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RESEARCH ARTICLE

Self-connection and well-being: Development and validation of a self-connection scale

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Abstract

Self-connection is defined as an (1) *awareness* of oneself, (2) *acceptance* of oneself based on this awareness, and (3) *alignment* of one's behavior with this awareness. Although some promising results suggest that self-connection uniquely contributes to well-being, they have relied on an untested, single-item measure. To advance empirical examination of self-connection and its role in well-being, the current research developed and validated a 12-item Self-Connection Scale (SCS). We recruited a total of 1,469 participants across three studies to examine the SCS and its three underlying components. Using both exploratory and confirmatory factor analyses, we found evidence supporting the factor structure and inter-item reliability as well as evidence of construct, concurrent, and incremental validity. Importantly, results from three studies suggest that the SCS is associated with multiple important indicators of health and well-being. The scale also demonstrated incremental validity beyond mindfulness, authenticity, self-concept clarity, self-compassion, and self-acceptance in its association with various mental health and well-being indicators. Thus, the SCS provides a valuable tool to measure and examine self-connection and its relationship to well-being and other important psychological outcomes.

KEYWORDS

mental health, self-acceptance, self-alignment, self-awareness, self-connection, well-being

1 | INTRODUCTION

People strive to stay connected all day, every day through the internet, social media, and smartphones. However, this type of digital connection is often associated with negative outcomes (Leckfor et al., [under review](#); Vahedi & Saiphoo, 2018). In contrast, connecting in person with others—defined as the feeling that you belong to a group and generally feel close to other people—is known to serve well-being (e.g., Keyes, 1998; Lakey & Orehek, 2011). Despite the large body of research on how people connect with others, less research has examined the benefits of connecting to the self. The theory of self-connection asserts that self-connection is central to well-being (Klussman et al., 2022). However, few empirical studies have directly tested this possibility. This is

probably due to the lack of a valid instrument designed to assess self-connection. If a validated instrument for measuring self-connection can be established, then it would allow future research to examine the antecedents and consequences of self-connection. The aim of the current research was to create a Self-Connection Scale (SCS), distinguish it from related constructs, and establish its unique link to well-being.

1.1 | Self-connection

Self-connection is defined as having three distinct yet interdependent components: (1) Self-Awareness, (2) Self-Acceptance, and (3) Self-Alignment (Klussman et al., 2022). Each component is itself important

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and may independently predict aspects of well-being. Further, the presence of all three should be the most beneficial. Self-connection represents a second-order factor that encompasses three first-order factors representing these three components. Therefore, the assessment of self-connection should include characteristics of all three components.

Although it resembles theoretically similar constructs that relate to well-being, self-connection is unique in its conceptual focus and components and is theorized to predict important outcomes independently from other constructs. Self-connection may even help to explain how other constructs can contribute to well-being. Consistent with this proposition, previous research has found that self-connection is positively related to positive affect (Klussman et al., 2020d), flourishing, satisfaction with life (Klussman et al., 2020a), and meaning in life (Klussman et al., 2020c). In addition, self-connection is negatively related to negative affect, and a lack of clarity in life (Klussman et al., 2020b). Researchers also recently found that self-connection mediated the relationship between trait mindfulness and flourishing (Klussman et al., 2020a).

1.1.1 | Self-awareness

The first component of self-connection, self-awareness, is defined as knowing one's internal states, values, preferences, resources, goals, and intuitions (Goleman, 1995). Self-awareness requires a person to attend to and understand one's internal states, values, preferences, resources, goals and intuitions and how they change across situations and over time (Klussman et al., 2022). Research has found that self-awareness itself contributes to well-being (Darviri et al., 2016; Schlegel et al., 2012, 2013; Sutton et al., 2015). Understanding the true self (regardless of how much they like that self) predicts active coping, happiness, mindfulness, psychological needs satisfaction, positive affect, self-actualization, self-esteem, meaning in life, and vitality (Schlegel & Hicks, 2011; Schlegel et al., 2009, 2012).

Furthermore, interventions aimed specifically at increasing self-awareness have been found to increase self-empowerment and stress management (Darviri et al., 2016). These positive outcomes occur because self-awareness promotes a sense of satisfaction with past decisions and confidence to make future decisions (Schlegel et al., 2013). It is thought that having knowledge of who one truly is and has been provides a sense of coherence across the lifespan, satisfying the desire for self-consistency (Schlegel et al., 2013). Consequently, awareness of the self is one key component of self-connection that may be important for well-being and positive functioning more broadly.

Self-acceptance

The self-acceptance component reflects acceptance of one's internal states, values, preferences, resources, goals, and intuitions. Awareness of one's perceived self may be inconsequential, if not potentially harmful, without an accepting mindset. Self-connection requires one to accept both the positive and the negative aspects of themselves as a part of who they are without judgement. Self-acceptance encourages people to find out more about themselves while potentially enabling

people to feel comfortable aligning their behavior with their internal states, values, preferences, resources, goals, and intuitions. Without self-acceptance, one experiences more internal conflict, making a person more prone to rumination, anxiety, and depression (Ingram, 1990; Nolen-Hoeksema, 2000).

In her research on well-being, Ryff defines well-being as consisting of seven key aspects including self-acceptance (Ryff, 1995). Ryff (1995) goes on to define self-acceptance as having a positive attitude toward oneself, and that this attitude is crucial for well-being. While this construct of self-acceptance is not the same as self-acceptance in self-connection, we expect to see similar outcomes associated with it. Supporting the importance of this concept, self-acceptance and eudaimonic well-being are positively related (Chamberlain & Haaga, 2001; MacInnes, 2006; Ranzijn & Luszcz, 1999). Other research suggests that unconditional self-acceptance (accepting both positive and negative aspects of self) relates strongly to well-being beyond simple positive self-evaluations (e.g., Ryff & Keyes, 1995). This includes experiencing positive emotions and mood and better mental health, such as depressive symptoms and anxiety (Chamberlain & Hagga, 2001; Jimenez et al., 2010; Vasile, 2013). Self-acceptance also correlates with successful ageing (Umami, 2019). Other research suggests that self-acceptance acts as a mediator between mindfulness and both subjective well-being (Xu et al., 2016) and depressive symptoms (Jimenez et al., 2010).

Self-alignment

Self-alignment reflects acting in concert with one's internal states, values, preferences, resources, goals, and intuitions. That is, self-alignment occurs when a person acts in line with his or her true self (Schlegel & Hicks 2011). When a person's actions are aligned in this manner, their psychological needs are fulfilled and cognitive dissonance is avoided (Harmon-Jones & Mills, 2019). If individuals are aware of their perceived values and accept them, but do not generally act in alignment with them, they would still likely be low in overall self-connection.

The alignment aspect of self-connection may allow people to fulfil their psychological needs and promote well-being (Deci & Ryan, 2008) while avoiding cognitive dissonance (Harmon-Jones & Mills, 2019). For such reasons, alignment is the essential third component of self-connection. Research on aligning one's internal goals with external behaviors also demonstrates the importance for well-being (Schultheiss & Brunstein, 1999; Schultheiss et al., 2008; Sheldon, 2004; 2014). When one's goals align with their values and interests, those goals are more likely to be achieved (Sheldon & Elliot, 1999; Sheldon & Houser-Marko, 2001), and the person is more likely to be happy (Sheldon & Elliot, 1998; Sheldon & Kasser, 1998).

1.2 | Comparison to related constructs

Self-connection is related to, but conceptually and empirically distinct from, mindfulness, self-compassion, authenticity, and self-concept clarity (Klussman et al., 2022). We will briefly review how these constructs are both similar to and distinct from self-connection and how self-connection goes beyond these constructs.

Mindfulness

Mindfulness is defined as “a receptive attention to and awareness of present events and experience” (Brown & Ryan, 2003; Brown et al., 2007). Mindfulness often includes distancing oneself from or transcending the self in favor of maintaining a general awareness of everything, inside and outside of oneself (Bernstein et al., 2015). Although the self-awareness component of self-connection resembles mindfulness in that both constructs rely on a person’s awareness (Kabat-Zinn, 1994; Lindsay & Creswell, 2017), self-awareness only refers to focusing on what is happening within one’s internal states, values, preferences, resources, goals, and intuitions (Klussman et al., 2022). Thus, while mindful people obtain a general awareness of both internal and external experiences (Lindsay & Creswell, 2017), self-connected individuals demonstrate awareness specifically of the self.

Mindfulness requires a person to detach themselves from the things they have become aware of to avoid self-judgement. This detachment from the self is in direct contradiction with the self-acceptance aspect of self-connection. In self-connection, one accepts both positive and negative aspects of their true self. While both constructs lead to a non-judgmental assessment of the self, which can be characterized as acceptance, self-connection asks that one accepts and connects with who they think they are, while mindfulness asks for detachment or distance from the self, where accuracy of one’s self perception is important (Brown et al., 2007). Finally, self-connection differs from mindfulness in that it contains a self-alignment component that includes taking action, something absent from common theories of mindfulness (Chatzisarantis & Hagger, 2007).

Self-concept clarity

Self-concept clarity is defined as how well one understands “the extent to which self-beliefs are clearly and confidently defined, internally consistent, and stable” (Campbell et al., 1996). This definition is most similar to the self-awareness aspect of self-connection. However, self-awareness allows for internal aspects of the self to change and evolve over time, while self-concept clarity is marked by the stability of the self. Additionally, self-concept theorists purport that at least some of the understanding of the self emerges from the way one perceives others respond to them (Kinch, 1963). This may be most similar to the self-acceptance component of self-connection. However, in self-connection, it is the self that must be accepted, regardless of external input.

Self-compassion

Self-compassion is defined as being kind and understanding with oneself during difficult moments in life (Neff, 2003), and may relate to both the self-awareness and self-acceptance aspects of self-connection. When people possess self-compassion, they view their personal experiences as a part of the ‘larger human experience’. Instead of feeling isolated in tough times, people who are self-compassionate feel they are connecting to the rest of humanity (Neff, 2003). This con-

cept relates most directly to the self-acceptance component of self-connection, yet it importantly differs as self-compassion focuses on the self in difficult situations. Instead of accepting those situations, self-compassion requires one to identify less with them (Klussman et al., 2022; Neff et al., 2007; Neff, 2011). In fact, the expected outcomes of self-connection and self-compassion differ. While both should be beneficial for well-being, self-connection allows for a sense of connection with the self, while self-compassion allows for a sense of connection with humanity more broadly. Additionally, self-compassion and self-connection differ due to the self-alignment component not being addressed in self-compassion. Self-compassion does not require action, it only asks for self-reflection and acceptance (Klussman et al., 2022).

Authenticity

The concept of authenticity also draws on awareness of the self, but in a narrower way than that proposed by self-connection. Authenticity reflects awareness that reduces self-deception and allows for genuine interactions with others (Kernis & Goldman, 2006; Lehman et al., 2019). Authenticity can be operationalized as self-alienation (i.e., the disconnect between the true self and one’s lived experiences), authentic living (i.e., living and behaving in ways that match one’s values), and accepting external influence (i.e., believing one has to conform to societal norms) (Wood et al., 2008). Additionally, other conceptualizations of authenticity may include aspects of self-acceptance (Kernis & Goldman, 2006). However, an important distinction is that the reference point in each construct is different. Authenticity is rooted in both internal and external awareness of the self and their relationship with the world (Wood et al., 2008). Authenticity is concerned with avoiding self-deception while grappling with external experiences and social pressures (Kernis & Goldman, 2006; Lehman et al., 2019). The root of self-connection requires that one is aware specifically of one’s internal states, values, preferences, resources, goals, and intuitions. It is concerned only with connecting with the self.

1.3 | Current research

The need for a multifaceted, validated measure of self-connection is twofold. First, the current single-item operationalization of self-connection lacks the ability to capture the entirety of the concept. Although single-item measures can often effectively measure unidimensional constructs, they are unable to validly represent more complex concepts (Drolet & Morrison, 2001; Sackett & Larson Jr., 1990). Second, self-connection may contribute meaningfully to our understanding of well-being. In particular, increasing self-connection may be possible as a personal improvement goal and in clinical settings. In both cases, understanding self-connection, its correlates, and its three components may provide individuals and practitioners with appropriate tools to facilitate self-connection and better health and well-being.

Most indicators of well-being can be categorized as either eudaimonic or hedonic. Eudaimonic well-being represents the subjective experiences associated with living a ‘good life’ (e.g., living a life of virtue in pursuit of human excellence, meaning and purpose in life,

personal growth, living well, autonomy, and flourishing; Deci & Ryan, 2000; Henderson & Knight, 2012; Huta & Waterman, 2014; Michalos, 2014). Hedonic well-being is defined as satisfaction with life, high positive affect and low negative affect, frequently called happiness (Ryan & Deci, 2006). Preliminary evidence suggests that self-connection is associated with both aspects of well-being, but research to date has relied on a single-item measure of self-connection with unknown reliability and validity (Klussman et al., 2020c). The potential implications of self-connection for well-being highlight the need for a psychometrically supported validated measure of self-connection that assesses all three components of the definition, both individually and as a global concept.

