"A Reframing of Meaning-Making and its Measurement among College Students"

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Association of Youth Ministry Educators (AYME)
Annual Conference, 2024

Abstract: An interdisciplinary team of researchers from Boston College has developed a novel approach to measuring meaning-making among college students. This paper offers the theoretical rationale for the assessment of meaning-making. It outlines four characteristics of meaning-making capacity, using constructive developmental theory, based on Robert Kegan, Sharon Daloz Parks and Marcia Baxter Magolda. It also describes the conversion of that assessment into a quantitative scale using the Rasch/Guttman Scenario methodology.

This project has been supported by contributions from the
Taylor University/Lilly Foundation Grant (2023), administered by AYME,
as well as the **Formative Education Grant** (2022), and
Teaching, Advising and Mentoring Grant (2023),
both awarded by Boston College

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Introduction

A college education plays a critical role in forming individuals as they transition from adolescence toward adulthood. Beyond intellectual development and employability, some argue that educational institutions have a responsibility to foster the social and spiritual lives of their students in ways that help them to develop as whole human beings, living lives of meaning and purpose (Dalton & Crosby, 2010; Glanzer et al, 2017; O'Malley, 2015). Higher education administrators, who are interested in formation as a key outcome and wish to better evaluate progress toward formative goals, need credible tools to measure such growth. However, the few tools available are inadequate to the task of measuring growth as a consequence of formative education initiatives (Bronk et al, 2018; Creamer et al, 2010).

Measuring outcomes of formative education remains challenging, in large part because relevant constructs, such as meaning-making and meaning and purpose, are very complex and difficult to operationalize. In response to this research gap, we (an interdisciplinary team of researchers) have been engaged in a long-term project to develop a portfolio of useful tools for measuring such constructs. We have employed a novel approach to quantify hard-to-measure constructs: the Rasch/Guttman Scenario (RGS) methodology. For measuring growth in meaning and purpose, we have successfully developed *Living a Life of Meaning and Purpose-A* (LAMP-A) (Ludlow et al, 2020a) and *Living a Life of Meaning and Purpose-B* (LAMP-B) (Ludlow et al 2022).

We have since developed *Living a Life of Meaning and Purpose-C* (LAMP-C) as a self-report instrument that captures meaning-making capacity among traditional-age college students. Our approach is novel because we are creating a quantitative tool to assess meaning-making, when most prior assessments have been accomplished through qualitative methods that are inefficient for assessment in educational settings. LAMP-C comprises three scales that assess students' "approach" to situations in three different contexts: in school, among family and with friends. LAMP-C is grounded in two different conceptual frameworks. The first is Constructive-Developmental Theory (CDT), which supplies the meaning-making construct the instrument seeks to capture (Kegan 1994; Parks 2000 & 2019; Baxter Magolda, 2001). The second is the Rasch/Guttman Scenario psychometric approach that guided the instrument development (Ludlow et al, 2014; Ludlow et al, 2020b).

The purpose of this paper is to offer the theoretical and methodological approach to LAMP-C. We begin with a discussion of the key research concerning meaning-making. Second, we offer a reframing of constructive-developmental theory for the purpose of operationalizing the theory in a quantitative assessment. Third, we look to the Rasch/Guttman Scenario methodology and the development of LAMP-C. Finally, we briefly discuss our preliminary findings, identify next steps, and suggest implications for further research.

I. Key Conceptual and Theoretical Approaches to Date

The literature on meaning-making, cognitive development, self-authorship, and leadership within educational contexts, particularly among college students and adults, presents a rich tapestry of interconnected ideas that collectively deepen our understanding of individual development. All theorists named below build upon the cognitive development work of Jean Piaget (1952), but expand beyond the merely cognitive to explore how individuals construct and evolve their understanding of the world and themselves. Collectively, this is called Constructive-Developmental Theory (CDT), and we offer a review of the primary and subsequent contributions to the theory.

Central to this body of work is Robert Kegan (1982 & 1994). Kegan's theory posits that development is a process of progressively more complex meaning-making, where individuals move through distinct stages of understanding, from childhood to mature adulthood. This framework has been instrumental in shaping subsequent research that examines how people, particularly in educational settings, navigate the cognitive and emotional challenges of growth. Kegan's emphasis on the transformation of meaning-making processes rather than merely the acquisition of new skills has resonated across various domains, particularly in education and leadership.

