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RESEARCH PAPER

The Situational Meaning in Life Evaluation (SMILE): Development and Validation Studies

Michela Zambelli[1,3] · **Semira Tagliabue**[2]

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Abstract

The present multi-study work presents a new self-report measure of meaning in life in the context of situational life experiences. Study 1 presents the development of the Situational Meaning in Life Evaluation (SMILE), a six-item measure that integrates the three content-dimensions (comprehension, significance and purpose) and the two process-dimensions (presence and search) of meaning in life. The scale is provided with a situational anchor that can be easily adapted to different event- and time-related situations. Two empirical studies examined the psychometric properties of the SMILE measure. Study 2 involved an Italian representative sample of 3035 individuals (51.6% female; M_{age}= 48.3, range= 18-91, SD= 14.03). Confirmatory Factor Analysis supported the theorized structure of the scale and provided evidence of good internal consistency collected with McDonald's Omega, generalizability across gender and age was established by measurement invariance, and criterion validity evidence was obtained by correlations with measures of well-being. Study 3 was conducted on a sample of 283 Italian emerging and young adults (76% female; M_{age}= 26; range= 19-36; SD= 4.09). Results confirmed the SMILE's structure and internal consistency and added evidence of convergent and incremental validity by conducting a series of hierarchical regressions to test the predictive power of the SMILE over the Meaning in Life Questionnaire on well-being measures. Findings provided evidence of the psychometric properties of the SMILE as a valid and reliable measure of situational meaning in life. Suggestions for future research are discussed.

Keywords Meaning in life · meaning-making · Scale development · Validation · Validity · Reliability

✉ Michela Zambelli
michela.zambelli@unicatt.it

[1] Department of Psychology, Università Cattolica del Sacro Cuore, Milan, Italy

[2] Department of Pyschology, Università Cattolica del Sacro Cuore, Brescia, Italy

[3] Present address: Department of Educational Sciences (DISFOR), University of Genova, Genova, Italy

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1 Introduction

Over the decades, theoretical and empirical attention has been devoted to understanding what the experience of meaning in life is, and how the perception of meaning in life can be enhanced in the context of situational experiences (King & Hicks, 2021). Frankl (1963) was a pioneer in introducing the concept of meaning in life as the primary motivational force in human life and started a debate around the process of meaning-making, that is how the subjective experience of having a life fulfilled with meaning is generated and change over time. Progress in answering these questions came from the development of reliable measures to assess the construct of meaning in life. Several self-report measures are nowadays available to assess the experience of meaning in life, among which Steger's (2006) Meaning in Life Questionnaire, to assess *presence* and *search* for meaning, and other recently developed measures to assess the perception of a life that is *comprehensible* and *coherent*, *goals-oriented* and dense with *significance* and *mattering* (Costin & Vignoles, 2020; George & Park, 2017; Martela & Steger, 2022). All these measures assess the global perception of life meaningfulness, by asking to provide an overall estimation of life's meaningfulness. Global measures are usually administered to compare individuals on their trait level of meaning in life, however, they are not intended to investigate how much a specific event or situation contributed to generate or disrupt life meaningfulness.

The meaning in life literature is missing a situational measure of meaning in life that is specifically designed to answer research questions related to how the subjective perception life meaningfulness can be disrupted or enhanced by major events (e.g. traumatic events, Park et al., 2012); or how people's assumptions about their meaning in life can be nurtured by everyday life experiences (e.g. Brassai et al., 2011; Steger et al., 2008). Starting from the most recent theoretical advancements in the meaning literature and an examination of the available global measures of meaning in life, the present work proposes the development of a new self-report measure dedicated to the assessment of the subjective evaluation of meaning in life in the context of specific life events and experiences. The psychometric properties of the new scale have been tested with two empirical studies.

1.1 Meaning in Life as a Processual Construct: Presence and Search for Meaning

Starting from the awareness about the beneficial effects of living a meaningful life (Frankl, 1963; Irving et al., 2017; Steger et al., 2009), for a long-time researchers questioned themselves about the origins of meaning in life, in other words, how meaning in life is created? How can it be enhanced? All these questions lead to the investigation of the dynamics of the meaning-making process. One of the first reflection about how to measure the meaning-making process came from Steger and colleagues (2006), who argued that meaning in life is not just a matter of presence or absence of meaningfulness, but the process-oriented nature of meaning in life can be expressed by the combination of two constitutive features: the perception of a life fulfilled with meaning (i.e., *presence of meaning*) and the active efforts to establish some understanding of purpose and meaning in life (i.e., *search for meaning*). The empirical findings produced in the last 15 years based on this theoretical framework have shown that, in the adult population, the two dimensions of presence and search for meaning are cross-sectionally negatively associated (Li et al., 2021 for a meta-analysis). If presence of meaning is unequivocally an indicator of well-being in all stages of life, prominent

levels of search for meaning are quite often positively associated with lower well-being or negative psychological functioning in the adult population. In contrast, when perceptions of meaning in life are reported by emerging and young adults, presence and search for meaning are often positively associated, and the search for meaning itself does not show negative associations with well-being constructs (Steger et al., 2011). These results underline a normative function of the search for meaning during emerging and young adulthood that mirrors the process of identity exploration typical of these phases of life (Mayseless & Keren, 2014; Negru-Subtirica et al., 2016). The bunch of empirical evidence collected by administering the MLQ measure made scholars concluding that presence and search for meaning are two separate but interdependent dimensions of meaning in life, therefore, they should be studied in conjunction to grasp the full complexity of the meaning-making process (Steger et al., 2009).

1.2 Meaning in Life as a Multidimensional Construct: The Tripartite view of Comprehension, Significance, and Purpose

A decade after Steger's conceptualization, a theoretical reflection about how to conceptually define and measure the construct of meaning in life raised. The starting point was the need to establish the theoretical independence of meaning in life from other related constructs such as well-being, life satisfaction and coping, discriminating what constitutes meaning in life from what is just a correlate (Leontiev, 2013; Park, 2010). In recent years, a scholar consensus emerged in defining meaning in life as a multidimensional construct founded on the perception of life that is comprehensible and coherent (i.e., *coherence* or *comprehension* dimension), endowed with value (i.e., *significant* or *mattering* dimension), and oriented by purposes (i.e., *purpose* dimension) (Costin & Vignoles, 2020; George & Park, 2017; Martela & Steger, 2016). *Comprehension/coherence* can be defined as the extent to which individuals perceive a sense of coherence and comprehensibility regarding one's life (Baumeister, 1991; George & Park, 2017; Reker. & Wong, 2013). Individuals with high coherence are able to understand the experiences and inscribe them into a clear and coherent life story (Heine et al., 2006; King et al., 2006). *Purpose* refers to the degree to which individuals live their lives as directed and motivated by intrinsically valued goals (George & Park, 2016; McKnight & Kashdan, 2009). Individuals with high purpose scores have a clear sense of their aspirations and are extremely committed to reach these ends (George & Park, 2016). Finally, the *significance/mattering* dimension represents the extent to which individuals feel their existence as inherently meaningful, valuable, and worth living (George & Park, 2016; King et al., 2006). Martela and Steger (2022) operated a distinction between significance and mattering, stating that the former (significance) is about a sense of life that is inherently valuable, while mattering is more about the value of one's life to the world.