Across three studies, we sought to develop and validate a measure of self-connection designed to assess all three proposed components of self-connection—self-awareness, self-acceptance, and self-alignment—and examine its relationship with well-being. We first generated items designed to measure self-connection and conducted exploratory factor analyses on this item pool (Study 1). We then tested the resulting 12-item scale using confirmatory factor analysis in a separate sample (Study 2). This study examined the scale both as a whole and according to its three subscales. We also analyzed relationships between this measure of self-connection and aspects of eudaimonic well-being (Study 1) and both hedonic well-being and health (Study 2). In Study 3 we sought to replicate our findings from the previous two studies with a larger sample size, examining both hedonic well-being and eudaimonic well-being. In Studies 1 and 3, we also sought to compare self-connection to related constructs, and to investigate the link between self-connection and well-being when controlling for those related constructs.

2 | STUDY 1

To begin developing a valid and reliable measure of self-connection, two of the lead researchers on the theory of self-connection first generated and refined an initial pool of items. We then used these items to accomplish three goals: (1) To gather data on the item pool to determine which subset of items demonstrated the strongest psychometric properties; (2) To examine whether the new scale demonstrated validity; and (3) To test whether the new scale was associated with aspects of well-being, as theorized and consistent with past research using a single-item self-connection measure.

2.1 | Method

Study 1 was a cross-sectional survey, approved by IntegReview Institutional Review Board (protocol # CONNECT_MEASURE). We administered the survey in early March of 2018. To avoid demand characteristics (Nichols & Maner, 2008), the only information we provided to participants was that the study asked, “people to tell us about themselves, their feelings and their opinions on different life topics”. The informed consent form further described the study as relating to “feelings and opinions about a variety of different topics related to how you feel about life”.

2.1.1 | Participants

We recruited participants via Amazon's Mechanical Turk (MTurk) and offered them \$1.50 for their participation. Significant support exists for the validity of data collected via MTurk and even suggests that these samples may be more attentive than traditional samples (Casler et al., 2013; Hauser & Schwarz, 2016). The only criterion that we specified was that participants must reside in the USA and be fluent in English. We obtained informed consent from all participants included in the study.

Sample size determinations for factor analysis are both mixed and controversial (Mundfrom et al., 2005). As a result, we aimed to create a sample that was adequately large and deemed acceptable by most estimates (Mundfrom et al., 2005). Four hundred two participants residing in the USA and fluent in English completed at least the section of the survey that included the self-connection questions. Of those, we excluded 74 participants whose IP addresses matched at least one other response in the data. We excluded an additional 20 participants who failed to correctly answer at least one of the two attention check questions embedded into the self-connection items (e.g., “Please select “Strongly Disagree”). These exclusions were made to refine the quality of the data while still maximizing the power of our analyses. This yielded a final sample size of 308 participants who completed the survey in a median time of 12.54 min.

2.1.2 | Measures

We focused this initial study on developing and testing a multi-item scale of self-connection. Additionally, we sought to understand the relationships between self-connection and the constructs theorized to be related to but distinct from it (i.e., mindfulness, authenticity, self-concept clarity). Furthermore, we began to examine the role of self-connection in well-being by focusing on two distinct indicators of eudaimonic well-being: flourishing and meaning in life (Ryan & Deci, 2001).

Self-connection

To develop a multiple-item measure, we began by generating an initial pool of 45 items thought to represent all three components of self-connection (15 items per component). Two of the authors, who are the lead researchers on self-connection and helped develop the theory, engaged in discussions about the concept and potential items and drafted the initial 45 items. A third person familiar with the relevant literature provided feedback and helped revise the wording. To ensure face validity of the items, a fourth person with expertise in social and positive psychology then identified and excluded items that appeared confounded with other, conceptually inconsistent constructs (e.g., self-esteem, conformity) or proposed consequences of self-connection (e.g., meaning, satisfaction). The resulting item pool contained 29 items. Participants rated each item on a seven-point scale (1 = *Strongly disagree*; 7 = *Strongly agree*).

We also measured self-connection using the single-item measure used in prior research (Klussman et al., 2020c). As is common in scale development, this allowed us to examine the concurrent validity with a similar existing measure (Nichols & Webster, 2015; Russell et al., 1980; Vogel et al., 2009). Specifically, we informed participants what being self-connected means and asked them to indicate the extent to which this applied to them, using a seven-point scale (1 = *I rarely or never feel self-connected*; 7 = *I always or often feel self-connected*). Higher scores on the single-item self-connection (SISC) measure indicated greater self-connection.

Authenticity

We assessed authenticity using Wood and colleagues' (2008) Authenticity Scale. The scale is composed of three components: Accepting External Influences, Self-Alienation, Authentic Living. Past research provides evidence for both the reliability and validity of this measure within and across diverse cultures and languages (Grégoire et al., 2014; Grijak, 2017; Wood et al., 2008). Participants rated 12 items on a seven-point scale (e.g., "*I always stand by what I believe in*": 1 = *does not describe me at all*; 7 = *describes me very well*). We then averaged the four items corresponding to each component to create a composite for each; higher scores reflect greater accepting external influences, $M = 2.37$, $SD = 1.45$, $\alpha = .91$, self-alienation, $M = 2.94$, $SD = 1.41$, $\alpha = .87$, and authentic living, $M = 5.75$, $SD = 1.01$, $\alpha = .87$, respectively.

Mindfulness

We assessed mindfulness using Feldman and colleagues' (2007) Cognitive and Affective Mindfulness Scale-Revised (CAMS-R). The scale has demonstrated good psychometric properties and predictive validity in a variety of contexts (Baer et al., 2009; Feldman et al., 2007; Schertz et al., 2009). Participants rated 12 items on a four-point scale (e.g., "*I can usually describe how I feel at the moment in considerable detail*": 1 = *rarely/not at all*; 4 = *often/always*). We averaged all 12 questions to create a composite measure of mindfulness; higher scores reflect greater mindfulness, $M = 2.89$, $SD = 0.55$, $\alpha = .87$.

Self-concept clarity

We assessed self-concept clarity using Campbell and colleagues' (1996) Self-Concept Clarity Scale. The scale has been validated around the world and has consistently demonstrated good reliability (Campbell et al., 1996; Matto & Realo, 2001; Steffgen et al., 2007). Participants rated 12 items on a five-point scale (e.g., "*In general, I have a very clear sense of who I am and what I am*": 1 = *strongly disagree*; 5 = *strongly agree*). We averaged all 12 questions to create a composite measure of self-concept clarity; higher scores reflect greater self-concept clarity, $M = 3.65$, $SD = 0.89$, $\alpha = .94$.

Flourishing

Diener and colleagues' (2010) Flourishing Scale served as one indicator of eudaimonic well-being. It has been used in a number of contexts and reliably demonstrated good psychometric properties (Brenner et al., 2018; Diener et al., 2010; Wong et al., 2019). Participants rated how much they agreed with seven statements on a seven-point scale (e.g., "*I*

am a good person and live a good life": 1 = *strongly disagree*; 7 = *strongly agree*). The original scale has eight items, but one item ("People respect me") was omitted in our survey due to a transcription error. We averaged these remaining seven questions to create a composite measure of flourishing; higher scores indicate greater flourishing, $M = 5.45$, $SD = 1.06$, $\alpha = .90$.

Meaning

We assessed the presence of meaning using the Presence of Meaning subscale of the Meaning in Life Questionnaire (MLQ-P; Steger et al., 2006). The MLQ is valid, reliable, and commonly used (Hallford et al., 2018; Stalikas et al., 2018; Steger et al., 2006). Participants responded to five items on a seven-point scale (e.g., "*My life has a clear sense of purpose*": 1 = *absolutely untrue*; 7 = *absolutely true*). We averaged all five questions to create a composite measure of meaning; higher scores correspond to greater meaning in life, $M = 4.95$, $SD = 1.54$, $\alpha = .95$.

Demographics

We measured several demographic variables to understand the representativeness of our sample as well as to control for demographic differences in our analyses. Specifically, we asked participants to report their Age, Gender, Race/ethnicity, Education (less than high school, high school graduate, some college, bachelor's degree, or postgraduate degree), and their household income (less than \$20k, \$20k–\$34,999, \$35k–\$49,999, \$50k–\$74,999, \$75k–\$99,999, \$100k–\$149,999, \$150k+). See Table 1 for a comprehensive description of each demographic variable.

2.2 | Results

2.2.1 | Item analysis and selection

We employed R version 3.5.1 (R Core Team, 2018) and the psych package (Revelle, 2017) for the following analyses. Before beginning our primary analyses, we examined the item-level statistics (see Table 2). As expected, most items had mild to moderate kurtosis, such that scores were generally favorable (i.e., suggesting higher self-connection). We also checked the data to ensure it was appropriate for exploratory factor analysis (EFA). All common criteria were met or exceeded. First, our sample size was over 300 (Gorsuch, 1983; Worthington & Whittaker, 2006). Second, with a participant to item ratio over 10, it exceeded the conservative 5 to 1 ratio often recommended (Floyd & Widaman, 1995; Gorsuch, 1983). Combined with average communalities over 0.5 and a proposed item to factor structure of almost 10:1, our data fit well within even the most conservative sample size recommendations (Worthington & Whittaker, 2006). Finally, an examination of the correlation matrix between the 29 items resulted in a Kaiser-Meyer-Olkin value of 0.92 (i.e., "marvelous") and Bartlett's test of sphericity resulting in a significant chi-square, $\chi^2(406, N = 308) = 5251.76$, $p < .01$. In all, it appears that our data are both sufficient and appropriate for EFA.

To begin our item minimization process, we subjected the original 29 items to a parallel analysis. A parallel analysis suggested that up to

TABLE 1 All studies: Demographic characteristics

		Study 1	Study 2	Study 3
Age	M	37.62	36.01	33.72
	SD	12.21	11.35	12.01
Education	Less than HS	0.65%	0.00%	0.70%
	HS	11.04%	9.15%	12.44%
	Some College	39.94%	34.76%	34.50%
	Bachelor's Degree	34.42%	39.63%	36.31%
	Graduate Degree	10.71%	7.32%	16.05%
Gender	Male	47.73%	51.83%	40.62%
	Female	48.70%	39.02%	55.97%
	Non-Binary	0.00%	0.00%	3.41%
Income	Less than \$20,000	11.36%	12.80%	15.35%
	\$20,000 to \$34,999	16.88%	16.46%	16.15%
	\$35,000 to \$49,999	20.13%	18.29%	15.05%
	\$50,000 to \$74,999	23.70%	22.56%	18.76%
	\$75,000 to \$99,999	14.61%	10.98%	11.63%
	\$100,000 to \$149,999	7.47%	7.90%	14.44%
	\$150,000 or more	2.60%	1.83%	8.63%
Race	White	79.55%	76.83%	72.42%
	Black	7.80%	9.15%	7.12%
	Asian	7.47%	4.27%	8.32%
	Native	0.32%	0.00%	0.30%
	Mixed	1.30%	0.61%	4.31%

Notes: In Study 1, 11 participants failed to answer the race/ethnicity question while 10 failed to answer the other demographic questions. In Study 2, 15 participants failed to answer the demographic questions. The descriptive statistics represent the percent of respondents, including those who did not respond to the demographic questions.

five factors should be considered, with eigenvalues of 9.27, 3.14, 1.18, 0.89, 0.45 that represent 22.7%, 11.1%, 7.9%, 8.8%, and 4.4% variance explained, respectively. The scree plot was consistent with this conclusion, as the slope approached zero at 5 factors (Cattell, 1966; see Figure 1). As such, we next performed a five-factor EFA with Principal Axis Factoring (PAF) as our extraction method and a Promax rotation. We used an oblique rotation because we expected that all three components would share significant variance and principal axis factoring due to its support in the literature and the fact that it does not make assumptions about error type (De Winter & Dodou, 2012). There were no missing data among the 308 participants and 29 proposed self-connection items. As recommended, we considered factor loadings of .4 or greater as "high" or "meaningful" (Floyd & Widaman, 1995).

