Presence Scale Development: Psychometrics and Validity

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Abstract

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This Master's Thesis reports on the final three studies toward completing a scale to measure Presence, a newly identified construct. With conceptual links to Mindfulness, Flow, and Self-Transcendence, Presence is defined as the state of being in which conditioned thinking ceases, and the mind is open, aware, non-reactive, and still; and often a witness of itself. In this state, one can experience one's consciousness as expanding, and one's self as becoming part of something larger than the self. College students (N = 599) answered 35 potential Presence items on a 1 (*not at all*) to 7 (*completely*) rating scale. The items were rotated according to the Schmid-Leiman transformation to uncover its hierarchical structure. Presence was hypothesized to be a higher-order construct with five lower-order factors; however, results indicated that a hierarchical model with Presence, the higher-order factor, and three lower-order factors was preferable. This factor structure replicated in a subsequent round of data collection with a US nationally representative sample (N = 384). Thus, the model of Presence was revised such that the three lower-order factors were titled: Stillness of Mind, Present Moment Awareness, and Consciousness Beyond Self. The potential Presence items were shortened to 14 items through a series of Exploratory and Confirmatory Factor Analyses on both pilot datasets to evaluate item properties, such as cross-loadings, reliabilities, and model fit, in conjunction with theoretical considerations. A new nationally representative sample (N = 601) completed the 14 Presence items, and Confirmatory Factor

Analysis revealed that the Presence Scale exhibited strong psychometric properties and model fit. Validity analyses comparing Presence with theoretically related constructs were also examined and indicate that Presence is a novel contribution to psychology.

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Acknowledgements:

This thesis was developed through collaborative efforts as part of the 'Presence Project' and was co-generated with key collaborators Peter H. Kahn, Jr., Carly E. Gray, Oscar L. Olvera Astivia, and Gregory N. Bratman. Additional contributions were made by Carina Croitoru and Katie Navidi, and, in a supporting role, many assistants of the HINTS (Human Interaction with Nature and Technological Systems) Lab. The project was executed under the leadership and direction of Peter H. Kahn, Jr.

Presence Scale Development: Psychometrics and Validity

> "I arrived at the beach with my mom and felt somewhat stressed or anxious. Lots of people were there, and I felt somewhat overwhelmed. I got onto the bike and began bike riding on the bike path next to the beach. I felt instantly calm and at peace after I began biking. It was not a lulled peacefulness but rather a conscious and awareness of my surroundings combined with acceptance of my busy surroundings… I felt super connected to the earth and the positive and peaceful energy around me. It reminded me of the feeling I aspire to get during mindfulness meditation."
>
> – College Student Participant

This participant's state of being and feelings during their bike ride may not occur often, but they likely may be impactful and important for psychologists to study. What can this experience be best characterized as? Our research team would call this a *Presence* experience. Formally, we define Presence as follows:

> *Presence* is the state of being in which conditioned thinking ceases, and the mind is open, aware, non-reactive, and still; and often a witness of itself. In this state, one can experience one's consciousness as expanding, and one's self as becoming part of something larger than the self. Presence is the mind attuned. Subject, not object. Life-affirming.

Conceptualizing and measuring Presence matters: Presence is suspected to be a state of optimal being that may be a universal experience, cutting across time, tradition, and culture. It is a deep, life-affirming construct that may likely contribute to positive outcomes such as human well-being and flourishing. It is easy for many individuals to go through life though with their minds constantly churning. Or when the mind does feel calm and at peace, that experience can be fleeting given the plethora of distractions we can turn to and become absorbed by on our phones and technological devices. Thus, in this current age in which it can be challenging for individuals to slow down and just be, conceptualizing and creating a scale to measure Presence will allow researchers to better understand, articulate, and measure something we may perhaps not experience as often as we would like.

An Overview to the Phases of the Presence Scale Development Process

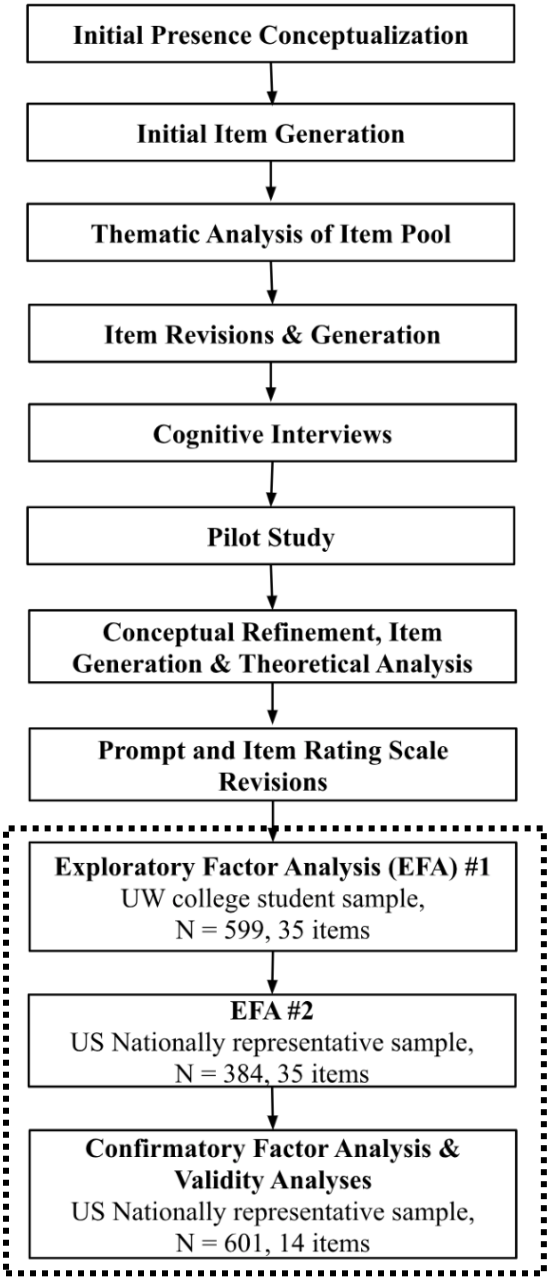
This Master's Thesis focuses on the completion of the Presence Scale development process. For the complete account of the intellectually co-generated Presence conceptual and scale development project, see the Presence Scale Technical Report (Sabine et al., in progress). To provide context, our research team's approach to developing the Presence Scale and how the work described in this Master's Thesis fits into this larger Presence conceptual and scale development project is outlined below.

We sought to conceptually develop Presence and create a Presence Scale following the best practices in scale development. Many papers introducing new scales include shortcuts to quickly produce a measure, which often do not advance the field (Carpenter, 2018). In fact, the use of scales with poor psychometric properties and with unclearly defined or misunderstood constructs can contribute to poor science as well as to the replication crisis (Flake, 2020). Thus, we sought to follow best practices whenever possible when developing the Presence Scale.

The diagram illustrated in Figure 1 depicts the steps taken to develop the Presence Scale, and the final three boxes below illustrate what is included in this Master's Thesis.

