conceptualizing life as a journey (vs. without a provided metaphor) increased meaning in life ($M_{\text{metaphor}} = 3.87$, $SD = .45$ vs. $M_{\text{no-metaphor}} = 3.67$, $SD = .51$), $t(130) = 2.42$, $p = .02$, $d = .42$. 95% CI_d [.07, .76]. Next we tested perceived coherence as an individual difference moderator of the effect of metaphor on meaning.

First we examined the association between coherence and meaning in life, and found a significant positive correlation, $r(131) = .49$, $p < .001$, 95% CI [.34, .61]. Next, we tested whether coherence and framing condition interacted to predict meaning in life. A regression analysis was conducted with the PROCESS macro for SPSS (Model 1; Hayes, 2013) with framing condition, life coherence, and the Condition \times Life coherence interaction included as predictors of meaning in life. Condition ($b = .93$, $SE = .36$, $\beta = .96$, $t(128) = 2.56$, $p = .01$, 95% CI_b [.22, 1.65]) and coherence ($b = .36$, $SE = .06$, $\beta = .61$, $t(128) = 6.36$, $p < .001$, 95% CI_b [.25, .47]), were both significant predictors of meaning in life in the regression model. However, these effects were qualified by the expected interaction, $b = -.18$, $SE = .09$, $\beta = -.78$, $t(128) = 2.07$, $p = .04$, 95% CI_b [-.36, -.01].

We decomposed this interaction using the Johnson-Neyman technique (Hayes, 2013), which probes the conditional effect of a predictor variable at values of the moderator and determines the value of the moderator for which the effect of the predictor becomes significant at $p < .05$. As predicted, the effect of framing life metaphorically (vs. non-metaphorically) on meaning in life was significant, and positive, as levels of perceived coherence decreased below 4.28 ($z = .31$). The corresponding simple slopes are depicted in Figure 1.

Framing life aspects as parts of a physical journey increased perceived meaning in life, a finding that directly replicates Study 1. Study 2 goes further to show that this effect

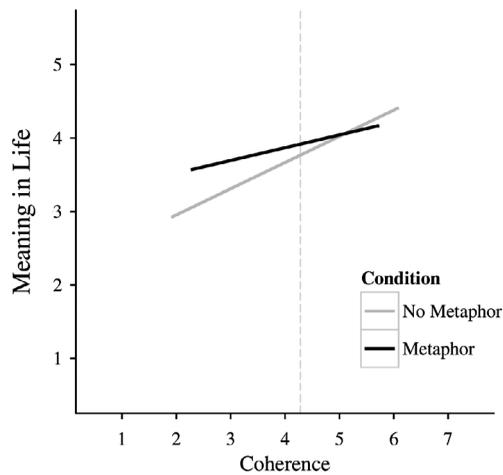


Figure 1. Cued metaphors of life bolster felt purpose particularly for individuals with low life coherence (Study 2).

Notes: The vertical dashed line indicates the Johnson-Neyman value of coherence where the effect of condition on meaning in life becomes significant at $p = .05$. Condition effects to the left of the dashed line are significant at $p < .05$ whereas condition effects to the right of the line are not statistically significant. Regression lines only extend the range of the data.

generalizes cross-culturally with German participants, suggesting that metaphors function by transferring commonly experienced schemas onto target concepts despite linguistic and cultural differences that might exist among those ideas.

Study 2 also yielded evidence supporting our functional account of metaphor use in forming perceptions of one's life. Framing life with a metaphor was particularly beneficial for finding meaning in life among individuals who have difficulty understanding how their life experiences are interrelated. These findings are consistent with our claim that transferring a well-structured source experience (here, moving along a journey) lent structure to separate life aspects when that structure was perceived as lacking.

However, it is still possible that metaphor's influence on meaning in life is simply due to thinking about life in terms of some other thing *in general*, rather than the products of a mapping between analogous parts of dissimilar concepts. Study 3 assesses this alternative possibility by comparing metaphor to two other framings of life that could function to lend life meaning. We also aimed to conceptually replicate the pattern of moderation found in Study 2.

Study 3

Our theoretical account posits that metaphor use helps people find meaning by transferring a familiar, well-structured schema from a source to the relatively more abstract notion of life as a whole. This account yields the moderation hypothesis tested in Study 2: Activating a life metaphor will support meaning particularly for individuals who lack a strong sense that their life has structure. Study 3 was designed to conceptually replicate that moderation effect, testing whether metaphor use benefits individuals who lack a framework of meaning. According to prevalent theories of meaning in life, a sense of meaning requires that a person be committed to some *framework* that provides a perspective for putting one's experiences

in context (Battista & Almond, 1973; Frankl, 1985; Maslow, 1964). Without a framework of meaning, life can lack structure and experiences can feel random and disjointed.

We measured the strength of participants' meaning framework, randomly assigned them to one of three life-framing conditions, and then measured meaning in life. In one condition, participants framed life aspects by describing their expectations for life five years in the future. According to construal level theory (Trope & Liberman, 2010), this future focus shifts attention away from concrete details and toward higher-level features of the target, which can facilitate comprehension of meaningful aspects of that target (Liberman, Sagristano, & Trope, 2002). Other research has shown that viewing one's self as temporally extended serves an important self-continuity function (Landau, Greenberg, & Solomon, 2008) and people generally see the future self as an improvement over the current and past selves (McAdams, 2005; Wilson & Ross, 2001). Indeed, evidence suggests that a dispositional focus on the future is associated with higher meaning in life scores (Steger, Kashdan, Sullivan, & Lorentz, 2008). However, the future is an uncertain intangible idea, and thus projecting life experiences into the future (without a metaphor) should not provide the structure that those with a weak framework of meaning need for comprehending the meaning of life.

In another condition, participants framed life aspects in terms of their defining personality traits. It has been shown that an abstract construal level prompts construing targets in terms of their traits (vs. behaviors; Rim, Uleman, & Trope, 2009). According to these authors, trait inferences, especially those that are generated spontaneously about a target, can provide "meaningful dispositional information about particular individuals" (p. 1089) that help perceivers determine the higher-level meaning of an action. Furthermore, traits that are perceived as invariant across distance are shown to be useful when predicting an actor's future behavior (Nussbaum, Trope, & Liberman, 2003), thus contributing to a sense of continuity over space and time. Although people are probably familiar with, and aware of, the traits that define who they are, the current account suggests that, because such traits are ultimately intangible ideas, their accessibility will not provide the structure that those with a weak framework of meaning need for comprehending the meaning of life.

The metaphor condition used the same journey framing as in Studies 1 and 2. Thus, the crucial difference between the metaphor condition and the two comparison conditions is that only in the metaphor condition are participants led to map aspects of life onto aspects of a concrete source concept. This makes it unlikely that priming a future focus, a general comparative process, or focusing attention on familiar self-defining characteristics can explain any observed effect of framing life using a metaphor.