When we examined the pattern matrix of this five-factor model, it became apparent that the second factor was composed entirely of negatively worded items across the three proposed components of self-connection, suggesting that it represented a method effect rather than a clear substantive factor. Therefore, we excluded items that loaded strongly only on that factor (six items). In addition, only two items

loaded strongly onto the fifth factor. Because three high loading items are often recommended for a factor to be considered of value (Comrey, 1988), we excluded this factor and the one item that only highly loaded on it and the second factor. Finally, we eliminated one other negatively worded item that did not load highly on any of the five factors and had its highest loading on the second factor. The items that loaded on the three remaining factors appeared to clearly represent self-awareness, self-acceptance, and self-alignment. Four items loaded onto each self-awareness and self-acceptance and 13 items loaded onto the self-alignment factor (all factor loadings > .4 on that factor and < .4 on the two remaining factors). See Table 2 for a complete view of the factor loadings and communalities.

At this point, the self-awareness and self-acceptance factors seemed well-represented with enough items to demonstrate good psychometric properties but not too many to preclude measuring them in research or practical settings (Saucier & Goldberg, 2002). Considering the proposed equality of the factors in understanding self-connection, it was important not to have one component disproportionately represented in the overall scale. Because each factor contained four items, we sought to reduce the number of self-alignment items to a similar number. First, we eliminated 50% of the remaining items with the lowest loadings (i.e., those under .70). We then examined the factor loadings and item-wording for each of the remaining seven items and removed three more items based on the conceptualization of self-connection and the size of the loadings. These three additional items appeared to represent perceptions rather than actual behavior: "In all the ways that matter, most aspects of my life reflect my values," "It is important that I make time to consider what is truly important to me in life." and "I spend time considering what values are important to me."

The resulting scale consisted of 12 items, four items tapping each of the three components of self-connection (see Appendix). We performed another parallel analysis and EFA on these 12 items to assess the degree to which they fit the proposed model. These and the resulting scree plot all supported three factors, with eigenvalues of 4.21, 1.17, and 0.73 and variance explained of 20.5%, 19.1%, and 17.3%, respectively (see Figure 2). In line with recommendations for total variance explained (Streiner, 1994), the three factors combined to account for 56.9% of the variance. All three factors clearly corresponded to the three components of self-connection, and all items loaded at least .5 on each primary factor and less than .3 on all other factors. In addition, the factor structure fit the data well, RMSEA = .07 [.05, .08], TLI = .95. Cronbach's alpha reliability estimates ($\alpha_{\text{Self-Awareness}} = .80$, $\alpha_{\text{Self-Acceptance}} = .76$, $\alpha_{\text{Self-Alignment}} = .85$) and omega reliability estimates, with 10,000 bootstrapped samples, also supported the internal reliability of each component ($\omega_{\text{Self-Awareness}} = .77$ [.73, .81], $\omega_{\text{Self-Acceptance}} = .77$ [.73, .80], $\omega_{\text{Self-Alignment}} = .85$ [.82, .87]). See Table 3 for the detailed results of this final EFA.

Due to our proposed higher-order factor structure, we also used the correlations among the three factors to perform an additional parallel analysis and EFA. This final set of analyses suggested that the three factors in fact did explain one higher-order factor, with loadings of .86, .69, and .49 on this self-connection factor. Although this provides preliminary support for our overall factor structure, we will further test this

TABLE 2 Study 1: Exploratory factor analysis of the initial 29 items

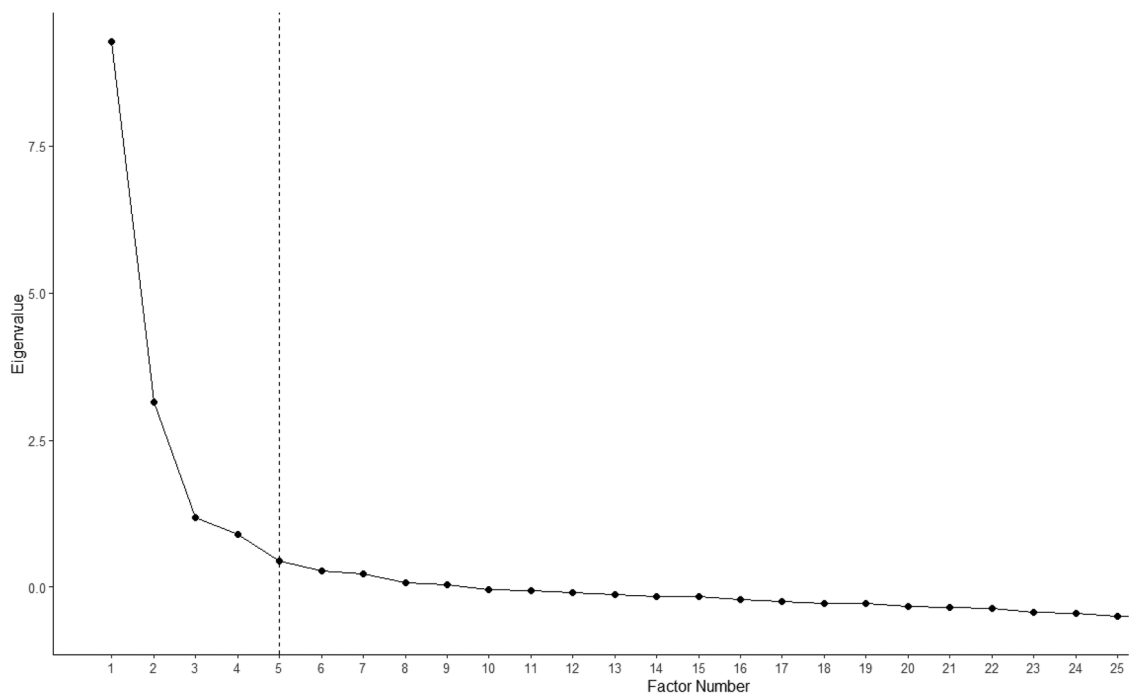
Item	M	SD	Skewness	Kurtosis	Factor					Communality
					1	2	3	4	5	
I consider myself someone who is very in-touch with my values.	5.62	1.13	-1.61	3.65	0.62	0.03	-0.16	0.36	0.14	0.64
I spend time considering what values are important to me.	5.38	1.32	-1.21	1.51	0.77	-0.02	-0.12	0.16	0.57	0.68
I am often unsure of what is important to me in life.	2.93	1.61	0.77	-0.4	-0.04	0.41	0.12	-0.2	0.26	0.49
Other people know me better than I know myself.	2.51	1.56	1.09	0.34	-0.04	0.38	0.25	-0.15	0.28	0.48
I have a deep understanding of myself.	5.31	1.3	-1.05	1.25	0.06	0.06	0.10	0.89	0.18	0.77
It is easy for me to identify and understand how I am feeling in any given moment.	5.3	1.34	-1.16	1.33	0.13	-0.02	0.09	0.65	0.05	0.58
I am often surprised by how little I understand myself.	2.94	1.72	0.73	-0.55	0.22	0.42	0.11	-0.44	0.29	0.63
It is important that I make time to consider what is truly important to me in life.	5.28	1.4	-1.06	1.09	0.83	-0.02	-0.13	-0.01	0.37	0.62
I know myself well.	5.53	1.25	-1.26	1.83	0.05	0.11	0.04	0.84	-0.03	0.76
I try not to spend too much time thinking about my life or what is important to me.	3.15	1.58	0.53	-0.56	-0.31	0.59	0.26	0.01	-0.08	0.55
Even when I don't like a feeling or belief that I have, I try to accept it as a part of myself.	4.53	1.52	-0.58	-0.3	0.03	-0.01	0.65	-0.09	0.04	0.43
I try not to judge myself.	4.4	1.7	-0.38	-0.91	0.07	0.10	0.53	0.03	-0.06	0.34
When I find out things about myself that I don't necessarily like, I try to accept those things.	4.43	1.54	-0.31	-0.65	-0.09	-0.04	0.77	0.06	0.00	0.57
I try not to pay attention to my feelings, because they make me unhappy.	2.79	1.58	0.87	-0.1	-0.15	0.71	-0.01	0.02	0.11	0.65
Even when I don't like something about myself, I try to pay attention to it.	5.08	1.27	-0.99	1.35	0.47	-0.10	0.23	0.13	0.25	0.47
I can easily forgive myself for mistakes I have made.	4.39	1.65	-0.39	-0.69	-0.04	-0.04	0.62	0.22	-0.12	0.51
I value honesty over comfort when examining what is important to me in life.	5.36	1.27	-1.1	1.5	0.60	0.01	-0.01	0.17	0.09	0.47
I try to avoid any feelings or parts of myself that make me uncomfortable.	3.59	1.69	0.21	-0.94	0.01	0.87	-0.02	-0.05	-0.16	0.72
I try to avoid situations where I feel uncomfortable with who I am.	4.06	1.72	-0.23	-0.93	0.10	0.77	-0.24	0.10	-0.01	0.51
I try to make sure that my actions are consistent with my values.	5.65	1.23	-1.47	2.89	0.97	0.10	-0.20	-0.14	-0.08	0.67

(Continues)

TABLE 2 (Continued)

Item	M	SD	Skewness	Kurtosis	Factor					Communality
					1	2	3	4	5	
I try to make sure that my relationships with other people reflect my values.	5.49	1.29	-1.32	2	0.96	0.06	-0.18	-0.18	0.00	0.62
My life truly reflects the things that are important to me.	5.21	1.32	-1.02	1.04	0.51	-0.05	0.25	0.05	-0.19	0.59
I spend time making sure that I am acting in a way that is a reflection of my true self.	5.3	1.37	-1.05	1.02	0.72	-0.05	0.07	0.05	0.10	0.60
I find it hard to act in a way that really reflects who I am.	3.12	1.74	0.71	-0.51	-0.02	0.49	-0.03	0.00	0.45	0.58
I follow my own path in life, even if others disagree.	5.31	1.28	-1	1.32	0.45	0.04	0.16	0.05	-0.04	0.32
I often do things because I think I should do them, rather than because I want to do them.	4.27	1.65	-0.26	-0.76	0.10	0.45	-0.04	0.12	0.04	0.17
I am able to live a life that reflects my values.	5.42	1.16	-1.33	2.58	0.51	-0.04	0.21	0.10	-0.26	0.65
I find small ways to ensure that my life truly reflects the things that are important to me.	5.21	1.25	-1.04	1.49	0.72	-0.09	0.18	-0.17	0.02	0.52
In all the ways that matter, most aspects of my life reflect my values.	5.29	1.24	-1.06	1.31	0.71	0.02	0.12	-0.02	-0.24	0.71

Note. Extraction = Principal Axis Factoring; Rotation = Promax

**FIGURE 1** Study 1: Scree plot from original 29-item EFA

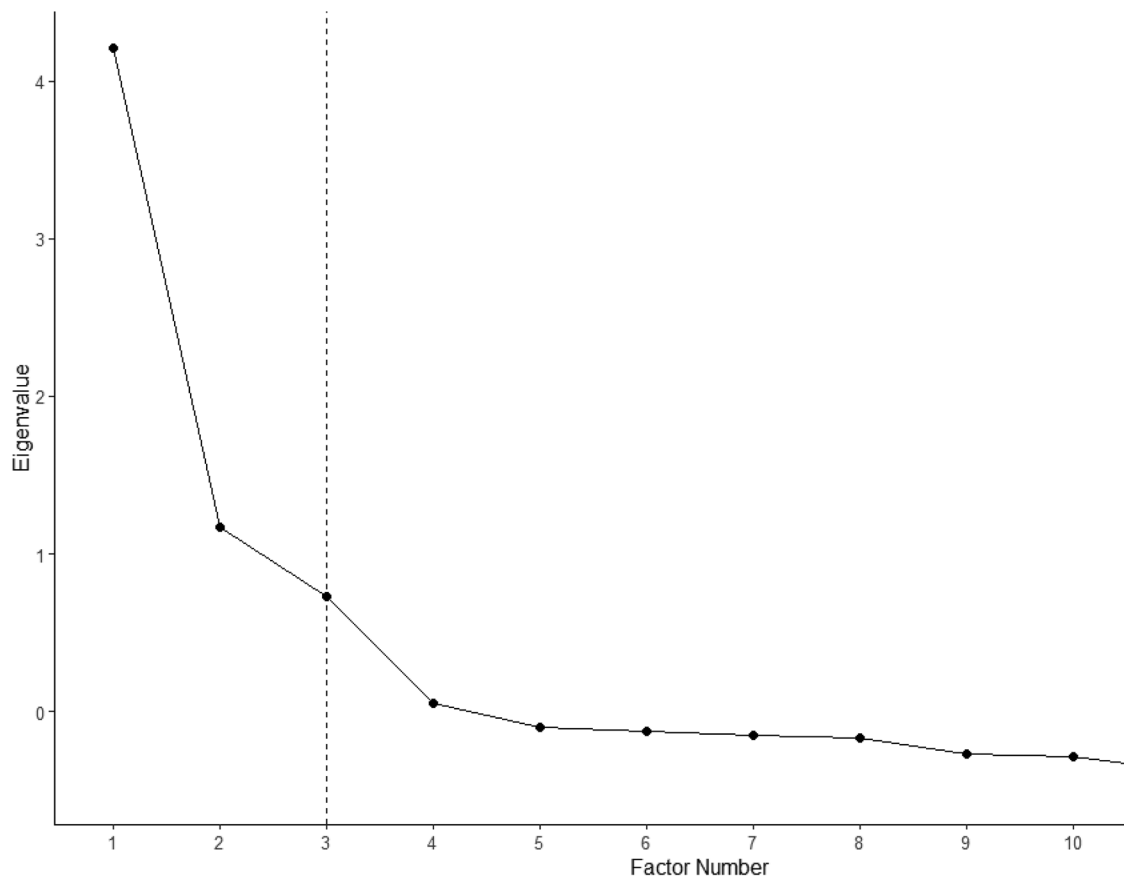


FIGURE 2 Study 1: Scree plot from final 12-item EFA

structure in Study 2 with a new sample and a confirmatory factor analysis (CFA).