Sharon Daloz Parks (2000), who studied traditional aged college students and young adults, identified how enhancement in meaning-making impacts and is impacted by cognitive capacity, but also one's relationships, and one's sense of authority to name reality. She was instrumental in identifying the highly affective aspects of meaning-making, as it had implications for the nature and diversity of one's relationships and who one trusted as a source of information.

Marcia Baxter Magolda (2001 & 2009) expands on the concept of meaning-making by explicitly integrating cognitive, intrapersonal, and interpersonal dimensions. Baxter Magolda's longitudinal research has followed traditional age college students into mature adulthood. Her work has been crucial for understanding how students achieve self-authorship, a key developmental milestone where individuals begin to internalize and own their values, beliefs, and identities. Baxter Magolda's findings underscore how development in educational settings is not solely an intellectual endeavor but a comprehensive process that includes identity formation and social interaction.

Patricia King's (2009) exploration of cognitive and moral development within higher education settings ties these threads together by emphasizing the role of educational practices in facilitating these developmental processes. Her work suggests that the cognitive and moral reasoning capacities of students evolve in response to educational and social experiences, further reinforcing the importance of designing curricula and learning environments that support holistic development.

Dan McAdams' (2013) exploration of narrative identity formation complements Kegan's framework by illustrating how individuals continually revise their life stories as they encounter new experiences and challenges. This narrative approach highlights the dynamic nature of self-authorship, where personal stories and identities are not static but are constantly being reshaped in response to developmental stages.

The challenges faced by high-risk students, as examined by Jane Elizabeth Pizzolato (2003), further enrich the discussion by highlighting how critical incidents and supportive relationships can facilitate or hinder the journey toward self-authorship. Pizzolato's work emphasizes that the developmental processes are not uniform but are deeply influenced by contextual factors such as socioeconomic status and social support.

Deborah Helsing and Annie Howell (2014) extend the relevance of these developmental theories into the realm of leadership, arguing that understanding the internal cognitive and emotional stages of development is crucial for assessing and nurturing leadership potential. Their work illustrates how the principles of CDT can inform leadership training and assessment, particularly in higher education contexts.

Finally, Cherry Stewart and Brenda Wolodko (2016) apply CDT to the design of adaptive learning environments. Their focus on aligning educational experiences with the developmental capacities of adult learners exemplifies how theoretical insights can be translated into practical strategies for enhancing educational outcomes.

In sum, the literature suggests that meaning-making, self-authorship, and cognitive development are deeply interconnected processes that are central to personal and educational growth. CDT provides a robust framework for understanding these processes, while subsequent research has enriched this understanding by exploring how these developmental stages are influenced by narrative identity, social context, and educational practices. The integration of these ideas underscores the importance of a holistic approach to education and leadership development, one that recognizes the complex and evolving nature of human growth.

All of these research projects have involved some form of qualitative interviews, such as the Subject-Object Interview developed by Kegan and colleagues (Leahy et al 2011). Qualitative interviews, while highly informative, are problematic for large scale administration because they are time consuming, both in administration and interpretation of data. They are usually reserved for small samples. A couple self-report questionnaires and scales have been created to assess self-authorship as pertains to career readiness (Fallar et al 2019, Creamer et al 2010). However, these measures have limitations, particularly in their ability to capture the dynamic and developmental nature of meaning-making across contexts. Our efforts have been to create a quantitative assessment of meaning-making, drawing on CDT to inform the instrument development.

II. Constructive-Developmental Theory and Gradation

As indicated above, meaning-making is not simply cognition or the thinking capacity alone. Kegan is "referring to the person's meaning-construction or meaning organizational capacities. I am referring to the selective, interpretive, executive, construing capacities ... .I look at people as the active organizers of their experience" (Kegan, 1994, p. 29). As a person develops complexity of mind, or meaning-making capacity, they do not forget or reject what was previously known, but subsumes it and organizes it in a wider framework of meaning. The person becomes able to notice more in their world, make better sense of what they see, which then enhances their agency. "It is about the organizing principle we bring to our thinking and our feelings and our relating to others and our relating to parts of ourselves" (Kegan, 1994, p. 29).