Method

Participants were 261 adults (48% female, $M_{\text{age}} = 34.22$, $SD_{\text{age}} = 10.92$) who participated on Mechanical Turk (compensation = \$1.00).⁷ They identified as White (77%), Asian (9%), Black (9%), Hispanic (4%), American Indian (<1%), and "other" (<1%).

Framework of meaning

We measured the strength of participants' meaning framework with the framework subscale of Battista and Almond's (1973) Life Regard Index. Participants used a 5-point scale (1 = *strongly disagree*; 5 = *strongly agree*) to indicate their agreement with 14 statements

(e.g., “I have a system or framework that allows me to truly understand my being alive”). The framework measure was reliable ($\alpha = .93$; $M = 3.59$, $SD = .84$).

Life framing manipulation

Participants were randomly assigned to one of three life-framing conditions in which they were prompted to write about their experiences in the same life domains as Study 1. In the *metaphor condition*, participants were instructed to write about how an experience in each domain is related to an aspect of a journey. In the *future condition*, participants were instructed to “think about what your life will be like five years in the future” and to write about an experience in each domain that is likely to occur five years from now. In the *personality condition* participants were instructed to “think about your life as a reflection of personality traits that define who you are” and then to write about how an experience in each domain is related to one of their personality traits.

Meaning in life

Following the life-framing manipulation, participants completed the 5-item Presence of Meaning scale (Steger et al., 2006). Using a 7-point scale (1 = *absolutely untrue*; 7 = *absolutely true*) they responded to items assessing the subjective feeling that life has meaning (e.g., “I have a good sense of what makes my life meaningful”). The measure was reliable ($\alpha = .96$; $M = 4.95$, $SD = 1.65$).

Results and discussion

Preliminary analyses

As in the previous studies, we used the LIWC software to compare the content of participants' responses between the metaphor and no-metaphor conditions. For overall word count, a planned contrast comparing the metaphor condition to the average of the future and personality conditions was used. Unexpectedly, word count was higher in the metaphor condition, *value of contrast* = 49.49, $SE = 17.52$, $t(258) = 2.82$, $p = .005$. Although word count was positively associated with meaning in life, $r(260) = .12$, $p = .05$, 95% CI [.01, .24], controlling for this variable in our analyses did not influence the predicted effects so it is not discussed further. Positive words were also used more frequently in the two comparison conditions when compared to the metaphor condition, *value of contrast* = 2.33, $SE = .57$, $t(258) = 4.06$, $p < .001$. Positive emotion word use was not correlated with any of the key variables ($p > .62$).

Because the future and personality conditions are *abstract* comparison conditions, we tested whether cognitive word use in those two conditions was higher, on average, when compared to the metaphor condition. This was indeed the case, *value of contrast* = 6.69, $SE = 1.06$, $t(258) = 6.31$, $p < .001$. Cognitive word count was negatively correlated with both framework $r(260) = -.14$, $p = .02$, 95% CI, [-.25, -.03], and meaning in life, $r(260) = -.17$, $p = .008$, 95% CI, [-.28, -.05], but controlling for this variable in our analyses did not influence the predicted effects.⁸

Also, because we designed the future condition to be an extended temporal focus comparison, we tested whether participants in the future condition (vs. the average of the metaphor and personality conditions) used more future-oriented language when describing their experiences. The expected pattern emerged, *value of contrast* = 7.61, $SE = .36$, $t(258) =$

21.04, $p < .001$. Future focus was not significantly correlated with any of the key variables ($ps > .10$).

Finally, we checked whether descriptions of embodied experiences (i.e., relativity words) were higher in the metaphor condition compared to the average of the two comparison conditions. This was indeed the case, *value of contrast* = 7.38, $SE = 1.12$, $t(258) = 6.60$, $p < .001$, providing further support that our metaphor induction prompts metaphoric transfer.

Primary analyses

First we examined main effects of condition and framework on presence of meaning in life. As would be expected, framework was positively correlated with the presence of meaning, $r(260) = .87$, $p < .001$, 95% CI, [.83, .90]. There was no significant main effect of condition on meaning in life, $F(2, 258) = 1.45$, $p = .24$. Next, we conducted regression analyses to test the hypothesis that activating a life metaphor increases meaning especially for people who have a weak meaning framework. Helmert coding was used to create two dummy codes representing the comparison between the metaphor condition and the average of the personality and future conditions (D1) and the comparison between the future and personality conditions (D2). Individual differences in Framework, the two dummy codes, and the Framework \times D1 and Framework \times D2 interactions were tested as predictors of the presence of meaning (See Table 1 for regression coefficients and significance tests).

However, this was qualified by the expected framework \times D1 interaction ($p = .04$). We decomposed the interaction using the PROCESS macro for SPSS and the Johnson-Neyman technique (Hayes, 2013). A graph of the interaction can be found in Figure 2. As predicted, the effect of metaphor (vs. the average of the two comparison conditions) on presence of meaning was significant, and positive, as levels of framework decreased below 3.34 ($z = -.30$).

Study 3 conceptually replicates Study 2 by demonstrating that an activated life metaphor reinforces meaning in life particularly among individuals who generally have difficulty comprehending their life's meaning. In this way, Studies 2 and 3 provide converging support of our moderation hypotheses using different methods for measuring variability in participants' motivation to confidently grasp life's meaning. Study 3 goes further to provide evidence that metaphors support meaning more than other framings shown to boost meaning, at least among individuals with a weak meaning framework. Despite their documented psychological benefits, framings focused on the distant future or self-defining traits give a relatively abstract picture of life – an assumption supported by our text analysis (i.e., higher

Table 1. Summary of regression analysis for meaning in life as a function of life framing condition and pre-existing meaning framework, Study 3.

Independent variable	Unstandardized coefficients			Standardized coefficients		
	<i>b</i>	SE	95% CI _{<i>b</i>}	β	<i>t</i> (255)	<i>p</i>
Intercept	-1.14	0.23	(-1.59, -.69)		5.03	<0.001
Framework	1.70	0.06	(1.57, 1.82)	0.86	27.56	<0.001
D1	-1.15	0.49	(-2.11, -.19)	-0.33	2.36	0.02
D2	0.25	0.55	(-.83, 1.34)	0.06	0.46	0.65
Framework \times D1	0.28	0.13	(.01, .54)	0.29	2.08	0.04
Framework \times D2	-0.05	0.15	(-.33, .24)	-0.04	0.31	0.76

Notes: D1 = metaphor condition vs. average of future and personality conditions; D2 = future condition vs. personality condition; Bold text highlights significant effects.