As a result, we created an overall composite score, consisting of all 12 items, to represent self-connection in the remaining analyses, $\alpha = .83$, $\omega = .84$ [.81, .86]. We also created individual composites for each of the components (Self-Awareness: $\alpha = .78$, $\omega = .77$ [.73, .81]; Self-Acceptance: $\alpha = .76$, $\omega = .77$ [.73, .80]; Self-Alignment: $\alpha = .84$, $\omega = .85$ [.82, .87]). This allowed us to examine both the overall concept of self-connection (i.e., the average of all 12 items) as well as the components themselves. This new measure is intended to be used as a composite scale of self-connection, and some researchers may wish to examine the subscales individually.

2.2.2 | Demographic differences

To understand the ways in which people may differ in their self-connection, based on demographics, we performed a series of analyses to examine these potential differences. First, a regression with age predicting self-connection suggested no relationship between the two, $\beta = .03$, $p = .55$. An analysis of variance (ANOVA) examining the effect of education on self-connection similarly suggested no differences between groups, $F(4, 293) = 0.20$, $p = .94$. A similar result emerged when examining the effect of income, $F(6, 291) = 2.05$, $p =$

$.06$, race, $F(4, 246) = 0.57$, $p = .68$, and gender, $F(1, 295) = 0.03$, $p = .87$. In all, this suggests that self-connection did not differ across demographic categories in this sample.

We next performed the same analyses to examine potential demographic differences in each of the three components. Regarding age, there appeared to be no relationship between it and any of the components (Self-Awareness: $\beta = .03$, $p = .65$; Self-Acceptance: $\beta = -.02$, $p = .73$; Self-Alignment: $\beta = .08$, $p = .17$). A similar result emerged when examining the effect of education (Self-Awareness: $F(4, 293) = 0.15$, $p = .96$; Self-Acceptance: $F(4, 293) = 1.26$, $p = .29$; Self-Alignment: $F(4, 293) = 0.76$, $p = .55$), income (Self-Awareness: $F(6, 291) = 2.00$, $p = .07$; Self-Acceptance: $F(6, 291) = 0.58$, $p = .75$; Self-Alignment: $F(6, 291) = 1.81$, $p = .10$), race (Self-Awareness: $F(4, 246) = 1.04$, $p = .39$; Self-Acceptance: $F(4, 246) = 0.34$, $p = .85$; Self-Alignment: $F(4, 246) = 0.43$, $p = .79$), and gender (Self-Awareness: $F(1, 295) = 0.03$, $p = .86$; Self-Acceptance: $F(1, 295) = 0.86$, $p = .35$; Self-Alignment: $F(1, 295) = 1.68$, $p = .20$). In all, this suggests that none of the individual components differ across demographic categories in this sample.

2.2.3 | Concurrent validity

Before examining various forms of validity associated with the SCS, we first excluded 54 additional participants who failed to answer at least

TABLE 3 Study 1: Exploratory factor analysis of the 12-item self-connection scale

Item	Factor			Communality
	1	2	3	
1. I have a deep understanding of myself.	.76	.16	.02	.71
2. It is easy for me to identify and understand how I am feeling in any given moment.	.68	.08	.12	.62
3. I know myself well.	.87	.03	.00	.77
4. I am often surprised by how little I understand myself.	-.60	.23	.05	.30
5. I try not to judge myself.	-.05	.61	.09	.40
6. When I find out things about myself that I don't necessarily like, I try to accept those things.	.00	.83	-.12	.61
7. Even when I don't like a feeling or belief that I have, I try to accept it as a part of myself.	-.16	.72	-.04	.45
8. I can easily forgive myself for mistakes I have made.	.28	.57	-.03	.48
9. I find small ways to ensure that my life truly reflects the things that are important to me.	.03	.18	.53	.42
10. I spend time making sure that I am acting in a way that is a reflection of my true self.	.13	.11	.63	.60
11. I try to make sure that my actions are consistent with my values.	.00	-.17	.91	.74
12. I try to make sure that my relationships with other people reflect my values.	-.09	-.13	.95	.73

Note. Extraction = Principal Axis Factoring; Rotation = Promax; Factor 1 represents Awareness, Factor 2 represents Acceptance, and Factor 3 represents Alignment

one of the nine additional attention check questions that we embedded into the additional scales. An examination of collinearity among all measured constructs suggested that this was not an issue in the current data. First, an examination of the correlation matrix resulted in all $r_s < .80$, below the .90 that many suggest indicates collinearity (Hair Jr. et al., 1998). Second, variance-inflation factors (VIFs) ranged from 2.38 to 3.38 and were well below the value often used to determine collinearity (i.e., 10; Hair Jr et al., 1998).

We then examined the relationship between the 12-item SCS, each four-item component, and the single-item self-connection measure (SISC) used in previous research. Results revealed moderate-to-strong correlations with the SISC for the overall SCS and all SCS components ($r_{\text{Self-Awareness}} = .61$, $r_{\text{Self-Acceptance}} = .37$, $r_{\text{Self-Alignment}} = .49$, $r_{\text{Overall}} = .66$, all $p_s < .01$). These results indicated that the SCS was strongly related to a previous operationalization of self-connection yet explains variance unique to that of the SISC.

2.2.4 | Construct validity

We next examined the relationships between the SCS and three theoretically related constructs: authenticity, mindfulness, and self-concept clarity. As shown in Table 4, the full SCS was positively correlated with each of these variables (all $r_s > .57$, $p_s < .01$), providing initial evidence of convergent validity. Importantly, the relationships with each of the components and these constructs were quite varied and suggest only modest overlap between the SCS and these constructs (see Table 4).

2.2.5 | Convergent validity

We then examined relationships between the SCS and eudaimonic well-being. As hypothesized, the full SCS was strongly associated with both meaning, $r = .61$, $p < .01$, and flourishing, $r = .71$, $p < .01$. Building on Fisher's r -to- z transformation and equations 3 and 10 from Steiger (1980), we subsequently employed the method proposed by Lee and Preacher (2013) to compare the magnitude of the relationships between the SCS and the SISC with well-being. The correlations between the full SCS and the well-being variables were stronger than the correlations between the SISC for both flourishing, $z = 3.53$, $p < .01$, and meaning in life, $z = 2.20$, $p = .03$, suggesting that the SCS does a better job predicting well-being than does the SISC (see Table 4).

The individual SCS components were also significantly related to meaning and flourishing, though the coefficients were lower than for the full scale, $.39 < r < .62$, all $p_s < .01$. This result is consistent with the proposition that all three components work together to support well-being. Furthermore, the correlations between each component and each indicator of well-being were quite varied, suggesting that each component contributes something unique to the overall experience of self-connection.

2.2.6 | Incremental validity

To test the incremental value of the SCS for predicting well-being variables, we next conducted hierarchical regressions predicting each

TABLE 4 All Studies: Correlations between the SCS, health, and well-being

	Study 1										Study 2										Study 3									
	Mind	SCC	AA	AS	AL	Flour	MP	PA	NA	LS	Anx	Dep	Health	HB	HP	SCom	SA	PA	NA	LS	Flour	MP	Anx	Dep						
SISC	.58**	.53**	-.47**	-.31**	.55**	.58**	.52**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
SCS	.64**	.57**	-.54**	-.36**	.56**	.71**	.61**	.47**	-.26**	.44**	-.23**	-.34**	.27**	.27**	-.09	.69**	.62**	.52**	-.42**	.48**	.68**	.61**	-.40**	-.47**						
SCS-Awareness	.55**	.67**	-.65**	-.37**	.21**	.53**	.49**	.27**	-.26**	.23**	-.12	-.23**	.24**	.28**	-.10	.42**	.45**	.40**	-.33**	.34**	.51**	.48**	-.31**	-.36**						
SCS-Acceptance	.45**	.24**	-.17**	-.15**	.62**	.45**	.39**	.44**	-.19**	.23**	-.33**	-.36**	.21*	.11	-.09	.67**	.48**	.35**	-.36**	.39**	.46**	.42**	-.35**	-.36**						
SCS-Alignment	.42**	.38**	-.40**	-.29**	.52**	.61**	.47**	.33**	-.14	.50**	-.03	-.16	.15	.24**	-.01	.43**	.47**	.46**	-.25**	.37**	.59**	.50**	-.22**	-.32**						

Note: Study 1: N = 254, Study 2: N = 145, Study 3: N = 991; SCS = Self-Connection Scale; SISC = Single-Item Self-Connection; Mind = Mindfulness; SCC = Self-Concept Clarity; AA = Authenticity - Accepting External Influence; AS = Authenticity - Self-Alienation; AL = Authentic Living; Flour = Flourishing; MP = Meaning-Presence; PA = Positive Affect; NA = Negative Affect; LS = Life Satisfaction; Anx = Anxiety; Dep = Depression; Health = Self-Rated Health; HB = Health Behaviors; HP = Health Problems; SCom = Self-Compassion; SA = Self-Acceptance. * $p < .05$, ** $p < .01$

well-being variable. Of note, we included demographic variables as predictors due to the abundance of research linking various demographics to well-being (e.g., Horley & Lavery, 1995; Witter et al., 1984). In particular, we entered age as a continuous variable and the remaining demographics as categorical without collapsing across any categories (see Table 5). The Step 1 predictors included demographics, mindfulness, authenticity (i.e., accepting external influence, self-alienation, and authentic living), and self-concept clarity. We then added the SCS in Step 2. The first model predicted flourishing, and the second model predicted presence of meaning. As shown in Table 5, the SCS significantly predicted both well-being variables above and beyond related constructs and demographics, providing evidence of incremental validity. Additionally, the SCS was the strongest predictor (comparing beta values) of both well-being variables.

2.3 | Discussion

Study 1 generated a 12-item measure of self-connection (the Self-Connection Scale: SCS) that appears useful for examining the role of self-connection in well-being. The findings offered initial evidence that this measure taps three theorized components of self-connection: self-awareness, self-acceptance, and self-alignment. Study 1 also supplied initial evidence of inter-item reliability of the full scale and its subscales. The results demonstrated that the SCS and its components were strongly related to a previously used single-item measure, providing evidence of construct validity, and that it may offer expanded content validity over that prior measure. Additional evidence of construct validity, specifically convergent validity, came from correlations between the SCS and measures of mindfulness, authenticity, and self-concept clarity. The SCS also demonstrated incremental validity beyond these variables (and demographics) for predicting two important eudaimonic well-being variables: presence of meaning and flourishing. Altogether, these findings suggest that measuring self-connection with the SCS will aid further examination of this important variable associated with well-being.

3 | STUDY 2

In the second study, we sought to further test both the psychometric properties of the SCS and the scale's association with well-being. To accomplish this, we recruited a new sample of participants to confirm the factor structure of the scale, and we used a different operationalization of well-being from the one in Study 1. Here, we examined the relationships between measures of hedonic well-being, the SCS, and commonly used measures of physical and mental health.