1.3 A Brief Panorama of Available Meaning in Life Measures and Their Limitations

Currently, we dispose of few self-report measures of meaning in life that were built under the aforementioned theoretical bases (Table 1). First, the Meaning in Life Questionnaire (MLQ) developed by Steger at al. (2006), which is the only available measure to assess meaning in life with a processual perspective, by operationalizing the construct as made of two dimensions, *presence* of meaning and *search* for meaning. The MLQ has been trans-

lated and validated in more than 20 countries and its bi-factorial structure showed strong stability and validity evidence (Table 1). The major drawback of the MLQ is that it does not grasp the multidimensionality of the construct as made of *comprehension*/*coherence*, *significance*/*mattering* and *purpose*.

Three self-report measures of *presence* of meaning in life has been recently developed based on the tripartite view of meaning, chronologically the Multidimensional Existential Meaning Scale (MEMS; George & Park, 2017), the multidimensional MIL scale (Costin & Vignoles, 2020) and the three Dimensional Meaning in life scale (3DM; Martela & Steger, 2022). All measures showed good psychometric properties and yielded support for a distinction among the three dimensions of MIL, also providing evidence of discriminant validity with other theory-related constructs.

We see two major shortcomings in the measures of meaning in life that we examined. First, we miss an integrated measure of meaning in life in which the tripartite view of meaning is acknowledged both as constituting the subjective perception of meaning in life, and as the target of individuals' exploration when searching for life meaningfulness. The second measurement issue is that all MIL instruments are measures of global meaning in life, as they grasp an overall estimation of how much people perceive their whole life as meaningful and/or how much they think to be in search of meaning. Coherently, the instructions do not refer to any specific situation or timeframe, with the only exception of the Multidimensional MIL scale (Costin & Vignoles, 2020) that asks participants to refer to their "*current feelings*". Items are formulated with the present verbal tense (e.g., from the MLQ: "I am always searching for something that makes my life feel significant"; from the Multidimensional MIL "I can make sense of the things that happen in my life"). The 3DM measure (Martela & Steger, 2022) reports a situational reference related to everyday life ("*Every day* I experience the sense that life is worth living"). Additionally, the MEMS (George & Park, 2017) includes one item with a future-oriented orientation "*Even a thousand years from now*, it would still matter whether I existed or not", and one item that specifically asks participants to globally evaluate the comprehensibility of their life "*looking at my life as a whole*, things seem clear to me".

Despite those measures possess good psychometric properties as shown in their validation works (Table 1), some authors expressed criticality in the use of global measures when the goal is to study meaning in life in the context of specific situational experiences. For instance, global evaluations of life meaning were considered unsuitable to measure daily dynamics assessed with intensive longitudinal designs, as they are not sensitive to short-time fluctuations (Newman et al., 2018, 2021). When people are asked to report their global perception of meaningfulness, they make an average estimate of life which is affected by their past peak experiences, by the current situation (e.g., one present mood), and by a comparison between their future expectations and reality, thus making impossible to distinguish the role of the different temporal dynamics and experienced events. Moreover, global measures do not provide indications about what experiences participants should consider when evaluating their perception of life meaningfulness, thus making even more difficult to provide a reliable self-report evaluation of their "meaning in life", a concept inherently ambiguous (Leontiev, 2013; Park, 2017). Hence, when the goal is to detect the meaning in life in relation to specific moments and events, it would be important to operationalize it as a situational construct by equipping the instructions and/or items with an anchor to specific situational experiences.

Table 1 Self-report measures of meaning in life assessing the three content-dimensions and the two process-dimensions of the construct

Instrument	Validation paper	Number of items	Scale of measurement	Instructions	Dimensions	Reliability	Validity evidence
MEMS - Multidimensional Existential Meaning Scale	George & Park, 2017	15 items	Likert 1–7	Please read the following items carefully. Using the response scale listed next to each item indicate the extent to which you agree or disagree with that statement.	Comprehension Purpose Mattering	from study1[a] 0.90 0.89 0.84	Content validation (by experts) Convergent validity Criterion validity
Multidimensional MIL scale	Costin & Vignoles, 2020	16 items	Likert 1–7	Please indicate your current feelings by selecting how much you agree or disagree with the following statements.	MIL judgement Coherence Purpose Mattering	from study1[b] 0.89 0.77 0.85 0.92	Structural stability (across time and samples) Generalizability (multigroup invariance)
3DM - Three dimensional meaning in life scale	Martela & Steger, 2022	11 items	Likert 1–7	Please read each of the following items carefully, thinking about how it relates to your life, and then indicate how true it is for you.	Coherence Purpose Significance	from study4[a] 0.84 0.85 0.71	Structural stability (across samples) Convergent validity Divergent validity Criterion validity

Table 1 (continued)

Instrument	Validation paper	Number of items	Scale of measurement	Instructions	Dimensions	Reliability	Validity evidence
MLQ - Meaning in Life Questionnaire	Steger et al., 2006	10 items	Likert 1–5	Please take a moment to think about what makes your life feel important to you. Please respond to the following statements as truthfully and accurately as you can, and also please remember that these are very subjective questions and that there are no right or wrong answers.	Presence Search	from study1b[a] 0.86 0.87	Structural stability (across samples) Convergent validity Divergent validity

Note.