As explained in greater detail below, the Rasch/Guttman Scenario psychometric approach operationalizes complex constructs, like meaning-making, by breaking the construct down into its characteristics, or *facets*. In this case, these facets are combined to construct *scenarios* that are responses to *situations* occurring in common contexts in which college students must exercise meaning-making. Within a context, the *scenarios* are incrementally changed to reflect *gradations* of the facets, thus reflecting different responses to the situations, thus different capacities of meaning-making. Further explanation of the scenario development is given in the next section of this paper. For the moment we offer the warrants for both the *facets* and their *gradation* by drawing from our analysis of the theories of Robert Kegan, Sharon Daloz Parks, and Marcia Baxter Magolda. Below each facet will be associated with at least one theorist's framework. In doing so, we offer a reframing of the theories for the purpose of operationalizing it for quantitative assessment.

In terms of gradations, all of the theorists cited above identified developmental steps in which individuals exhibit qualitatively different capacities for interpreting and responding to their worlds. Kegan, whose framework spans the lifecycle from early childhood to adulthood, identifies five possible (but not inevitable) "orders of consciousness" across the lifespan (Kegan, 1994, p. 314-315). Daloz Parks identifies four "forms" spanning from adolescence to mature adulthood (Daloz Parks, 2000, p. 90). Baxter Magolda names four "phases," starting in college and extending into mature adulthood (Baxter Magolda, 2001, p. 40). With each shift of order, form or phase, a person does not forget or reject what was previously known, but subsumes it and organizes it in a wider framework of meaning. This process takes years and takes the appropriate balance of challenges and supports to be accomplished. Kegan is most explicit in claiming that people spend more time transitioning between orders than in stasis at any given order, and that transition between orders of consciousness takes years.[1]

In view of our focus on traditional college students, we propose five gradations, which we call "positions." Three positions are based on Kegan's range from "2nd order", associated with later childhood and early adolescence, and finishing with "4th order", possible in later young adulthood. We then named two "emerging" positions to distinguish between when a particular "order of consciousness" is first onboarded (emerging) from more established. Furthermore, our emerging positions create better alignment with Daloz Parks and Baxter Magolda's frameworks. Table A offers a correspondence among the five positions of LAMP-C and the three frameworks offered by these theorists.

[1] In fact, the coding instruction guide for the Subject-Object Interview, distinguishes six positions across a transition from one order to the next: X, X(Y), X/Y, Y/X, Y(X), Y. (Leahy et al, 2011,p. 42)

LAMP Position	Kegan (1994)	Daloz Parks (2019)	Baxter Magolda (2001)
1	2ndOrder	_	_
2	Emerging 3rd Order	Adolescent/ Conventional	Following external formulas
3	3rd Order	Adolescent/ Conventional	Following external formulas
4	Emerging 4th Order	Emerging adult	Crossroads
5	4th Order	Tested adult	Self-authorship

[Table A, Five Positions and Constructive-Developmental Frameworks]

In the subsections which follow, we have identified four facets, or characteristics, that reflect the cognitive, interpersonal and intrapersonal characteristics of meaning-making capacity. They are: ideation, relational awareness, conflict resolution, and sense of responsibility. We describe each in their turn, drawing from the theorists as we do so and indicate the rationale for their gradation. It is important to note that these positions are offered as being the most characteristic way people in these positions react, in a sense, as their default. Even as individuals at moments may respond in ways that reflect positions above or below their default, the positions offered are representative of normal development.

i. ***Ideation (Cognitive)***

The first facet, or characteristic, of CDT is cognitive ability. Within the field of developmental psychology, Jean Piaget's work on cognitive development is foundational.[2] The gradations of cognitive capacity identified by Piaget for the range of development considered here are *Concrete-Operational*, *Early Formal Operational* (able to recognize and think thematically), and *Full Formal Operational* (able to recognize and think ideologically). These gradations are reflected in Kegan's organization: *Categorical*, *Cross-categorical* and *System-Complex*. We represent this range in the following five positions.