Figure 1

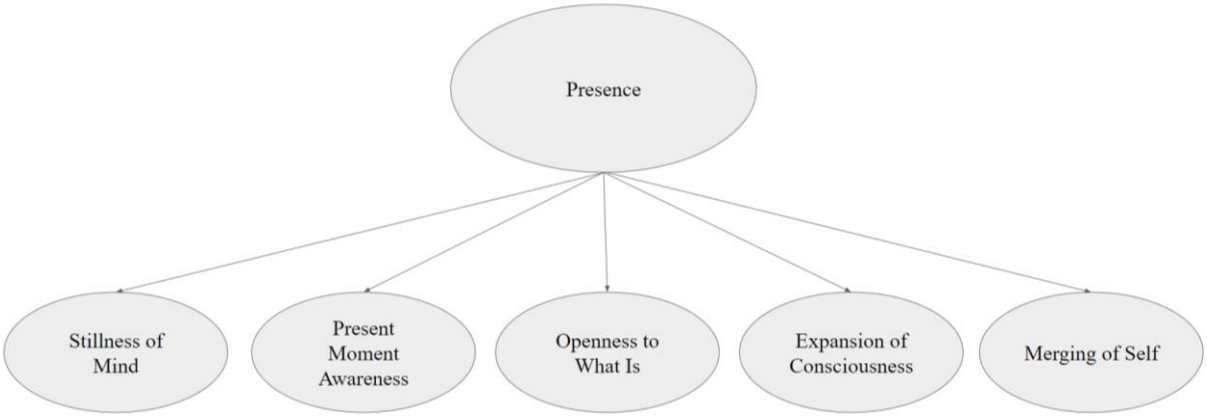
Stages of the Presence Scale Development Process



At this stage in the development of the Presence Scale prior to conducting Study 1, the "Exploratory Factor Analysis (EFA) #1" study listed in Figure 1, we hypothesized that Presence was a higher-order factor and contained five lower-order factors: *Stillness of Mind, Present Moment Awareness, Openness to What Is, Expansion of Consciousness* and *Merging of Self,* as shown in Figure 2.

Figure 2

Conceptual Model of the Hypothesized Five Factors of Presence



Stillness of Mind occurs when discursive thinking subsides and the mind is clear, calm, and settled. *Present Moment Awareness* occurs when there is awareness of the now, of the present moment, even if – or as – one is involved in activity. *Openness to What Is* occurs when one is open, receptive, and nonjudgmental toward what is happening. *Expansion of Consciousness* occurs when one's consciousness seems to expand beyond the confines of the body and mind. *Merging of Self* occurs when one experiences becoming One with another entity or realm.

Additionally, at this stage, three items were also included that were suspected to measure *Present Moment Immersion*, which occurs when one is immersed in and absorbed by the present moment. During the "Conceptual Refinement, Item Generation & Theoretical Analysis Stage" (See Figure 1), our research team theorized that many of the Present Moment Awareness items contained construct irrelevant variance and in fact may better be measuring Present Moment Immersion. Thus, we decided to keep three of these items and assess whether statistically these items would also separate from the Present Moment Awareness items in a factor analysis. Additionally, three *Present Moment-Related* contender items were also included that likely blended Present Moment Awareness and Present Moment Immersion, and we sought to assess how statistically these items would perform. For an in-depth explanation on Present

Moment Awareness vs Present Moment Immersion and on the five factors and their conceptual history, please see the Technical Report (Sabine et al., in preparation).

Table 1 provides a list of items administered in College Sample EFA organized by hypothesized factor.

Table 1

Presence Items Administered in College and Prolific EFA Samples

Item	*Item Label*
My mind felt like a calm, clear lake	ST 1
If you let a bucket of sandy water sit, the water becomes clear as the sand settles. It felt like my mind experienced something like that	ST 2
There were moments when my mind felt still	ST 3
My mind was free from inner dialogue	ST 4
My mind felt settled	ST 5
My whole being was involved in the moment.	PM.i1
Nothing seemed to exist outside of the present moment	PM.i2
I felt fully immersed in the moment.	PM.i3
Whatever I experienced brought me into the present moment	PM.1
I was simply in the now, not preoccupied with the past or future	PM.2
I wasn't thinking about what would happen next	PM.3
I sensed at the time that I was fully alive in that moment	PMA1
Even as I was immersed in the experience, there was a part of me that was aware of it	PMA2
I was immersed in the experienced without getting lost in it	PMA3
It was like I was aware of everything, moment by moment	PMA4
I was conscious of myself experiencing the moment	PMA5
I welcomed what was happening to me for what it was	OP1
My heart was open to the full experience	OP2
I found myself receptive to the experience as it unfolded	OP3
My lack of judgment toward the experience helped me be more open to it	OP4
I felt that I had opened up to a reality beyond my normal life	OP5
I felt that I had awakened to a reality different from my everyday experience	OP6
I accepted the reality of the experience for what it was	OP7
I felt a part of myself expanding outward	EXP1
My consciousness extended outward as if toward a horizon	EXP2
My consciousness expanded	EXP3
I felt limitless	EXP4
The core of my being radiated outward	EXP5
A part of me felt boundless	EXP6

I felt a deep sense of oneness	MER1
I became a part of something greater than myself	MER2
My sense of self faded as I became part of something greater	MER3
I seemed to merge with something beyond myself	MER4
I felt my self merging with everything, as though I were a wave that merged back into the ocean	MER5
I felt a part of it all	MER6

Note: ST= Stillness of Mind; PM.i = Present Moment Immersion; PM. = Present Moment-Related; PMA = Present Moment Awareness; OP = Openness to What Is; EXP = Expansion of Consciousness; MER = Merging of Self. Each item's label shown in column 2 are used throughout the Presence Scale development process.

An Overview of Hypothesized Relationships between Presence and Other Constructs

Many new constructs inadvertently are re-inventing older constructs with a new label, or inappropriate labels are used to describe what construct is being measured. These mistakes have been characterized as the Jingle-Jangle Fallacy, and it is imperative that researchers avoid committing this fallacy (Marsh, 1994). Thus, we sought to provide ample initial validity evidence for the newly identified construct of Presence.

Table 2 below outlines Presence's relationships with other constructs, along with definitions of these constructs. These hypotheses serve as the foundation of validity claims which add meaningful information to the validation process of Presence. For further conceptual discussion on the relationships between Presence and other related constructs, please see the Technical Report (Sabine et al., in preparation).

