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MEANING IN LIFE AND METACOGNITION: APPLICATION OF THE SELF-VALIDATION HYPOTHESIS

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MEANING IN LIFE AND METACOGNITION:
APPLICATION OF THE SELF-VALIDATION HYPOTHESIS

A Thesis submitted in partial fulfillment
of the requirements for the degree
Master of Science

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Bowling Green, Kentucky

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MEANING IN LIFE AND METACOGNITION: APPLICATION OF THE SELF-VALIDATION HYPOTHESIS
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ABSTRACT

MEANING IN LIFE AND METACOGNITION:
APPLICATION OF THE SELF-VALIDATION HYPOTHESIS

Meaning in Life is a robust predictor of various positive outcomes, and provides a buffer against a host of negative outcomes. Due to this fact, it becomes important to examine all the facets of a meaningful life. One consistent predictor of Meaning in Life (MIL) in the literature is one's sense of positive affect. I tested the idea that it is possible to doubt (or have confidence in) one's affect, such that under conditions of doubt, positive affect is less strongly related to MIL. It may be the case that positive affect predicts MIL because of what we think of it, not because it inherently equates to MIL. I rely on existing theory for this prediction (Briñol & Petty, 2022.

In this study, participants were asked to rate their positive affect and list affect related thoughts before being exposed to either a confidence, doubt, or control writing induction. Participants then reviewed their positive affect related thoughts and were asked to rate their thought confidence before being given the presence subscale of the Meaning in Life Questionnaire (MLQ) to measure current sense of meaning. Participants were subsequently given a single item self-esteem measure, the Patient Health Questionnaire (PHQ-9) to measure depression and Need for Cognition scale.

Results are consistent with previous research showing positive affect, PHQ, and need for cognition as predictors of Meaning in life. Results also showed an interaction between thought confidence, positive affect, and the doubt induction.

Keywords: Meaning in Life, Self-Validation Theory, Positive affect

To Ashley and Brian

ACKNOWLEDGEMENTS

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Introduction

The inquiry into what is the meaning of life has been a central question throughout human history. Such questions were clearly asked in the popular works of Plato, Socrates and many others. Hellenistic philosophy often asked what humans were and how they ought to live. For example, Aristotle believed more in a eudaimonic conception of life, where one's purpose was to ration well, something commonly called the function argument (Aristotle, 2006). Contrast this to the platonic view of human life, which is to gain wisdom and understanding (Cooper & Hutchinson, 1997). Thus, the forefront question of humanity started to emerge; what is the meaning of life?

A large transition occurred with the rise of modern philosophy, especially the works of Soren Kierkegaard. Kierkegaard laid the foundation for existentialism which posits that one's source of meaning comes from within and not an objective outside source (Kierkegaard, 2004). Nietzsche's philosophy included the idea that "He who has a why to live for can bear almost any how" (Frankl, 1946). This quote in particular was very influential to Viktor Frankl, a concentration camp survivor who himself used this quote in his book "Man's Search for Meaning" (Frankl 1946). Frankl highlighted the importance of one's perceived meaning in their life, paving the way for logotherapy which sought to determine one's sense of meaning and how that sense of meaning can help mitigate suffering. Frankl's logotherapy is the tie between the philosophy of meaning and psychology.

Meaning in life

Initial creation of MIL as a Construct

Although Frankl focused more on the development of logotherapy and its relation to psychotherapy, contemporary research on meaning is heavily inspired by Frankl (King & Hicks, 2021). As time progressed, questions pertaining to *the* meaning of life have transitioned to questions pertaining to one's meaning *in* life (Battista & Almond, 1973). In order to measure meaning, Frankl's assertion that meaning was subjective and to be discovered by the individual was the inspiration. This alone, however, is conceptually barren for researchers as it leaves to door open to everything and needs to be expounded upon. This leads one to the current research domain of meaning. Martela and Steger (2016) theorize that Meaning in life has 3 distinct components: coherence, purpose and significance . Through these components of meaning one may discern what exactly meaning in life is as a construct to be studied.

Coherence is the degree to which one can make sense of the world. Coherence itself is a cognitive component, as it is asking if life makes sense or is comprehensible (Reker & Wong, 1988). This element is one that individuals seek to maintain, and if there are threats or damages to it, individuals seek to regain a sense of coherence. For instance, the Meaning Maintenance Model asserts that individuals wish to maintain a sense of meaning in their lives and that they may do this through a mechanism called "fluid compensation" (Heine et al., 2006). According to the principle of fluid compensation, a threat or damage to one domain of meaning (such as lack of coherence at work) may be maintained or repaired by an adjacent one (such as perceptions of coherence in a relationship.). In fact, individuals report a higher perceived meaning in life when things are coherent (Heintzelman et al., 2013).

The next of the 3 components as discussed by Martela & Steger (2016) is purpose In some research, the concepts of purpose and meaning have been used interchangeably. For

instance, the Purpose in Life scale was intended to measure meaning and has been used to measure meaning in life, but the purpose concept is distinct (Steger, 2006). Purpose is a more goal directed facet of meaning and includes motivational forces (McKnight & Kashdan, 2009). An example or purpose could be the motivation and goals one may perceive within their employment. Purpose may or may not include a sense of coherence (Martela & Steger, 2016).

The final concept is significance, or the sense of value in one's life. This has been the most neglected facet of this tripartite meaning model (George & Park, 2014). However, significance is often described as the sense of worthwhileness or "mattering" one has in contemplating their life (Martela & Steger, 2016. King & Hicks, 2021). Contemporary research describes perception of significance, as it relates to one's sense of meaning in life, as eudaimonia or living well, successfully and responsibly. This sense of significance is a more distinct and philosophically oriented facet of Meaning in Life. This facet of meaning has was suggested to be harder to operationalize and therefore investigate empirically (Martela & Steger, 2016).

Measures of Meaning in Life

In order to operationalize meaning in life for empirical investigation, it is understood that it may not just be a particular source as much as it might be one's perception that life is meaningful. For example, family is reported to be a large source of meaning, but it is not meaning itself (Lambert et al., 2010). There are a variety of ways of measuring meaning in life. Early examples include the Purpose in Life scale, with its complementary Seeking of Noetic Goals scale (Crumbaugh, 1968. Crumbaugh, 1977). These two scales tap into purpose, a single facet of the multifaceted construct of Meaning in Life previously discussed. Both scales are problematic in that they do not divorce positive affect from the operationalization of meaning (Hicks & King, 2021). For example, these scales ask explicitly about positive affect or mood,

asking whether or not daily tasks are, "a source of pleasure or satisfaction" (Crumbaugh, 1968, Crumbaugh, 1977). Not only do these early scales only include the "purpose" portion of the tripartite model, but they fail to separate purpose from positive affect.

Other related measures include the Life Regard Index (Battista & Almond, 1973). This scale is also conflated with positive affect, asking questions such as, "I really feel good about my life". The later Sense of Coherence Scale (Antonovsky, 1993) attempts to marry multiple concepts to gain a larger conceptual view of Meaning, but again suffers due to positive affect. For example, in their responses participants may answer "feel how good it is to be alive".

Contemporary research usually relies on the Meaning in Life Questionnaire (MLQ: King & Hicks, 2021). The creation of the Meaning in life Questionnaire allows for the measurement of the single construct of Meaning in Life (Steger et al., 2006). One important element of the MLQ is that it measures both the presence of, and the search for, meaning. The search subscale taps into the lack of meaning one perceives in their life and their desire to find it. The MLQ is correlated with positive affect, but does not ask about positive affect, something distinct from other scales (King & Hicks, 2021). The MLQ provides face-valid questions that have been connected to various other concepts that would theoretically be related to meaning.

Meaning is Related to a Variety of Variables

Meaning in life exhibits value insofar as it also relates to contemporary indices of mental and physical health, such as lower anxiety and lower depression (Shiah et al., 2013, Steger et al., 2006). Individuals who have lower levels of meaning in life or have their meaning in life threatened report higher levels of stress (Park & Baumeister, 2016). Higher levels of meaning search were associated with high levels of daily emotional exhaustion (Garrosa et al., 2017). Longitudinal observation has found that, after a 10 year follow-up, individuals who report higher

meaning in life report lower allostatic load or wear that are associated with accumulated stress (Zilioli et al., 2015). In fact, higher levels of perceived meaning predict higher levels of proactive coping (Miao et al., 2017). It is also the case that individuals with a higher sense of meaning in life are more likely to engage in intuitive thought (Heintzelman & King, 2015).

Sources of Meaning

Meaning in Life has various positive effects, but where exactly does it come from? The perception of meaning in one's life is theorized to stem from perceptions of the self, others, and the world (Debats et al., 1995). For self as a source of Meaning in Life, early theorization of self asserted that the self was a system of meaning separate from the physical body (Baumeister, 1999). Research indicates that an increased accessibility of one's self-concept increases perceptions of meaning in life (Schlegel et al., 2009). In previous research, the increase in self-concept accessibility was due to a manipulation where individuals were asked to write about 10 real or actual things about themselves, with 5 being positive and 5 being negative. High levels of spirituality are associated with higher levels of self-actualization and meaning, although the direction of this relationship has not been clarified (Ivtzan et al., 2013).

Meaning in life seems to be a feeling that is gleaned from various sources, rather than one direct source. Meaning in life is associated with constructs such as social relations, religions and worldviews (King et al., 2021). Cultural influence is a determinant of one's sense of meaning in life, with independent self-construals being associated with increased levels of perceived meaning (Datu & Salanga, 2018). Religiosity, a powerful social belief system that can be integral for social identity, has been found to be a predictor of meaning in life, and the specific mechanism by which it increases one's perceived meaning in life appears to be by clarifying the self-concept (Błażek & Besta, 2012). Individuals who are more curious also report subsequent

higher meaning in life (Kashdan & Steger, 2007). The three psychological needs identified in self-determination theory, autonomy, competence and relatedness, also are associated with higher meaning and the self (Martela et al., 2017, Deci & Ryan, 2012).