3.1 | Method

3.1.1 | Participants

We again recruited participants via MTurk, using the same study description and informed consent as in Study 1, and compensated each

TABLE 5 Study 1: Hierarchical regressions for self-connection scale predicting well-being

	ΔR^2	SS	MS	df	F	p	B	β
Flourishing								
<i>Step 1</i>	.62			24	15.21	<.01		
Age		0.07	0.07	1	0.15	.70	-.008	-.09
Area		0.53	0.27	2	0.56	.57		
Education		1.92	0.48	4	1.01	.40		
Income		14.02	2.34	6	4.89	<.01		
Race		9.05	2.26	4	4.74	<.01		
Gender		18.35	9.18	2	19.21	<.01		
Mindfulness		105.27	105.27	1	220.40	<.01	.88	.45
Accepting External Influences		2.99	2.99	1	6.25	.01	-.11	-.16
Self-Alienation		5.41	5.41	1	11.34	<.01	.20	.26
Authentic Living		16.66	16.66	1	34.89	<.01	.39	.37
Self-Concept Clarity		0.03	0.03	1	0.06	.81	-.02	.02
Residuals		107.95	0.48	226				
<i>Step 2</i>	.08*			25	20.56	<.01		
Age		0.07	0.07	1	0.18	.67	-.004	-.04
Area		0.53	0.27	2	0.70	.50		
Education		1.92	0.48	4	1.26	.29		
Income		14.02	2.34	6	6.12	<.01		
Race		9.05	2.26	4	5.92	<.01		
Gender		18.35	9.18	2	24.03	<.01		
Mindfulness		105.27	105.27	1	275.64	<.01	.59	.30
Accepting External Influences		2.99	2.99	1	7.82	<.01	-.10	-.13
Self-Alienation		5.41	5.41	1	14.18	<.01	.18	.24
Authentic Living		16.66	16.66	1	43.63	<.01	.26	.25
Self-Concept Clarity		0.03	0.03	1	0.07	.79	-.10	-.08
Self-Connection		22.02	22.02	1	57.65	<.01	.55	.41
Residuals		85.93	0.38	225				
Presence of Meaning								
<i>Step 1</i>	.41			24	6.58	<.01		
Age		0.17	0.17	1	0.11	.74	-.01	-.12
Area		2.73	1.37	2	0.87	.42		
Education		8.10	2.02	4	1.30	.27		
Income		15.62	2.60	6	1.67	.13		
Race		15.00	3.75	4	2.40	.05		
Gender		19.08	9.54	2	6.11	<.01		
Mindfulness		155.02	155.02	1	99.32	<.01	1.10	.39
Accepting External Influences		3.15	3.15	1	2.02	.16	-.07	-.07
Self-Alienation		10.51	10.51	1	6.73	.01	.27	.24
Authentic Living		14.86	14.86	1	9.52	<.01	.34	.22
Self-Concept Clarity		2.15	2.15	1	1.38	.24	.20	.12
Residuals		352.76	1.56	226				

(Continues)

TABLE 5 (Continued)

	ΔR^2	SS	MS	df	F	p	B	β
Step 2	.08*			25	8.75	<.01		
Age		0.17	0.17	1	0.13	.72	-.01	-.07
Area		2.73	1.37	2	1.01	.37		
Education		8.10	2.02	4	1.50	.20		
Income		15.62	2.60	6	1.93	.08		
Race		15.00	3.75	4	2.77	.03		
Gender		19.08	9.54	2	7.07	<.01		
Mindfulness		155.02	155.02	1	114.79	<.01	.67	.24
Accepting External Influences		3.15	3.15	1	2.34	.13	-.05	-.05
Self-Alienation		10.51	10.51	1	7.78	<.01	.24	.22
Authentic Living		14.86	14.86	1	11.00	<.01	.16	.10
Self-Concept Clarity		2.15	2.15	1	1.59	.21	.09	.05
Self-Connection		48.90	48.90	1	36.21	<.01	.81	.42
Residuals		303.86	1.35	225				

Note: Values represent analysis of deviance; All demographic variables were entered into the equation as categorical without collapsing across categories. * indicates a significant model improvement a $p < .01$

of them \$1.50 for their participation. We obtained informed consent from all participants. In line with recommendations for samples of at least 200 in confirmatory factor analysis-based research, we aimed to recruit 200 participants in the current study (Kline, 2011). In March 2018, 226 participants completed at least the section of the survey pertaining to self-connection. Of those, we excluded 48 participants because their IP addresses matched at least one other response in the data from Study 1 or 2. We then excluded 14 additional participants who failed to correctly answer at least one of the two attention check questions that we embedded into the self-connection items. Again, we did this to eliminate any participants who were potentially careless when responding to the self-connection items but to retain as much quality data as possible for use in at least some of our analyses. This yielded a final sample size of 164 participants who completed the survey in a median time of 11.01 min. Although smaller than Study 1, this sample still exceeded the general cut-off of 10 participants/item often recommended in factor analysis (Kline, 2011).

3.1.2 | Measures

The current study sought to further understand the relationship between self-connection and well-being, while expanding the scope to include hedonic well-being and common measures of mental and physical health. This is important because eudaimonic and hedonic well-being are often quite distinct in their antecedents and outcomes (McMahan & Estes, 2011). We measured two indicators of hedonic well-being: affect and life satisfaction. We then included measures of anxiety and depression to assess relevant aspects of mental health. As is common in health research, physical health was assessed using indicators of healthy behaviors since an important component of self-

connection is related to actual behavior. Finally, we measured perceptions of overall health using common measures of health perceptions.

Self-connection

We assessed self-connection using the 12-item Self-Connection Scale developed in Study 1 (see Appendix). Participants rated how much each item described them on a seven-point scale (1 = *strongly disagree*; 7 = *strongly agree*). We averaged all 12 questions to create a composite measure of self-connection, $M = 5.19$, $SD = 0.79$, $\alpha = .78$.

Life satisfaction

We measured life satisfaction with the single-item measure validated by Cheung and Lucas (2014). Although multiple-item measures are generally preferred due to their psychometric superiority, researchers and practitioners commonly use single-item measures of life satisfaction due to their good psychometric properties (Abdel-Khalek, 2006; Cheung & Lucas, 2014; Lucas & Donnellan, 2012). The item we used asks participants to respond to the following question on a four-point scale, "In general, how satisfied are you with your life?" (1 = *very satisfied*; 4 = *very dissatisfied*). We reverse-coded the item so that higher values represented higher life satisfaction, $M = 2.87$, $SD = 0.89$.

Positive and negative affect

We assessed affect using Watson et al.'s (1988) Positive and Negative Affect Schedule (PANAS). In addition to being one of the most widely used measures of affect, there is substantial evidence of its validity and reliability (Crawford & Henry, 2004; Thompson, 2007; Watson et al., 1988). We asked participants to rate the extent to which they felt 20 positive and negative emotions in the past week (e.g., "Guilty": 1 = *very slightly or not at all*; 5 = *extremely*). We averaged all 10 positively worded questions to create a composite measure of positive affect and all 10 negatively worded questions for a measure of negative affect; higher

scores for each subscale reflect greater positive, $M = 3.14$, $SD = 0.94$, $\alpha = .93$, or negative affect, $M = 1.62$, $SD = 0.79$, $\alpha = .94$, respectively.

Anxiety and depression

We assessed anxiety and depression symptoms using Kroenke and colleagues' (2001) Patient Health Questionnaire for Depression and Anxiety (PHQ-4). The PHQ has been employed in a variety of contexts and has good psychometric properties (Gilbody et al., 2007; Han et al. 2009; Kroenke et al., 2001). Participants rated four items, two for anxiety and two for depression, on a four-point scale (e.g., "Feeling nervous anxious or on edge": 1 = not at all; 4 = nearly every day). We averaged the two questions that reflected anxiety to create a composite measure of anxiety and the two that reflected depression to form a measure of depression; higher scores reflect higher levels of anxiety, $M = 1.49$, $SD = 1.92$, $\alpha = .93$, and depression, $M = 1.34$, $SD = 1.85$, $\alpha = .93$, respectively.

CDC health measures

To measure participants' current health, we used a subset of measures from the CDC "Healthy Days Questionnaire" (2000) used in past research and published on the Life Paths Research Center website (<http://lifepathsresearch.org/wp-content/uploads/Health-Related-Quality-of-Life.pdf>). The first question (taken from the Healthy Days Core Module) assesses general self-rated health on a five-point scale: "Would you say that, in general, your health is:" (1 = poor; 5 = excellent). Higher scores reflect better overall health, $M = 3.44$, $SD = 0.90$.

The remaining questions, also taken from the CDC Healthy Days Questionnaire, assess physical and mental health ailments by asking participants five additional items on a six-point scale (0 = 0 days; 5 = every day). Of note, we modified one question, "During the past 30 days, for about how many days did poor physical or mental health keep you from doing your usual activities, such as self-care, work, or recreation?" into two questions to independently measure physical and mental health limitations. Versions of this measure have been successfully employed around the world with good psychometric properties (Barile et al., 2013; CDC, 2000; Mielenz et al., 2006). We averaged all five questions to create a composite measure of health; higher scores reflect more frequent health problems, $M = 2.21$, $SD = 0.38$, $\alpha = .88$.

Health behaviors

We measured positive health behaviors using the Preventive Health Behaviors Scale developed by Moorman and Matulich (1993) and modified by Jayanti and Burns (1998). The scale is both valid and reliable and commonly used in health research (Dutta-Bergman, 2004; Jayanti & Burns, 1998; Tucker et al., 2009). It assesses the prevalence of 17 health behaviors on a three-point scale (e.g., "How often do you undertake the following activities? Exercise regularly": 1 = never, 3 = always). We averaged all 17 questions to create a composite measure of health; higher scores indicate higher overall positive or protective health behaviors, $M = 4.38$, $SD = 4.60$, $\alpha = .82$.

Demographics

We measured and computed demographics in the same way as in Study 1. See Table 1 for a complete breakdown of all demographic characteristics.

3.2 | Results

3.2.1 | Confirmatory factor analysis

To follow up on our series of EFAs from Study 1 and provide an additional examination of the psychometric properties of the SCS, we performed two confirmatory factor analyses (CFAs) in R version 3.5.1 (R Core Team, 2018) using the lavaan package (Rossee, 2012). All models used maximum likelihood estimation with robust standard errors and listwise deletion (although no data were missing among the SCS items). Our primary model consisted of our predicted factor structure, with all variables treated as continuous and allowing covariances among factors to be freely estimated but with uncorrelated measurement errors (see Figure 3). In this hierarchical model, we tested if self-connection consists of three factors: self-awareness, self-acceptance, and self-alignment. The model further specified that each factor consisted of the four items suggested by the final EFA in Study 1. In the second model, we tested a simple, one-factor solution where all 12 items loaded on a single factor. This one-factor model did not fit the data well, so we focus here on our predicted hierarchical model (see Table 6 for model specifics).

Results of the CFA supported our predicted structure. First, we examined the loadings of each measure on its predicted factor. The solution provided strong loadings for all 12 items on their respective three factors. For the self-awareness factor, each of the four items predicted to represent the factor had loadings greater than .44. For self-acceptance, each of the four items loaded greater than .62. For self-alignment, each of the four items loaded greater than .61. Finally, each of the three factors loaded at least .46 on the higher-order self-connection factor. For a complete picture of the proposed factor structure with all standardized loadings, please refer to Figure 3.

Next, we examined the fit indices to test the overall fit of our hypothesized factor structure. First, the model chi-square test was not significant, suggesting that the model had good fit, $\chi^2_{\text{robust}}(51, N = 164) = 52.99$, $p = .40$. We next examined the proportion of chi-square to degrees of freedom. With a desired ratio of < 2 , our ratio (1.04) further supported the model fit. Next, we examined various fit indices, all of which exceeded .9 and supported good model fit, $TLI_{\text{robust}} = .995$, $CFI_{\text{robust}} = .996$. Also, the standardized root mean square residual ($SRMR_{\text{robust}}$) was .06, below the .08 cut-off for good fit and indicating that our model provides a good fit to the data. Last, the $RMSEA_{\text{robust}}$, with a value = .02 [0, .06], again suggested good fit. These results indicate that the current model provides good fit to the data. The high loadings also support this conclusion.