Table 2

Hypothesized Relationships Between Presence and Other Constructs

Construct	**Construct Definition**	**Hypothesized relationship to Presence**
Mindfulness	"Broadly conceptualized, mindfulness has been described as a non-elaborative, non-judgmental, present-centered awareness in which each thought, feeling, or sensation that arises in the attentional field is acknowledged and accepted as it is (Kabat-Zinn, 1990; Shapiro & Schwartz, 1999; Segal et al., 2002)" (p. 1447, Lau et al., 2006). Factor 1 – *Curiosity: "*reflect awareness of present moment experience with a quality of curiosity" (p. 1452). Factor 2 – *Decentering: "*emphasize awareness with some distance and disidentification rather than being carried away by one's thoughts and feelings and is conceptually similar to decentering as defined by Teasdale et al. (2002)" (p. 1452).	Mindfulness is hypothesized to have a positive relationship with Presence, but that Mindfulness is distinct from Presence.
Flow	"When in flow, a person becomes totally involved in an activity and experiences a number of positive experiential characteristics, including freedom from self-consciousness and great enjoyment of the process. Flow is an intrinsically enjoyable state and is accompanied by an order in consciousness whereby the person experiences clarity of goals and knowledge of performance, complete concentration, feelings of control, and feelings of being totally in tune with the performance." (p. 18, Jackson & Marsh, 1996).	Flow is hypothesized to have a positive relationship with Presence, but that Flow is distinct from Presence.
Ego-Dissolution	Ego-dissolution can be defined as a "disruption of ego boundaries, which results in the blurring of the distinction between self-representation and object-representation". This allows one to become whole with their surroundings. (pg. 2, Nour et al., 2016).	Ego-Dissolution is hypothesized to have a positive relationship with Presence, but that Ego-Dissolution is distinct from Presence.
Non-Dual Awareness	"A state of consciousness that rests in the background of all conscious experiencing -- a background field of awareness that is unified, immutable, and empty of mental content, yet retains a quality of cognizant bliss." (pg. 1625-1626, Hanley et al., 2018; paraphrased from Josipovic, 2014). Hanley et al., (2018) also propose Non-Dual Awareness having two components: Self-transcendence and bliss.	Non-Dual Awareness is hypothesized to have a positive relationship with Presence, but that Non-Dual Awareness is distinct from Presence.

Rumination	"Depressive rumination is a particularly maladaptive form of self-focus (Mor and Winquist 2002; Nolen-Hoeksema et al. 2008), which involves repetitively focusing attention on the causes and implications of one's negative mood (Nolen-Hoeksema 1991)" (p. 447, Marchetti et al., 2018).	Rumination is hypothesized to have a modest negative relationship with Presence. Presence is not simply the opposite of Rumination.
Self-Reflection	Self reflection is defined as "the inspection and evaluation of one's thoughts, feelings, and behavior" (Grant et al., 2002, p. 821).	It is hypothesized that there will be no relationship or very modest positive relationship between Self-Reflection and Presence.
Insight	Insight is defined as "the clarity of understanding of one's thoughts, feelings, and behavior" (Grant et al., 2002, p. 821).	It is hypothesized that there will be no relationship or very modest positive relationship between Insight and Presence.

Note. Some constructs, in particular Mindfulness, have been defined inconsistently (Altgassen et al., 2023). In this table, construct definitions are purposefully obtained and quoted from papers that developed scales on these measures that we administered.

In summary, Presence is hypothesized to be similar to but distinct from Mindfulness and Flow, as well as from Ego-Dissolution and Non-Dual Awareness both of which measure facets of Self-Transcendence. Additionally, it may be the case that Presence is a construct that draws upon and bridges together aspects of these constructs. Thus, for convergent validity we expected to see positive relationships between Presence and Mindfulness, Flow, Ego-Dissolution, and Non-Dual awareness.

We hypothesized to detect a slight negative relationship between Presence and Rumination as evidence of discriminant validity, as Presence is negatively related to but not the opposite of Rumination.

Lastly, we examined validity claims relating to Presence, Self-Reflection, and Insight. Some individuals might challenge whether it would be appropriate to administer the Presence Scale to individuals with low or below average levels of Self-Reflection or Insight. They might wonder if higher levels of Self-Reflection or Insight are necessary to be able to endorse items on the Presence Scale. As Presence does require awareness. It is also possible that some critics might speculate that Presence can be experienced only by those with relatively high levels of Self-Reflection or Insight. Thus, as part of the Presence validation work, the relationship between Presence and Self-Reflection and Insight was

examined. We hypothesized that greater Self-Reflection and Insight is not necessary to experiencing and reporting greater Presence.

EFA Study 1: College Sample

Method

Participants

Six hundred thirty-nine college students 18–65 years old (M = 19.79, SD = 2.99) participated in this study in May through September of 2022. Fifty-eight participants were omitted due to failing at least two or more (of four) attention checks, not completing the full survey, being suspected duplicate responses, or reporting an age below 18 even though the consent explicitly stated that one needed to be at least 18 years old to participate. The remaining 599 participant responses were used in the subsequent analyses. 71.95% of participants identified as female, 22.54% identified as male, 4.51% identified as non-binary, and 2.00% selected 'prefer not to respond' or 'other'. A range of racial and ethnic identities were represented in this sample: 37.90% Asian, 33.39% White, 14.52% multiple races, 6.34% Hispanic or Latino/a/x, 2.17% Black or African American, 0.33% Native American, American Indian, or Alaskan Native, 0.17% Native Hawaiian or Pacific Islander, and 4.34% selected 'prefer not to say' or 'other'.

Procedure

The protocols for the Presence Scale development research (IRB: STUDY00012489) were deemed exempt from oversight by the University of Washington Human Subjects Division on February 9, 2021.

All participants were affiliated with the University of Washington. Some participants (N = 95) were recruited from Introductory Psychology courses and their participation counted toward extra credit. The remaining participants (N = 504) were either current undergraduate students, new students who were about to start their first-year of college, or recent college graduates who participated within 3 months of graduating. Students were recruited via email invitations, course announcements, tabling, or through viewing advertisements in school newspapers, newsletters, posters, and flyers. They were informed that

they could enter a raffle for a chance to win one of 48 $5 ice cream gift cards, three $20 Amazon gift cards, or a $100 Amazon gift card for completing this one-time online survey.

After providing their informed consent, participants read the following prompt:

> "Think back to an experience you've had, fairly recently, that resonates with any or all of the statements in the bulleted list below. Your experience may have been brief or may have lasted a longer period of time. During your experience, your body may or may not have been active.
>
> - You felt receptive and alive to the here-and-now.
> - You weren't thinking about the past or worrying about the future.
> - Your mind felt peaceful even while highly aware of what was going on.
> - You experienced a sense of freedom.
> - A part of your mind was aware of you in the experience, and not judging any of it.
> - You felt a connection to – or even part of – a larger existence."

Participants were told that the rest of the survey would be asking questions about the experience they chose. To continue, participants had to select the response, "Yes, I have an experience in mind."

On the next page, participants viewed the prompt again and were instructed to answer several qualitative questions on what led up to their experience, what occurred during their experience, and how they felt during their experience. They also indicated how long their experience lasted and how recently it occurred.