Individuals find that a consistent source of meaning in life is family, with various other types of relationships also being important to one's perceived meaning in life (Lambert et al., 2010, O'Donnel et al., 2014). This corresponds with other work demonstrating that social exclusion in particular reduces one's perceived meaning in life (Stillman et al., 2009). Many self-related constructs, such as relatedness needs from Self-Determination Theory or religiosity as a predictor of social identity, also implicate other individuals in one's sense of meaning.

Global focus connects one to the world, global focus being the ability to "see the forest through the trees" so to speak, and fluctuations in global focus can also cause fluctuations in one's sense of Meaning in Life (Hicks & King, 2007). Religion, in addition to its effects for identity and social belonging, is a meaning making system that provides one with a particular worldview (Park, 2005).

In line with previous conceptualizations of meaning in life, one source of meaning is perceived coherence (Heintzelman et al., 2013). In one study, individuals presented with a coherent pattern of trees conforming to the order of seasons reported higher perceived MIL than those who experienced the tree images in a random order (Heintzelman et al., 2013). Daily routines and typical patterns of behavior are also sources of meaning (Heintzelman & King, 2019). These can be considered to represent interactions with the world.

Across different investigations, it seems that some consistent sources of meaning are things such as religiosity, social relationships, socio-economic status and positive affect (Ward and King, 2016, Grouden & Jose, 2016). There also have been more formal attempts to discern

the various sources of meaning one can identify with, such as the Sources of Meaning in Life Questionnaire (SoMe). This scale investigates 26 sources of meaning categorized into 4 main categories: self-transcendence, self-actualization, order and well-being/relatedness (Schnell, 2009). The Sources of Meaning Scale asks about such experiences and events as "I have a task in life" or "I lead a fulfilled life". Reverse-scored items include: "I suffer from the fact that I don't see any point in life". But again, there is not one distinct source of meaning.

The source of meaning may remain elusive because the most proximal predictors of MIL are internal states. There is a particularly interesting connection between Meaning in life and positive affect (Lambert et al., 2010). There is also the indication that positive affect interacts with one's perceived meaning in life in various ways (King et al., 2006). For example, meaning in life is positively correlated with affect, such that the more positive one's affect, the higher one's MIL. Research has found that positive affect was tied to higher reported measures of purpose (Chen et al., 2020). Positive expectancy related emotions such as hope are also associated with an increased perception of meaning in one's life (Feldman & Synder, 2005). Furthermore, positive affect predicts meaning even after accounting for income level (Ward & King, 2017). Overall, positive affect is a robust predictor of Meaning in Life, regardless of the approach taken to explain its connection to Meaning in Life (King & Hicks, 2021). The importance of positive affect is consistent with the possibility that a fruitful approach to understanding MIL may be to examine individuals' internal states and their interpretations of these states.

One of the better known models for thinking about the interpretation of one's emotions, such as positive affect, is the feelings-as-information hypothesis (Schwarz, 2012). The feelings-as-information hypothesis points to how subjective experiences are utilized when making

judgments (Schwarz, 2012). Happiness is generally good, but happiness at a funeral may be bad. Another example could be anger and sadness, both are potential responses to loss, but are contextual and provide information about a situation. Researchers have suggested that Meaning in Life, perhaps due to its association with positive affect, may sometimes exert the kinds of influences described by the feelings-as-information hypothesis (Heinzelman & King, 2014). This function manifests due to meaning being the sense of coherence or reliable patterns in one's environment. So, when one perceives meaning, they are perceiving reliable patterns and coherence that they can subsequently use to make future decisions. But this could also be the case due to positive affect's relationship with meaning.

In the feelings as information model, the implications of emotional states in context are considered as inputs to behavior. But many states in addition to feelings may be considered in this way. Just as we rely on feelings in relation to our context as a source of information, that we also rely on thoughts in relation to our context, and that we rely on thoughts in relation to other thoughts as sources of information for judgment. This idea is often examined under the rubric of metacognition.

Just as we rely on feelings as experience, we may also rely on confidence or doubt as a source of information about our feelings. It is clear from a review of MIL correlates that while specific events such as family or religion contribute to MIL, that a sizeable portion of MIL depends on perceptions of these events (Lambert et al., 2010, Steger & Frazier, 2005). For instance, constructs such as religion, worldviews, and perceived coherence rely on complex belief systems that are potentially supported by high levels of cognitive involvement. Such cognitive involvement opens the possibility that meta-cognitive processes may be implicated.

Self-validation Theory

Metacognition is, broadly put, "thinking about thinking" a term coined by John Flavell (1979). Since its initial conception, research in the domain of meta-cognition has used this or very similar definitions (Lai, 2011). Metacognition differs from normal cognition in that metacognition contains the ability to evaluate, plan and monitor one's thoughts (Akturk & Sahin, 2011). Each element of metacognition has some temporal aspect such as: planning before something, monitoring taking place during an activity, and evaluating taking place after a cognitive activity.

Metacognition has been expanded upon since its initial conception, taxonomizing metacognition further into two subdomains: Cognitive knowledge and cognitive regulation (Whitebread et al., 2009. Schraw et al., 2006). Cognitive knowledge contains metacognitive elements related to knowledge, such as knowledge about when and where to apply a certain cognitive strategy (Lai, 2011). As previously mentioned, Meaning in Life may act as a sort of information (Heintzelman & King, 2014). Cognitive regulation may include thoughts about thoughts, such as the degree to which one may believe a thought is valid or not given additional information. For example, as it relates to meaning, one may have thoughts about thoughts relating to one's perceived meaning.

A further distinction that may help elucidate what exactly metacognitions are is the idea of primary vs secondary cognitions (Brinol & DeMarree, 2012). Primary cognitions are immediate thoughts in relation to anything, such as "I like color" or "that tree has green leaves". They are immediate. Secondary conditions involve thoughts about those initial first-level cognitions. For example "do I really like this color?" or "do those leaves really look green or more yellow?". Thoughts can be organized in such a way that secondary cognitions are utilized

to increase, decrease, attenuate or even reverse the impact of these previously generated primary cognitions. These metacognitions are valuable insofar as they may produce changes in thoughts that have subsequent effects on other thoughts, feelings, or behavior (Brinol & DeMarree, 2012).

One particular theory of metacognition as it relates to effects on thoughts and feelings is Self Validation Theory. Due to this theory being related to thoughts about thoughts it is primarily thought of as a metacognitive theory (Jost et al., 1998). Self Validation Theory (SVT) pertains to the realm of persuasion in a thought or idea, and involves those previously mentioned secondary cognitions with persuasion in a thought or idea being the degree to which one believes it to be valid (Brinol & Petty, 2021). According to SVT, beliefs have effects to the extent they are seen as valid. Indicators of thought validity often involve thoughts and feelings of confidence or doubt. Confidence and doubt comprise the metacognitive factors that operationalize the concept of "validation" in SVT.

The Self Validation Theory framework makes the key assumption that thoughts become more consequential for action as the perceived validity of the thought increases (Briñol & Petty, 2022). One of the core ideas operating within Self-Validation Theory is the idea that certain pieces of information that may incrementally increase the perceived validity of thoughts can come from a wide variety of factors, even those considered to be incidental or situational (Briñol, 2009). There are many methods to produce increased perceived thought validity. For example, shaking one's head yes or no may increase confidence or doubt in the validity of an idea. In general, a method for affecting the perceived validity of thoughts is one's sense of confidence or doubt in the idea. Previous research indicates that a way in which one may increase one's confidence or doubt in a thought is with a confidence or doubt induction where participants write about times they felt confident or doubtful (Petty & Cacioppo, 1986). An important idea that

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arises from this theory is that these unrelated inductions and thoughts can be combined to subsequently increase or decrease the likelihood that a certain thought may become consequential for behavior and future thought.

SVT demonstrates that even incidental confidence or doubt can work to influence primary cognitions (Brinol & Petty, 2022). In the context of MIL, where antecedent experiences and events serve as the basis for primary cognitions, subsequently induced confidence and doubt may affect the relationship between these primary cognitions and perceptions of MIL. To the extent that my thinking about causes of MIL matters, it seems that the way we think about sources of Meaning in Life should affect their relationship to the MIL construct. SVT provides a means to examine this proposition.

Proposed Study:

As previously discussed, literature suggested a good deal of inter-individual variability in sources of MIL. Put more concretely, some may find their job, their hobby, their faith or even their morning ritual to be a source of Meaning in Life. But what underlies this sense of meaning? Regardless of the specific events or experiences that individuals may attribute their MIL to, it is likely that the confidence or doubt with which they hold the cognitions linked to their experiences will be reflected in subsequent MIL judgments.

The proposed study sought to examine some of the implications of SVT for Meaning in Life. By taking positive affect, a known consistent correlate of MIL, and applying the Self-Validation hypothesis, I was able to gain evidence for the role of metacognition for this construct. Positive affect was chosen primarily due to its straightforward nature and established connection to Meaning in Life (King & Hicks, 2021).

Although multiple studies have examined sources of MIL, I aimed to show that it is not only the things previously mentioned that cause fluctuations in one's perceived sense of Meaning in Life, but also the level of confidence or doubt in those things. For example, research demonstrates that positive affect is a significant source of Meaning in Life (King et al., 2006, King & Hicks, 2021). It seems to be the case that it is not as much one has any sort of objective source of meaning, but more that confidence and doubt in our various influences on meaning determine the extent to which these influences bolster or undermine the sense of MIL.

Design and Method

The current study utilized Qualtrics survey flow to randomly assign and deliver conditions to participants. First, participants were presented with information about the current study and an IRB notice, while being given the opportunity to provide consent. If the participant gave consent, then the study continued, if not, then the study ended immediately. After consent, participants were presented with basic demographics. After Demographics, participants went on to complete the following items in the order presented here:

Positive Affect

In order to tap into the construct of positive affect, the positive affect portion of the PANAS was utilized (Watson et al., 1988). Positive affect, as previously mentioned, is intimately tied to Meaning in Life (King & Hicks, 2021). Specifically, higher daily positive affect is associated with a higher perceived meaning in one's life. Participants were asked what their feelings were at this moment and responded from *Slight or not at all (1)* to *Extremely (5)*. Example affect items are "interested" or "excited". I utilized this scale in particular as I wished to capture the immediate affect of individuals at the moment of time they participate in the study and after the manipulation.