3.2.2 | Measurement invariance

We additionally examined the measurement invariance of our model across gender groups. We first analyzed configural invariance by examining our original model while allowing the loadings to vary across men and women. Next, we examined metric invariance by constraining the factor loadings to be equivalent across gender groups. Finally, we

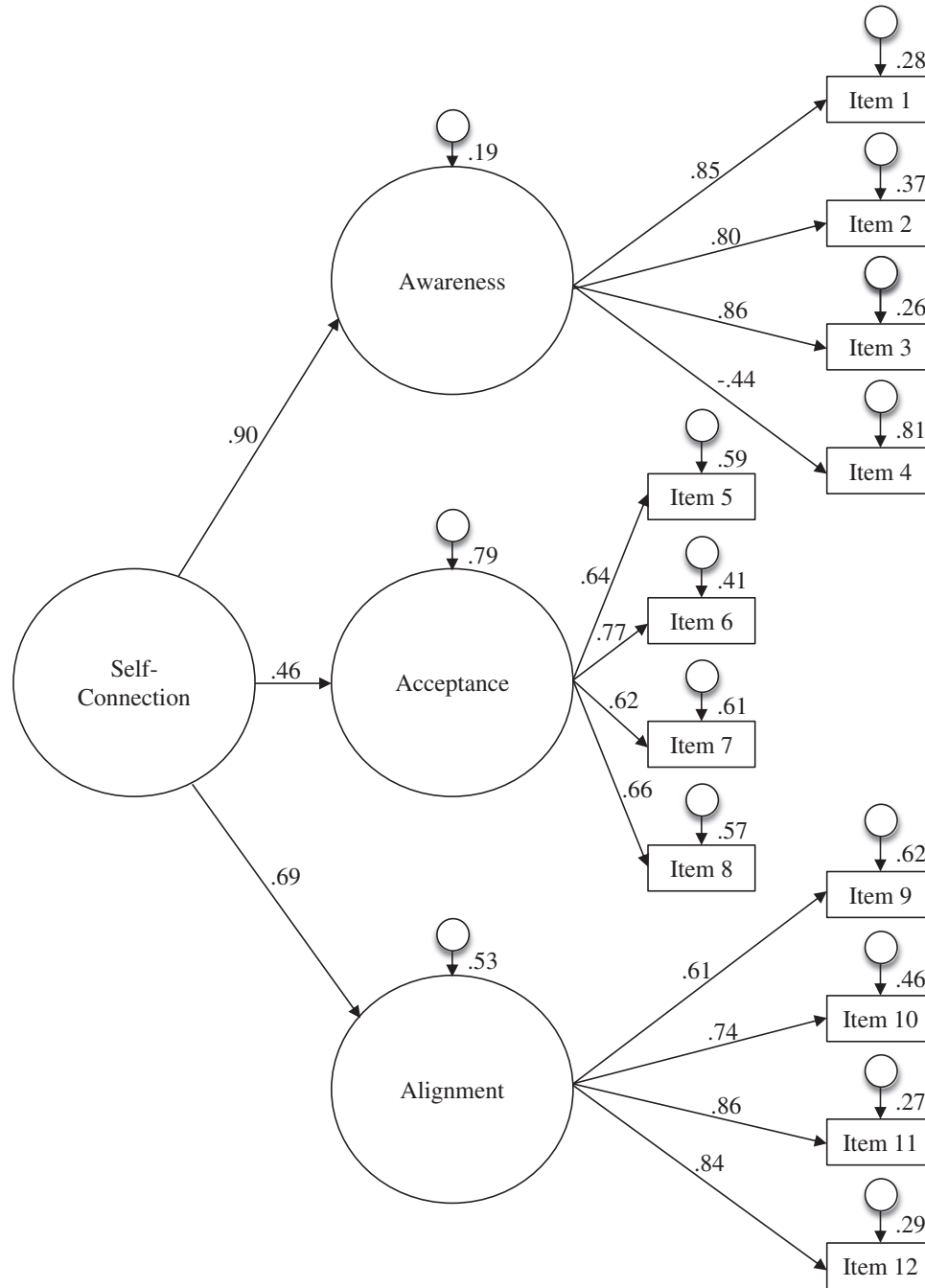


FIGURE 3 Study 2: Results of confirmatory factor analysis with standardized coefficients

TABLE 6 Study 2: Model comparisons for the Self-Connection Scale (SCS)

Model	X ²	df	SRMR	RMSEA [90% CI]	TLI	CFI	p
One-Factor	213.11	54	.14	.17 [.15, .19]	.55	.63	
Hierarchical	52.99	51	.06	.18 [0, .06]	.995	.996	< .01

Note: CI = Confidence interval; All statistics were generated using maximum likelihood estimation with robust standard errors

TABLE 7 Study 2: Model comparisons for measurement invariance

Model	χ^2	df	SRMR	RMSEA [90% CI]	TLI	CFI	<i>p</i>
Gender Invariance							
Configural	136.10	102	.08	.08 [.04, .11]	.92	.94	
Metric	144.14	113	.10	.07 [.03, .10]	.93	.94	.60
Scalar	154.39	121	.10	.07 [.03, .10]	.93	.94	.25
Sample Invariance							
Configural	208.04	102	.07	.08 [.06, .09]	.92	.94	
Metric	214.81	113	.08	.07 [.06, .09]	.93	.94	.51
Scalar	229.30	121	.08	.07 [.06, .09]	.93	.94	.08

Note: CI = Confidence interval; Gender Invariance models: $N = 164$; Study Invariance models: $N = 472$; All statistics were generated using maximum likelihood estimation with robust standard errors

analyzed scalar invariance by constraining the item intercepts to be equivalent (Pendergast et al., 2017). Each model provided a good fit to the data and was not significantly different from the model in which it was nested (all $ps > .05$), suggesting that the hypothesized factor structure held for both women and men. See Table 7 for a complete list of model fit statistics and chi-square difference tests.

We next combined the data from both Study 1 and Study 2 to provide us with the most power and ability to test the structure of our model. In particular, we performed an additional CFA with data from both Study 1 and Study 2, using only participants who appropriately completed the SCS questions and did not have a duplicate IP address (total $n = 472$; Study 1 $n = 308$; Study 2 $n = 164$). All model parameters and constraints were identical to our original analysis. The results also suggested a good fitting model, $\chi^2_{\text{robust}}(51, N = 472) = 155.47, p < .05, TLI_{\text{robust}} = .92, CFI_{\text{robust}} = .94, SRMR_{\text{robust}} = .08, RMSEA_{\text{robust}} = .08 [.06, .09]$. In addition, examining the difference between the data from Study 1 and Study 2 provided further evidence of measurement invariance. That is, the stepwise chi-square difference tests between a configural invariant model, a metric invariant model, and a scalar invariant model resulted in no significant difference from one model to another (all $ps > .05$). In all, the gender and sample analyses provide further support for the proposed structure of self-connection and SCS as a measurement tool (see Table 7).

3.2.3 | Construct validity

Before examining relationships between the SCS and the other measures, we eliminated 19 additional participants who failed to answer the final attention check question that we embedded into the health behaviors questionnaire and created an overall composite score for self-connection and each component. We then examined the potential collinearity among these variables through VIFs and inspection of the correlation matrix. With $rs < .80$ and $VIFs < 3.97$, we concluded that collinearity was not present in the current data (Hair Jr et al., 1998). We subsequently examined the correlations between the SCS to predict well-being and health, as shown in Table 4. First, we examined the relationships between self-connection and the measures of hedo-

nic well-being. Overall, the SCS was positively correlated with positive affect and life satisfaction and negatively related to negative affect. We next examined the relationships between self-connection and measures of mental and physical health. The SCS was positively correlated with overall self-rated health and healthy behaviors. The SCS was also inversely related to symptoms of anxiety and depression. However, the SCS was unrelated to frequency of health problems.

Finally, we examined the relationships between each of the three SCS components and the measures of health and well-being. With the exception of mental health, the overall scale related more strongly to each indicator. Self-acceptance was most strongly related to anxiety and depression. Across components, the correlations between each and any indicator again were quite disparate, suggesting that each is uniquely related to health and well-being. Furthermore, this suggests that the combination of all three best represents self-connection and most strongly relates to well-being (see Table 4).

3.3 | Discussion

Study 2 provided evidence confirming the factor structure of the SCS, suggesting that the items load onto three factors (self-awareness, self-acceptance, and self-alignment) which in turn load onto a higher-order self-connection factor. This second study also replicated good inter-item reliability for the SCS and its subscales. Importantly, Study 2 also found that the SCS was associated with components of hedonic well-being (high positive affect, low negative affect, and life satisfaction) and positive indicators of health (i.e., protective health behaviors and self-rated health). The SCS was also inversely related to anxiety and depression, but unrelated to frequency of health problems. In all, the results of Study 2 provide additional evidence of the reliability and validity of the SCS and the relevance of self-connection in increased health and well-being.

4 | STUDY 3

In this final study, we had two main goals. First, we wanted to demonstrate the SCS's utility beyond measures of the related constructs of

self-compassion and self-acceptance. Second, we sought to replicate the psychometric properties of the SCS with a larger, representative sample obtained from a different participant recruitment platform. To accomplish this, we recruited a large sample of participants and asked them to report on their self-connection, self-compassion, mental health, and both hedonic and eudaimonic well-being.

4.1 | Method

4.1.1 | Participants

For the current study, we recruited participants via the online platform Prolific and compensated each of them \$2 for their participation. We obtained informed consent from all participants. In June 2021, 1002 participants completed at least the section of the survey pertaining to self-connection. Of those, we excluded five participants who failed to correctly answer the attention check question embedded into the SCS. Again, we did this to eliminate any participants who were potentially careless when responding to the self-connection items but retain as much quality data as possible for use in at least some of our analyses. This yielded a final sample size of 997 participants who completed the survey in a median time of 9.95 min for analyses involving only the SCS. For analyses involving other variables, we excluded an additional five participants who failed to correctly answer at least one of the two additional attention check questions included in the remainder of the questionnaire (resulting $n = 992$).

4.1.2 | Measures

The current study sought to further understand the relationships between well-being and self-connection. In particular, we operationalized hedonic well-being as a combination of life satisfaction and affect. We also operationalized eudaimonic well-being as flourishing and the presence of meaning in life. Finally, we included measures of anxiety and depression to assess relevant aspects of mental health. Additionally, we measured self-compassion and self-acceptance to further understand the incremental validity of the SCS.

Anxiety and depression

We again assessed anxiety and depression symptoms using PHQ-4 (Kroenke et al., 2001) and averaged the two questions that reflected anxiety to create a composite measure of anxiety and the two that reflected depression to form a measure of depression; higher scores reflect higher levels of anxiety, $M = 2.12$, $SD = 1.02$, $\alpha = .90$, and depression, $M = 1.94$, $SD = 0.97$, $\alpha = .87$, respectively.

Eudaimonic well-being

Our measures of eudaimonic well-being were identical to Study 1. Diener et al.'s (2010) Flourishing Scale served as the first indicator of eudaimonic well-being. We averaged all eight questions to create

a composite measure of flourishing; higher scores indicated greater flourishing, $M = 4.94$, $SD = 1.16$, $\alpha = .91$. Our second indicator was MIL. We again assessed MIL using the Presence of Meaning subscale of the Meaning in Life Questionnaire (MLQ-P; Steger et al., 2006). We averaged all five questions to create a composite measure of meaning; higher scores corresponded to participants feeling they had greater meaning in life, $M = 4.30$, $SD = 1.64$, $\alpha = .95$.

Hedonic well-being

As in Study 2, we assessed affect using the PANAS (Watson et al., 1988). We averaged all 10 positively worded questions to create a composite measure of positive affect and all 10 negatively worded questions for a measure of negative affect; higher scores for each subscale reflect greater positive, $M = 2.90$, $SD = 0.86$, $\alpha = .91$, or negative affect, $M = 2.13$, $SD = 0.85$, $\alpha = .91$, respectively.

Rather than using a single item in Study 3, as we did in Study 2, we measured life satisfaction with the satisfaction with life scale (Diener et al., 1985). Across many countries, cultures, and languages, the scale has received considerable psychometric support (Pavot & Diener, 1993). Participants rated five items on a seven-point scale (e.g., "In most ways my life is close to ideal?" (1 = strongly disagree; 7 = strongly agree). We averaged all five questions to create a composite measure of life satisfaction; higher scores reflect greater life satisfaction, $M = 3.92$, $SD = 1.57$, $\alpha = .92$.

Self-connection

We assessed self-connection using the 12-item SCS. Participants again rated how much each item described them on a seven-point scale (1 = strongly disagree; 7 = strongly agree). We averaged all 12 questions to create a composite measure of self-connection, $M = 4.81$, $SD = 0.85$, $\alpha = .85$.

Self-acceptance

Self-acceptance was assessed using the self-acceptance subscale of Ryff's Psychological Well-Being Scale (Ryff, 1989). This scale is widely used around the world and has demonstrated good reliability and validity (Akin, 2008; Bayani et al., 2008; Van Dierendonck, 2004). Participants rated three items on a 5-point scale (e.g., "I like most aspects of my personality": 1 = strongly disagree; 5 = strongly agree). We averaged all questions (including one that was reverse-scored) so that higher scores represent higher self-acceptance, $M = 3.24$, $SD = 1.04$, $\alpha = .82$.

Self-compassion

We assessed self-compassion using the Self-Compassion Scale-Short Form (Raes et al., 2011). This 12-item measure is considered valid and possesses good reliability (Garcia-Campayo, 2014; Raes et al., 2011). Participants rated these 12 items on a five-point scale (e.g., "I try to see my failings as part of the human condition": 1 = strongly disagree; 5 = strongly agree). We averaged all 12 questions to create a composite measure of self-compassion; higher scores reflect greater self-compassion, $M = 2.89$, $SD = 0.78$, $\alpha = .88$.