[a] reliability calculated with Cronbach's Alpha

[b] reliability calculated with Raykov's (1997) formula for latent factors

Up to now, only sporadic attempts have been made to develop measures in some way related to meaning in life that include an anchor to specific situational experiences. Park et al. (2016) assessed how much a specific stressful or traumatic experience violated personal values and the ability to accomplish life-goals with the Global Meaning Violations Scale (GMVS); and The Meaning-Focused Coping Questionnaire (MFCQ; Gan et al., 2013) detects the extent to which participants possess specific meaning-focus skills in the context of bad experiences (e.g. "I wondered whether there is some special meaning in the occurrence of this event"). In a couple of daily diaries, Newman and colleagues (Newman et al., 2018; Newman & Nezlek, 2019) tried to integrate temporality into the measurement of meaning in life by asking participants to refer to the events of the previous 24 h to make their assessment of meaning in life (e.g. "How meaningful did you feel your life was *today*?").

2 Meaning in Life as a Situational Construct: Event-specific and Temporal Oriented

The experience of life meaningfulness and the process of meaning-making grounds in specific timeframes and contexts (King & Hicks, 2021). Therefore, when taking into consideration meaning in life as a situational construct, we must consider that it possesses two properties: it is *event-specific* and *temporal oriented*. Meaning in life is event-specific because it can be disrupted or enhanced by some major experiences, such as *traumatic events* (e.g., death; Barak & Leichtentritt, 2015); *stressful events* (e.g., dealing with an organizational change; Van den Heuvel et al., 2013); or *normative transitions* (e.g., graduating from college, Wilt et al., 2016). The occurrence of these events can be expected or unexpected, but in any case, it generates a shift in one's system of meanings that can be perceived by individuals either as a crisis of meaning, or as an enhancement of life-fulfillment. Not just major events, but also mundane activities can foster a sense of life meaningfulness. As human beings we build the meaning of our life day after day, by interpreting the naturally occurring life-experiences and integrating them in our identity (Brassai et al., 2011; Steger et al., 2008). For instance, daily routines and leisure activities, such as have a cup of coffee every morning, has been found to play a leading role in making one's life meaningful (Bailey & Fernando, 2017; Heintzelman & King, 2019).

The second situational property of meaning in life is that it is *temporal-oriented*. As stated by Fivush et al. (2017) "meaning-making emerges differentially across days, weeks, months, and years after an experience, and this event processing takes place within ongoing developmental change" (pp. 127). In other words, the perception of life meaningfulness experienced before something unexpected happens is different from that perceived concurrently with the event, and change along with the evolving situation, and beyond, because even when an event is concluded (e.g., recovery from an illness) the overall assessment of one's life could still change until finding a new stable configuration. The temporality of the process can emerge also in short time-frames, as the ways individuals elaborate and give meaning to specific experiences change and undulate at a daily level (Fivush et al., 2017; Frankl, 1963; Heintzelman & King, 2019).

From the literature presented so far, it emerges that the psychometric literature on meaning in life is missing an integrated measure that is capable of detecting the multi-dimensionality of the construct within a situational framework, where for *situational* we intend both the reference to specific life events or transition of interest (e.g. cancer diagnosis, COVID-19 pandemic, getting a new job), and a specific time-frame (e.g. day by day, the last month), in order to be able to measure the meaning-making dynamics we intend to measure, that is precisely what scholars refers to as construct validity of a measure (Hubley & Zumbo, 2011).

3 Aims

The aims of the present work are two-fold:

Aim 1. To develop a new self-report measure of meaning in life capable of (a) capturing the complexity of the construct by integrating the tripartite view of MIL (coherence/comprehension, mattering/significance, and purpose) within the two process-oriented dimen-

sions of presence and search for meaning in life, and (b) detecting the situational features of meaning in life in the context of event-specific and time-oriented experiences. The new measure is called SMILE (*Situational Meaning In Life Evaluation*).

Aim 2. To collect empirical evidence of the validity of the SMILE (structural validity, generalizability, reliability, convergent, criterion and incremental validity).

Three studies have been designed to properly answer the aims. The first study presented the process of development of the SMILE (Aim 1); the second study tested the psychometric properties of the SMILE (Aim 2) by collecting evidence of structural validity, reliability evidence, generalizability evidence, and criterion-related validity on a representative sample of 3033 Italian participants; the third study examined the replicability of the validity evidence collected in study 2 (Aim 2) on a sample of 318 emerging and young adults (18–36 years; Arnett, 2014), and additionally examined convergent, divergent and incremental validity.

4 Study 1. Development of the SMILE Measure

The purpose of the study was to create the item pool for the construction of a situational measure of meaning in life that must have the following properties: (a) assess the process-dimensions of presence and search for meaning in life; (b) include the multidimensionality of the construct as made of comprehension/coherence, significance/mattering and purpose in both the presence and search form; (c) each item must be equipped with an event-specific and temporal-oriented anchor that can be adapted to different context and situations; (d) the measure must not exceed in length to be used in longitudinal and intensive designs.

With the aim to formulate a theoretically grounded and face valid item pool, we based on the most recent and relevant theoretical definitions of meaning in life and we examined the available global measures of meaning in life. The selection of items followed a recursive process of ideation and discussion by the authors until reaching consensus about the clarity and consistency of the items with the theoretical definitions of meaning in life.

For the *comprehension/coherence* dimension we took as a reference the MLQ's item "I understand my life's meaning" and two items from MEMS' comprehension dimension "I understand my life" and "I can make sense of the things that happen in my life". According to the literature, the *coherence/comprehension* dimension refers to the people's past experiences, as it is grounded in the ability of people to understand the meaning of an occurred event or experience, and then being able to integrate it into a coherent life narrative (Reker. & Wong, 2013; Martela & Steger, 2016). Therefore, we developed one item that assesses the ability of people to understand the meaning of events that happen in life (*presence of comprehension*), and we equipped the item with a reference to a specific event or situation and a temporal anchor to the past "If I look back at my life". This item has been formulated also in the search for meaning version (*search for comprehension*) to grasp the attempt of people to find out a meaning of the event.

For the *significance/mattering* dimension we referred especially to the 3DM's items "My life is full of value" and "Every day I experience the sense that life is worth living", and the MLQ's item "I have a good sense of what makes my life meaningful". The subjective perception of living a valuable life is strictly connected with present feelings (Martela & Steger, 2016), in fact this is the affective component of meaning in life, as it relates with emotions as happiness and fulfillment (Reker & Wong, 2013). Therefore, we developed one

item to assess how much people perceive their life as valuable in the present ("Today") in the context of a specific event or situation (*presence of significance*). In the search for meaning version this item assesses the attempt to find out what gives value to life in the context of a specific event or situation (*search for significance*).