Positive Affect Thought Listing

Next, participants completed a writing induction where they were asked to write about the thoughts they were experiencing when they reported on their positive affect. Participants were provided with 5 boxes and were instructed to complete as many or as little as they desired.

Confidence/Doubt Inductions and Control

Next, participants were randomly assigned via Qualtrics' survey flow to one of three conditions based upon the self-validation hypothesis (Briñol & Petty 2022). The conditions are a confidence or doubt induction, where participants were provided with 5 spaces to write about times they felt confident or doubtful. A control condition was also utilized to see if there was a unique effect of the inductions. Participants were asked to take as little or as much time as they needed. Participants were informed they did not need to fill out all spaces provided. Participants saw this specific text:

We're also interested in how people think about different prototypical life experiences. We want to understand some of the thoughts people have when they are (wording varied according to random condition assignment: doubtful or uncertain/confident or certain/ neutral).

Please describe personal experiences where you felt doubtful or uncertain (confident/certain or neutral). These situations could be anything relevant to you. Don't worry about grammar or spelling--we just want to know personal experiences where you felt doubtful (confident or neutral).

We have provided 5 boxes for your experiences. Please complete as many as you can and provide as much or as little detail as you like.

Positive Affect Thought Confidence Measurement

Next participants were shown their previously written, affect related, thoughts and asked to rate the degree to which they felt confident or doubtful in their thoughts about affect. Participants responded to the thoughts they previously wrote. Participants were asked about their confidence or doubt in their response, from a scale of 1, *Very Doubtful*, to 4, *Very Confident*. There was an additional answer option for participants to mark if their thought was unrelated to their feelings so that it could be excluded from later analysis.

Meaning in Life

Participants completed the presence subscale of the Meaning in Life Questionnaire (Steger, 2006). This scale is widely utilized, especially those studies connecting MIL and positive affect. This is a 5-item scale, ranging from *Absolutely untrue (1)* to *Absolutely true (7)*. Example questions include, "I have a good sense of what makes my life meaningful" and "My life has no clear purpose.", which was reverse coded.

Need For Cognition, Depression and debriefing

A set of items to assess meta-cognitive ability were included (Cacioppo & Petty, 1982). These questions are rated from 1, *Extremely Uncharacteristic*, to 5, *Extremely Characteristic*. Example questions include, "I would prefer simple to complex problems" and "I really enjoy a task that involves coming up with new solutions to problems.". I also included the PHQ-9, a brief screener utilized to assess depression, a common correlate of Meaning in Life (Kroenke et al., 2001).

Participants were finally asked if they felt their data should be included. I asked this question as research demonstrates that participants may self-select out of a study even if they don't know why their data may be problematic to include (Meade & Craig, 2012). This may help

account for those who were not attentive and fully present for the study at hand. Finally, after all

sections were completed, participants were debriefed and notified that the study had completed.

A pictorial overview of the order of items in this study is below, with the confidence, control and

doubt inductions being the three possible conditions participants were placed in.

Figure 1. *Study flow chart*
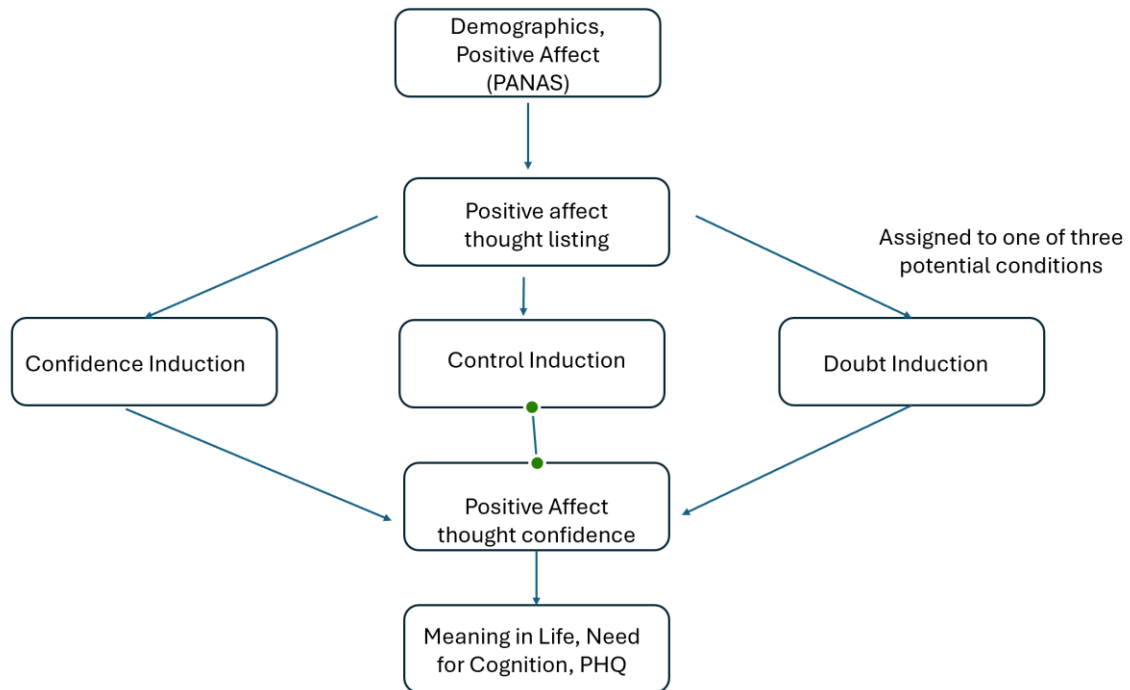
Analyses:

      The syntax used for my analyses are listed in Appendix A. To begin, any participant who

did not originally give consent was automatically dropped from the study and did not receive

credit. For all analyses pairwise deletion was utilized for any missing data.

      Participants who indicated that they did not feel as though their data should be included

in the final dataset were removed. Due to the nature of the presence subscale of the MLQ, one

item was reverse scored before further analyses were conducted (Steger, 2006). Participants

condition assignment was dummy coded into confidence or doubt inductions, or the control

condition for later analysis. Standardized scores were calculated for the MLQ, PHQ, Thought Confidence, and the Need for Cognition scale. After this, the analyses were conducted as described in the following.

Expected Results

Hypothesis.

I expected that a confidence/doubt induction would moderate the relationship between positive affect and MIL as portrayed in figure 2. For individuals in the confidence induction, I expected that those with high levels of positive affect would report higher MIL, and those with lower levels of positive affect would show lower MIL. I expected this relationship between affect and MIL to be weaker in the control condition, and potentially to reverse in the doubt induction condition.

Figure 2. *Hypothesized results*
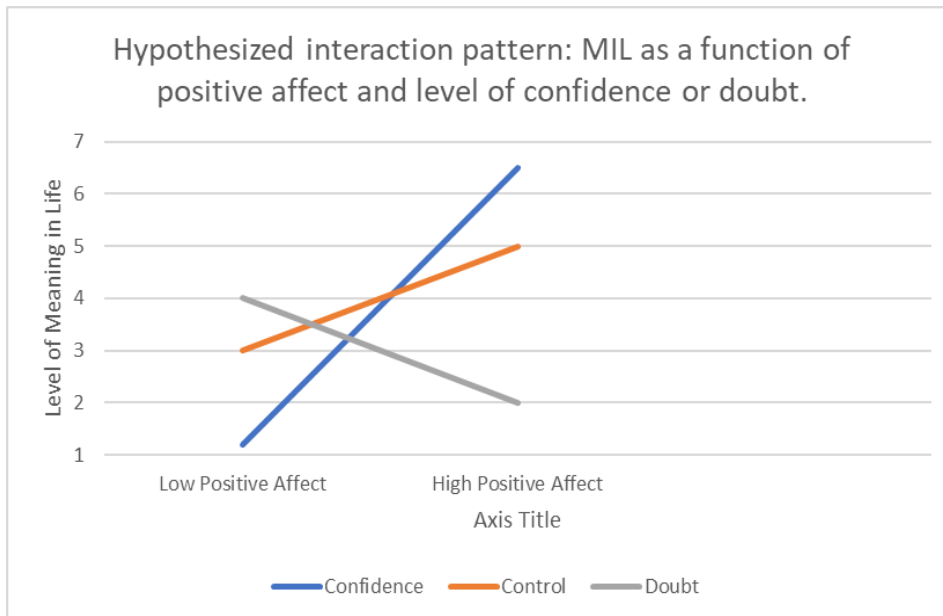
Once data were collected, I planned to run a sequence of models to test this idea, progressing to the next model in the sequence if evidence of a doubt/confidence moderation of affect on MIL was not observed. The planned models were as follows: First I examined Meaning in life and positive affect as related to the three manipulated conditions confidence, doubt, and the control. Second, I added the variable of thought confidence to the model, with all interactions. The third model included Need for Cognition, while the fourth examined the PHQ in relation to just meaning in life, positive affect and confidence inductions. Finally, the fifth model included the PHQ, Meaning in Life, thought confidence, positive affect in addition to the manipulated condition variable.

Results:

The initial sample size was 206. After removing participants who did not follow directions or who indicated they did not want their results included in analysis, 149 observations remained. Of these 149, 28 identified as male, 119 as female, and 2 as other. The mean age of the sample was about 20 years of age. 132 identified as white/European, 6 as Black/African American, 3 as Asian American, 2 as Pacific Islander and 6 as other.

In the following analyses, all continuous predictor variables were averaged after appropriate reverse scoring, and were then standardized. This standardization was done to ease interpretation. Outcome variables remained in their original units, while manipulated variables are dummy coded. The doubt, control, and confidence induction conditions were represented with two dummy variables, a doubt condition variable which was coded 1 in the doubt condition, and otherwise 0, and a confidence induction condition variable which was coded 1 in the confidence condition, and otherwise 0. Participants randomly assigned to the control condition

thus had a zero for both of these dummy variables. Participants total number of boxes used for

the induction was a mean of 3.28 of the 5 boxes (SD= 1.54).