Participants were then asked to "please indicate the extent to which each statement below describes your experience" on a 7-point rating scale with the following points: *not at all, very slightly, a little, moderately, quite a bit, very much*, and *completely*. The 35 items were randomly displayed on six different pages, and this order was randomized across participants. Additionally, an attention check item was included among the Presence items asking participants to select a certain response option.

Then, participants answered brief questions on whether they understood the prompt and whether they were able to keep their experience in mind while responding to the survey questions. The Qualtrics

survey then re-displayed their written descriptions of their experience, and they were told to keep their experience in mind when completing these additional questions. The constructs measured were as follows:

Toronto Mindfulness Scale (TMS, Lau et al., 2006). Participants rated 13 state Mindfulness items on a scale from 1 (*not at all*) to 5 (*very much*). Mindfulness was measured as a two-factor model including Curiosity (e.g., "I was curious to see what my mind was up to from moment to moment.") and Decentering (e.g., "I experienced myself as separate from my changing thoughts and feelings."). For the full scale, see Appendix A. Additionally, an attention check item was included among the other mindfulness items the asking participants to select a certain response option.

Flow State Scale (FSS, Jackson & Marsh, 1996). Participants rated 32 Flow items on a 5-point Likert Scale from 1 (S*trongly disagree*) to 5 (*Strongly agree*) to indicate the extent they experienced each item, such that higher responses indicate a greater degree of Flow. This scale included eight factors: Challenge-skill balance (e.g. "My abilities matched the high challenge of the situation."), Action-awareness merging (e.g. "Things just seemed to be happening automatically."), Clear goals (e.g. "I had a strong sense of what I wanted to do."), Unambiguous feedback (e.g. "It was really clear to me that I was doing well."), Concentration on task at hand (e.g. "I had total concentration."), Paradox of control (e.g. "I felt in total control of what I was doing."), Loss of self-consciousness (e.g. "I was not concerned with how I was presenting myself."), Transformation of time (e.g. "The way time passed seemed to be different from normal."), and Autotelic experience (e.g. "The experience left me feeling great."). For the full scale, see Appendix B. Additionally, an attention check item was included among the flow items asking participants to select a certain response option.

Ego-Dissolution Inventory (EDI, Nour et al., 2016). Ego-dissolution describes a loss of one's sense of self, which Yaden et al. (2017) categorize as a form of self-transcendence. Participants rated the extent they experienced 8 items on a 0 to 100 slider scale. Only the endpoints were labeled with "*No, not more than usually*" (0) and "*Yes, I experienced this completely/entirely*" (100). Items included "I experienced a dissolution of my "self" or ego." and "All notion of self and identity dissolved away." The

Ego-Dissolution Inventory was validated in the context of psychedelic experiences; however, it has been administered with non-psychedelic samples (e.g., Martial et al., 2021). For the full scale, see Appendix C.

Participants who were receiving psychology course credit (N = 95) also completed four additional measures: Non-Dual Awareness, Rumination, Self-Reflection and Insight, and The Big-5 Personality Inventory.

Non-Dual Awareness (NDA, Hanley et al., 2018). Participants completed the short Non-Dual Awareness state scale which contained the following three questions: “I experienced all things seeming to unify into a single whole”; “I felt surrounded and filled with a blissful warmth or energy”; and “I experienced all sense of self and identity dissolve away.” Participants indicated how well these statements described what they experienced on a 10-point scale in which only item anchors (*Not at all*) and (*Very much*) were labeled. The short Non-Dual Awareness state scale was chosen specifically because the full NDA scale measured trait Non-Dual Awareness, and for the purposes of the Presence validation work it was essential to measure state Non-Dual Awareness. For the full scale, see Appendix D.

Brief State Rumination Inventory (BSRI, Marchetti et al., 2018). Participants thought back to how they thought or felt during their experience and indicated their agreement with 8 items on a 0 (*completely disagree*) to 100 (*completely agree*) slider scale. Marchetti et al. (2018) originally validated the scale with the phrase “Right now” at the start of each item; however, in the current study it was critical to uncover how much participants were ruminating at the time of their experience, not at the current moment of completing the survey. Thus, the phrase “Right now” was eliminated from all items and items were changed to past tense. For example, the original item “Right now, it is hard for me to shut off negative thoughts about myself” was revised to “It was hard for me to shut off negative thoughts about myself.” Other studies have also adapted the BSRI such as omitting the phrase “Right now” changing the tense of the items (Muir et al., 2023). For the full scale, see Appendix E.

Next, participants were informed that they would be asked a series of questions on how they generally feel and were then presented with the Self-Reflection and Insight Scale as well as the Big Five Inventory.

Self-Reflection and Insight Scale (SRIS, Grant et al., 2002). This 2-factor scale contains 12 items measuring self-reflection (e.g., “I frequently take time to reflect on my thoughts”) and 8 items measuring insight (e.g., “I usually know why I feel the way I do”), with over half of the insight items requiring reverse-scoring (e.g., I’m often confused about the way that I really feel about things”). Participants rated all items on a 6-point rating scale from 1 (*strongly disagree*) to 6 (*strongly agree*). For the full scale, see Appendix F.

Big Five Inventory (BFI, John et al., 1991). Participants were presented with 44 items describing personality characteristics and indicated the extent to which they agreed or disagreed with the statements using a five-point agreement scale. This instrument contains five factors: Agreeableness (e.g., “Is helpful and not selfish with others”), Conscientiousness (e.g., “Makes plans and sticks to them”), Extraversion (e.g., “Talks a lot”), Neuroticism (e.g., “Gets nervous easily”), and Openness to Experience (e.g., “Is curious about a lot of different things”). Many items (e.g., “Prefers work that is routine”) were reverse-scored. For the full scale, see Appendix G.

Lastly, all participants answered demographic questions. Introductory psychology students received course credit and other students had the option to enter the raffle.

Results

Part 1: Exploratory Factor Analyses

The potential Presence items were analyzed in R using version 4.2.1 using the *psych* and *lavaan* packages (R Core Team, 2019; Rosseel, 2012; Revelle, 2023). Each items’ response distribution was assessed and the mean skew was -0.58.

Before conducting factor analyses on all the items together, the dimensionality of the items that were hypothesized to be in each lower-order factor were assessed. This in conjunction with running EFAs on the lower-order factors uncovers how many underlying latent variables were contained in each of the hypothesized five factors. It was hypothesized that each of these tests would indicate one factor lay beneath each of the five groups. All parallel analysis dimensionality tests used Pearson correlations. These

dimensionality tests then informed subsequent EFAs, all of which used Minres, that were conducted on each of the factors. Oblique rotation was used when models included more than one factor.

For the five hypothesized Stillness of Mind items, parallel analysis and sum of eigenvalues greater than one both indicated a one-factor solution. A one-factor model was fitted to the Stillness of Mind items and explained 43.8% of the variance.

In addition to the Present Moment Awareness items, items that we suspected would measure Present Moment Immersion as well as Present Moment-Related items conceptually in between Present Moment Immersion and Present Moment Awareness were included. After spending time conceptually making this distinction (See Technical Report), we sought to examine whether these items would also differentiate empirically. If so, then our intention was to keep only the Present Moment Awareness items.