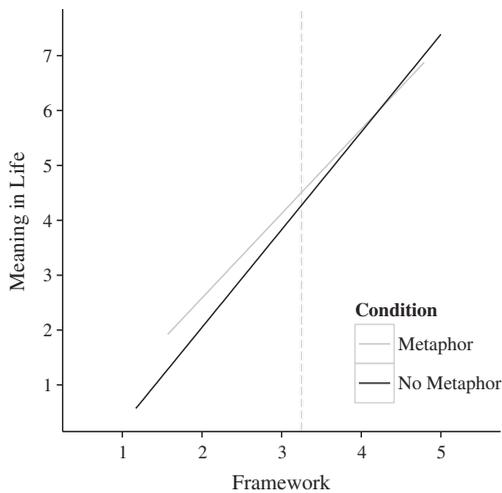


Figure 2. Cued metaphors of life bolster felt meaning particularly for individuals with a weak meaning framework (Study 3).

Notes: No Metaphor = average of future and personality conditions. The vertical dashed line indicates the Johnson-Neyman value of framework where the effect of condition on meaning in life becomes significant at $p = .05$. Condition effects to the left of the dashed line are significant at $p < .05$ whereas condition effects to the right of the line are not statistically significant. Regression lines only extend the range of the data.

cognitive word use). However, the negative correlations among cognitive word use, presence of a meaning framework, and meaning in life, could be evidence in support of the notion that some meaningful ways of thinking about life experiences are *too* abstract to facilitate comprehension. Thus, for individuals with a relatively weak framework of meaning, metaphor is uniquely beneficial, presumably because it maps life onto a concrete schema for a familiar activity.

It is important to note that a main effect of metaphor on meaning in life did not emerge in Study 3. This null effect can be attributed to the chosen comparison conditions, which offered framings of life that can boost meaning, especially when a framework of meaning is present. But when life is experienced as incoherent or lacking in structure, it is metaphor that gives life more meaning. We hypothesize that metaphor does so by offering a familiar schema for organizing and conceptualizing life experiences. In Study 4 we aimed to show direct evidence for this mechanism.

Study 4

If metaphor use serves to link different aspects of a target (e.g., *life*) to a common source (e.g., *a journey*), then people would be expected to perceive aspects of that target as more interrelated when framed metaphorically compared with non-metaphoric framings. In other words, through the processes of metaphoric transfer and structural alignment, aspects of the target will form a tighter conceptual “web” of interrelated elements. We examined this process using the novel and versatile spatial arrangement method for multidimensional scaling (SpAM; Hout, Goldinger, & Ferguson, 2013). This procedure offers a valid and efficient measure of the interrelatedness of stimuli and can be applied to both perceptual relatedness (e.g., between letters of the alphabet in varying font sizes; Goldstone, 1994) and conceptual

relatedness (e.g., names of animals; Hout et al., 2013). More recently, the SpAM method has been used to assess differences in the ways groups of stimuli are conceptualized. For instance, SpAM has been used to meaningfully differentiate social groups on stereotypic dimensions (Koch, Imhoff, Dotsch, Unkelbach, & Alves, 2016) and can reliably show that positive stimuli (e.g., words) are more conceptually dense, that is, have higher inter-stimulus proximity on average, than negative stimuli when spatially arranged (Koch, Alves, Krüger, & Unkelbach, 2016).

We applied the SpAM paradigm to assess the perceived density – or interrelatedness – of participants' idiosyncratic life experiences when those experiences were framed as part of a journey or in non-metaphoric terms. We expected metaphor to increase the density of self-generated life events. We further predicted, based on our foregoing theory and findings, that the effect of metaphor on the increased density of life events would mediate increased meaning in life for participants who are motivated to establish confident, clear-cut understanding of their lives. We operationalized meaning in life as a composite of perceived meaning, comprehensibility of experience, and assessments of life's value and significance. Individual differences in the motivation for structured knowledge were measured with the PNS Scale.

Method

Participants were 199 adults (48% female, $M_{\text{age}} = 36.50$, $SD_{\text{age}} = 11.51$) who participated on Mechanical Turk (compensation = \$1.00).⁹ They identified as White (75%), Asian (10%), Black (9%), Hispanic (5%), and "multiracial/other" (1%).

Personal need for structure

Chronic epistemic motivation was assessed with Thompson et al.'s (2001) 12-item PNS scale, which assesses the extent to which individuals prefer order, certainty, and unambiguous knowledge. Participants indicated their level of agreement with each of the 12 items (e.g., "I enjoy having a clear and structured mode of life") on a 7-point scale (1 = *strongly disagree*; 7 = *strongly agree*). The scale formed a reliable composite ($\alpha = .89$; $M = 4.66$, $SD = 1.01$).

Life framing manipulation

Participants were randomly assigned to a metaphor or no-metaphor condition, as in the previous studies. In the metaphor condition, participants were given a short description that *life is a journey* and then instructed to generate 15 different life events that "you have experienced on your journey." In the no-metaphor condition, participants generated 15 life events but were not given any further description of life. Participants typed one or two keywords describing each life event in separate text boxes.

Participants were then provided instructions for the SpAM task, which stated that their life events would appear in the middle of the screen and they were to arrange each event so that events more related to one another are closer together, and events less related are further apart. Participants were given further clarification to place events that are strongly related (unrelated) in the same position (opposite ends) of the screen.

The SpAM task was presented with a black background that covered the entire screen. Each life event was presented separately outlined by a white border, and together the life events created a 5×3 matrix in the center of the screen. After moving an event, the white

border disappeared so that participants could distinguish which events had been dragged and which had not. After arranging all of the events, participants were prompted to make final adjustments if they wanted to before moving to the next screen. For each of the 15 life events, we computed the average pixel proximity to all other life events in proportion to the length of the screen diagonal (i.e., the maximum possible distance). Following methods used in prior research (Koch et al., 2016), we label this ratio *event density* and coded values such that high scores represent high relatedness among life events.

Life comprehensibility

We created seven items to assess participants' subjective feelings that life is generally well-structured and comprehensible. Items were face valid (e.g., "I find it difficult to understand why things in my life happen the way they do (reversed);" see the Appendix 1 for full scale) and formed a reliable composite ($\alpha = .83$; $M = 5.01$, $SD = .99$).

Presence of meaning

The presence of meaning in life was assessed with the same 5-item presence of meaning scale used in Study 3 ($\alpha = .94$; $M = 5.03$, $SD = 1.63$).

Life satisfaction

The 5-item Satisfaction with Life Scale Diener, Emmons, Larsen, and Griffin (1985) was used to assess subjective well-being, or the general feeling that life is valuable and good. Participants used a 7-point scale to respond to statements such as: "In most ways my life is close to my ideal" ($\alpha = .94$; $M = 4.46$, $SD = 1.64$).