I ran the initially planned sequence of models and found that conditional main effects

were significant for positive affect and Need for Cognition (B=.53 p = .012, B = .34 p=.003;

Appendix B). Contrary to expectation, did not observe moderation of the effects of affect on

MIL in any the models. Output from these models is in Appendix B. I therefore revisited model

2 in the data and used regression diagnostics (Fox, 2019) to identify and remove six outlying

data points. The datapoints that were determined to be outliers were determined through a

Cook's D analysis, which was run three times in total to determine outliers (Figure 3).

Figure 3._Cooks D Analysis_
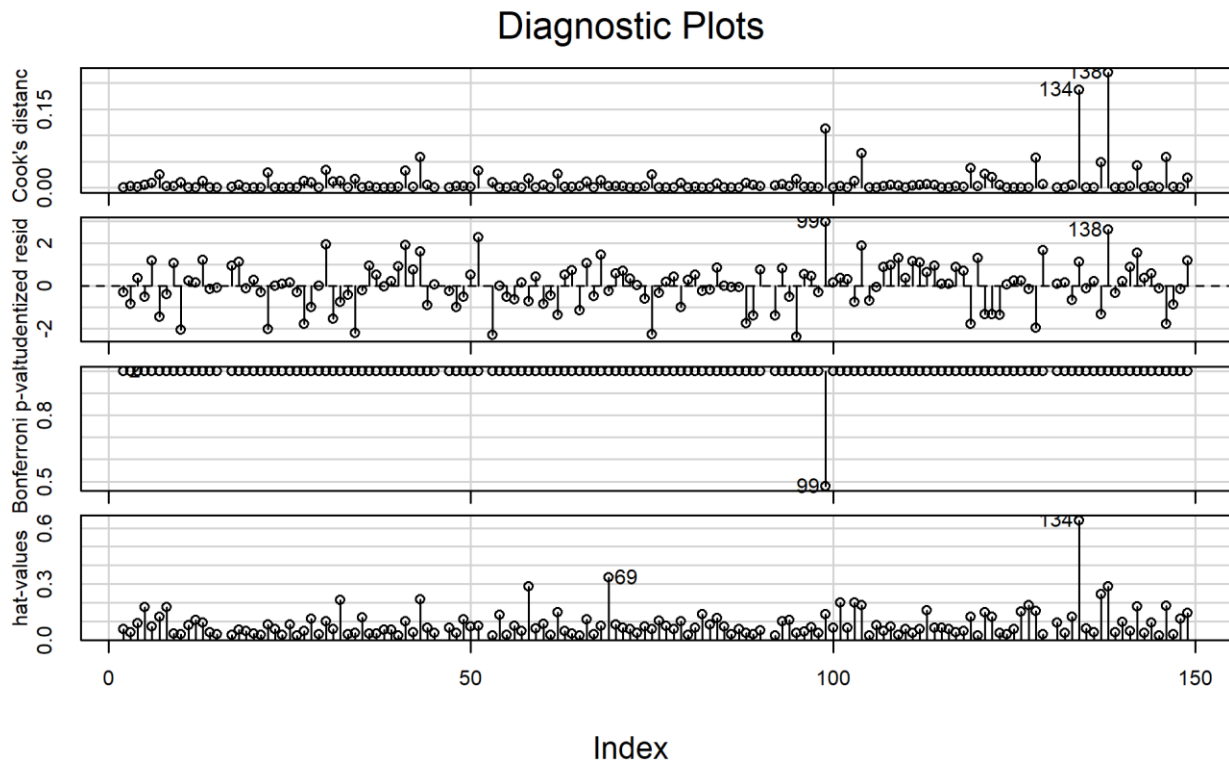
Reanalysis of this new sample of n = 143 revealed a significant three-way interaction between manipulated condition, positive affect, and affect thought confidence, as shown in Table 1 and plotted in figures 4 through 6.

Table 1.

Confidence/doubt Inductions, thought confidence, and positive affect as regressed upon Meaning in Life.

Predictors	Meaning in Life		
	Estimates	CI	p
(Intercept)	4.64	4.26 – 5.02	**<0.001**
Doubt Condition	0.14	-0.38 – 0.66	0.593
Positive Affect	0.69	0.30 – 1.08	**0.001**
Thought Confidence Rating	-0.00	-0.46 – 0.46	0.987
Confidence Condition	0.09	-0.46 – 0.64	0.740
Doubt Condition × Positive Affect	0.32	-0.25 – 0.89	0.273
Doubt Condition × Thought Confidence Rating	0.04	-0.52 – 0.60	0.884
Positive Affect × Thought Confidence Rating	0.23	-0.31 – 0.77	0.401
Positive Affect × Confidence Condition	-0.32	-0.91 – 0.27	0.287
Thought Confidence Rating × Confidence Condition	0.17	-0.46 – 0.81	0.593
(Doubt Condition × Positive Affect) × Thought Confidence Rating	-0.78	-1.52 – -0.05	**0.037**
(Positive Affect × Thought Confidence Rating) × Confidence Condition	0.12	-0.60 – 0.84	0.739
Observations	137		
R^2 / R^2 adjusted	0.302 / 0.241		

Figure 4.

Interaction of doubt condition, positive affect and thought confidence as regressed upon
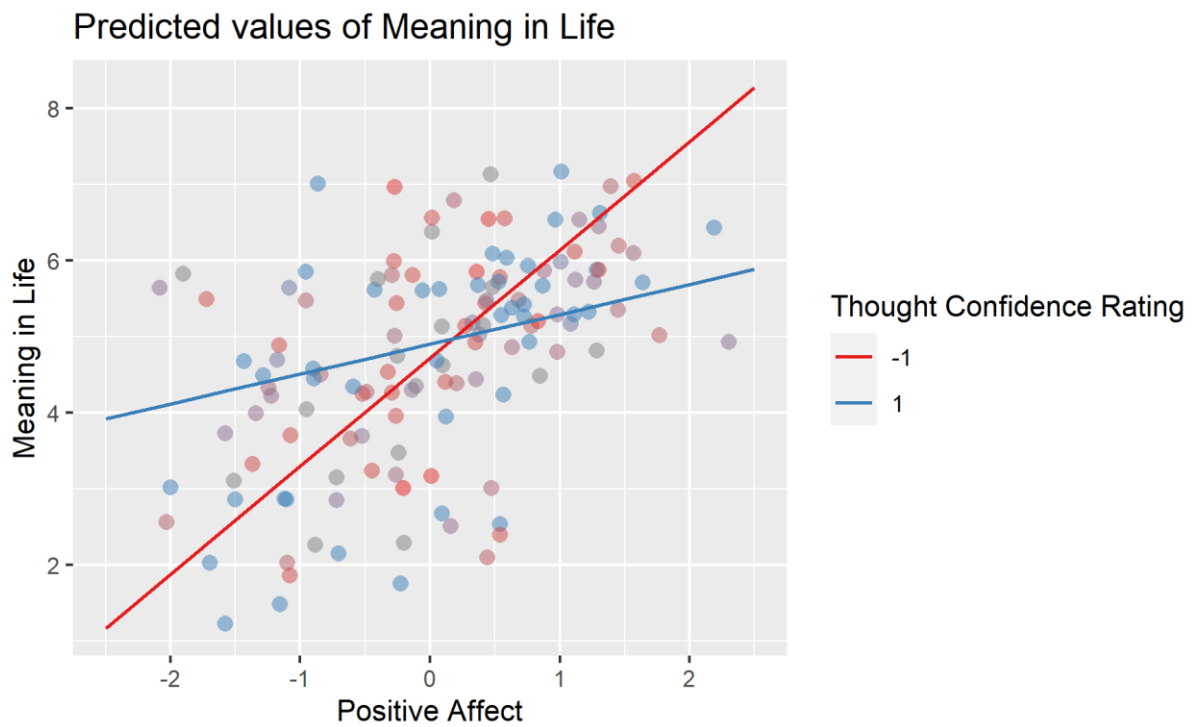
Meaning in Life.

Figure 5.

Interaction of confidence condition, positive affect and thought confidence as regressed upon

Meaning in Life.

Predicted values of Meaning in Life
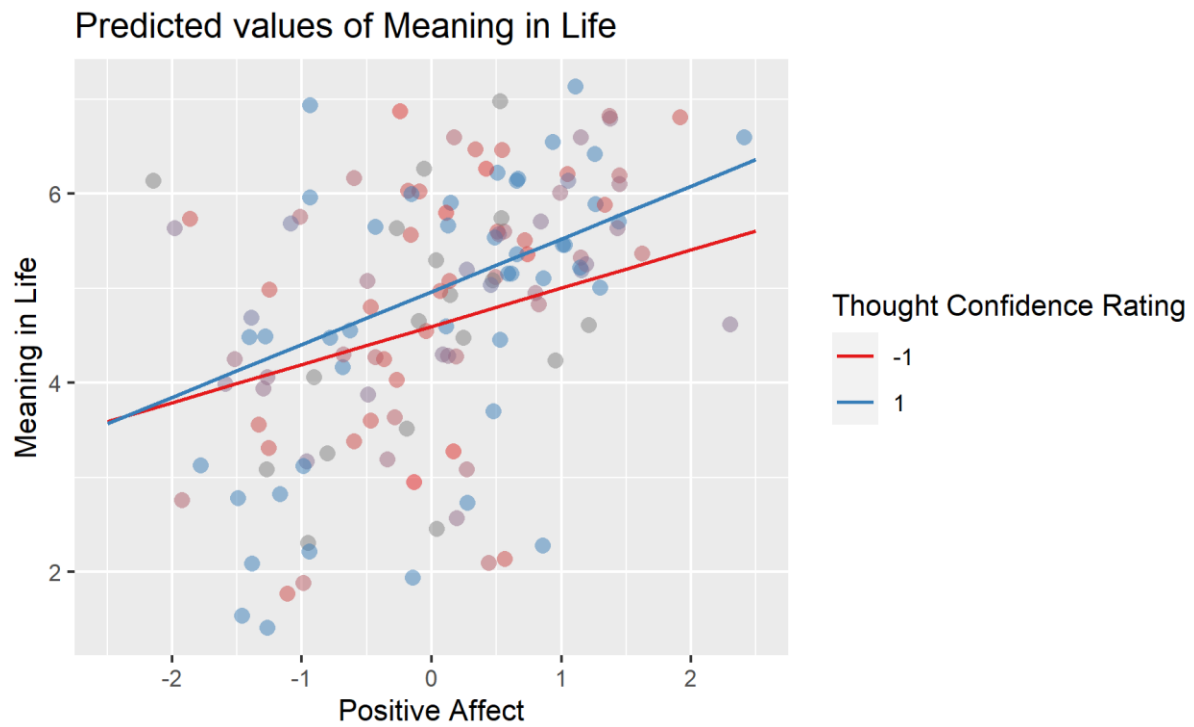
Figure 6.