Parallel analysis and sum of eigenvalues greater than one on the 11 Present Moment Awareness, Present Moment Immersion, and Present Moment-Related items suggested a two-factor solution. The two-factor EFA indicated that all five of the Present Moment Awareness items loaded on a single factor. The other factor was composed of most of the other items, and two items cross loaded onto both factors. The conceptual proposition that Present Moment Awareness is different from being immersed in the present moment was supported by empirical evidence, thus providing motivation to keep only the five Present Moment Awareness items. A one-factor model was fitted to the five Present Moment Awareness items explained 33.6% of the variance.

For the seven hypothesized Openness to What Is items, results from both parallel analysis and sum of eigenvalues greater than one indicated a two-factor solution. Upon examining the factor loadings from a two-factor EFA, OP1–OP4 and OP7 were loading onto one factor, whereas OP5 and OP6 were separating out into their own factor. Upon examining correlations of all the items, OP5 and OP6 had stronger correlations with the items in the Expansion of Consciousness and Merging of Consciousness factors than with the other items within the Openness to What Is factor. Thus, there was clear evidence to omit OP5 and OP6. Parallel analysis and sum of eigenvalues greater than one suggested that a one-factor

solution should be retained for the five remaining Openness to What Is items. A one-factor model that was fitted to the five Openness to What Is items explained 42.8% of the variance.

Dimensionality tests on the Expansion of Consciousness items and Merging of Self items separately each indicated one-factor solution. However, upon examining the moderately high correlations between Expansion of Consciousness items and Merging of Self items, it was worth investigating the dimensionality of all of these items. Parallel analysis and sum of eigenvalues greater than one both indicated a one-factor solution for these 12 items. A one-factor model was fitted to the 12 Expansion of Consciousness items and Merging of Self items explained 50.8% of the variance.

Correlations across the items were also assessed and shown in the Tables 3-5 below:

Table 3

Means, Standard Deviations, and Correlations of the Stillness of Mind Items: College EFA Sample

Item	*Item ID*	*M*	*SD*	1.	2.	3.	4.	5.
1. My mind felt like a calm, clear lake	ST 1	5.00	1.69	1	--			
2. If you let a bucket of sandy water sit, the water becomes clear as the sand settles. It felt like my mind experienced something like that	ST 2	4.36	1.78	.48	1	--		
3. There were moments when my mind felt still	ST 3	4.78	1.72	.51	.45	1	--	
4. My mind was free from inner dialogue	ST 4	4.62	1.79	.38	.25	.33	1	--
5. My mind felt settled	ST 5	5.34	1.49	.57	.40	.52	.34	1

Note. $N = 599$. *M* and *SD* are used to represent mean and standard deviation, respectively. All inter-item correlations were significant, below $p = .05$.

Table 4

Means, Standard Deviations, and Correlations of the Present Moment Awareness and Openness to What Is Items: College EFA Sample

Item	*Item ID*	*M*	*SD*	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1. I sensed at the time that I was fully alive in that moment	PMA1	5.75	1.36	1	--								
2. Even as I was immersed in the experience, there was a part of me that was aware of it	PMA2	5.32	1.40	.31	1	--							
3. I was immersed in the experienced without getting lost in it	PMA3	5.32	1.42	.24	.32	1	--						
4. It was like I was aware of everything, moment by moment	PMA4	5.03	1.59	.42	.27	.27	1	--					
5. I was conscious of myself experiencing the moment	PMA5	5.54	1.42	.37	.49	.29	.33	1	--				
6. I welcomed what was happening to me for what it was	OP1	5.93	1.16	.38	.27	.26	.26	.27	1	--			
7. My heart was open to the full experience	OP2	5.87	1.27	.55	.34	.35	.42	.37	.52	1	--		
8. I found myself receptive to the experience as it unfolded	OP3	5.60	1.23	.36	.34	.32	.35	.32	.46	.50	1	--	
9. My lack of judgment toward the experience helped me be open to it	OP4	4.79	1.75	.27	.22	.17	.27	.23	.28	.32	.31	1	--
10. I accepted the reality of the experience for what it was	OP7	5.77	1.22	.38	.23	.31	.35	.35	.47	.46	.42	.31	1

Note. $N = 599$. *M* and *SD* are used to represent mean and standard deviation, respectively. All inter-item correlations were significant, below $p = .05$.

Table 5

Means, Standard Deviations, and Correlations of the Expansion of Consciousness and Merging of Self Items: College EFA Sample

Item	Item ID	M	SD	1	2	3	4	5	6	7	8	9	10	11	12
1. I felt a part of myself expanding outward	EXP1	4.27	1.85	1	--										
2. My consciousness extended outward as if toward a horizon	EXP2	3.99	1.85	.67	1	--									
3. My consciousness expanded	EXP3	4.25	1.81	.63	.68	1	--								
4. I felt limitless	EXP4	4.55	1.85	.49	.48	.49	1	--							
5. The core of my being radiated outward	EXP5	4.09	1.91	.62	.63	.58	.50	1	--						
6. A part of me felt boundless	EXP6	4.92	1.67	.48	.45	.44	.64	.46	1	--					
7. I felt a deep sense of oneness	MER1	4.67	1.76	.46	.55	.50	.39	.45	.44	1	--				
8. I became a part of something greater than myself	MER2	4.18	1.94	.55	.57	.56	.45	.52	.48	.43	1	--			
9. My sense of self faded as I became part of something greater	MER3	3.67	1.93	.51	.55	.48	.40	.48	.40	.39	.59	1	--		
10. I seemed to merge with something beyond myself	MER4	3.99	1.99	.61	.63	.61	.45	.58	.46	.46	.69	.61	1	--	
11. I felt my self merging with everything, as though I were a wave that merged back into the ocean	MER5	4.05	1.94	.58	.62	.58	.42	.51	.42	.47	.54	.51	.62	1	--
12. I felt a part of it all	MER 6	5.31	1.55	.42	.39	.36	.42	.43	.37	.37	.44	.33	.39	.39	1