Positive and negative affect

Next, participants reported their mood using a 20-item measure of positive and negative affect (PANAS; Watson, Clark, & Tellegen, 1988). Using a 7-point scale (1 = *slightly or not at all*, 5 = *a great deal*) they indicated how much they were feeling 10 positive emotions ($\alpha = .91$; $M = 2.99$, $SD = .90$) and 10 negative emotions ($\alpha = .95$; $M = 1.38$, $SD = .69$). We assessed mood as a potential covariate.

Results and discussion

Preliminary analyses

First we examined bivariate correlations among the measures assessing different facets of meaning in life: Comprehensibility, presence of meaning, and life satisfaction. All of the measures were highly correlated, $r_s(198) = .60, -.70, p_s < .001$, so we opted to create a composite meaning in life index by averaging participants' standardized scores on each scale. The standardized index was reliable ($\alpha = .89$). Then we confirmed that participants' mood was not affected by condition. Neither positive ($p = .80$) nor negative ($p = .23$) affect was different across conditions. Thus it is unlikely that any effects of condition are driven by changes in mood. PNS was not significantly correlated with either primary outcome variable: Density ($p = .32$) or meaning in life ($p = .35$).

Main effects

We then tested for condition effects on event density and the composite of meaning in life with independent samples *t*-tests. Life events for participants in the metaphor condition

were arranged more densely compared to those in the no-metaphor condition, $M_{\text{metaphor}} = .82$, $SD = .07$ vs. $M_{\text{no-metaphor}} = .79$, $SD = .07$, $t(197) = 2.68$, $p = .008$, $d = .43$, 95% CI_d [.15, .71]. No significant main effect of condition emerged for meaning in life ($p = .24$).

Moderation by PNS

Next, we incorporated PNS as a continuous moderator variable, testing whether the effect of condition on event density and meaning in life were a function of personal need for structure. Separate regression analyses tested Framing condition, PNS, and the Condition \times PNS interaction as predictors of event density and meaning in life (see Table 2 for regression coefficients and significance tests). The interaction was not significant for event density ($p = .30$) but did emerge for meaning in life as expected ($p = .02$). In line with Studies 2 and 3, simple slopes analyses revealed that framing life events metaphorically increased meaning in life as the need for structure increased above 5.10 ($z = .44$).

Moderated mediation

Finally, we tested the hypothesis that participants high in PNS would be especially likely to translate the increased event density provided by metaphor into meaning in life. To do so, we used the PROCESS macro for SPSS (5000 bootstrap resamples; Model 15; Hayes, 2013) and specified a moderated mediation model in which the effect of condition on meaning in life was mediated by event density, and both effects of condition and event density on meaning in life were moderated by PNS (see Figure 3).

The effect of event density on meaning in life was moderated by PNS, $b = 2.46$, $SE = .88$, $\beta = 2.39$, $t(193) = 2.81$, $p = .006$, 95% CI_b [.73, 4.19]. As expected, event density was associated with higher meaning in life as PNS increased above 5.34 ($z = .67$). In contrast, event density was associated with lower meaning in life as PNS decreased below 3.38 ($z = -1.27$). The indirect effect of condition on meaning in life through event density was significant and positive only for participants high in PNS (+1SD), *indirect effect* = .08, $SE = .05$, 95% [.01, .20]. The index of moderated mediation was also significant, *index* = .07, $SE = .04$, 95% [.010, .17], suggesting that the indirect effect through event density is indeed dependent on PNS. However, the condition \times PNS interaction on meaning in life remained significant in the moderated mediation model, $b = .31$, $SE = .12$, $\beta = .99$, $t(193) = 2.59$, $p = .01$, 95% CI_b [.07, .55], suggesting that event density cannot explain the entire interaction effect of condition and PNS on meaning in life.

Table 2. Summary of regression analysis for density and meaning in life as a function of life framing condition and personal need for structure, Study 4.

Dependent variable	Independent variable	Unstandardized coefficients			Standardized coefficients		
		<i>b</i>	SE	95% CI_b	β	<i>t</i> (195)	<i>p</i>
Density	Intercept	0.86	0.08	(0.19, 0.21)		11.37	<0.001
	Condition	-0.02	0.05	(-0.05, -0.01)	-0.15	0.46	0.65
	PNS	-0.02	0.02	(-.05, 0.01)	-0.28	1.28	0.20
	Condition \times PNS	0.01	0.01	(-0.01, 0.03)	0.40	1.05	0.30
Meaning in life	Intercept	1.98	0.91	(0.19, 3.76)		2.19	0.03
	Condition	-1.16	0.58	(-2.31, -0.02)	-0.67	2.01	0.05
	PNS	-0.47	0.19	(-.84, -0.09)	-0.54	2.47	0.01
	Condition \times PNS	0.28	0.12	(0.04, 0.52)	0.89	2.30	0.02

Note: Bold text highlights significant effects.

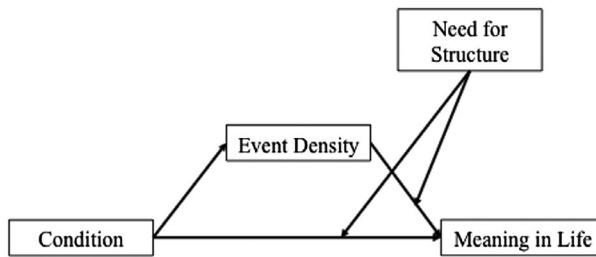


Figure 3. Hypothesized moderated mediation model (Study 4).

Notes: The conditional effect of condition on meaning in life for people high in PNS is mediated by event density, also for people high in PNS.

Study 4 shows that life events that are conceptualized as part of one's journey are perceived as more interrelated (i.e., densely arranged in space) than life events that are conceptualized without a metaphor. The interrelatedness that metaphors offer to life events is then translated as higher meaning in life, but only for people who seek structure and order in their lives (moderated mediation). Study 4 also offered supporting evidence for the hypothesis that metaphors are a tool for comprehending meaning in life, especially when epistemic needs are high. In this study, it was participants high in the need for structure – those who seek order and avoid uncertainty in their lives – that benefited from generating and organizing life events using an accessible metaphor. In fact, we found some suggestive evidence for the opposite effect of metaphor and event density on meaning in life for people who are low in the need for structure. Thus it could be that metaphors sometimes feel restrictive when they offer structure where none is needed or desired. Participants low in the need for structure might view metaphors – especially those that are imposed on them – as undermining the variety and spontaneity of life that they enjoy.

So far, we have demonstrated that metaphors can give life meaning, especially when people are motivated to reach for the concrete structure that metaphors offer. However, one limitation in the previous studies is that we provided participants with a conventional metaphor, *life is a journey*, and explicated that metaphor's mappings in the instructions (e.g., "Decisions are like branching paths"). Thus, it is unclear whether priming other metaphors also lends life meaning, and whether accessible metaphors can be applied to conceptualize life aspects even if conceptual mappings are not explicitly provided. We address these limitations in Studies 5 and 6 by allowing participants to generate their own, idiosyncratic metaphor for life prior to indicating their perceptions of life meaning.