Interaction of control condition, positive affect and thought confidence as regressed upon

Meaning in Life.

Predicted values of Meaning in Life
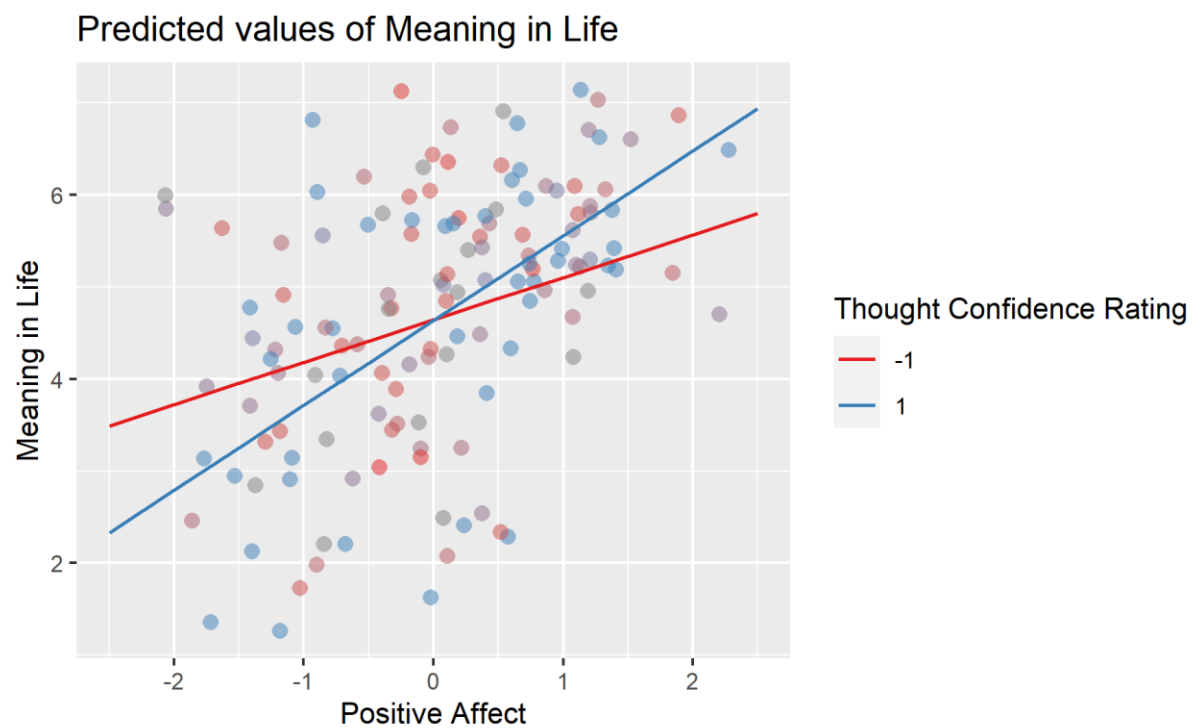
Analyses showed that self-judged confidence in affect-related thoughts interacted with

positive affect to predict MIL in the doubt, but not in the confidence or control conditions.

Taking the thought confidence that participants had in their affect thoughts into consideration,

the doubt induction appeared to weaken the strength of the relationship between positive affect

and MIL under high affect thought confidence. For those with lower thought confidence, however, the doubt induction strengthened the relationship. Stated differently, the doubt induction seems to have caused people to "doubt" their thought confidence. When thought confidence was relatively higher, the doubt induction attenuated the expected relationship between affect and MIL. When thought confidence was lower, the doubt induction seems to have caused participants to doubt their low thought confidence, resulting in those with lower thought confidence showing a stronger relationship (evidenced by the steeper slope) between positive affect and MIL This indicates that sort of double doubt acts as a form of confidence For the confidence induction (Figure 3), there was no interaction between thought confidence and positive affect, and neither was there a significant interaction between thought confidence and positive affect in the control condition (Figure 4). This could be due to a failure of the induction, or simply because one who was experiencing positive affect could not feel more confident that they were by already feeling positive affect.

Following the examination of this three-way interaction, I also tested whether, using the same reduced sample, Need for Cognition was still related to MIL. Previous research has shown Need for Cognition to be related to MIL, and I wanted to test the replicability of this finding. Results from this model show there again was a main effect of positive affect, but that there was also the main effect of Need for Cognition ($t(1,124) = 3.007$, B = 0.31, CI = (.11-.52) $p =.003$). Additionally, the three-way interaction between doubt condition, Positive Affect, and Thought confidence as predicting Meaning in Life remained significant (t(1,124) = -2.143, B = -0.77, 95% CI= (-1.49- -.06) $p =.034$). This indicates that even when controlling for other variables, doubt inductions, thought confidence, and positive affect all are related to MIL. The full results of this model are shown in Table 2 and figures below.

Table 2.

Confidence/doubt inductions, thought confidence, positive affect and Need for Cognition as regressed upon Meaning in Life

Predictors	Meaning in Life		
	Estimates	CI	p
(Intercept)	4.63	4.26 – 5.00	**<0.001**
Doubt Condition	0.18	-0.33 – 0.68	0.488
Positive Affect	0.64	0.25 – 1.02	**0.001**
Thought Confidence Rating	-0.02	-0.46 – 0.43	0.943
Confidence Condition	0.17	-0.37 – 0.70	0.543
Need for Cognition	0.31	0.11 – 0.52	**0.003**
Doubt Condition × Positive Affect	0.39	-0.16 – 0.94	0.166
Doubt Condition × Thought Confidence Rating	0.09	-0.46 – 0.63	0.748
Positive Affect × Thought Confidence Rating	0.22	-0.31 – 0.74	0.412
Positive Affect × Confidence Condition	-0.38	-0.96 – 0.19	0.190
Thought Confidence Rating × Confidence Condition	0.24	-0.38 – 0.86	0.446
(Doubt Condition × Positive Affect) × Thought Confidence Rating	-0.77	-1.49 – -0.06	**0.034**
(Positive Affect × Thought Confidence Rating) × Confidence Condition	0.07	-0.63 – 0.77	0.841
Observations	137		
R^2 / R^2 adjusted	0.350 / 0.287		

Figure 7.

Interaction of doubt condition, positive affect and thought confidence as regressed upon

Meaning in Life while accounting for Need for Cognition.

Predicted values of Meaning in Life
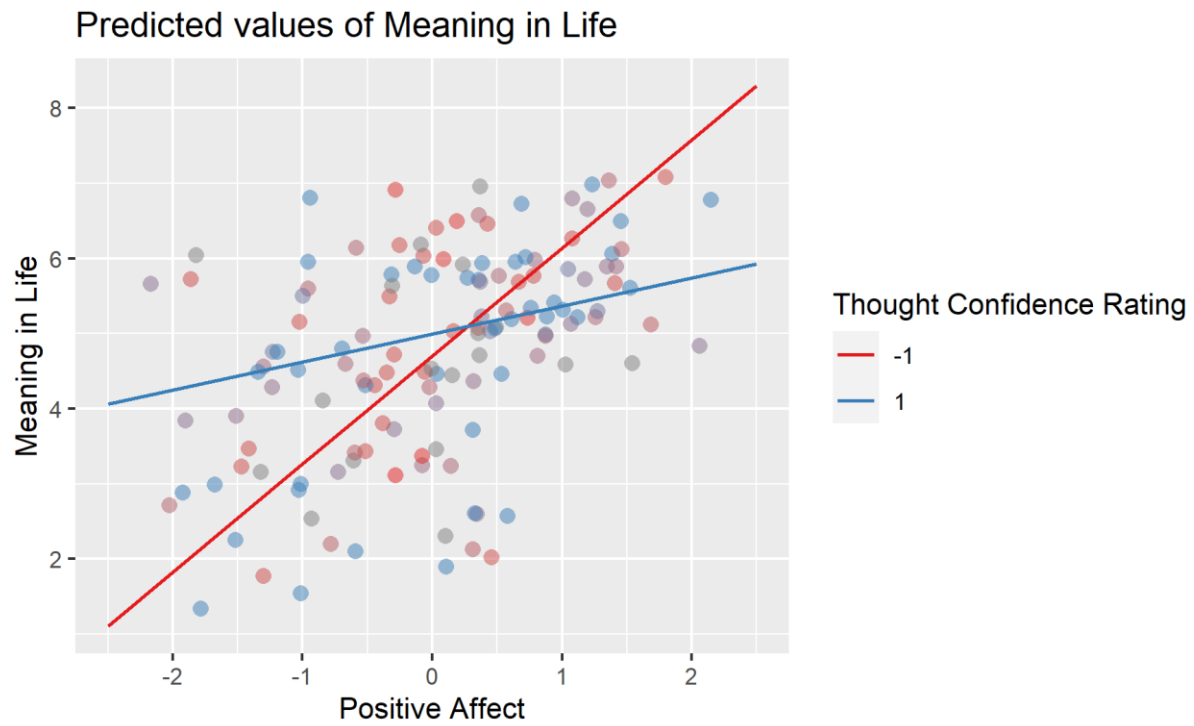
Figure 8.

Interaction of confidence condition, positive affect and thought confidence as regressed upon

Meaning in Life while accounting for Need for Cognition.