1	Concrete/ Categorical: able to think logically about the concrete and immediate. May

[2] Kegan offers a rich review and analysis of Jean Piaget's contributions to constructive-developmental theory in chapter one of *The Evolving Self: Problem and Process in Human Development* (Cambridge, MA: Harvard University Press, 1982).

	understand and reproduce other's use of concepts or themes, but cannot reliably produce the same independently.[3]
2	Cross-categorical: Beginning to recognize and use values and concepts, including acting on or producing the same independently.
3	Cross-categorical: Well established in use of values and concepts, including acting on or producing the same independently. May understand and reproduce other's use of ideologies or priorities, but cannot reliably produce the same independently.
4	System-complex: Beginning to recognize and use priorities and ideologies, including acting on or reliably producing the same independently.
5	System-complex: Well established ability to recognize and use priorities and ideologies, including acting on or reliably producing the same independently.

With increased cognitive complexity comes the ability to better recognize and make sense of the world. This is reflected in a person's ability to recognize their own interior life (e.g., thoughts, emotions, hopes) and attribute similar interiority to others.[4] Whereas those in position 1 are not guided by values, as such, those in positions 2 and 3 are able to recognize and talk about the values they hold and try to live by, but may be challenged to prioritize among competing values. In addition, those in positions 4 and 5 are able to prioritize among competing values. As Kegan says, they have "values *about* values" (Kegan, 1994, p. 90). Increased cognitive complexity is also reflected in their ability to recognize the relationship between behaviors, ideas and worldviews. Similarly, they can increasingly recognize connections between themselves and others and the mutual impact that is part of relationships. These interpersonal and intrapersonal developmental capacities are drawn out in the following facets.

ii. Relational Awareness (Interpersonal)

Our next facet is relational awareness. Sharon Daloz Parks writes, "an underrecognized strength of the Piagetian paradigm is its psychological conviction that human becoming absolutely depends upon the quality of interaction between the person and his or her social world" (Daloz Parks, 2000, p. 89). With appropriate challenges and support, it becomes increasingly apparent to the person that they have been and are in relationship with others. It is not just that they are more able to engage in relationships with mutuality, but first that they are beginning to recognize the relationships of which they are already a part.

[3] The phrase "cannot reliably produce … independently" means that the person may be able to use language and concepts that are recognizable to others, but they do not communicate a meaning that is reliable for others. The meaning or intent is not shared.

[4] The neurobiological changes that begin with the onset of puberty were unknown to Jean Piaget at the time of his research are widely recognized now. These changes, particularly the development of the prefrontal cortex, create the possibility for self-consciousness, ideation and executive functioning, as well as a deeper sense of time past and future. However, the development of complexity of mind is not inevitable, but requires the neurobiological tools and the appropriate challenges and supports (Kegan, 1982 & 1994).

According to Kegan's framework, the second order adolescent is unselfconsciously self-interested. They may recognize that others have a point of view, just as they do, but they are unable to "take their point of view and another's simultaneously" and are likely to "manipulate others on behalf of [their] own goals" (Kegan, 1994, p. 30). They do not recognize they have relationships, with implicit expectations. While this lack of relational awareness is normal in older children, it is something that is hoped they grow out of as they move through adolescence. As such, we thought it fitting to start our scale with position 1, which corresponds to Kegan's second order as described below.

The move towards Kegan's third order brings a capacity to recognize relationships, and begin to take others into consideration. This happens first in a tacit manner (position 2) whereby a person becomes generally aware of social pressures and expectations. In time and with encouragement (position 3), tacit belonging is replaced by conscious alignment, whereby one takes on and even can become a proponent for the values and expectations of particular relationships. Daloz Parks names this as "Conventional" belonging, "marked by conformity to cultural norms and interests" of the relationship or community (Daloz Parks, 2000, p. 92). With this capacity there is a presumption for similarity within a group and strong boundaries, thus eliciting a self-imposed expectation to live within those boundaries.