Study 5

In Study 5, participants generated their own metaphor for life before being randomly assigned to describe life aspects with or without that metaphor. To clarify, all participants were induced to generate a life metaphor, but only in one condition were they instructed to apply that metaphor to describe life's decisions, goals, and other aspects. We compared this condition to a metaphor-no-mapping condition, in which participants generated a life metaphor but did not subsequently apply it. This enabled us to assess whether metaphor lends life meaning when applied to conceive different parts of life, as we hypothesize, and not merely by cuing a simple figurative image of one's life.

Method

Participants were 63 adults participating on MTurk (compensation = \$0.50).¹⁰ We excluded data from 4 participants who did not follow instructions and 4 participants who indicated that they had completed a “metaphor and meaning” study recently. The final sample consisted of 55 adults (64% female; $M_{\text{age}} = 34.73$, $SD_{\text{age}} = 14.54$) who identified as White (67%), Hispanic (13%), Asian (7%), Black (4%), and Other or Multiple identifications (9%).

Life framing manipulation

Participants read the same cover story as in Study 1 and then were asked to “take a moment to think about a metaphor that best describes your life.” Instructions made it clear that they could choose any metaphor they wanted. They were asked to complete the root phrase “My life is a/an ...” by typing their chosen metaphor into a text box. Various metaphors were generated, some conventional (e.g., *story*), others idiosyncratic (e.g., *casserole*).

Next, participants were randomly assigned to a metaphor or metaphor-no-mapping condition. Participants in the metaphor condition were instructed to use their chosen metaphor to describe an experience from each of the six life aspects from Study 1 (decisions, difficulties, relationships, goals, morals/values, and authenticity). Participants in the metaphor-no-mapping condition were not instructed to use their metaphor, and instead described their experiences with those six aspects in plain terms.

Meaning in life

We assessed meaning in life with the same measure from Studies 1 and 2 ($\alpha = .93$; $M = 3.37$, $SD = .74$) so that we could directly compare the main effects in this study with those found previously.

Results and discussion

Preliminary analyses

As in previous studies, we compared the length and content of written responses (using LIWC). Overall word count and percent of total words associated with temporal focus and cognitive processing were examined. Independent samples *t*-tests revealed that overall word count did not differ significantly between conditions ($p = .92$). Percent of words associated with a future focus did not differ significantly across conditions ($p = .25$), although the percent of past-focused words was marginally higher in the metaphor condition ($M_{\text{metaphor}} = 2.92$, $SD = 2.34$ vs. $M_{\text{metaphor-no-mapping}} = 2.01$, $SD = 1.42$), $t(53) = 1.76$, $p = .09$, $d = .48$, 95% CI_d [-0.06, 1.01]. However, past-focused word use was not significantly associated with meaning in life ($p = .12$). Positive emotion words were higher in metaphor-no-mapping condition ($M_{\text{metaphor}} = 4.05$, $SD = 1.61$ vs. $M_{\text{metaphor-no-mapping}} = 5.95$, $SD = 2.14$), $t(53) = 3.69$, $p = .001$, $d = 1.00$, 95% CI_d [.43, 1.56] but positive word use was not associated with meaning in life ($p = .79$). Cognitive word use did not differ significantly across conditions ($p = .21$).

Again, we looked for between-condition differences in words related to embodied experiences (i.e., relativity words). Although participants in Study 5 were not provided a *journey* metaphor, we still expected relativity words to be higher for those participants instructed to use their metaphor as many common life metaphors are grounded in sensorimotor and bodily experiences (Lakoff & Johnson, 1980). This effect emerged, $M_{\text{metaphor}} = 13.76$, $SD = 4.28$ vs. $M_{\text{metaphor-no-mapping}} = 10.90$, $SD = 2.45$, $t(53) = 3.09$, $p = .003$, $d = .83$, 95% CI_d [1.28, 1.38].

Primary analyses

Submitting meaning in life scores to an independent samples *t*-test revealed that applying (vs. not applying) a personal metaphor to describe life aspects increased perceived meaning ($M_{\text{metaphor}} = 3.65, SD = .53$ vs. $M_{\text{metaphor-no-mapping}} = 3.06, SD = .81$), $t(53) = 3.11, p = .003, d = .85$, 95% CI_d [.30, 1.41].

Study 5 replicates Studies 1 and 2 and strengthens our empirical contribution by addressing two alternative interpretations of the previous studies. First, it is plausible that the effects seen in earlier studies resulted from the salience of any trope used in popular culture to describe life – in this case, the image of the journey – rather than priming metaphor per se. We recognize that the *journey* metaphor is commonly used in greeting cards, motivational speeches, and other inspirational communications, and may therefore have boosted meaning by simply priming conventional images. The results of Study 5 suggest that this is unlikely, however, because they show that participants asked to come up with their own, personal metaphor of life felt a stronger sense of life's meaning. In fact, many of the metaphors generated were quite idiosyncratic (e.g., *snowflake on the moon, bouncy ball, twisted up tremendous spider web*).

A second plausible alternative interpretation is that even if the prior effects are specific to metaphor, they resulted from the mere accessibility of a metaphoric snapshot of one's life, not a mental mapping between life and a concrete source, as suggested by conceptual metaphor theory. Contrary to this possibility, in Study 5 all participants brought to mind a personally resonant life metaphor, but it was only those led to systematically apply their chosen metaphor to describe life aspects that felt a stronger sense of meaning. Put differently, participants in Study 5 were induced to generate their metaphor's mappings between features of the chosen source and analogous features of life – the mappings that are theorized to underlie metaphor's unique influence on self-conceptions. Moreover, participants' life descriptions were equivalent in terms of scope, elaboration, and thoughtfulness, suggesting that these factors cannot account for the observed effect.

Study 6 aimed to replicate and extend Study 5 by adding a no-metaphor (control) condition and to further assess our functional account of metaphor's influence by testing the potential moderating role of individual differences in the desire for clear-cut knowledge.

Study 6

Study 6 is a final replication study that aims to provide further support that metaphor use in general, and not the *journey* metaphor in particular, can lend life meaning; and that metaphor use is particularly beneficial for individuals who are predisposed to desire clear and confident understanding. The procedure was identical to Study 5, except that we included a no-metaphor control condition along with the metaphor and metaphor-no-mapping conditions. We assessed PNS as an individual difference moderator.

Method

Participants were 188 adults participating on MTurk (compensation = \$1.70).¹¹ We excluded data from one participant who did not generate a metaphor as instructed. The final sample consisted of 187 adults (48% female; $M_{\text{age}} = 35.53, SD_{\text{age}} = 10.85$) who identified as White (75%), Asian (9%), Black (9%), Hispanic (6%), American Indian (<1%) and Other (1%).