Predicted values of Meaning in Life
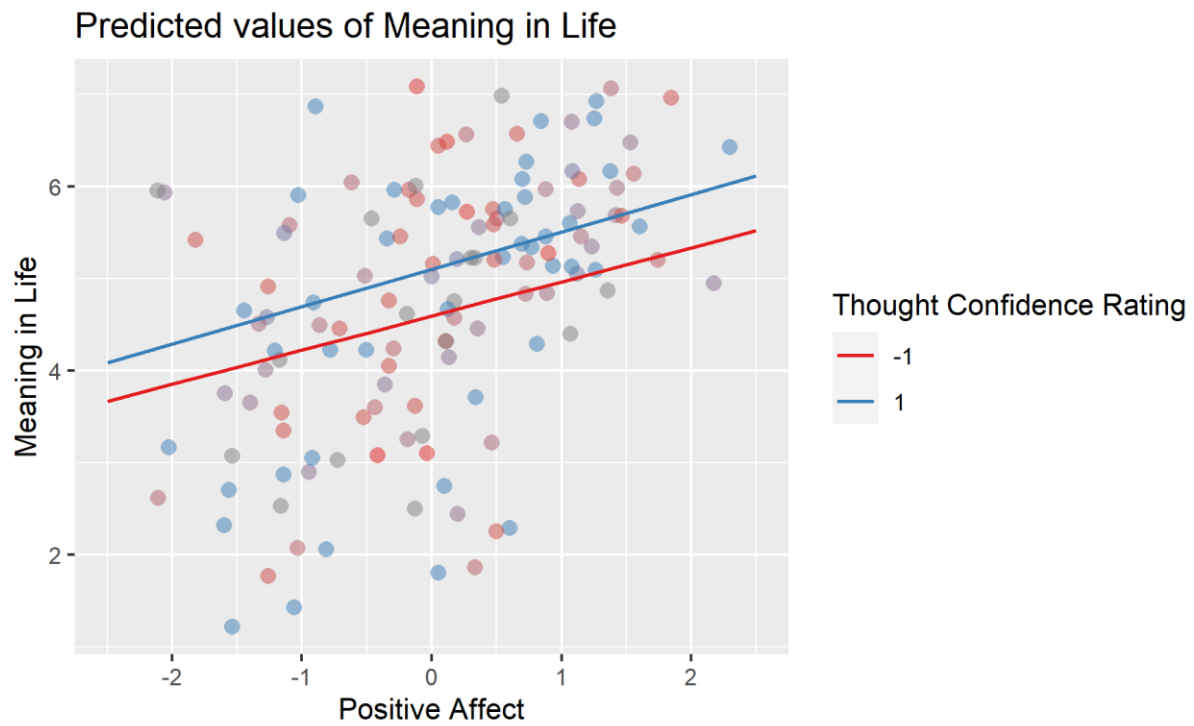
Figure 9.

Interaction of control condition, positive affect and thought confidence as regressed upon

Meaning in Life while accounting for Need for Cognition.

Predicted values of Meaning in Life
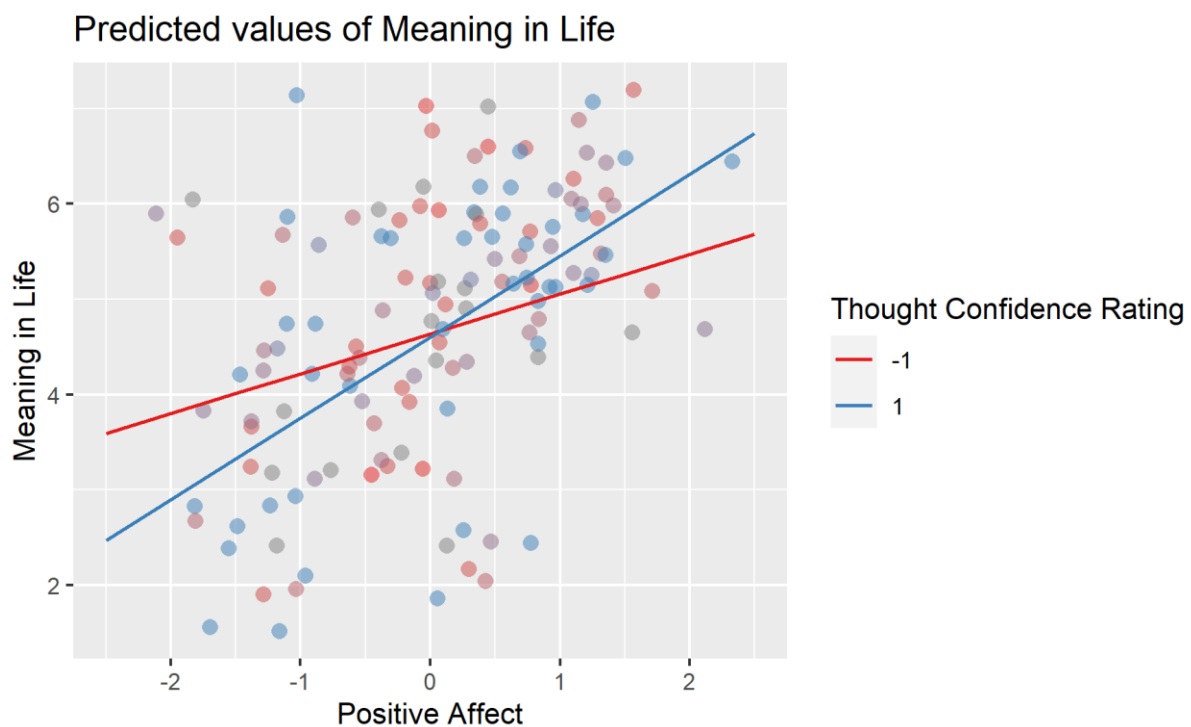
Discussion:

Success was observed in the doubt inductions within the models presented earlier, specifically in the interaction between positive affect, thought confidence and doubt inductions. This could be due to individuals being more susceptible to doubt than confidence when experiencing positive affect. Furthermore, this interaction remained significant when the main effect of Need for Cognition was added. The observed interaction provides suggestive evidence

for my hypothesis, and the observed positive relationship between Need for Cognition and MIL confirms previous findings demonstrating this relationship (Steger et al., 2008).

Self Validation Theory based inductions of confidence or doubt were applied to positive affect. Although results in the doubt condition were encouraging, results overall were mixed. Throughout my analyses, it was a consistently significant finding that positive affect, depression and Need for Cognition all predicted Meaning in life, indicating successful replication of previous findings (Zero-order correlations are: .38, -.46 and .27 respectively) (Appendix B) (Hicks & King, 2021 Steger et al., 2008, Steger et al., 2006). What, however, was most interesting were the results from the confidence and doubt conditions, namely that doubt inductions were the only inductions to produce an effect.

There are a few potential explanations as to why the confidence and doubt inductions did not work as expected. One comes from the Self-Validation Theory framework itself (Brinol & Petty 2022). It could be the case that one's positive affect, or one's lack thereof, and one being made aware of one's positive affect by filling out the positive affect items, may act as sort of "happiness" induction. Research in the domain of SVT demonstrates that happiness can increase reliance of thoughts, and when these thoughts are introduced by a persuasive message, that happiness can increase response to persuasion (Brinol et al., 2007). For example, just writing about positive affect may induce feelings of happiness and make subsequent thoughts more valid. The interactions in my study indicate a sort of cross-modal interaction, where two different domains, affective and cognitive, are used at once. For example, one domain used explicitly is confidence and doubt inductions, which may be more cognitive in nature, which is arguably different from positive affect. This sort of cross-modal interaction has not thoroughly been examined. If it were the case that both the initial cognitions relating to the construct and the

meta-cognitions of the inductions were of the same category, say affect-based, then results may have been more so as predicted. These findings may be a case of a sort of double positive. if someone already feels very confident due to strong positive feelings, adding another confidence booster might not have much additional effect. Future research might shed light on self-validation in the context of cross-modal inductions.

When it comes to the inconsistent results in regard to confidence and doubt inductions it could be the case that the confidence/doubt associated with the inductions interacting with positive affect has limited effect. Confidence inductions on positive affect failed to change the nature of the relationship between positive affect and MIL. The doubt induction, however, did affect this relationship. This could be due to the nature of positive affect and how one who is experiencing positive affect may already be confident that they are feeling good, making a confidence induction redundant. However, the mixed results from doubt inductions show us that positive affect may be something that is susceptible to change in the negative direction. It may be a situation where if one feels positive affect they are already confident in their thoughts about it, showing limited confidence induction fluctuations. Those who experienced the confidence condition did not experience statistically significant changes in positive affect, but those who experienced the doubt induction did. This indicates that positive affect is more susceptible to doubt than confidence.

It is also important to address some weaknesses. Firstly, my study had to rely on a sample gained from WKU's study board. Due to issues with securing funding, I could not gain a sample from Prolific, a system that reimburses a broader internet sample of participants' participation in a study, which would have not only provided a more diverse sample, but a larger one too.

Second, the final usable sample was reduced from 209 to 149 usable cases. This smaller sample reduced statistical power.

Conclusion:

To reiterate, Meaning in Life is associated with a host of positive outcomes, and buffers against negative outcomes (King & Hicks, 2021). One particularly important connection to meaning in life is positive affect, which acts as a predictor of one's sense of meaning (King et al., 2006). Self-validation theory is applicable to both Meaning in life and positive affect, since both are counted as sources of information that cognitive processes could be conducted on (Heintzelman & King, 2014, Schwarz, 2012). Since both are pieces of information, the Self-Validation hypothesis' persuasion techniques apply to them.

This study represents the first application of SVT to a well-being construct. This line of research can help us understand how exactly one's sense of meaning comes about and, potentially, how to change one's sense of meaning in life. This, in turn, could pave the way for future developments of techniques and interventions to help increase one's positive affect or meaning in life to reap the positive benefits. Meaning in Life is a beautiful thing, but without confidence, it may be for nought.