Finally, the *purpose* dimension of meaning in life is distinctively future-oriented, as it is concerned to the strive to reach valuable life-goals for one's future and give a sense of life directionality (Martela & Steger, 2016). We referred to 3MD's item "I have a set of core goals that give my life a sense of direction" and the Multidimensional MIL scale's "I have certain life goals that compel me to keep going" to formulate the *presence of purpose* and the *search for purpose* items grasping respectively the perception of having or being in search for life goals that push to move forward during a specific event or situation, with a temporal anchor to the future ("If I think about my future").

The final version of the Situational Meaning in Life Evaluation scale is composed by six items belonging to two different process-dimensions, *presence of meaning* and *search for meaning*. Each process-dimension is provided by three items, covering the three content-dimension of meaning in life of *comprehension*, *significance* and *purpose*. Each item is provided with the reference to the specific situation or event that people are processing while making meaning of their life and incorporate the temporal feature specific of the content dimension considered (past for coherence, presence for mattering, future for purpose). The instructions given to participants are "Looking back on what has happened, and what you have been thinking and doing since the occurrence of the [event/situation], we ask you to evaluate how much do you agree with the following statements". Use the following scale to answer considering that 1 corresponds to "strongly disagree" and 7 corresponds to "strongly agree".

The SMILE measure, in both the English and Italian version, is available in supplementary materials, together with instructions for the adaptation to different events and situations. A daily version (SMILE_daily), specifically developed for daily diary studies and other typologies of intensive longitudinal designs, is also available in supplementary materials.

4.1 Study 2. Validation of the SMILE Measure on a Representative Sample

The aim of the second study was to test the psychometric properties of the SMILE on an Italian representative sample. The factorial structure of the SMILE was evaluated by testing few theory-based alternative models with Confirmatory Factor Analysis. Specifically, we sequentially tested a mono-factorial structure (general meaning in life factor), a two-factor structure (presence and search for meaning), a two-factor structure with correlated residuals of items belonging to the same content-dimension of meaning (e.g. presence-coherence with search-coherence), and a bi-factor structure in which two factorial structures (structure 1: presence-search for meaning; structure 2: comprehension-significance-purpose) were contemporaneously estimated. Once the best factorial structure was established, the generalizability was examined across gender and age by testing measurement invariance. Internal consistency was examined with McDonald's omega (**Ω**; Dunn et al., 2014). Finally, we collected evidence of concurrent criterion validity with measures of well-being (i.e., positivity and mental health) and future anxiety, a construct especially relevant given the context of the pandemic (Leung et al., 2022; Zambelli et al., 2022) from which we expected negative

correlations with the presence of meaning in life. Validity evidence was collected with SEM models as suggested by the contemporary view of validity (Hubley & Zumbo, 2011).

5 Participants and Procedures

Data came from the third wave of a broader longitudinal research titled "The Family at the time of COVID-19" conducted by the Family Studies and Research University Centre of Università Cattolica del Sacro Cuore of Milan, Italy. The study was approved by the Ethics Committee of Università Cattolica del Sacro Cuore of Milan and conducted in accordance with APA ethical guidelines for human research. Data was gathered by Human Highway (https://www.humanhighway.it/) through Op*Line*, an online representative panel of the Italian population.

Participants completed an anonymous online survey in May 2021, during a COVID-19 scenario in which several restrictions were raised in different regions of Italy according to spread rates of the virus. The sample included 3035 participants (51.6% female) belonging to different life phases: 21.9% emerging and young adults (18–35 years), 64.2% adults (36–64 years), and 14% late adults (65–91 years)[1], with a mean age of 48.3 years (SD = 14.03). Socio-demographic variables are consultable in Table S1 in supplementary materials.

6 Measures

6.1 Situational meaning in life

A practical example of how the SMILE can be easily adapted to investigate meaning in life in the context of a stressful event is presented. The purpose of this study was to investigate the perception of meaning in life in the Italian population who was experiencing a collective stressful event such as the COVID-19 pandemic. Therefore, the generic situational anchor [event/situation] has been substituted with "the pandemic" in each of the six items of the original version (e.g., "Today I can say that my life has value during the pandemic"). The temporal references were maintained in the original form, except for the past reference of the coherence items that was changed into "If I look back at the past year" because the intention was to make participants reflect on the entirety of their pandemic experience that started in their country exactly one year before data collection. The items were rated on a Likert scale from 1 (strongly disagree) to 7 (strongly agree).

6.2 Positivity

As measure of well-being, we selected the Positivity Scale (Caprara et al., 2012) which is made of 8 items (e.g., "I have great faith in the future") assessed on a 5-point Likert scale (1 = strongly disagree; 5 = strongly agree). The scale showed good internal consistency ($\Omega = 0.89$).

[1] Participants were divided in three age-classes according to the most widespread age classification (e.g. Navarro-Pérez et al., 2022).

6.3 Mental Health

The Mental Health Continuum–Short Form (MHC–SF; Petrillo et al., 2015) was administered. This scale is made of 14 items assessing how frequently participants experiences emotional (e.g., "happy"), social (e.g., "that people are basically good"), and psychological (e.g., "that you liked most part of your personality") well-being in the past month (1 = once or twice; 6 = every day). The hierarchical structure of the scale allows the estimation of a global mental health factor. The scale showed good internal consistency ($\Omega = 0.93$).

6.4 Future Anxiety

As measure of distress, we considered the Dark Future Scale (Zaleski et al., 2019) made of five items (e.g., "I fear that in the future my life will change for the worse") rated on a 5-point Likert scale (1 = absolutely false; 5 = absolutely true). The scale showed good internal consistency ($\Omega = 0.90$).

7 Results

All the analysis has been conducted with SPSS and Mplus 8.8. Multivariate outliers have been checked using the Mahalanobis distance (Tabachnick & Fidell, 2013) determining the exclusion of 204 cases, for a final sample of $N = 2831$[2]. Maximum Likelihood was selected as the estimator given that all the items were normally distributed (kurtosis and skewness $\leq |1.2|$; Muthén & Kaplan, 1985). The factorial structure of the criterion variables was tested in our sample with CFA (codes and outputs are available at: https://doi.org/10.17605/OSF.IO/QKZ9X).

7.1 SMILE's Factorial Structure and Reliability Evidence

Each of the theory-based factorial structures have been tested with Confirmatory Factor Analysis, and the adaptability of the model to the data was examined through fit indices (a graphical representation is available in Fig. S1 in supplementary materials). In conjunction with the χ^2 value we examined: the comparative fit index (CFI; acceptable fit for values $\geq$ 0.90), the root mean square error of approximation (RMSEA; acceptable fit for values $\leq$ 0.08), and the standardized root mean square residual (SRMR; acceptable fit for values $\leq$ 0.05; Little, 2013).