Personal need for structure

Participants completed the 12-item PNS Scale described in Study 4 ($\alpha = .93$; $M = 4.73$, $SD = 1.17$).

Life framing manipulation

Participants then read the same cover story as in Study 5 and were randomly assigned to one of three conditions. In the metaphor condition, participants were instructed to choose a personal life metaphor and to apply that metaphor to describe six aspects of their lives. In the metaphor-no-mapping condition, participants were instructed to choose a personal life metaphor and, subsequently, to describe six life aspects with no instructions to apply their metaphor. The materials and procedure for these two conditions were identical to those of Study 5. In the new no-metaphor condition, participants described the six life aspects in plain terms (similar to the no-metaphor conditions from Studies 1 & 2).

Meaning in life

We assessed meaning in life with the same measure from Studies 1, 2 and 5 ($\alpha = .93$; $M = 3.65$, $SD = .74$).

Results and discussion

Preliminary analyses

We first compared the length and content of written responses with a planned contrast comparing the metaphor condition to the average of the metaphor-no-mapping and no-metaphor conditions. Total word count was higher for participants in the metaphor condition compared to the other two conditions, $contrast = 106.99$, $SE = 31.88$, $t(184) = 3.36$, $p = .001$. Word count was not associated with any of our key variables ($ps > .26$). Positive emotion words were higher in the two comparison conditions compared to the metaphor condition, $contrast = 1.65$, $t(184) = 2.61$, $p = .01$. But positive word use was not associated with our key variables ($ps > .25$). Words associated with temporal focus did not differ significantly across conditions ($ps > .15$) nor did words indicative of cognitive processes ($p = .92$).

We also checked for differences in descriptions related to embodied activity (relativity words). As in the previous studies, we expected relativity words to be higher for those participants who applied a chosen metaphor to frame their lives. This effect emerged, $contrast = 2.59$, $SE = 1.22$, $t(184) = 2.12$, $p = .04$. Participants in the metaphor condition successfully applied their metaphor to describe life experiences.

Primary analyses

Although our primary prediction is that applying an accessible, self-generated metaphor to describe life experiences would increase meaning in life particularly for participants high in PNS, we first looked at the main effects of condition without considering the PNS moderator. Although perceptions of meaning in life were highest in the metaphor condition compared to the other two conditions, this comparison did not reach significance, $contrast = .28$, $SE = .23$, $t(184) = 1.19$, $p = .21$. Thus, we did not find evidence that replicates the main effect of condition found in Study 5.

We nevertheless tested our moderation hypothesis. A regression analysis with Helmert coding was used to create two dummy codes representing the comparison between the

metaphor condition and the average of the metaphor-no-mapping condition and the no-metaphor condition (D1) and the comparison between the metaphor-no-mapping condition and the no-metaphor condition (D2). We entered PNS, each dummy code (D1, D2), and the PNS \times D1 and PNS \times D2 interactions as predictors of meaning in life (see Table 3 for regression coefficients and significance tests).

When looking at the interactions of interest, only the PNS \times D1 interaction was significant ($p = .03$). We decomposed the interaction using the PROCESS macro for SPSS and the Johnson-Neyman technique (Hayes, 2013). A graph of the interaction can be found in Figure 4. As predicted, the effect of metaphor (vs. the average of the two comparison conditions) on meaning in life was significant, and positive, as levels of PNS increased above 5.23 ($z = .43$).

Table 3. Summary of regression analysis for meaning in life as a function of life framing condition and personal need for structure, Study 6.

Independent variable	Unstandardized coefficients			Standardized coefficients		
	<i>b</i>	SE	95% CI _{<i>b</i>}	β	<i>t</i> (181)	<i>p</i>
Intercept	4.03	0.23	(3.58, 4.47)		17.77	<0.001
PNS	-0.08	0.05	(-0.17, 0.01)	-0.13	1.75	0.08
D1	-0.87	0.47	(-1.80, 0.05)	-0.55	1.86	0.06
D2	0.33	0.57	(-0.79, 1.45)	0.18	0.58	0.56
PNS \times D1	0.21	0.10	(0.03, 0.40)	0.66	2.24	0.03
PNS \times D2	-0.10	0.12	(-0.33, 0.13)	-0.27	0.85	0.40

Notes: D1 = metaphor-mapping condition versus average of metaphor-no-mapping and control conditions; D2 = metaphor-no-mapping condition versus control condition; Bold text highlights significant effects.

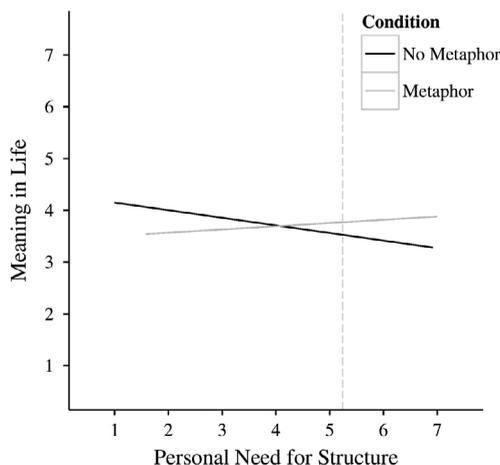


Figure 4. Accessible metaphors for life bolster meaning in life particularly for individuals high in the need for structure (Study 6).

Notes: No Metaphor = average of metaphor-no-mapping and control conditions. Metaphor = metaphor-mapping condition. The vertical dashed line indicates the Johnson-Neyman value of PNS where the effect of condition on meaning in life becomes significant at $p = .05$. Condition effects to the right of the dashed line are significant at $p < .05$ whereas condition effects to the left of the line are not statistically significant. Regression lines only extend the range of the data.

Internal meta-analysis

We conducted a meta-analysis to summarize the evidence in support of our claims that: (1) metaphor use boosts perceived meaning in life; and (2) metaphor's influence is especially strong when there is a strong desire for confident understanding. The effects of metaphor (vs. no-metaphor) on meaning in life across all studies were converted to the effect size r using t (or F) values. Positive values indicate a positive linear relationship between metaphor and meaning and negative values indicate a negative linear relationship. Analyses were carried out using the Metafor package for R (Viechtbauer, 2010) and followed conventional methods (Borenstein, Hedges, Higgins, & Rothstein, 2009; Lipsey & Wilson, 2001). First, effect sizes were submitted to a random-effects meta-analysis, as these effects result from different procedures across studies, and are assumed to be a sample from a larger population. Across studies, there was a reliable but small main effect of metaphor on meaning in life, $r = .12$, $SE = .04$, $z = 2.92$, $p < .004$, 95% CI, [.04, .21].