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```
library(readxl)
DF <- read_excel("LiamThesisClean.xlsx")
library(tidyverse)
library(car)
library(sjPlot)
library(janitor)
library(corrplot)

saveRDS(DF, file= "ThesisData.rds")

DF <- clean_names(DF)
View(DF)
###First we remove those who did not give consent or other conditions:
sum(DF$i_vnot1, na.rm = TRUE)
DF$q11 <- replace(DF$q11, is.na(DF$q11), 0) # Replaces NA with 0 to remove
DF <- filter(DF, q11 == 1) # to filter out those who said no or yes to consent
DF <- filter(DF, q11 == 1 & i_vnot1 == 0 & use_me == 1)
DF1 <- filter(DF, use_me == 1)
DF <- DF1


#gender:
table(DF$gender) # 28 males, 119 females, 2 other
#age
mean(na.omit(as.numeric(unlist(DF$age))))#about 20.4 average age
#ethnicity
table(DF$ethnicity)


#doubt is 0, confidence 1, control 2.
#The below creates dConf = 1 when in conf condition, otherwise, in doubt and control
conditions, it's 0
#also creates dDoubt = 1 when in doubt condition, otherwise is 0 in confidence and control
conditions.
DF$dConf <- ifelse(!is.na(DF$doubt_rt_page_submit), 0,
          ifelse(!is.na(DF$conf_rt_page_submit),1, 0))
DF$dDoubt <- ifelse(!is.na(DF$doubt_rt_page_submit), 1,
          ifelse(!is.na(DF$conf_rt_page_submit),0, 0))

#Time to recode variables and combine them into a zscored variable:
```

```
DF$mil5 <- 8-DF$mil5r

DF$milMean <- rowMeans(select(DF, mil1:mil4, mil5 ), na.rm = TRUE)
DF$zMilMean <- as.numeric(scale (rowMeans(select(DF, mil1:mil4, mil5 ), na.rm = TRUE) ))
DF$zPosAff <- as.numeric(scale(rowMeans(select(DF,pa_panas_1:pa_panas_10), na.rm =
TRUE)))


#recoding thought ratings
DF$posthtRt1 <- DF$posthought_rating1
DF$posthtRt2 <- DF$posthought_rating2
DF$posthtRt3 <- DF$posthought_rating3
DF$posthtRt4 <- DF$posthought_rating4
DF$posthtRt5 <- DF$posthought_rating5
#Removing those unrelated thoughts
DF$posthtRt1 <- ifelse(DF$posthtRt1==3,NA ,DF$posthtRt1)
DF$posthtRt2 <- ifelse(DF$posthtRt2==3,NA ,DF$posthtRt2)
DF$posthtRt3 <- ifelse(DF$posthtRt3==3,NA ,DF$posthtRt3)
DF$posthtRt4 <- ifelse(DF$posthtRt4==3,NA ,DF$posthtRt4)
DF$posthtRt5 <-ifelse(DF$posthtRt5==3,NA ,DF$posthtRt5)
#adjusting scores to run from 1-4, with 4 meaning "very confident"
DF$postht1_4pt <- ifelse(DF$posthtRt1==4,3 ,ifelse(DF$posthtRt1==5, 4, DF$posthtRt1))
DF$postht2_4pt <- ifelse(DF$posthtRt2==4,3 ,ifelse(DF$posthtRt2==5, 4, DF$posthtRt2))
DF$postht3_4pt <- ifelse(DF$posthtRt3==4,3 ,ifelse(DF$posthtRt3==5, 4, DF$posthtRt3))
DF$postht4_4pt <- ifelse(DF$posthtRt4==4,3 ,ifelse(DF$posthtRt4==5, 4, DF$posthtRt4))
DF$postht5_4pt <- ifelse(DF$posthtRt5==4,3 ,ifelse(DF$posthtRt5==5, 4, DF$posthtRt5))

# Standardize
DF$thtConfRating <- rowMeans(select(DF, postht1_4pt:postht5_4pt), na.rm = TRUE)
DF$zThtConfRating <- as.numeric(scale(DF$thtConfRating))

#how many thoughts did each person list?
DF$numThts <-  apply(DF[,c("posthtRt1", "posthtRt2", "posthtRt3", "posthtRt4", "posthtRt5")],
1, function(x) sum(!is.na(x)))

DF$numThtsAffect <-  apply(DF[,c("affct_tht1",
                    "affct_tht2",
                    "affct_tht3",
                    "affct_tht4",
                    "affct_tht5")], 1, function(x) sum(!is.na(x)))

DF$numThts <- sum(!is.na (c(DF$posthtRt1:DF$posthtRt5)))

DF$zNumThts <- as.numeric(scale(DF$numThts))
```

```
#compute PHQ scores
DF$phqSum <- rowSums(select(DF, phq_9_1:phq_9_9 ), na.rm = TRUE)
hist(DF$phqSum)
DF$zPHQ <- as.numeric(scale(DF$phqSum))

#compute need for cognition very short form scores
#Items 3, 4,  are reverse scored.

DF$n_cog_3r <- 6-DF$n_cog_3
DF$n_cog_4r <- 6-DF$n_cog_4

DF$nCogMean <- rowMeans(select(DF, n_cog_4r,n_cog_3r, n_cog_1, n_cog_2, n_cog_5,
n_cog_6), na.rm = TRUE)
summary(DF$nCogMean)
DF$zNCog <- as.numeric(scale(DF$nCogMean), na.rm = TRUE)



#all renames for variables below
DF$Meaning_in_Life <- DF$milMean
DF$Doubt_Condition <-DF$dDoubt
DF$Confidence_Condition <- DF$dConf
DF$Positive_Affect <- DF$zPosAff
DF$Thought_Confidence_Rating <- DF$zThtConfRating
DF$Need_for_Cognition <- DF$zNCog
DF$PHQ <- DF$zPHQ

#1
Mod1 <-
lm(Meaning_in_Life~Doubt_Condition*Positive_Affect+Confidence_Condition*Positive_Affec
t, data = DF)
summary(Mod1)
tab_model(Mod1)

#2
Mod1 <-
lm(Meaning_in_Life~Doubt_Condition*Positive_Affect*Thought_Confidence_Rating+Confide
nce_Condition*Positive_Affect*Thought_Confidence_Rating, data = DF)
summary(Mod1)
tab_model(Mod1)
influenceIndexPlot(Mod1)
#outlier removal below
Mod1 <-
lm(Meaning_in_Life~Doubt_Condition*Positive_Affect*Thought_Confidence_Rating+Confide
nce_Condition*Positive_Affect*Thought_Confidence_Rating, data = DF[-
c(138,134,104,99,142,41),])
summary(Mod1)
```

```
tab_model(Mod1)
plot_model(Mod1, type = "pred", terms = c( "Positive_Affect", "Thought_Confidence_Rating[-
1,1]", "Doubt_Condition[1]"), show.data = TRUE, jitter = TRUE, ci.lvl = NA )
plot_model(Mod1, type = "pred", terms = c( "Positive_Affect", "Thought_Confidence_Rating[-
1,1]", "Confidence_Condition[1]"),show.data = TRUE, jitter = TRUE, ci.lvl = NA)
plot_model(Mod1, type = "pred", terms = c( "Positive_Affect", "Thought_Confidence_Rating[-
1,1]", "Doubt_Condition[0]", "Confidence_Condition[0]"),show.data = TRUE, jitter = TRUE,
ci.lvl = NA)

#3
Mod1 <-
lm(Meaning_in_Life~Doubt_Condition*Positive_Affect*Thought_Confidence_Rating+Confide
nce_Condition*Positive_Affect*Thought_Confidence_Rating+Need_for_Cognition, data = DF)
summary(Mod1)
tab_model(Mod1)
influenceIndexPlot(Mod1)
#outlier removal below
Mod1 <-
lm(Meaning_in_Life~Doubt_Condition*Positive_Affect*Thought_Confidence_Rating+Confide
nce_Condition*Positive_Affect*Thought_Confidence_Rating+Need_for_Cognition, data = DF[-
c(138,134,104,99,142,41),])
summary(Mod1)
tab_model(Mod1)
plot_model(Mod1, type = "pred", terms = c( "Positive_Affect", "Thought_Confidence_Rating[-
1,1]", "Doubt_Condition[1]"), show.data = TRUE, jitter = TRUE, ci.lvl = NA )
plot_model(Mod1, type = "pred", terms = c( "Positive_Affect", "Thought_Confidence_Rating[-
1,1]", "Confidence_Condition[1]"),show.data = TRUE, jitter = TRUE, ci.lvl = NA)
plot_model(Mod1, type = "pred", terms = c( "Positive_Affect", "Thought_Confidence_Rating[-
1,1]", "Doubt_Condition[0]", "Confidence_Condition[0]"),show.data = TRUE, jitter = TRUE,
ci.lvl = NA)

Mod1 <-
lm(Meaning_in_Life~Doubt_Condition*Positive_Affect*Thought_Confidence_Rating*Need_fo
r_Cognition+Confidence_Condition*Positive_Affect*Thought_Confidence_Rating*Need_for_C
ognition, data = DF)
summary(Mod1)
tab_model(Mod1)


#4
Mod1 <-
lm(Meaning_in_Life~Doubt_Condition*Positive_Affect+Confidence_Condition*Positive_Affec
t+PHQ, data = DF)
summary(Mod1)
tab_model(Mod1)
```

```
Mod2 <-
lm(Meaning_in_Life~Doubt_Condition*Positive_Affect*PHQ+Confidence_Condition*Positive
_Affect*PHQ, data = DF)
summary(Mod2)
tab_model(Mod2)

#5
Mod1 <-
lm(Meaning_in_Life~Doubt_Condition*Positive_Affect*Thought_Confidence_Rating+Confide
nce_Condition*Positive_Affect*Thought_Confidence_Rating+PHQ, data = DF)
summary(Mod1)
tab_model(Mod1)