Table 2 presents the model fit for each of the four theory-based structural models. Model 3 (two-factor with correlated residuals) showed good fit indices and factor loadings ranging from 0.717 to 0.878 for presence of meaning, and 0.723-0.838 for search for meaning. McDonald's Ω coefficient (i.e., composite reliability) has been calculated directly from the CFA, showing strong reliability for both presence and search for meaning ($\Omega_{presence} = 0.83$; $\Omega_{search} = 0.82$). Model 4 (bi-factor model) also had good fit, however, the model required fixing to 1 the first factor loading of the comprehension, significance, and purpose dimensions

[2] No significant differences were found comparing included cases with excluded cases on gender ($\chi^2(1) = 0.594$; $p = .441$) and age-classes ($\chi^2(2) = 1.82$; $p = .482$).

Table 2 Comparison of different theory-based structural models of SMILE tested with CFA in study 2 (N=2831)

Model	χ^2(df)	p-value	RMSEA [CI]	CFI	SRMR	Correlations among factors
Model 1 – one-factor structure	913.1 (9)	<0.001	0.19 [0.178-0.199]	0.89	0.05	-
Model 2 – two-factor structure with orthogonal residuals	325.3 (8)	<0.001	0.12 [0.108-0.130]	0.96	0.03	presence with search r=.79
Model 3 – two-factor structure with correlated residuals	109.1 (5)	<0.001	0.09 [0.072-0.100]	0.99	0.02	presence with search r=.77
Model 4 – bi-factor structure	12.9 (2)	<0.001	0.04 [0.023-0.068]	0.99	0.00	presence with search r=.86 comprehension with purpose r=.72 comprehension with significance r=.89 significance with purpose r=.82

Note. χ^2(df): Chi-square test of model fit (degrees of freedom); RMSEA [CI]: root mean square error of approximation [90% confidence interval]; CFI: comparative fit index; SRMR: standardized root mean square residual.

to obtain model convergence. Factor loadings for Model 3 and Model 4 are consultable in Table S2-S3 in supplementary materials.

7.2 Generalizability Evidence across Gender and age

The generalizability of the two best-fitting factorial structures (Model 3, two-factor structure with correlated residuals; Model, 4 bi-factor structure) was examined by testing the equivalence of the measurement structure (i.e., multi-group measurement invariance; Zumbo, 2009) across gender (male, female) and age (emerging adults, adults, older adults). The process of testing multi-group measurement invariance involved the comparison of a series of nested CFA models in which the measurement parameters (factor loadings, intercepts and residuals) of the SMILE were constrained to be equal across different groups. First, configural invariance was obtained by modelling a multi-group model in which the factorial structure of the SMILE was estimated separately for the considered groups (e.g., males and females) without any additional constraint. If good fit indices are obtained, metric invariance can be tested by constraining the factor loading to equivalence between groups. The following steps involved testing the equivalence of intercepts (scalar invariance) and of residuals (strict invariance) across groups. Full invariance is obtained when the addition of equality constraints to all measurement parameters does not significantly worsen the fit of the model. Additionally, we tested the structural invariance of the association between the presence and search for meaning latent factors across gender and age. The nested models were compared by examining the significant worsening of the chi-square $\Delta\chi^2$ (p<.001), and the decrease in model fit statistics, where a ΔCFI $\leq$ -0.01 and a ΔRMSEA $\leq$ 0.015 indicates a lack of invariance (Little, 2013).

Results confirmed a full invariance of the SMILE's two-factor structure (Model 3) across gender and age (see Table S4 in supplementary materials). Structural invariance was also

confirmed, with the association between presence and search for meaning latent factors that was 0.767 across males and females and 0.774 across the three age-classes. Convergence problems emerged since the level of configural invariance for Model 4 (bi-factor), therefore, we decided not to proceed with testing the following levels of invariance.

7.3 Criterion Validity Evidence

Empirical proofs of concurrent criterion validity have been collected following Hubley's and Zumbo (2011) golden roles. Specifically, we estimated a series of SEM models in which we examined the associations between the presence and search for meaning in life latent factors (obtained from the structural model with correlated residuals) and respectively, the positivity latent factor (Model A); the global mental health latent factor (Model B), and the future anxiety latent factor (Model C). In line with the literature, we expected presence of meaning to be positively associated with positivity and mental health, and negatively associated with future anxiety. With respect to search for meaning, results from the literature are inconsistent regarding its associations with well-being measures (Li et al., 2021), therefore we didn't have strict hypotheses.

All the models presented acceptable fit (Model A: χ^2 (71) = 1632.9, $p < .001$; RMSEA = 0.09 [0.084, 0.092]; CFI = 0.93; SRMR = 0.05; Model B: χ^2 (161) = 1796.2, $p < .001$; RMSEA = 0.06 [0.057, 0.062]; CFI = 0.96; SRMR = 0.04; Model C: χ^2 (38) = 266.5, $p < .001$; RMSEA = 0.05 [0.041, 0.051]; CFI = 0.99; SRMR = 0.03). As expected, presence of meaning was strongly associated with both measures of well-being and showed a marginal but significant negative association with future anxiety (Table 3). Search for meaning was positively associated with well-being and was also positively associated with future anxiety.

8 Discussion

The goodness of the SMILE scale, composed of items carefully selected from the literature, has been confirmed. The best model resulted to be the two-factor with correlated residuals which allows to consider both theoretical structures (structure 1: presence-search; structure 2: comprehension-significance-purpose) while keeping parsimonious. This model showed good internal consistency. The bi-factor model had a good fit, but showed convergence problems; in our opinion, this model could be suitable if a longer version of the scale is developed (with at least 2 items for each dimension as suggested by the Classical Theory of Test, e.g. Velicer & Fava, 1998), to capture more nuances of the three content dimensions of meaning.

Table 3 Concurrent criterion evidence of the SMILE in study 2 ($N = 2831$)

	POS (Model A)	GMH (Model B)	DFS (Model C)
SMILE_P	0.653**	0.559**	−0.130**
SMILE_S	0.336**	0.273**	0.174**

Note. *$p < .05$; **$p < .01$. SMILE_P: presence of meaning latent factor; SMILE_S: search for meaning latent factor; DFS: Dark Future Scale latent factor; POS: Positivity latent factor; GMH: Global Mental Health latent factor.