Next we obtained effect sizes for participants low ($-1SD$) and high ($+1SD$) in epistemic needs for the studies in which we assessed individual differences: Perceived coherence (Study 2), framework of meaning (Study 3), and PNS (Studies 4 and 6). We coded those effect sizes such that 0 = low epistemic needs and 1 = high epistemic needs. Effects were submitted to a mixed-effects meta-regression testing whether epistemic needs modified the effect of metaphor on meaning in life. There was significant variability in individual effect sizes, $Q(df = 7) = 17.79$, $p < .01$. We therefore proceeded to test whether epistemic needs could account for this variability. Supporting our hypothesis, epistemic needs was a significant moderator of the effect sizes, $\beta = .09$, $SE = .04$, $z = 2.35$, $p = .02$, 95% CI [.01, .17]. Separate random-effects meta-analyses were conducted on the effect sizes within each level of epistemic needs. The effect of metaphor on meaning in life was significant when epistemic needs were high, $r = .19$, $SE = .04$, $z = 5.15$, $p < .0001$, 95% CI [.12, .26] whereas the effect was not significant when epistemic needs were low, $r = -.01$, $SE = .04$, $z = -.28$, $p = .78$, 95% CI, [-.08, .06].

General discussion

Taken together, the findings from these studies portray conceptual metaphor as an existential resource. A meta-analysis of all main effects of metaphor on meaning in life reveals a significant, albeit weak, effect of metaphor on perceived meaning in life. This effect was significant for studies in which participants were provided a metaphor (Studies 1 & 2) or chose their own (Study 5), suggesting that the effect is not specific to a single conventional metaphor for life. Also consistent with conceptual metaphor theory, the effect appears to stem, at least in part, from the mapping mechanism entailed by metaphor use: Life events are perceived as more interrelated when conceptualized metaphorically (Study 4) and meaning in life is elevated when connecting life aspects using a metaphor, as opposed to simply bringing a life metaphor to mind (Study 5). We also demonstrate the generalizability of metaphor's effect on increased meaning in life across cultures, by replicating the effect with German participants in Study 2.

The overall effect of metaphor on meaning in life is qualified, however, by personal epistemic motivations. Activating a journey metaphor was especially beneficial when personal epistemic needs are unmet, as when life coherence is low (Study 2) or when a meaning

framework is lacking (Study 3), or when epistemic motives are high, such as the PNS (Studies 4 & 6). A mixed-effects meta-analysis confirmed that the effect of metaphor on meaning in life emerges under these conditions in particular.

Theoretical implications

Theories of meaning are numerous and span many disciplines from existential and cultural psychology to religion and theology. Even within these fields, conceptualizations of meaning in life differ; for instance, perspectives in psychology range from those that are based in how people mentally structure the environment (Heintzelman & King, 2014; Proulx & Heine, 2006) to those that are based on how people construct symbolic cultural meaning (Greenberg, Pyszczynski, & Solomon, 1986). Some work has aimed to connect these varying perspectives. E.g., Sullivan, Kosloff, and Greenberg (2013) describe two aspects of meaning defined as *everyday* and *ultimate* meaning, and suggest that arriving at the feeling that life has purpose and value may be optimally achieved when the world is perceived to be organized, structured, and predictable. Although this may be true, the cognitive processes that allow people to translate everyday structure in the world into ultimate meaning in life are less understood. This issue may have led some to reduce meaning in life to an affective state, suggesting that feelings of meaning in life and feelings that arise from perceiving everyday coherence in the world are the same affect with different names (Heintzelman & King, 2013, 2014a, 2014b).

Alternatively, we propose that perceptions of everyday and ultimate meaning are conceptually distinct, but may nonetheless result from the same cognitive mechanism, and therefore result in similar feelings. Following from CMT, and evidenced by the moderation analyses in our studies, people who may find it difficult to comprehend how their life experiences are related (or those who have a strong desire to comprehend such interrelatedness) can use metaphor to gain a sense of meaning in life. These findings suggest that metaphors may act on perceptions of everyday and ultimate meaning simultaneously. That is, metaphors can give structure and significance to life at the same time. The resulting positive affect, perhaps arising from the fluency with which one can now comprehend otherwise incomprehensible experiences (i.e., *insight*; Topolinski & Reber, 2010), may feel like meaning in life, consistent with claims made by Heintzelman and her colleagues (2014a). However, the underlying sources of that affect remain conceptually distinct dimensions of meaning, in line with traditional theories (see Sullivan et al., 2013).

It is important to note that we are not arguing that metaphors are the ultimate source of meaning in life. Indeed, the findings of the current Study 3 suggest that metaphors provide as much meaning as other meaningful construals of experience, on average. Instead, we claim that metaphor's effects are the result of a unique cognitive mechanism whereby directly experienced aspects of a source concept (e.g., routine understanding of journeys) can be used to reason about more abstract and symbolic aspects of life (e.g., the purpose of one's existence). By doing so, metaphors create a stronger, more coherent "web" of meaning, and thus can benefit people when they strongly desire to comprehend their life experiences.

Practical implications

These findings have important clinical implications, and support what many psychotherapists have already described regarding the usefulness of metaphor in therapy (Kopp, 1995;

Loue, 2008). By providing evidence that metaphors can increase meaning in life, we have shown at least one way that clinical patients could benefit from thinking about their lives in metaphoric terms. For example, therapeutic practices that encourage metaphor use may aid in contributing to an overall sense of meaning for individuals with depressive and/or suicidal tendencies. Indeed, certain perspectives suggest that hopelessness is a key variable linking depression to suicidal behavior (Beck, Kovacs, & Weissman, 1975) and that suicide attempts are the result of individuals perceiving themselves in an “impossible situation” – a feeling that there is no escape from the mental pain, uncertainty, and confusion caused by life (Baumeister, 1990; Beck et al., 1975; Levi et al., 2008). The findings from Study 2 and 3 are encouraging in this regard, as conceptualizing experiences in terms of a life metaphor elevated perceived meaning in life for participants who perceived little coherence in life, and reported a weak pre-existing meaning framework. Metaphors, compared to other meaningful construals of life, may help depressed individuals escape from their impossible situation particularly because they offer a framework for comprehending the meaning of life experiences typically experienced as confusing and stressful. However, given that clinical populations are unique and likely differ in many ways to the samples we collected here, and that we did not assess the long-term applicability of metaphor over time, this is a speculation that needs further testing.