Mod1 <-
lm(Meaning_in_Life~Doubt_Condition*Positive_Affect*Thought_Confidence_Rating*PHQ+C
onfidence_Condition*Positive_Affect*Thought_Confidence_Rating*PHQ, data = DF)
summary(Mod1)
tab_model(Mod1)
```

Predictors	Meaning in Life		
	Estimates	*CI*	*p*
(Intercept)	4.79	4.42 – 5.15	**<0.001**
Doubt Condition	0.13	-0.39 – 0.64	0.628
Positive Affect	0.63	0.30 – 0.96	**<0.001**
Confidence Condition	0.10	-0.43 – 0.62	0.714
Doubt Condition × Positive Affect	0.04	-0.48 – 0.55	0.885
Positive Affect × Confidence Condition	-0.34	-0.86 – 0.18	0.197
Observations	149		
R^2 / R^2 adjusted	0.164 / 0.135		

	Meaning in Life		
Predictors	*Estimates*	*CI*	*p*
(Intercept)	4.78	4.37 – 5.19	**<0.001**
Doubt Condition	0.11	-0.45 – 0.67	0.702
Positive Affect	0.60	0.18 – 1.02	**0.006**
Thought Confidence Rating	-0.09	-0.56 – 0.39	0.718
Confidence Condition	0.13	-0.45 – 0.70	0.667
Doubt Condition × Positive Affect	0.09	-0.50 – 0.69	0.762
Doubt Condition × Thought Confidence Rating	-0.02	-0.60 – 0.57	0.955
Positive Affect × Thought Confidence Rating	0.06	-0.53 – 0.64	0.847
Positive Affect × Confidence Condition	-0.26	-0.87 – 0.34	0.392
Thought Confidence Rating × Confidence Condition	0.22	-0.40 – 0.85	0.483
(Doubt Condition × Positive Affect) × Thought Confidence Rating	-0.14	-0.89 – 0.62	0.724
(Positive Affect × Thought Confidence Rating) × Confidence Condition	-0.03	-0.72 – 0.66	0.931
Observations	143		
R^2 / R^2 adjusted	0.180 / 0.111		

| | **Meaning in Life** | | |
Predictors	*Estimates*	*CI*	*p*
(Intercept)	4.76	4.37 – 5.16	**<0.001**
Doubt Condition	0.15	-0.39 – 0.69	0.582
Positive Affect	0.53	0.12 – 0.94	**0.012**
Thought Confidence Rating	-0.08	-0.54 – 0.38	0.738
Confidence Condition	0.19	-0.37 – 0.75	0.504
Need for Cognition	0.34	0.12 – 0.56	**0.003**
Doubt Condition × Positive Affect	0.19	-0.39 – 0.77	0.516
Doubt Condition × Thought Confidence Rating	0.01	-0.56 – 0.57	0.981
Positive Affect × Thought Confidence Rating	0.05	-0.52 – 0.61	0.868
Positive Affect × Confidence Condition	-0.30	-0.89 – 0.29	0.312
Thought Confidence Rating × Confidence Condition	0.26	-0.35 – 0.86	0.405
(Doubt Condition × Positive Affect) × Thought Confidence Rating	-0.12	-0.86 – 0.61	0.737
(Positive Affect × Thought Confidence Rating) × Confidence Condition	-0.06	-0.73 – 0.61	0.861
Observations	143		
R^2 / R^2 adjusted	0.236 / 0.165		

Predictors	Meaning in Life		
	Estimates	CI	p
(Intercept)	4.73	4.30 – 5.16	<0.001
Doubt Condition	0.17	-0.41 – 0.74	0.562
Positive Affect	0.47	0.01 – 0.93	0.045
Thought Confidence Rating	-0.12	-0.61 – 0.37	0.630
Need for Cognition	0.59	0.14 – 1.03	0.010
Confidence Condition	0.26	-0.34 – 0.86	0.390
Doubt Condition × Positive Affect	0.22	-0.41 – 0.84	0.495
Doubt Condition × Thought Confidence Rating	0.03	-0.58 – 0.63	0.935
Positive Affect × Thought Confidence Rating	0.16	-0.49 – 0.80	0.632
Doubt Condition × Need for Cognition	-0.48	-1.09 – 0.13	0.123
Positive Affect × Need for Cognition	0.03	-0.49 – 0.55	0.908
Thought Confidence Rating × Need for Cognition	-0.22	-0.79 – 0.35	0.439
Positive Affect × Confidence Condition	-0.30	-0.95 – 0.34	0.359
Thought Confidence Rating × Confidence Condition	0.29	-0.35 – 0.93	0.376
Need for Cognition × Confidence Condition	-0.07	-0.68 – 0.54	0.825
(Doubt Condition × Positive Affect) × Thought Confidence Rating	-0.22	-1.03 – 0.59	0.593
(Doubt Condition × Positive Affect) × Need for Cognition	0.05	-0.63 – 0.73	0.887
(Doubt Condition × Thought Confidence Rating) × Need for Cognition	0.20	-0.51 – 0.90	0.582
(Positive Affect × Thought Confidence Rating) × Need for Cognition	0.25	-0.45 – 0.95	0.488
(Positive Affect × Thought Confidence Rating) × Confidence Condition	-0.11	-0.86 – 0.65	0.779
(Positive Affect × Need for Cognition) × Confidence Condition	-0.11	-0.79 – 0.57	0.757
(Thought Confidence Rating × Need for Cognition) × Confidence Condition	0.29	-0.44 – 1.02	0.435
(Doubt Condition × Positive Affect × Thought Confidence Rating) × Need for Cognition	-0.29	-1.18 – 0.60	0.517
(Positive Affect × Thought Confidence Rating × Need for Cognition) × Confidence Condition	-0.50	-1.38 – 0.37	0.254
Observations	143		
R^2 / R^2 adjusted	0.271 / 0.130		

	Meaning in Life		
Predictors	*Estimates*	*CI*	*p*
(Intercept)	4.88	4.55 – 5.22	**<0.001**
Doubt Condition	-0.03	-0.51 – 0.45	0.913
Positive Affect	0.42	0.11 – 0.73	**0.009**
Confidence Condition	-0.06	-0.55 – 0.42	0.798
PHQ	-0.54	-0.75 – -0.33	**<0.001**
Doubt Condition × Positive Affect	0.05	-0.42 – 0.52	0.836
Positive Affect × Confidence Condition	-0.16	-0.65 – 0.32	0.503
Observations	149		
R^2 / R^2 adjusted	0.293 / 0.264		

| | **Meaning in Life** | | |
Predictors	*Estimates*	*CI*	*p*
(Intercept)	5.00	4.63 – 5.38	**<0.001**
Doubt Condition	-0.24	-0.77 – 0.28	0.362
Positive Affect	0.49	0.16 – 0.83	**0.004**
PHQ	-0.40	-0.78 – -0.02	**0.041**
Confidence Condition	-0.20	-0.71 – 0.32	0.455
Doubt Condition × Positive Affect	-0.09	-0.61 – 0.43	0.732
Doubt Condition × PHQ	-0.25	-0.78 – 0.28	0.357
Positive Affect × PHQ	0.31	-0.03 – 0.66	0.077
Positive Affect × Confidence Condition	-0.22	-0.74 – 0.29	0.396
PHQ × Confidence Condition	-0.27	-0.80 – 0.26	0.317
(Doubt Condition × Positive Affect) × PHQ	-0.58	-1.08 – -0.07	**0.025**
(Positive Affect × PHQ) × Confidence Condition	-0.24	-0.73 – 0.26	0.347
Observations	149		
R^2 / R^2 adjusted	0.326 / 0.272		

Predictors	Meaning in Life		
	Estimates	CI	p
(Intercept)	4.91	4.53 – 5.29	**<0.001**
Doubt Condition	-0.06	-0.58 – 0.46	0.815
Positive Affect	0.38	-0.02 – 0.78	0.062
Thought Confidence Rating	-0.06	-0.50 – 0.37	0.780
Confidence Condition	-0.08	-0.61 – 0.46	0.776
PHQ	-0.55	-0.77 – -0.34	**<0.001**
Doubt Condition × Positive Affect	0.12	-0.43 – 0.66	0.673
Doubt Condition × Thought Confidence Rating	0.06	-0.47 – 0.60	0.823
Positive Affect × Thought Confidence Rating	0.08	-0.46 – 0.62	0.773
Positive Affect × Confidence Condition	-0.05	-0.62 – 0.51	0.848
Thought Confidence Rating × Confidence Condition	0.14	-0.44 – 0.71	0.642
(Doubt Condition × Positive Affect) × Thought Confidence Rating	-0.18	-0.87 – 0.52	0.615
(Positive Affect × Thought Confidence Rating) × Confidence Condition	-0.03	-0.66 – 0.60	0.923
Observations	143		
R^2 / R^2 adjusted	0.315 / 0.251		

Predictors	Meaning in Life		
	Estimates	CI	p
(Intercept)	5.24	4.73 – 5.75	**<0.001**
Doubt Condition	-0.51	-1.15 – 0.13	0.115
Positive Affect	0.21	-0.31 – 0.73	0.423
Thought Confidence Rating	-0.46	-1.14 – 0.23	0.187
PHQ	-0.87	-1.58 – -0.16	**0.017**
Confidence Condition	-0.41	-1.05 – 0.22	0.201
Doubt Condition × Positive Affect	0.18	-0.50 – 0.87	0.594
Doubt Condition × Thought Confidence Rating	0.51	-0.26 – 1.28	0.195
Positive Affect × Thought Confidence Rating	0.46	-0.26 – 1.17	0.207
Doubt Condition × PHQ	0.20	-0.60 – 1.01	0.617
Positive Affect × PHQ	0.61	-0.01 – 1.24	0.054
Thought Confidence Rating × PHQ	0.68	-0.18 – 1.54	0.118
Positive Affect × Confidence Condition	0.10	-0.57 – 0.78	0.758
Thought Confidence Rating × Confidence Condition	0.49	-0.30 – 1.27	0.220
PHQ × Confidence Condition	0.16	-0.68 – 1.01	0.703
(Doubt Condition × Positive Affect) × Thought Confidence Rating	-0.43	-1.30 – 0.45	0.335
(Doubt Condition × Positive Affect) × PHQ	-0.90	-1.65 – -0.14	**0.020**
(Doubt Condition × Thought Confidence Rating) × PHQ	-0.55	-1.50 – 0.39	0.248
(Positive Affect × Thought Confidence Rating) × PHQ	-0.39	-1.13 – 0.34	0.291
(Positive Affect × Thought Confidence Rating) × Confidence Condition	-0.40	-1.24 – 0.45	0.354
(Positive Affect × PHQ) × Confidence Condition	-0.65	-1.40 – 0.10	0.087
(Thought Confidence Rating × PHQ) × Confidence Condition	-0.47	-1.46 – 0.52	0.349
(Doubt Condition × Positive Affect × Thought Confidence Rating) × PHQ	0.48	-0.39 – 1.34	0.275
(Positive Affect × Thought Confidence Rating × PHQ) × Confidence Condition	0.32	-0.59 – 1.24	0.488
Observations	143		
R^2 / R^2 adjusted	0.370 / 0.248		

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