Presence and search for meaning dimensions were positively correlated, and this could be interpreted as a novelty of the SMILE's two-factor structure compared to the MLQ measure. Indeed, although the correlation between presence and search for meaning measured with the MLQ is not consistent (Li et al., 2021), it is easier to find negative associations between the two. In Steger's MLQ the comprehension dimension is represented with only one item in the presence of meaning version (e.g., understand my life's meaning); instead, the SMILE proposes a more balanced bipartite view of meaning where coherence, significance and purpose are equally represented in both the presence and the search dimensions.

Regarding validity evidence, positive associations between presence of meaning and well-being measures are consistent with the literature. Search for meaning was positively correlated with positivity, mental health and with future anxiety. These results highlight the specificity of the SMILE's search for meaning to grasp the activation of the meaning-making process following a stressful/traumatic experience in the attempt to make new meanings out of it. In this sense, the positive correlation between search for meaning and well-being outcomes could represent the typical process of "he who seeks shall finds". While the positive association with future anxiety indicates that perceiving uncertainty about the future stimulates people to activate the process of meaning-making. However, this interpretative hypothesis is to be confirmed with subsequent studies.

8.1 Study 3. Validation of the SMILE Measure in a Sample of Emerging Adults

The aim of the third study was to provide a first replication the SMILE's two-factor structure with correlated residuals, and to test the psychometric properties on a sample of emerging adults (18–36 years; Arnett, 2014). Evidence of internal consistency (Ω), convergent validity (with the MLQ), concurrent criterion validity (with measures of well-being and future anxiety), and incremental validity (predictive power of the SMILE over MLQ on measures of well-being) was collected.

8.2 Participants and Procedures

283 emerging and young adults (76% female; M_{age} = 26; range = 19–36; SD = 4.09) living in Italy participated in the study in February 2021, during a COVID-19 scenario without ongoing restrictions. Participants were recruited with an intentional sampling and a snowball procedure. Those who signed the informed consent completed an anonymous online survey implemented in Qualtrics. The study received the ethical approval from Università Cattolica del Sacro Cuore of Milan (Italy) and was conducted in accordance with APA ethical standards for human research. Socio-demographic variables are consultable in Table S1 in supplementary materials.

8.3 Measures

Situational meaning in life. The same version of the SMILE adopted in study 2 was administered.

Global meaning in life. The Meaning in Life Questionnaire (Steger et al., 2006; Negri et al., 2019) was administered. Participants answered on a 7-point Likert scale (1 = strongly

disagree; 7=strongly agree). The scale showed good internal consistency ($\Omega_{presence}$=0.90; Ω_{search}=0.90).

Satisfaction with life. As measure of well-being we selected the Satisfaction With Life Scale (Diener et al., 1985; Di Fabio & Busoni, 2009), made of 5 items (e.g., "In most ways my life is close to my ideal") assessed on a 7-point Likert scale (1=strongly disagree; 7=strongly agree). The scale showed good internal consistency (Ω=0.90).

Hope. The Adult Hope Scale (Snyder et al., 1991) was administered. This scale is made of 12 items divided in two dimensions, *agency* (4 items; e.g., "I energetically pursue my goals"), *pathway* (4 items; e.g., "I can think of many ways to get the things in life that are most important to me"), and four items are fillers. Items were rated on a 7-point Likert scale (1=completely disagree; 7=completely agree). The scale showed good internal consistency (Ω_{total}=0.88; Ω_{agency}=0.80; $\Omega_{pathway}$=0.82).

Future anxiety. The Dark Future Scale (Zaleski et al., 2019) adopted in study 2 was administered. The scale showed good internal consistency (Ω=0.90).

9 Results

Five cases were identified as multivariate outliers and excluded from subsequent analysis, for a final sample of N=278. All the items administered were normally distributed, therefore, Maximum Likelihood was selected as the estimator. The factorial structure of the criterion variables was tested in our sample with CFA (codes and outputs are available at: https://doi.org/10.17605/OSF.IO/QKZ9X).

9.1 Factorial Structure and Reliability Evidence

The two-factor model with correlated residuals showed acceptable fit indices, with the exception of the RMSEA's estimate which exceeded the desired value of 0.08 [χ^2 (5)=22.4, p<.001; RMSEA=0.11 [0.067, 0.161]; CFI=0.98; SRMR=0.05]. Standardized factor loadings for presence of meaning ranged from 0.760 −0.932, and 0.743 −0.868 for search for meaning (Table S5 in supplementary materials). Presence and search for meaning factors were positively correlated (r=.23). Both dimensions showed good reliability ($\Omega_{presence}$=0.84; Ω_{search}=0.83).

9.2 Convergent Validity Evidence

We examined convergent validity by including in a SEM model the measurement models of the SMILE and the MLQ and examining the correlation between their latent factor scores. We expected the presence of meaning dimensions of SMILE and MLQ to be positively associated, as well as the search for meaning dimensions. In the light of previous literature (Li et al., 2021) and results from study 2, we expected differences in the correlation between presence and search for meaning between the SMILE and the MLQ.

The model fit was acceptable [χ^2 (95)=333.8, p<.001; RMSEA=0.09 [0.084, 0.106]; CFI=0.93; SRMR=0.08]. The SMILE's and the MLQ's presence of meaning dimensions were strongly correlated, as well as the search for meaning dimensions in the two scales

Table 4 Convergent validity evidence of the SMILE with MLQ in study 3 ($N=278$)

	SMILE_P	SMILE_S	MLQ_P	MLQ_S
SMILE_P	1			
SMILE_S	0.215**	1		
MLQ_P	0.909**	0.106	1	
MLQ_S	0.139*	0.807**	0.023	1

Note. *$p<.05$; **$p<.01$. _P: presence of meaning latent factor; _S: search for meaning latent factor.

Table 5 Concurrent criterion evidence of the SMILE in study 3 ($N=278$)

	SWLS (Model A1)	HOPE_A (Model B1)	HOPE_P (Model B1)	DFS (Model C1)
SMILE_P	0.686**	0.753**	0.620**	−0.521**
SMILE_S	0.000	0.082	0.011	0.209**

Note. *$p<.05$; **$p<.01$. SMILE_P: presence of meaning latent factor; SMILE_S: search for meaning latent factor; SWLS: Life satisfaction latent factor; HOPE_A: Agency latent factor; HOPE_P: pathway latent factor; DFS: Dark Future Scale latent factor.

(Table 4). As expected, presence and search from the MLQ were not associated, while the correlation between the SMILE's dimensions was positive and significant.