Position 4 marks a shift in one's sense of dependence on and obligation to one's relationships. It reflects what Baxter Magolda names as the "Crossroads". In her research she found that people came to a crossroads because following the "external formulas" of their relationships "did not produce the expected results" (Baxter Magolda, 2001, p. 93). This brought about the occasion to name their own needs and perspectives, even if doing so might risk the relationship. In position 4, one is beginning to risk sharing one's perspective as distinct from the other. By the time one is in position 5 one is more confident in claiming their own voice and has a greater ability to recognize and appreciate diversity within their communities. Rather than being bound by the expectations of a relationship, Kegan describes this as one having a "relationship to the relationship" (Kegan, 1994, p. 91-92). Furthermore, they "can sustain respectful awareness of communities other than its own" (Daloz Parks, 2000, p. 100).

1	Self-interested in their use of the other/groups. Others function within roles, in reference to self. Unable to simultaneously hold another's point of view alongside their own.
2	Increasingly aware of the other/group. Tacit sense of belonging to given social groups and expectations of those relationships.
3	Conscious sense of belonging and alignment with the other/group. More able to be selective about group membership, yet a tendency to see groups as monolithic w/ strong parameters.
4	Becoming aware of diversity internal to the other/group and beginning to name their own point of view within the group.
5	Aware of diversity internal to the other/group. Able to confidently name their own point of view within/among others/groups.

iii. Conflict Resolution (Intrapersonal)

Each of these theorists argue that the interpersonal and the intrapersonal are intertwined, as a person's sense of identity and agency are implicated by how they see and interpret their relationships. Conflictual situations are spaces in which the intrapersonal is made apparent, for how one chooses to resolve the conflict reflects a sense of self in relation to others. So we suggest the source and resolution of conflicts as indicative of meaning-making complexity.

The person in position 1 is able to think logically about their perceptions, but unable to simultaneously consider the perceptions of others, the intrapersonal tends to focus on their own interests and preferences. In a conflict they will resolve in favor of their own needs and desires, but not for any principled reason. The shift from second order (position 1) to third order (position 2), Kegan argues, is reflected in the "need to take out membership in a community of interest greater than one, to subordinate their own welfare to the welfare of the team, even, eventually, to feel a loyalty to and identification with the team" (Kegan, 1994, p. 47). At first this may be a tacit acceptance to conform to what "everyone" expects (position 2). In time, it may develop into a greater sense of identity, grounded in particular relationships and social alignments (position 3). The capacity to identify oneself in the midst of one's many relationships is a development over prior positions, even though this capacity may eventually become a limit; the boundaries and expectations of the relationship can serve as the boundaries of the self.

As one becomes able to distinguish between oneself and one's relationships (position 4), they become more able to express a self distinct from their relationships and associations. While remaining deeply invested in their relationships, they do not feel the need to conform to others' expectations of them for those relationships. There is no longer a felt need to conform to expectations of the relationship, even while mindful of those expectations. The consideration of the self found in position 5 is more integrated, reflecting principles and values that the person holds dear, regardless of the relationship and context. Baxter Magolda describes this as "trusting the internal voice" (Baxter Magolda 2010).

1	Self-interest v. others/group. Self-interest wins, but not in a way that reflects ideals or values, but reflects advantages that are more concrete and immediate. No reflection of an inner sense of self.
2	Self-interest v. others/group. Group wins. Self-interest becomes tied up in the group's interests and tacit expectations of the relationship.
3	Self v. others/group. Conflict within relationships is ameliorated. Conflict between relationships is avoided. Alignment with the relationship, often expressed in shared values or perspectives.
4	Self v. others/group. Self risks relationships to express self as different from the relational expectations, values or perspectives.
5	Self v. others/group. Confident in relationships while expressing self as different from the relational expectations, values or perspectives.

iv. Sense of Responsibility (Intrapersonal and Interpersonal)

This final facet, sense of responsibility, reflects both the interpersonal and the intrapersonal dimension. As "boundaries of awareness…expand…the person begins to move in new ways in the adult world of responsibility" (Daloz Parks, 2000, p. 93). As such, a person's sense of responsibility, often expressed as guilt, can be a strong indicator of meaning-making capacity (Leahy et al, 2011, p 15).