Demographics

We measured and computed demographics in the same way as in Studies 1 and 2. See Table 1 for a complete breakdown of all demographic characteristics.

4.2 | Results

4.2.1 | Confirmatory factor analysis

To further test the structure of the SCS, we performed a CFA identical to the one performed in Study 2. We again used maximum likelihood estimation with robust standard errors and listwise deletion, treating all variables as continuous and allowing covariances among factors to be freely estimated but with uncorrelated measurement errors. Results of the CFA supported our predicted structure. First, the model provided strong loadings for all 12 items on their respective three factors. For the self-awareness factor, each of the four items predicted to represent the factor had loadings greater than .70. For self-acceptance, each of the four items loaded greater than .65. For self-alignment, each of the four items loaded greater than .63. Each of the three factors additionally loaded at least .47 on the higher-order self-connection factor. For a complete picture of the proposed factor structure with all standardized loadings, please refer to Figure 4.

The fit indices further supported the fit of the model. Although the model chi-square test was significant, $\chi^2_{\text{robust}}(51, N = 992) = 351.04$, $p < .05$, all goodness of fit indices exceeded .90 and supported good model fit, $TLI_{\text{robust}} = .910$, $CFI_{\text{robust}} = .931$. With a standardized root mean square residual ($SRMR_{\text{robust}}$) of .06, and a $RMSEA_{\text{robust}}$ of .09 [.08, .10], these results indicate that the current model provides good fit to the data.

4.2.2 | Measurement invariance

We next sought to replicate the measurement invariance of our model across gender groups. We again analyzed configural invariance by examining our original model while allowing the loadings to vary across men and women. Next, we examined metric invariance by constraining the factor loadings to be equivalent across gender groups. Finally, we analyzed scalar invariance by constraining the item intercepts to be equivalent (Pendergast et al., 2017). Each model provided a good fit to the data. As expected, the configural invariance model ($\chi^2_{\text{robust}}(102, N = 992) = 426.40$, $TLI_{\text{robust}} = .91$, $CFI_{\text{robust}} = .93$, $SRMR_{\text{robust}} = .06$, $RMSEA_{\text{robust}} = .09$) did not provide a significantly different fit to the data than did the metric invariance model, $\chi^2(11)_{\text{diff}} = 10.71$, $p = .47$ ($\chi^2_{\text{robust}}(113, N = 992) = 438.84$, $TLI_{\text{robust}} = .92$, $CFI_{\text{robust}} = .93$, $SRMR_{\text{robust}} = .07$, $RMSEA_{\text{robust}} = .09$). The difference in fit between the scalar invariance model ($\chi^2_{\text{robust}}(121, N = 992) = 457.69$, $TLI_{\text{robust}} = .91$, $CFI_{\text{robust}} = .93$, $SRMR_{\text{robust}} = .07$, $RMSEA_{\text{robust}} = .08$) and the metric invariance model was also similar. However, the chi-square difference test did reach statistical significance at $\alpha = .05$ ($\chi^2(8)_{\text{diff}} = 16.95$, $p = .03$).

4.2.3 | Construct validity

With all $r_s < .80$ and VIFs < 4.18 , we concluded that collinearity was not present among the measured variables in the current data (Hair Jr et al., 1998). As a result, we examined the relationships between the SCS and two additional theoretically related constructs: self-compassion and self-acceptance. As shown in Table 4, the full SCS was positively correlated with each of these variables (Self-Compassion: $r = .69$, $p < .01$; Self-Acceptance: $r = .62$, $p < .01$), providing evidence of convergent validity. At the same time, each measure shares less than 50% variance with the SCS, suggesting that they are unique concepts and measures. In addition, the relationships with each of the components and these constructs was quite varied and suggests only a small amount of overlap between the SCS and these constructs (see Table 4).

We next examined relationships between the SCS, well-being, and mental health. As hypothesized, and consistent with the results of Studies 1 and 2, the SCS was strongly associated with all indicators, all $r_s > .40$, $p_s < .01$. The individual SCS components were also significantly related to all indicators, yet these relationships were again lower than for the full scale and varied across indicators and components, $.22 < r < .67$, all $p_s < .01$. This again lends support to the idea that all three components work together to support well-being and that each component contributes something unique to the overall experience of self-connection.

4.2.4 | Incremental validity

To test the incremental value of the SCS for predicting well-being and mental health variables, we conducted hierarchical regressions, similar to Study 1, predicting each well-being and mental health variable. Again, we included demographic variables as predictors due to the abundance of research linking various demographics to well-being (e.g., Horley & Lavery, 1995; Witter et al., 1984). In particular, we entered age as a continuous variable and the remaining demographics as categorical without collapsing across any categories. The Step 1 predictors included demographics, self-compassion, and self-acceptance. We then added the SCS in Step 2. As shown in Table 8, the addition of SCS significantly increased the amount of variance explained in flourishing, MIL, and positive affect. This was not true for negative affect, anxiety, depression, or life satisfaction.

4.3 | Discussion

Study 3 provided additional evidence of the psychometric strength of the SCS. Again, this suggests that these 12 items make up three factors (self-awareness, self-acceptance, and self-alignment) that represent the self-connection construct. However, more evidence is needed for the scalar invariance of the SCS across gender groups. The SCS also shared significant variance with all indicators of well-being and mental health. Of note, Study 3 provided initial support that this shared variance often goes beyond that of self-compassion and self-acceptance

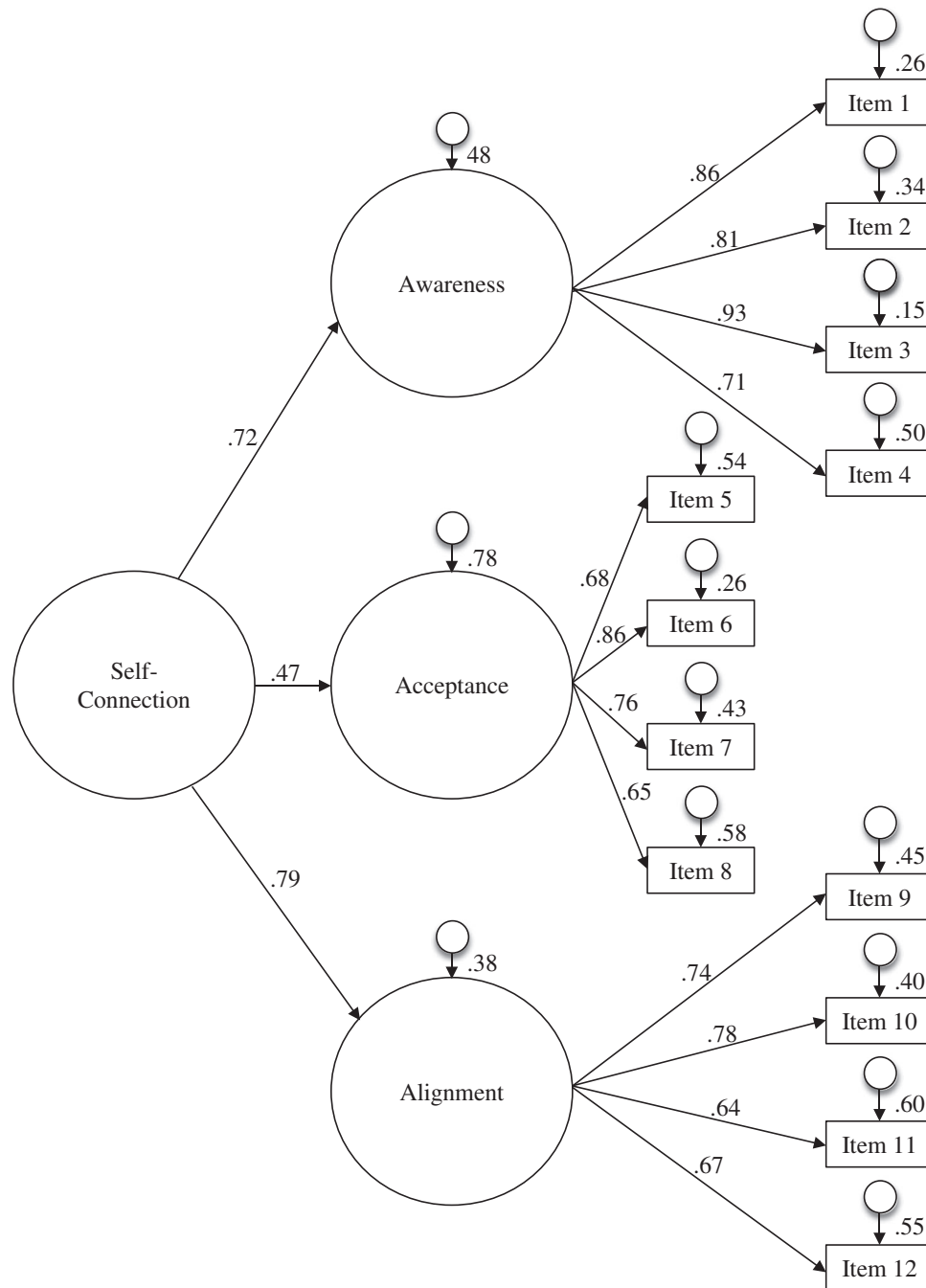


FIGURE 4 Study 3: Results of confirmatory factor analysis with standardized coefficients

but that the contribution of each is dependent on the indicator under consideration.

Examining the details of each model illuminates two possibilities. First, self-acceptance as measured in Ryff's Psychological Well-Being Scale appears to be acting almost as a proxy for life satisfaction and is highly correlated with it ($r = .80$). This led to non-significant relationships between both self-connection and self-compassion with life satisfaction in the hierarchical regression model. In fact, dropping Ryff's self-acceptance from the model resulted in a significant relationship between life satisfaction and self-compassion in Step 1 and a significant incremental effect of self-connection in Step 2. This pattern of results

is consistent with the intention of Ryff's self-acceptance subscale to be a direct measure of well-being. Second, although the SCS is correlated with negatively framed concepts, these appear to share the smallest amount of variance with the SCS. We discuss this more below.

5 | GENERAL DISCUSSION

Across three studies, we developed the 12-item Self-Connection Scale (SCS) and tested its relationship with measures of well-being. Across studies, the SCS demonstrated good psychometric properties and

TABLE 8 Study 3: Hierarchical regressions for self-connection scale predicting mental health and well-being

	ΔR^2	SS	MS	Df	F	p	b	β
Flourishing								
<i>Step 1</i>	.60			27	53.54	<.01		
Age		14.41	14.41	1	26.13	<.01	<.001	<.001
Education		35.76	5.11	7	9.27	<.01		
Income		58.59	9.76	6	17.71	<.01		
Race		27.44	3.43	8	6.22	<.01		
Gender		2.36	0.79	3	1.43	.23		
Self-Acceptance		625.60	625.60	1	1134.65	<.01	.67	.60
Self-Compassion		32.83	32.83	1	59.55	<.01	.31	.21
Residuals		530.41	0.55	226				
<i>Step 2</i>	.05*			28	63.53	<.01		
Age		14.41	14.41	1	29.74	<.01	-.002	-.02
Education		35.76	5.11	7	10.54	<.01		
Income		58.59	9.76	6	20.15	<.01		
Race		27.44	3.43	8	7.08	<.01		
Gender		2.36	0.79	3	1.63	.18		
Self-Acceptance		625.60	625.60	1	1291.26	<.01	.55	.49
Self-Compassion		32.83	32.83	1	67.76	<.01	.08	.06
Self-Connection		64.82	64.82	1	133.78	<.01	.45	.33
Residuals		465.59	0.48	961				
Presence of Meaning								
<i>Step 1</i>	.48			27	32.75	<.01		
Age		54.79	54.79	1	37.98	<.01	.006	.04
Education		68.57	9.80	7	6.79	<.01		
Income		104.55	17.43	6	12.08	<.01		
Race		42.85	5.36	8	3.71	<.01		
Gender		1.21	0.40	3	0.40	.84		
Self-Acceptance		947.34	947.34	1	656.67	<.01	.82	.52
Self-Compassion		56.50	56.50	1	39.17	<.01	.41	.19
Residuals		1387.81	1.44	962				
<i>Step 2</i>	.04			28	37.47	<.01		
Age		54.79	54.79	1	41.35	<.01	.003	.02
Education		68.57	9.80	7	7.39	<.01		
Income		104.55	17.43	6	13.15	<.01		
Race		42.85	5.36	8	4.04	<.01		
Gender		1.21	0.40	3	0.30	.82		
Self-Acceptance		947.34	947.34	1	714.90	<.01	.65	.41
Self-Compassion		56.50	56.50	1	42.64	<.01	.11	.05
Self-Connection		114.35	114.35	1	86.29	<.01	.60	.31
Residuals		1273.46	1.33	961				
Positive Affect								
<i>Step 1</i>	.36			27	20.17	<.01		
Age		14.01	14.01	1	28.83	<.01	.003	.05
Education		11.20	1.60	7	3.29	<.01		