Limitations and future directions

One limitation of the current research is that our studies rely heavily on a measure of meaning in life – the Purpose in Life Test – that has been shown to correlate highly with positive affect (McGregor & Little, 1998; Steger et al., 2006). Given that positive affect can have a causal effect on perceived meaning in life (King et al., 2006), we cannot definitively rule out the possibility that metaphor boosts meaning by increasing only positive affect. However, some evidence (or lack thereof) in the current research weakens this alternative. For instance, we do not find evidence that metaphor increases positive mood (Study 4), that participants enjoyed thinking of their life metaphorically more than non-metaphorically (Study 1), or that participants used more positive words in their metaphoric descriptions of life compared to other life framings (Study 3). We also provide support for our hypotheses with a measure of meaning in life – the Presence of Meaning Scale (Studies 3 and 4) – that overlaps considerably less with positive affect, life satisfaction, and self-esteem compared to the Purpose in Life Test (Steger et al., 2006). Nevertheless, it could be true that metaphor acts on some components of meaning in life – especially those with a strong connection to positive affect such as life satisfaction – more so than others. However, we call on future research to examine this possibility, as the aim of the current research was to focus on meaning in life, broadly defined as feelings of purpose, significance, and continuity.

Another limitation of this research is that we cannot address whether the demonstrated effects will occur for all metaphors. For example, perceiving life as a *merry-go-round* or a *long, bitter winter* may involve the systematic mapping of *meaninglessness* onto life. Secondly, although we suggest that source concept needs to be represented at an optimally schematic level, some metaphors may be too abstract, for instance when a person compares their *career* to a *dream* (e.g., “I got my *dream* job”). This metaphor might serve to imbue one’s career with a general sense of significance, but at a cost; the metaphor may be lacking in structure and thus might cause people to overlook many concrete actions necessary for

achieving optimal success, such as organization and staying on schedule. Further research should explore the boundary conditions that determine when metaphor will have a positive effect on meaning and life and when it may not. Perhaps people can use mixed metaphors to overcome the limitations of single metaphors (e.g., “I am on the *path* to my *dream job*”); research has yet to investigate this possibility.

Another question for future research would be whether certain metaphors serve different functions depending on individuals’ current needs. Would metaphors that transfer a clear structure onto life be desired when people are feeling uncertain, even if those metaphors had relatively negative impact on perceptions of life’s meaning? Conversely, would abstract metaphors be desired when individuals’ ultimate sense of purpose is threatened, even if using such a metaphor does not provide a clear schema for how that purpose can be achieved? In other words, future research could pit epistemic and existential needs against each other to determine whether people strategically use different metaphors to satisfy those needs that are most salient.

Finally, it may be the case that people can anticipate the negative implications of a salient metaphor and either reject the metaphor before any conceptual mapping can occur, or use the salient metaphor as a contrast. If an individual is exposed to a metaphor with negative implications for purpose in life – for instance, *life is a merry-go-round* – she may simply ignore the metaphor or she may search for features of her current life that are different from features of the salient source concept. A search for differences in this case could make salient cognitions that are inconsistent with the metaphoric standard, such as “life is a straight path to a destination, *not* an unending loop of ups and downs” which may promote meaning in life by way of contrast (see Mussweiler, 2003). Future research is needed to address these questions, and further explore the factors that influence metaphor-selection and comparison processes.

Conclusion

Knowing life’s meaning can be a difficult and often unsuccessful endeavor (Frankl, 1985). Nevertheless, life seems to be pretty meaningful for most people (Heintzelman & King, 2014b). The current research presents a fresh look at why this might be the case. By recruiting accessible metaphors, the meaning of life can be known with relative ease and efficiency, an idea quaintly expressed by Science Fiction writer Orson Scott Card: “Metaphors have a way of holding the most truth in the least space.”

Notes

1. We set our sample size in Study 1 based on a G*power analysis for a *t*-test, medium effect size $d = .50$, and 80% power. According to this analysis, we needed 51 participants per cell, and increased the total sample size to $n = 120$. Note that for this, and all other studies conducted online, final sample sizes can deviate slightly from the pre-set number due to technical issues on the part of MTurk and TurkPrime services.
2. This study was run before our lab had developed a system for excluding repeat participants, and our lab had run other metaphor studies on MTurk recently. So it was likely that these participants were not naïve to the purpose of the experiment. The two participants who did not follow instructions indicated that they did not think their life was a journey, or that they never experienced one or more of the life aspects we presented.

3. The predicted effect was not significant without the familiarity covariate, $t(106) = .98, p = .33$. Relatively lower familiarity with the journey metaphor compared to the control condition could mean that the sample of participants in the metaphor condition tend not to view their lives as a journey, or could also reflect the extent to which some participants in this sample tend not to reach for a metaphor when thinking about life. In both cases, lower familiarity in the metaphor condition could essentially “wash out” any effects if those participants have no motivation to apply the given metaphor to life aspects. Indeed, being forced to relate life to a metaphor that is unfamiliar could even have the opposite effect, which is supported by the association between (lower) familiarity and (lower) meaning in life. Thus, it is important to control for feelings of familiarity to get an accurate estimate of metaphor’s effect.
4. In Study 2, we again used G*power and the effect size obtained in Study 1 (with the covariate included; $d = .44$) to determine that our sample would need to have 67 participants per cell ($N = 134$). Slightly more participants were collected due to participants being run in groups in the lab.
5. Items from the other two subscales were not included because they focused specifically on managing distress (manageability subscale; e.g., “Has it happened that people whom you counted on disappointed you: 1 = *never happened*; 7 = *always happened*”) or were more closely related to satisfaction or purpose than coherence (meaning subscale; e.g., “Doing the things you do every day is: 1 = *a source of deep pleasure and satisfaction*; 7 = *a source of pain and boredom*”).
6. After considering which life aspects to exclude, we ultimately chose authenticity due to the variety of ways in which the term can be translated in German, as well as some general confusion about what authenticity means in the German language. After discussions with the research assistant responsible for translating materials, as well as other native German colleagues, we agreed that we may even gain some experimental control by removing this life aspect, as it could indeed cause confusion among our German participants.
7. Sample size in Study 3 was determined by approximately doubling the necessary sample size for detecting a medium effect in Studies 1 and 2 (total $n = 260$).
8. The fact that cognitive word count was more prevalent in the non-metaphor conditions, taken together with the negative correlations between cognitive word count, framework, and meaning in life, could be evidence in support of the notion that many ways of thinking about life experiences are *too abstract* to facilitate comprehension.
9. Sample size in Study 4 was determined by rounding the sample sizes determined in Studies 1 and 2 up to the nearest hundred (total $n = 200$).
10. Sample size in Study 5 was set using the convention of 30 participants per condition (total $n = 60$), which would be large enough to detect a large effect size ($d = .80$) with 80% power (total $n = 52$).
11. Study 6 used the same sample size considerations from Study 1, and aimed for 60 participants per condition (total $n = 180$).

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Appendix 1

Items from the comprehensibility scale in Study 4.

- (1) I feel like my life has order.
- (2) Different experiences in my life feel connected in a meaningful way.
- (3) I can see how different aspects of my life are all connected.
- (4) Events in my life feel random.
- (5) Most things in my life feel like they are connected to a common source or theme.
- (6) My life is organized.
- (7) I find it difficult to understand why things in my life happen the way they do.