In position 1, relationships and obligations to others are not yet acknowledged, so there is no sense of responsibility to others. One may feel guilty for actions, but that is usually reserved for situations for which there are obvious and immediate negative consequences. However, position 2 reflects an awareness of relationships and social connections, resulting in a move to feel responsible *to* those relationships. One may feel guilty for upsetting others or falling short of expectations, but does not see themselves as being in a position to alter those expectations. As one moves to position 3, there is a stronger alignment with relationships, and the values they represent, thus enabling the ability to be more mindful of and responsible to the relationships and values, but still looking to others to determine the rules of engagement. (Kegan, 1992)

As the person comes to see themselves as having relationships, but not being defined by them, they can begin (position 4) to "reflect on, control, take responsibility for" those relationships (Leahy et al, 2011, p 9) by determining how they will be in them; they increasingly determine their own rules of engagement for their relationships. As they come more consistently able to name who they are in their relationships (position 5), they can better see how their attitudes and actions shape the relationship for themselves and others. As such they become more responsible *for* those relationships; they recognize they are part of determining the rules of engagement for everyone.

1	No responsibility beyond self interest. Relational expectations and parameters are thought to be arbitrarily set by others.
2	*To* the other/group. Tacitly aware of expectations and parameters with a felt need to respond to them.
3	*To* the other/group. Explicitly aware of expectations and parameters with a felt need to respond to them.
4	*For* the other/group. Becoming aware of their ability to determine who they are in the relationship, thus their contribution to the culture of the relationship.
5	*For* the other/group to serve the group's greater good. Very aware of their ability to determine who they are in the relationship, thus their contribution to the culture of the relationship.

Thus concludes our description of the four facets of CDT and their gradations that we have used to operationally define meaning-making for the sake of quantitative assessment. In the next section we look at how we used this reframing to develop the LAMP-C instrument.

III. Shifting Methodologies: from Qualitative to Quantitative

i. Rasch/Guttman Scenario Method of Instrument Construction

As mentioned above, the Rasch/Guttman Scenario psychometric approach operationalizes complex constructs, like meaning-making, by breaking the construct down into its characteristics, or *facets* (Ludlow et al, 2014; Ludlow et al, 2020b). These facets are combined to construct *scenarios,* that are responses to *situations* occurring in common contexts in which college students must exercise meaning-making. In LAMP-C we offer three scales, each reflecting a different context: school, family and friends, each with a potentially conflictual situation. Within each scale, there are five scenarios, the facets of which, identified above, are incrementally changed to reflect gradations of meaning-making capacity. The full set of scenarios within the scale reflects the possible range of meaning-making capacity among college students in that context. In this section we discuss the choice of contexts and development of situations; the construction of scenarios; setting the response options; and the interpretation of scores. We begin with a discussion of how language use is an important consideration with the scales.

Each of these theorists, Kegan, Daloz Parks and Baxter Magolda, use qualitative interviews to gather information about subjects. A qualitative interview, such as the Subject-Object interview protocol developed by Kegan and Leahy, offers interview prompts, such as "What makes being in this school important to you?" (Leahy et al, 2011, p. 51). It also offers rubrics for coding the interviews. Central to the coding process is attending to how subjects use language and narrate their circumstances. An interviewee's use of language is an important aspect of assessing meaning-making capacity. For example, does the interviewee use concepts, themes or values in their narration, or is their speech limited to concrete actions and preferences? Is their speech primarily self-referential or do they consider their relationship to and impact on others? When considering decisions, to whom do they defer? How a person talks about themselves and their world reflects how they perceive and make meaning of their worlds (Leahy et al 2011).

In contrast, LAMP-C assesses meaning-making capacity through a quantitative method, whereby the situations and the language are provided in the instrument. Instead of offering interview prompts, the RGS method calls for the development of scenarios, which are designed to be rich descriptions of real life, to which people then compare themselves. The scenarios are set in situations that people would likely encounter and recognize. Since the scenarios present five distinct ways of making-meaning of the situation, each scenario must reflect the language and concepts as they would be used by people in each of the five positions. Thus you will notice different kinds of language use in each scenario within a context. In position 1, the character speaks of concrete actions and personal preferences. By the time you get to position 5, the character is able to talk about prioritizing among competing values and ideas. This pattern of change over the five positions reflects an increasing complexity in meaning-making capacity.

ii. The choice of contexts, the development of situations and scenarios

LAMP-C is composed of three scales, each within a specific context and each setting forth an interactional situation.[5] Because we are assessing college students, we chose contexts that would likely be important to them. Those are family, school and friends. We anticipate that students will exhibit higher levels of meaning-making in the school context, as school is designed to challenge and support new ways of meaning-making. On the other hand, in the context of family, students may exhibit lower levels of complexity in meaning-making, as there are longstanding patterns of behavior and potentially strong emotional consequences for change. By offering three different scales, thus interrogating the students in these three contexts, we create a comprehensive picture of the student, and can note if there is difference among the three contexts.