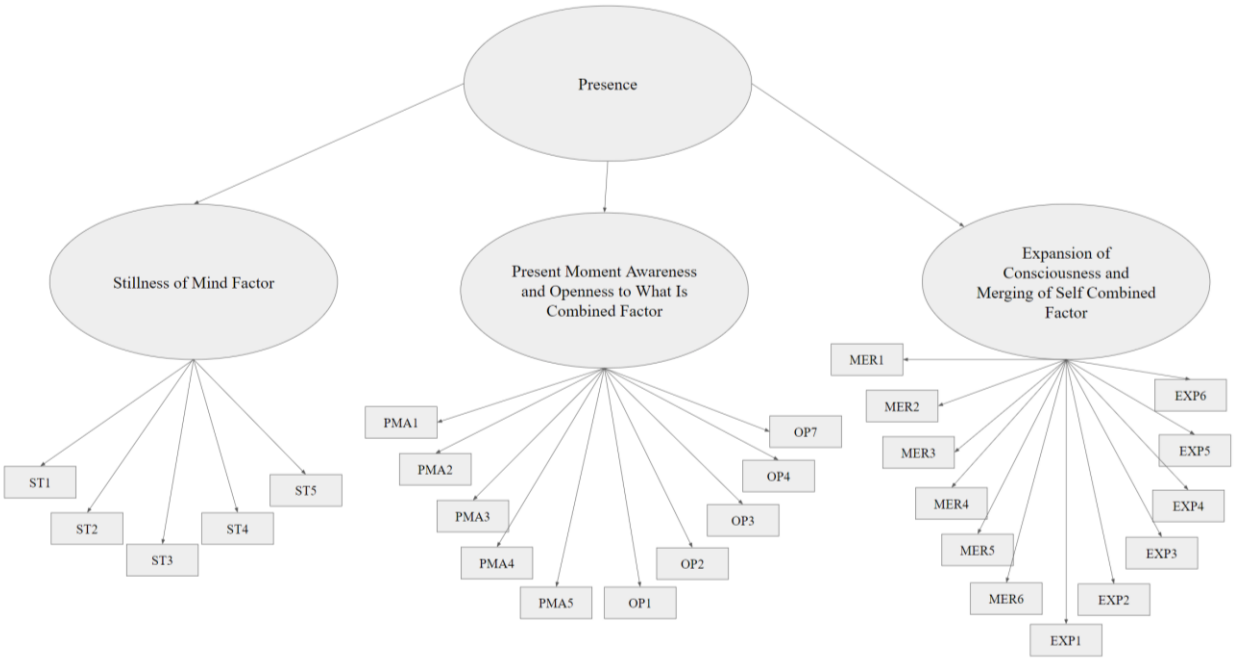
Note. $N = 599$. *M* and *SD* are used to represent mean and standard deviation, respectively. All inter-item correlations were significant, below $p = .05$.

At this stage, the full model of Presence could be tested. Exploratory factor analyses using the Schmid-Leiman rotation (Schmid & Leiman, 1957) were conducted on most of the items, excluding items OP5 and OP6. Of the potential Present Moment contenders, only the five Present Moment Awareness

items were included as immersion had separated out from awareness empirically. Among these 27 items, a hierarchical three-factor model appeared to be most promising, as conceptually shown in Figure 3.

Figure 3

Hierarchical Three-Factor Model of Presence with 27 Potential Presence Items



54% of the variance in the items could be attributed to the hierarchical factor, or Presence. The items exhibited strong reliability: Cronbach's alpha = 0.93; Omega Total = 0.94. See Table 6 below for loading results from this exploratory factor analysis.

Other models were also explored using exploratory factor analysis, and the hierarchical three-factor solution had the cleanest results.

Table 6

Item Loadings for College Sample EFA Results

Item	Factor loading			Presence
	1	2	3	g*
Factor with ST items				**0.59**
1. My mind felt like a calm, clear lake	0.06	-0.01	**0.76**	
2. If you let a bucket of sandy water sit, the water becomes clear as the sand settles. It felt like my mind experienced something like that	0.29	0.03	**0.45**	
3. There were moments when my mind felt still	0.12	-0.05	**0.66**	
4. My mind was free from inner dialogue	0.11	0.02	**0.40**	
5. My mind felt settled	-0.12	0.21	**0.69**	
Factor with PMA & OP items				**0.71**
1. I sensed at the time that I was fully alive in that moment	0.14	**0.55**	0.05	
2. Even as I was immersed in the experience, there was a part of me that was aware of it	0.00	**0.53**	-0.05	
3. I was immersed in the experienced without getting lost in it	-0.09	**0.47**	0.11	
4. It was like I was aware of everything, moment by moment	0.20	**0.37**	0.15	
5. I was conscious of myself experiencing the moment	0.03	**0.54**	-0.03	
6. I welcomed what was happening to me for what it was	-0.08	**0.64**	0.04	
7. My heart was open to the full experience	0.02	**0.75**	0.00	
8. I found myself receptive to the experience as it unfolded	0.00	**0.62**	0.09	
9. My lack of judgment toward the experience helped me be open to it	0.13	**0.30**	0.13	
10. I accepted the reality of the experience for what it was	-0.02	**0.60**	0.08	
Factor with EXP & MER items				**0.73**
1. I felt a part of myself expanding outward	**0.79**	0.01	-0.01	
2. My consciousness extended outward as if toward a horizon	**0.82**	-0.05	0.07	
3. My consciousness expanded	**0.77**	-0.06	0.09	
4. I felt limitless	**0.49**	0.24	0.02	
5. The core of my being radiated outward	**0.66**	0.12	0.02	
6. A part of me felt boundless	**0.44**	0.24	0.09	
7. I felt a deep sense of oneness	**0.44**	0.13	0.22	
8. I became a part of something greater than myself	**0.75**	0.14	-0.17	
9. My sense of self faded as I became part of something greater	**0.70**	-0.07	0.06	
10. I seemed to merge with something beyond myself	**0.82**	0.03	-0.07	
11. I felt my self merging with everything, as though I were a wave that merged back into the ocean	**0.69**	-0.03	0.13	

12. I felt a part of it all	0.27	**0.53**	-0.07

Note. * these g loadings pertain to the higher loading for the Presence high-order factor. Factor loadings above 0.3 are in bold. The numbers next to each item are listed to indicate the number of items in each factor, not the item ID number.

Part 2: Exploratory Validity Findings

As a preliminary step to assess the relationship between Presence and constructs hypothesized to be relevant as shown in Table 2, correlations between the Presence items and items in previously validated scales were assessed. In this sample, 35 Presence items were administered, but over half of these would be cut for the final Presence Scale. Thus, at this stage in the Presence Scale development process, examining item correlations was a viable approach to initially empirically assessing validity since Presence scores could not yet be calculated. Given the large number of items, figures visualizing the correlation matrices between items were examined.

Each figure includes items from two scales: the potential Presence items as well as items from a previously validated scale. The upper left-hand segment of all these visualizations illustrates the potential Presence items' correlations with each other. The upper right-hand and the lower left-hand sections illustrate the correlations between the potential Presence items and items from the other construct assessed. The lower right-hand segment depicts item correlations among items within the other construct.