9.3 Criterion Validity Evidence

The concurrent criterion validity was examined with the same procedure of study 2 but including the measures of satisfaction with life (Model A1), hope (Model B1), and future anxiety (Model C1). In line with results from study 2, we hypothesized presence of meaning to be positively associated with life satisfaction and hope, and negatively associated with future anxiety, while search for meaning was expected to be positively associated with life satisfaction, hope, and future anxiety.

All the models presented acceptable fit (Model A1: χ^2 (38) = 73.2, $p<.001$; RMSEA = 0.06 [0.037, 0.078]; CFI = 0.98; SRMR = 0.04; Model B: χ^2 (68) = 162.5, $p<.001$; RMSEA = 0.07 [0.057, 0.085]; CFI = 0.95; SRMR = 0.05; Model C1: χ^2 (38) = 76.6, $p<.001$; RMSEA = 0.06 [0.041, 0.080]; CFI = 0.97; SRMR = 0.05). As expected, presence of meaning was positively associated with life satisfaction, hope and negatively associated with future anxiety; search for meaning was positively associated with future anxiety, and non-significantly associated with well-being (Table 5).

9.3.1 Incremental Validity Evidence

Incremental validity was tested by verifying that the SMILE's dimensions were able to explain a portion of variance of constructs related to well-being that is unique, not explained by the MLQ. We tested a series of hierarchical regressions in which the criterion variables (outcomes) were the life satisfaction's factor score (MODEL_S), the hope's agency factor score (MODEL_HA), the hope's pathway factor score (MODEL_HP), and the future anxiety's factor score (MODEL_F). In each model the MLQ's presence and search for mean-

ing were entered as predictors in the first step, while the SMILE's presence and search for meaning were entered as independent predictors in the second step.

Results of the hierarchical regressions (Table 6) suggested that SMILE's presence of meaning (but not the search for meaning) was a significant predictor of all the criterion variables (life satisfaction in MODEL_S; hope's agency and pathway in MODEL_HA and MODEL_HP; future anxiety in MODEL_F) over and above MLQ's dimensions [MODEL_S:

Table 6 Hierarchical linear regression to test incremental validity of the SMILE in study 3 (N=278)

	Model coefficients	Model comparison		
	β	Adjusted R^2	ΔR^2	F
MODEL_S (Dependent variable: SWLS)				
Block 1 - MLQ				
MLQ_P	0.70**	0.50		
MLQ_S	−0.12**			
Block 2 - SMILE				
MLQ_P	0.52**			
MLQ_S	−0.16**			
SMILE_P	0.23**	0.52	0.02	5.10**
SMILE_S	0.02			
MODEL_HA (Dependent variable: HOPE_A)				
Block 1 - MLQ				
MLQ_P	0.68**	0.46		
MLQ_S	−0.01			
Block 2 - SMILE				
MLQ_P	0.48**			
MLQ_S	−0.01			
SMILE_P	0.26**	0.48	0.02	5.83**
SMILE_S	−0.05			
MODEL_HB (Dependent variable: HOPE_P)				
Block 1 - MLQ				
MLQ_P	0.63**	0.39		
MLQ_S	0.00			
Block 2 - SMILE				
MLQ_P	0.42**			
MLQ_S	0.03			
SMILE_P	0.27**	0.41	0.02	5.89**
SMILE_S	−0.10			
MODEL_F (Dependent variable: DFS)				
Block 1 - MLQ				
MLQ_P	−0.50**	0.33		
MLQ_S	0.29**			
Block 2 - SMILE				
MLQ_P	−0.28**			
MLQ_S	0.28**			
SMILE_P	−0.28**	0.35	0.03	5.71**
SMILE_S	0.07			

Note. *p<.05; **p<.01. SMILE_P: presence of meaning's factor score; SMILE_S: search for meaning's factor score; MLQ_P: presence of meaning's factor score; MLQ_S: search for meaning's factor score; SWLS: Life satisfaction's factor score; HOPE_A: Agency's factor score; HOPE_P: pathway's factor score; DFS: Dark Future Scale's factor score.

F (4, 268) = 73.79; $p < .001$; MODEL_HA: F (4, 270) = 64.10; $p < .001$; MODEL_HP: F (4, 270) = 49.09; $p < .001$; MODEL_F: F (4, 270) = 38.64; $p < .001$].

With an exploratory purpose we tested the incremental validity of the six SMILE items separately, in order to investigate whether the separate components of comprehension (presence and search), purpose (presence and search), and mattering (presence and search) had a unique contribution the outcomes beyond MLQ's indicators. Results are reported in supplementary materials.

10 Discussion

The two-factor structure with correlated residuals was replicated in this study and showed good internal consistency, thus confirming the adaptability of the SMILE's structure in a sample of emerging and young adults.

The SMILE showed convergent validity with the MLQ, however, the two measures do not overlap as demonstrated by the correlation between the dimensions of presence and search for meaning that was significant and positive in the SMILE (consistently with study 2) and non-significant in the MLQ. We hypothesize two main reasons for the inconsistent association between presence and search for meaning assessed with the MLQ compared to the SMILE that are related to the different operationalization of the construct.

First, the search for meaning dimension is measured in the MLQ by items grasping the general tendency to search for meaning by winking at the need to fill a void of meaning, that could reasonably reflect in the negative/non-significant association with presence of meaning often found in the literature (e.g., Steger et al., 2009; Boyraz et al., 2013). Conversely, the SMILE introduces the operationalization of search for meaning as the attempt of building a life that is comprehensible, purposeful and significant, thus grasping the meaning-making activation as a normative process emerging by the intertwined association between presence and search for meaning, as originally framed by Steger et al. (2006).

The second reason is related to the operationalization of meaning in life as a situational construct in the SMILE measure, while the MLQ measures a dispositional and general self-perception of meaning in life. For this reason, it is reasonable that the situational context (in this case, the covid-19 pandemic) might be one of the factors moderating the direction and strength of the association between presence and search for meaning in life assessed with the SMILE. Future studies are needed to help disentangling the role of situational factors and life experiences on the meaning-making process, intended as the process of searching and finding meaning in life in the real life.

Examination of criterion validity further confirms the positive association of SMILE's presence of meaning with well-being outcomes and the negative association with future anxiety. Contrary to study 2, search for meaning was not associated with positive outcomes.

This discrepancy could be explained by several factors. First, the criterion variables considered in the two studies were different.

Second, the two considered samples differed with respect to demographic characteristics. In fact, study 2 involved a representative Italian sample, while study 3 investigated a more homogeneous sample of young people (mostly female) living in Lombardia, the most affected Italian region by the pandemic at that time.