In order to operationalize a respondent's capacity for meaning-making, the situations are potentially conflictual, depending how someone makes sense of them. They are designed as such that in each situation, the person is called to make sense of the situation and offer some kind of response to the situation. Five possible ways of making meaning of each situation are reflected in the five scenarios.

The construction of the scenario items to define each meaning-making position followed the Rasch measurement principles summarized in Ludlow et al., (2014):

1. The items should measure a single facet and range from lower to higher levels of the facet;
2. The items should define a clear, substantively meaningful, hierarchical progression with respect to the facet; and
3. The *a priori* underlying theory of the dimension should be reflected in the empirical results.

This means the scenarios were written to follow principles 1 and 2 with the third principle as a cornerstone for the establishment of content and construct validity. Following principle 1, each scenario combines elements of the four facets identified above: cognition, relational awareness, conflict resolution and sense of responsibility. The first scenario reflects the facets as outlined for position 1, and so forth, until the last scenario reflects position 5. Following principle 2, each of the five scenarios within a context represents a progressively more complex capacity for meaning-making. For an example, see the school scale (Figure A). This deliberate, systematic item construction process should generate an *a priori* expected ordering of the scenarios along our hypothesized meaning-making continuum for each of the three contexts, thus aligning with principle 3. We address construct validity in the next section.

[5] A scale refers to the set of items that are measuring a construct. In LAMP-C we have three scales, each measuring meaning making but each scale is for a different context. The set of three scales is a battery, instrument, or 'portfolio.'"

Situation:
John is a student in a college and a program that he likes. He is enrolled in a course required for his program of study and he gets on fine with the professor. There has never been any indication from this professor that there are consequences for holding diverse perspectives from the professor. In a question on an exam, the professor instructs students to offer their perspective on an issue, applying the course material to support their answer. Each scenario below reflects a different way John might approach the situation.

1. I don't like questions like this. It feels like a trap. Do they want my opinion or the course material? Which is it? If they know what answer they want, they should just tell us what it is and not try to mess with us.

2. I really don't see how my opinion matters on this. There's got to be one right way to answer this question, whether it's naming the right steps or the right theorists. My job is to figure out what the right answer is.

3. There are multiple right ways to answer this question using the course material, and I really think differently about this than the professor does. But there's no way in the world I'm going to offer anything different from what I think the professor wants.

4. There are multiple ways to answer this question, and some are better than others. On this question, I really think differently than the professor does. It feels a little risky, but I think if I make a strong, well-supported argument using the course material, I should be alright.

5. There are multiple ways to answer this question, and some are better than others. If I have the space and time, I think I will lay out a few options, and argue the merits and limits of each. But in the end, it will be really important that I make a clear argument for which one I think is most effective. I like questions like this; they offer a chance to really engage with the material.

[Figure A, The School Scale]

iii. Response options and instrument validity

The RGS approach functions differently from traditional scales in substantial ways. Rather than using traditional response formats, such as agree/disagree, a RGS instrument employs distinctive "comparative response" options. In LAMP-C the respondent is asked to compare themselves to the character in each scenario. More specifically, the instructions direct the respondent "to imagine yourself in each situation and consider the degree of similarity between your approach to that of the character's approach." They are then offered five options:

A. In the past I might have approached this kind of situation similarly to X, but I don't now.
B. Sometimes I approach this kind of situation similarly to X, but not regularly anymore.
C. Now, I regularly approach this kind of situation similarly to X.

D. Sometimes I approach this kind of situation similarly to X, but not as regularly as I would like to.
E. Someday I might approach this kind of situation similarly to X, but I don't now.

Since our scale is based on CDT, we presume respondents experience change in meaning-making capacity over time. Therefore, the response options reflect change over time, requiring the respondent to situate themselves vis-a-vis each scenario in a manner that reflects their changes in meaning-making over time.