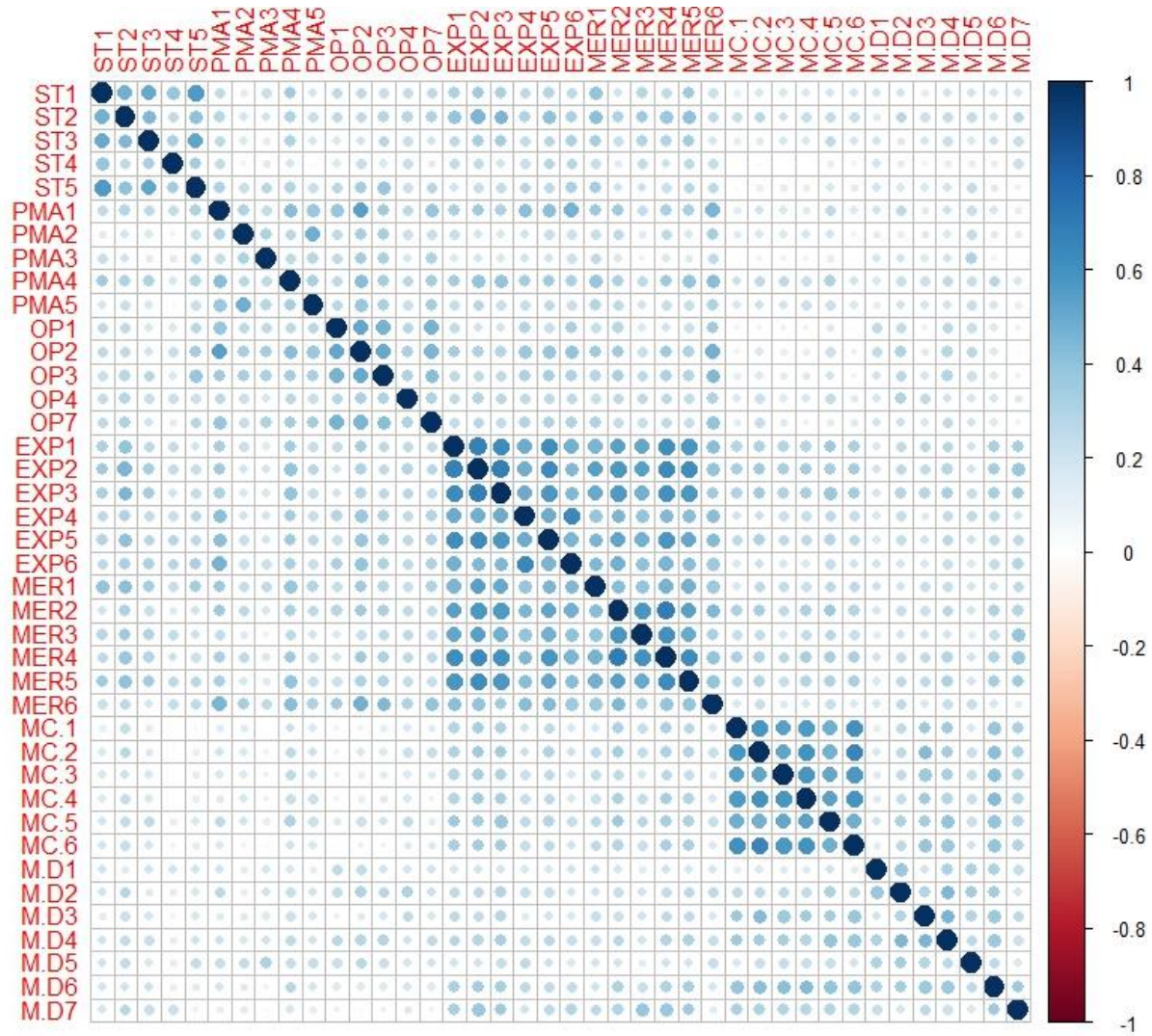
In the visualizations, item correlations are visualized with dots that range from blue (positive) to red (negative) with white indicating no correlation. The darker the shade of blue or red, the greater the magnitude of the correlation.

Although all 599 participants completed the potential Presence Scale items, not all participants answered all of the items from the other scales. Upon examining all the items administered from other scales: 9.5% (N = 57) skipped one or more items; 6.5% (N = 39) skipped 2 or more items; and 0.5% (N = 3) skipped 10 or more items. If participants did skip items, they were most likely in the Ego-Dissolution Inventory. For the following correlation calculations and visualizations, missing data is accounted for by pairwise deletion.

The visualizations are shown in Figures 4–14. These visualizations were created in R version 4.2.1 1 using the *corrplot* package (Wei & Simko, 2021). Note that Figures 7–14 were created with a subset of 95 participants who completed these measures; thus, readers should interpret these results with caution given the smaller sample size.