Third, between study 2 and study 3 the contextual situation lived by individuals consistently changed in terms of societal restrictions imposed due to the pandemic. Study 2 was conducted in a time when several restrictions have been raised to fight the spread of the virus, while study 3 occurred in the absence of any pandemic restrictions. Such differences in the situational context experienced by participants have probably been grasped by the SMILE measure, which has been specifically designed to investigate the situational perception of meaning in life. One possible interpretation is that the activation of search for meaning was more beneficent among people while dealing with greater challenges due to the pandemic (e.g., To, 2016; Lin & Chan, 2021), however, to sustain this kind of interpretation, further empirical evidence must be collected.

Finally, results suggested that the SMILE's presence of meaning scores have incremental validity when compared with MLQ's presence and search for meaning scores in predicting well-being outcomes and future anxiety. This result adds to the convergent validity evidence in proving that the SMILE contributes to explain relevant criterion variables independently from the MLQ. The fact that only the presence of meaning was a significant predictor in the regression models is not surprising considering that the search for meaning did not correlate with the variables related to well-being. To evaluate the predictive power of the search for meaning, different criterion variables should be selected, for example those related to rumination, or identity exploration.

10.1 General Discussion

This work addressed the methodological challenge of providing the literature with a situational measure of meaning in life dedicated to the study of meaning-making in the context of situational experiences.

In study 1, starting from the available instruments and the most recent empirical evidence, the process of development of the SMILE scale was presented in detail. Compared to available meaning in life measures, the SMILE possesses two big novelties: (a) it is the first measure that operationalizes the content features of meaning in life, i.e. comprehension, significance and purpose, both in the version of presence of meaning and search for meaning; and (b) it is the first situational measure of meaning in life that provides anchors to specific life-events and time-frames to evaluate the subjective experience of meaning in life in the context of situational experiences.

In study 2, the scale was administered to a representative sample of the Italian population; four theory-based factorial structures were examined, and the psychometric properties of the best solution were tested. The best theoretical structure was the two-factor (presence and search for meaning dimensions) with correlated residuals, which allowed to consider the multifaceted nature of meaning in life while maintaining a good level of parsimony. The validity evidence confirmed on the one side the positive associations between presence of meaning and well-being measures. On the other side, the positive association between search for meaning and well-being brought to light a two-sided view of the SMILE's search for meaning as a proactive response to overcome stressful/traumatic events (e.g., Park, 2010), and as a normative process of integrating life experiences into a coherent system of meanings (Negru-Subtirica et al., 2016; Zambelli & Tagliabue, 2023).

Study 3 replicated the SMILE's factorial structure and provided additional proofs of its validity. The consistency of the measure in assessing presence and search for meaning

was demonstrated with high correlations with the corresponding dimensions in the MLQ and with positive correlations between presence of meaning and well-being or distress outcomes. Further proofs of the distinctiveness of the SMILE to the MLQ were collected, especially regarding the search for meaning dimension that was positively correlated with presence of meaning and uncorrelated with measures of well-being (e.g., Newman et al., 2018). Additionally, the unique predictive power of the SMILE against the MLQ was supported by examining incremental validity with criterion variables that were theoretically associated with the construct.

10.2 Implications for Practice

Findings from the studies provide indications regarding the applicability of this new scale of situational meaning in life. First, the SMILE measure should be taken into consideration when the aim is to detect presence and search for meaning as two sides of the same construct, by acknowledging comprehension, significance, and purpose as the basic constituents of meaning in life.

Second, the SMILE should be preferred to global measures when investigating the process of meaning-making in the context of specific life-experiences. Indeed, the SMILE measure has been designed to be easily adapted to different events or time-frames, therefore it can be adopted to answer questions such as "what is the impact of the pandemic on people's meaning in life?" or "how individuals make meaning of the loss of a relative in their life?".

Third, due to its shortness, the SMILE is applicable to longitudinal and intensive longitudinal designs (Bolger & Laurenceau, 2013) in which the interest is to grasp changes in the perception of life meaningfulness and fluctuations in the meaning-making dynamics. In this regard, a daily version of the SMILE measure has been provided in supplementary materials.

Finally, the SMILE's search for meaning allows to more easily detect the normative dimension of search for meaning (e.g., Mayseless & Keren, 2014; Zambelli & Tagliabue, 2023); therefore, it might be used when the target is the emerging and young adult population.

10.3 Limitations and Future Directions

We acknowledge several limitations in this study, accompanied by future directions. First, the samples were collected within the Italian population during an historical context shacked by the COVID-19 pandemic, therefore further studies on different cultures and contextual situations should be conducted to examine the generalizability of results.

Second, the criterion variables didn't provide sufficient information about the validity of the search for meaning dimension, as they were not correlated. Therefore, further proofs of criterion validity should be drawn by including variables more related to the search for meaning dimension, for instance rumination (e.g., Kamijo & Yukawa, 2018) or identity (Glavan et al., 2020). In addition, the ability of the SMILE to predict outcome variables related to traumatic and stressful experiences (e.g., positive reappraisal, perceived stress) should be examined.

Third, the choice of developing a short measure has the drawback of reducing the theoretical richness of the meaning in life construct, especially regarding the tripartite view of meaning. A future development would be to create a long version of the SMILE scale

by including at least three items for each content dimension to grasp the nuances of the construct. Related to this, the inclusion of other measures of meaning in life assessing the tripartite view of meaning, as those included in Table 1, would allow collecting evidence of convergent validity with the SMILE.

Finally, the validation studies were cross-sectional, however, as the SMILE was developed with a processual perspective, future research should examine the ability of the SMILE to detect long-term changes and short-term fluctuations in the meaning-making dynamics by using longitudinal and intensive longitudinal designs (Boker et al., 2016).

Supplementary Information The online version contains supplementary material available at https://doi.org/10.1007/s10902-024-00730-1.

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Declarations

Conflict of interest The authors have no competing interests to declare that are relevant to the content of this article.

Compliance with ethical standards Ethical approval was obtained from the Department of Psychology of Università Cattolica del Sacro Cuore of Milan (study 2 protocol number: 15–20; study 3 protocol number: 32 – 20). All studies have been conducted in accordance with APA ethical guidelines for human research.

Informed Consent Informed consent has been obtained from participants before data collection in both study 2 and study 3.

Data transparency The study has not been pre-registered. Data are not publicly available. Materials and analysis codes used in study 2 and study 3 have been made publicly available at OSF and can be accessed at: https://doi.org/10.17605/OSF.IO/QKZ9X.

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