As mentioned above, RGS results should reflect an *a priori* expected order, or scale structure, of the items in terms of their levels of developmental capacity along the hypothesized continua of meaning-making. By creating scenarios that contain five increasingly complex approaches/"position" to situations, and asking respondents to compare themselves to the character in each scenario, we are able to test the validity of the scale itself. By requiring respondents to choose a response for every scenario, rather than identify a scenario that best fits their current situation, we produce a "score" for each scenario, not just for each respondent, when the scale is administered. Therefore, if LAMP-C presumes meaning-making changes developmentally, then we should expect to see a change over time reflected in the selection of responses to all of the scenarios (e.g., in the past I might have approached (position 1 scenario) and someday I might approach (position 5 scenario)). If the results do not, it is the instrument that is out of alignment, not the person responding to the instrument. In this way, the RGS method facilitates the development of assessment instruments that measure an actual construct, like meaning-making, not a hypothetical construct. Ideally, in a well-designed scale, the individual items (scenarios) will appear "scored" on a variable map as a ladder-like progression that is congruent with their hypothesized order.[6]

iv. Respondent score interpretation

Given that the instrument is internally valid, we then are able to generate scores for individuals that can be interpreted more richly. Variable maps are an essential component of Rasch model analyses. These maps are graphical representations that simultaneously display the scenario difficulty estimates and the respondent level of meaning-making estimates, both as locations along a quantitative continuum. This continuum provides the basis for a substantive diagnostic interpretation of a person's score.

For example, in addition to the ordering of the scenarios from simpler (position 1) to more complex (position 5) responses to situational interactions, the response options are ordered and framed in terms of past to future reactions to those situations. This means that scores are generated for the scenarios (mentioned immediately above) and people alike. Specifically, 'high' scores for people correspond to higher levels of meaning-making in terms of their responses to the scenarios. From this score, we can interpret where they are in their meaning-making capacity, as relates to the facets identified above: cognition, relational awareness, conflict resolution and sense of responsibility. Thus, LAMP-C offers rich feedback on a student's meaning-making

[6] A prior iteration of LAMP-C was presented at the annual meeting of the American Educational Research Association in 2022. While there were initially positive results, that version did not present the desired ladder-like distribution as clearly as was hoped for, so this current version is a dramatic reworking of the scales (O'Keefe et al 2022).

capacity. Were the instrument to be administered at different times over the course of an undergraduate career, changes might be noted on changes in meaning-making capacity.

IV. Preliminary Testing and Looking Ahead

Preliminary results from early iterations of LAMP-C were promising, but did not present the ladder-like ordering in the response scales. After consultation with a Student Voices Advisory Group (SVAC) that we assembled of diverse undergraduate students, we restructured LAMP-C. We then conducted initial testing of the “school” and “friends” scales with undergraduates, to positive effect. Particularly, the instrument was easier to understand and the results presented in the ladder-like distribution anticipated. The testing and restructuring process will be outlined in a separate paper.

Since our preliminary results are promising, our next step is to proceed with a larger administration. This will test the most recent small changes made to the “school” and “friends" scales and the untested “family” scale to confirm the psychometric properties of the most recent iteration of the scales. We are open to partnering with external colleges and universities (e.g., AYME colleges and universities) to administer LAMP-C. Our hope, beyond providing colleges and universities a means of measuring meaning-making as an element of formative education, is to conduct longitudinal studies to track the development of meaning-making capacities over time, offering deeper insights into how college experiences contribute to students' cognitive, interpersonal, and intrapersonal growth.

Looking forward, we are also exploring opportunities to expand LAMP-C’s applicability across diverse educational settings, including community colleges and non-traditional student populations. We will continue to integrate feedback from additional Student Voices Advisory Groups to ensure the instrument remains relevant to students from varied backgrounds and experiences. Our ultimate goal is to develop a comprehensive suite of tools that assess personal and educational growth, contributing to a deeper understanding of how meaning-making evolves during the college years and beyond.

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This project has been supported by contributions from the
Taylor University/Lilly Foundation Grant (2023), administered by AYME,
as well as the **Formative Education Grant** (2022), and
Teaching, Advising and Mentoring Grant (2023),
both awarded by Boston College