(Continues)

TABLE 8 (Continued)

	ΔR^2	SS	MS	Df	F	p	b	β
Income		15.44	2.57	6	5.30	<.01		
Race		14.32	1.79	8	3.68	<.01		
Gender		8.52	2.84	3	5.84	<.01		
Self-Acceptance		173.12	173.12	1	356.28	<.01	.29	.35
Self-Compassion		28.03	28.03	1	57.68	<.01	.29	.26
Residuals		467.44	0.49	962				
Step 2	.03*			28	21.73	<.01		
Age		14.01	14.01	1	30.04	<.01	.002	.03
Education		11.20	1.60	7	3.43	<.01		
Income		15.44	2.57	6	5.52	<.01		
Race		14.32	1.79	8	3.84	<.01		
Gender		8.52	2.84	3	6.09	<.01		
Self-Acceptance		173.12	173.12	1	371.17	<.01	.22	.27
Self-Compassion		28.03	28.03	1	60.09	<.01	.16	.15
Self-Connection		19.21	19.21	1	41.19	<.01	.24	.24
Residuals		448.23	0.47	961				
Negative Affect								
Step 1	.34			27	18.13	<.01		
Age		23.19	23.19	1	46.95	<.01	-.007	-.10
Education		11.66	1.67	7	3.37	<.01		
Income		17.71	2.95	6	5.98	<.01		
Race		7.92	0.99	8	2.00	.04		
Gender		4.45	1.48	3	3.00	.03		
Self-Acceptance		142.01	142.01	1	287.43	<.01	-.24	-.29
Self-Compassion		34.90	34.90	1	70.63	<.01	-.32	-.30
Residuals		475.27	0.49	962				
Step 2	.00			28	17.52	<.01		
Age		23.19	23.19	1	46.95	<.01	-.007	-.10
Education		11.66	1.67	7	3.37	<.01		
Income		17.71	2.95	6	5.98	<.01		
Race		7.92	0.99	8	2.00	.04		
Gender		4.45	1.48	3	3.00	.03		
Self-Acceptance		142.01	142.01	1	287.43	<.01	-.23	-.27
Self-Compassion		34.90	34.90	1	70.63	<.01	-.30	-.28
Self-Connection		0.48	0.48	1	0.97	.32	-.04	-.04
Residuals		474.79	0.49	961				
Life Satisfaction								
Step 1	.68			27	64.37	<.01		
Age		3.52	3.52	1	4.30	.04	-.005	-.04
Education		156.44	22.35	7	27.26	<.01		
Income		207.85	34.64	6	42.26	<.01		
Race		26.94	3.37	8	4.10	<.01		
Gender		2.26	0.75	3	0.92	.43		
Self-Acceptance		1027.81	1027.81	1	1253.77	<.01	1.13	.75

(Continues)

TABLE 8 (Continued)

	ΔR^2	SS	MS	Df	F	p	b	β
Self-Compassion		0.01	0.01	1	0.01	.92	-.005	-.003
Residuals		682.05	0.82	832				
Step 2	.00			28	62.19	<.01		
Age		3.52	3.52	1	4.30	.04	-.006	-.05
Education		156.44	22.35	7	27.29	<.01		
Income		207.85	34.64	6	42.29	<.01		
Race		26.94	3.37	8	4.11	<.01		
Gender		2.26	0.75	3	0.92	.43		
Self-Acceptance		1027.81	1027.81	1	1254.86	<.01	1.11	.74
Self-Compassion		0.01	0.01	1	0.01	.92	-.04	-.02
Self-Connection		1.41	1.41	1	1.72	.19	.07	.04
Residuals		680.64	0.82	831				
Anxiety								
Step 1	.37			27	20.66	<.01		
Age		35.08	35.08	1	51.52	<.01	-.01	-.12
Education		15.19	2.17	7	3.19	<.01		
Income		44.77	7.46	6	10.96	<.01		
Race		17.56	2.19	8	3.22	<.01		
Gender		22.83	7.61	3	11.18	<.01		
Self-Acceptance		183.25	183.25	1	269.15	<.01	-.24	-.24
Self-Compassion		61.17	61.17	1	89.84	<.01	-.43	-.33
Residuals		654.99	0.68	962				
Step 2	.00			28	19.92	<.01		
Age		35.08	35.08	1	51.48	<.01	-.01	-.12
Education		15.19	2.17	7	3.19	<.01		
Income		44.77	7.46	6	10.95	<.01		
Race		17.56	2.19	8	3.22	<.01		
Gender		22.83	7.61	3	11.17	<.01		
Self-Acceptance		183.25	183.25	1	268.93	<.01	-.25	-.25
Self-Compassion		61.17	61.17	1	89.76	<.01	-.44	-.34
Self-Connection		0.16	0.16	1	0.23	.63	.02	.02
Residuals		654.83	0.68	961				
Depression								
Step 1	.42			27	25.52	<.01		
Age		23.01	23.01	1	40.78	<.01		
Education		27.37	3.91	7	6.93	<.01		
Income		37.08	6.18	6	10.95	<.01		
Race		10.63	1.33	8	2.35	.01		
Gender		8.09	2.70	3	4.78	<.01		
Self-Acceptance		251.49	251.49	1	445.68	<.01	-.38	-.40
Self-Compassion		31.15	31.15	1	55.20	<.01	-.31	-.25
Residuals		542.84	0.56	962				

(Continues)

TABLE 8 (Continued)

	ΔR^2	SS	MS	Df	F	p	b	β
Step 2	.00			28	24.80	<.01	-.01	-.07
Age		23.01	23.01	1	40.88	<.01		
Education		27.37	3.91	7	6.95	<.01		
Income		37.08	6.18	6	10.98	<.01		
Race		10.63	1.33	8	2.36	.01		
Gender		8.09	2.70	3	4.79	<.01		
Self-Acceptance		251.49	251.49	1	446.83	<.01	-.35	-.38
Self-Compassion		31.15	31.15	1	55.34	<.01	-.27	-.21
Self-Connection		1.96	1.96	1	3.48	.06	-.08	-.07
Residuals		540.88	0.56	961				

Note: Values represent analysis of deviance; All demographic variables were entered into the equation as categorical without collapsing across categories. * indicates a significant model improvement a $p < .01$.

associations with well-being measures. Study 1 provided evidence of convergent validity through relationships with conceptually related constructs, including mindfulness, authenticity, and self-concept clarity. At the same time, the SCS was clearly distinct from each of these measures, as they all shared less than 41% of the variance of SCS. Further, the SCS demonstrated unique relationships with eudaimonic well-being above and beyond these conceptually related constructs, supporting its incremental validity and highlighting its importance for understanding well-being.

In Study 2, we confirmed the factor structure of the scale, using a hierarchical confirmatory factor analysis. Through a combination of high factor loadings and good model fit, these results further supported the use of the full scale and its subscales. Study 2 also provided additional evidence of the convergent validity of the SCS, including associations between the SCS and several measures indicative of hedonic well-being and health. Further, combined with the data from Study 1, it demonstrated scalar invariance both between datasets and between gender categories.

In Study 3, we recruited a large online sample and again examined the SCS using confirmatory factor analysis. We were able to replicate the factor structure of the scale as a whole, along with its subscales. Further, we gathered more evidence of the convergent validity of the SCS with measures of both hedonic and eudaimonic well-being. We also found evidence for the SCS being distinct and demonstrating incremental validity beyond both self-compassion and self-acceptance. This is important as it suggests that this measure of self-connection adds something valuable to the literature and distinguishes self-connection from currently available concepts.

5.1 | Implications

Altogether, this research provides initial evidence for the value of the SCS for measuring self-connection and the potential relevance of self-connection in increasing health and well-being. Additionally, this research suggests that the subscales may provide useful tools to mea-

sure the individual components of self-connection either individually or combined into an aggregate self-connection scale. Based on initial evidence from this research, the SCS offers a valid and reliable measure for researchers to use in future investigations of self-connection.

Beyond providing a more content-valid assessment tool than the previous measure of self-connection, the current research extends existing knowledge by highlighting self-connection's relationship with multiple aspects of well-being (both hedonic and eudaimonic) as well as certain aspects of health. The current research is also the first to examine relationships between self-connection and theoretically similar constructs, including mindfulness, authenticity, self-concept clarity, self-compassion, and self-acceptance, and to demonstrate the incremental role of self-connection in predicting well-being and mental health. In all, these relationships underscore the relevance of self-connection to well-being and highlight the potential value of the SCS in future research and practice.

5.2 | Limitations and future directions

The first two studies were based on convenience samples of American MTurk workers completing self-report measures within cross-sectional research designs. The third study was larger but also used participants from an online sampling software (i.e., Prolific). Future research will need to examine whether these results replicate in other more demographically diverse samples and how broadly they can be generalized (e.g., Hendriks et al., 2019). In particular, future studies should focus on an examination of self-connection cross-culturally. The current samples were American samples with a mostly white population, and the relationships observed may or may not generalize to other samples and populations. For example, in cultures where there is less emphasis on oneself and more of a focus on one's group, being connected to one's group may be more predictive of well-being than self-connection. Given the differing relationships between well-being and other important outcomes, across cultures, future research will greatly clarify our understanding of self-connection in this way

(Okely et al., 2018). Of note, we found mixed support for scalar invariance across gender groups. Future researchers may want to keep this in mind when using the scale as well as further investigate this finding while examining other potential differences in self-connection based on demographic characteristics.

Additionally, future research should examine the SCS and its ability to predict positive as opposed to negative functioning. Consistent with past research demonstrating the unique relationships between positive and negative functioning, the SCS had only a weak inverse association with measures of negative functioning (Chang et al., 2004) and did not demonstrate incremental validity for negatively valenced measures of mental health and well-being. These results suggest a potentially stronger connection between self-connection and positive functioning, although the SCS did directly relate significantly to both negative and positive functioning. Thus, we cannot confidently assert that the SCS is better suited for increasing positive functioning versus decreasing negative functioning. Future research will need to investigate more fully how self-connection differentially relates to both positive and negative functioning. Researchers should also replicate previous studies on self-connection that used the single item measure while instead using the newly validated 12-item measure to better understand the nomological network of self-connection.

Employing longitudinal and experimental research designs will also increase confidence in the SCS. Longitudinal research will permit examination of the test-retest reliability of the SCS as well as a general understanding of the malleability of self-connection and the tendency for it to act as more of a trait, a state, or both (see McAdams & Pals, 2006). Experimental research should also investigate ways to manipulate self-connection, assessing the impact of various interventions on self-connection levels and the resulting well-being. Such interventions may be useful in improving societal well-being through clinically assisted efforts and governmental policy planning. Future investigations can also include behavioral and physiological measures to better understand the ways in which self-connection relates to habits and health.

6 | CONCLUSION

Self-connection is a new and promising construct that researchers have only begun to examine. Early research had yet to present and test a valid measure of self-connection. The present research produced the 12-item Self Connection Scale, with three subscales representing the three components of self-connection—self-awareness, self-acceptance, and self-alignment—and provided initial evidence of good psychometric properties. The scale was related to multiple important operationalizations of well-being and positive aspects of health. It also shared additional variance with these variances beyond related concepts. As such, it can be useful in future research and practice to better understand self-connection and greater well-being.

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The authors report no conflicts of interest.

ETHICS APPROVAL STATEMENT

The studies were approved by the IntegReview IRB.

DATA AVAILABILITY STATEMENT

The data is available upon request from the first author.

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APPENDIX

Self-Connection Scale (SCS)

Please select the response below that best describes you:

Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
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- I have a deep understanding of myself.
- It is easy for me to identify and understand how I am feeling in any given moment.
- I know myself well.
- I am often surprised by how little I understand myself.
- I try not to judge myself.
- When I find out things about myself that I don't necessarily like, I try to accept those things.
- Even when I don't like a feeling or belief that I have, I try to accept it as a part of myself.
- I can easily forgive myself for mistakes I have made.
- I find small ways to ensure that my life truly reflects the things that are important to me.
- I spend time making sure that I am acting in a way that is a reflection of my true self.
- I try to make sure that my actions are consistent with my values.
- I try to make sure that my relationships with other people reflect my values.

Question #4 should be reverse-scored

Awareness = 1–4; Acceptance = 5–8; Alignment = 9–12