Figure 4

Correlation Plot of Potential Presence Items and Mindfulness Items

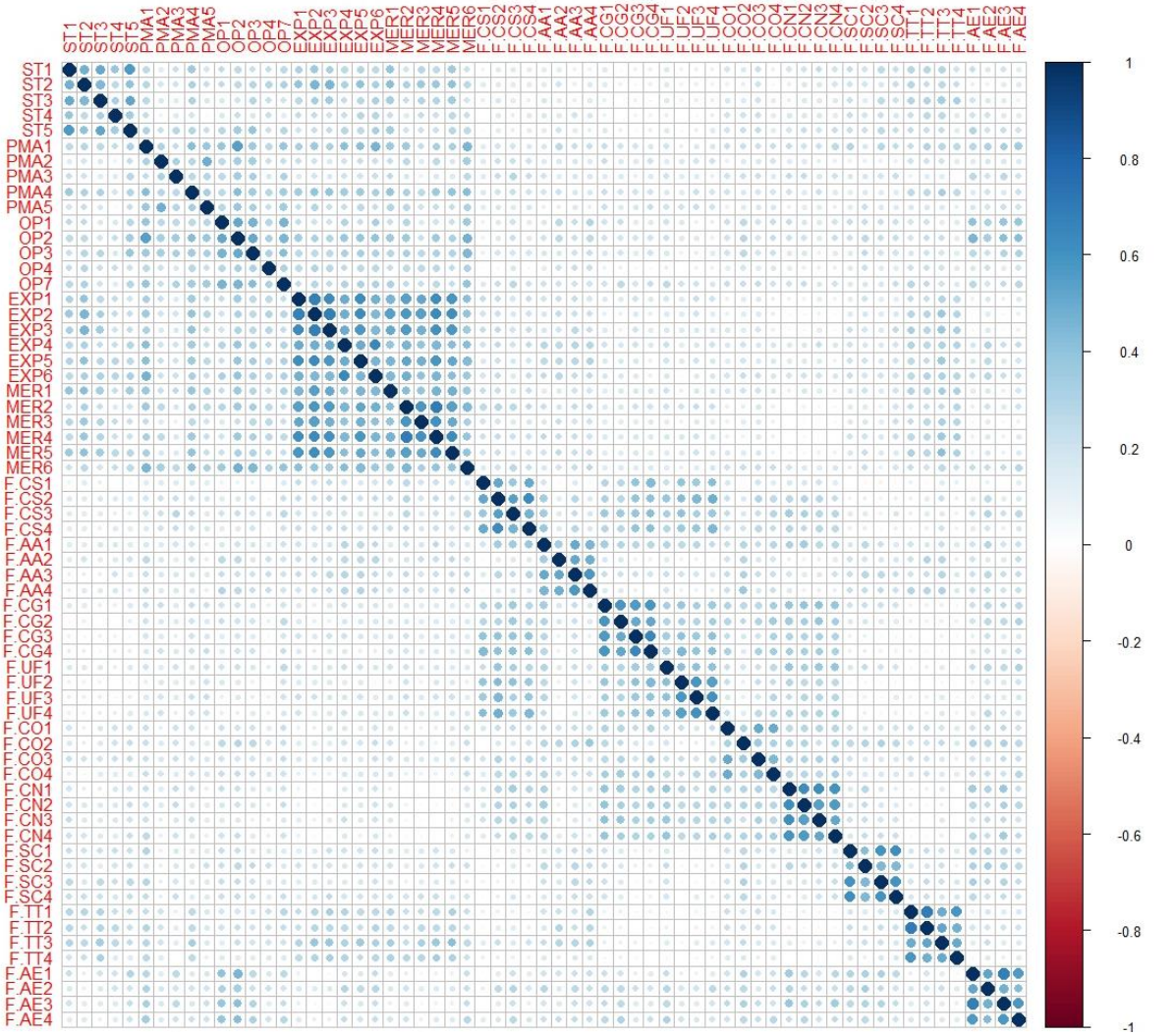


Note. N = 599. The potential Presence items span from ST to MER. ST = Stillness of Mind, PMA = Present Moment Awareness, OP = Openness to What Is, EXP = Expansion of Consciousness, and MER = Merging of Self. The Mindfulness items include MC. = Curiosity and M.D = Decentering.

This figure illustrates that the potential Presence items are more strongly correlated with one another than they are with the Mindfulness items. Additionally, the Decentering Mindfulness items are not as strongly correlated with one another as the Curiosity Mindfulness items are with one another. Overall, the potential Presence items' correlations with the Mindfulness items range from no correlation to moderate positive correlations. On average, the potential Presence items exhibited modest positive correlations with the Mindfulness items.

Figure 5

Correlation Plot of Potential Presence Items and Flow Items



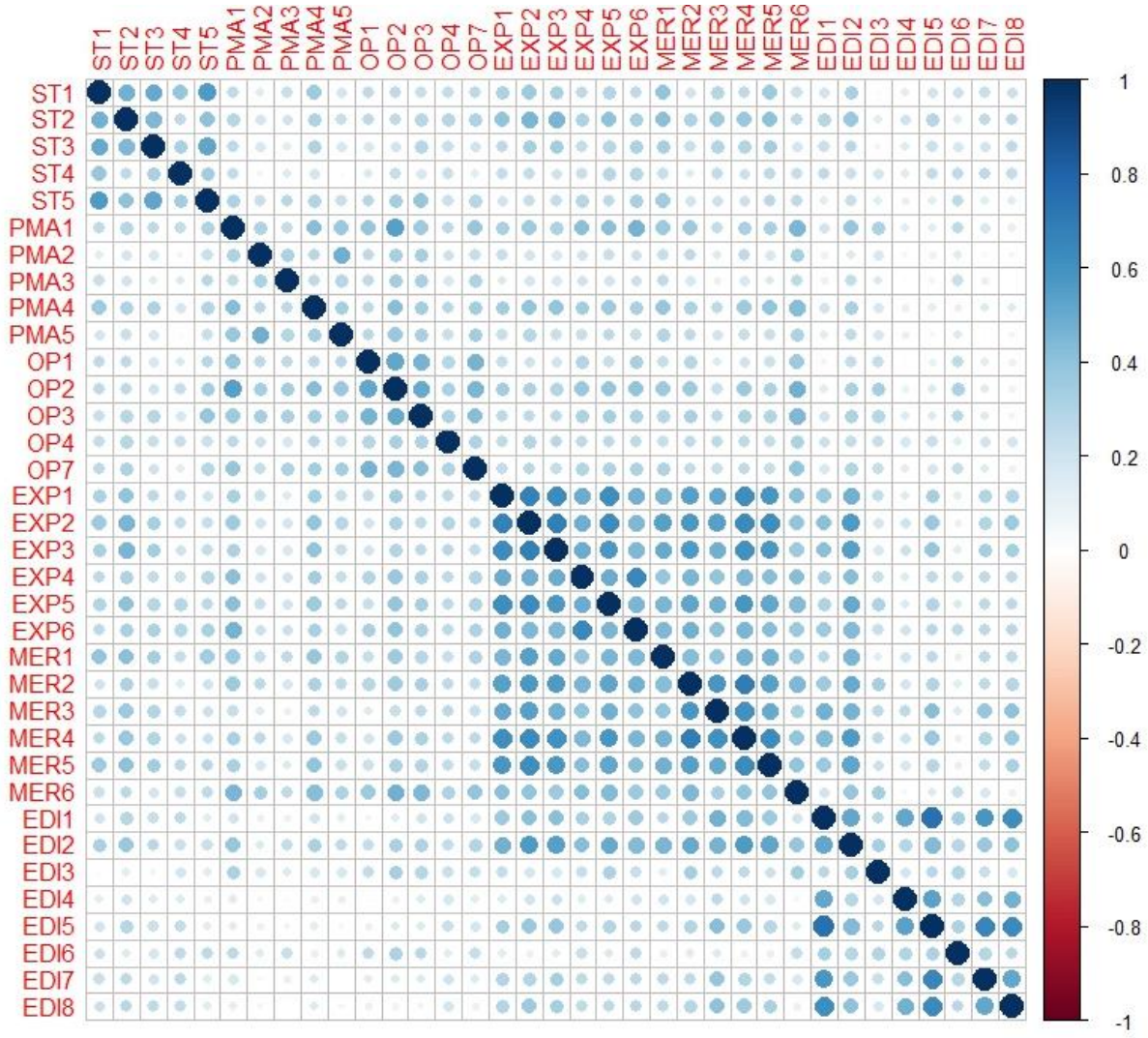
Note. N = 599. The potential Presence items span from ST to MER. ST = Stillness of Mind, PMA = Present Moment Awareness, OP = Openness to What Is, EXP = Expansion of Consciousness, and MER = Merging of Self. The Flow factor labels are as follows: F.CS = Challenge-Skill Balance, F.AA = Action-Awareness Merging, F.CG = Clear Goals, F.UF = Unambiguous Feedback, F.CO = Concentration on Task at Hand, F. CN = Paradox of Control, F.SC = Loss of Self-Consciousness, F.TT = Transformation of Time, F.AE = Autotelic Experience.

There is a small positive correlation between the potential Presence and Flow items. As expected, Presence items are more correlated with each other than with the Flow items. The Transformation of Time Flow items appear to be slightly more correlated with the Expansion of Consciousness and Merging of Self potential items. Additionally, the Autotelic Experience items appear to more correlated with OP1 “I

welcomed what was happening to me for what it was" and OP2 "My heart was open to the full experience".

Figure 6

Correlation Plot of Potential Presence Items and Ego-Dissolution Items

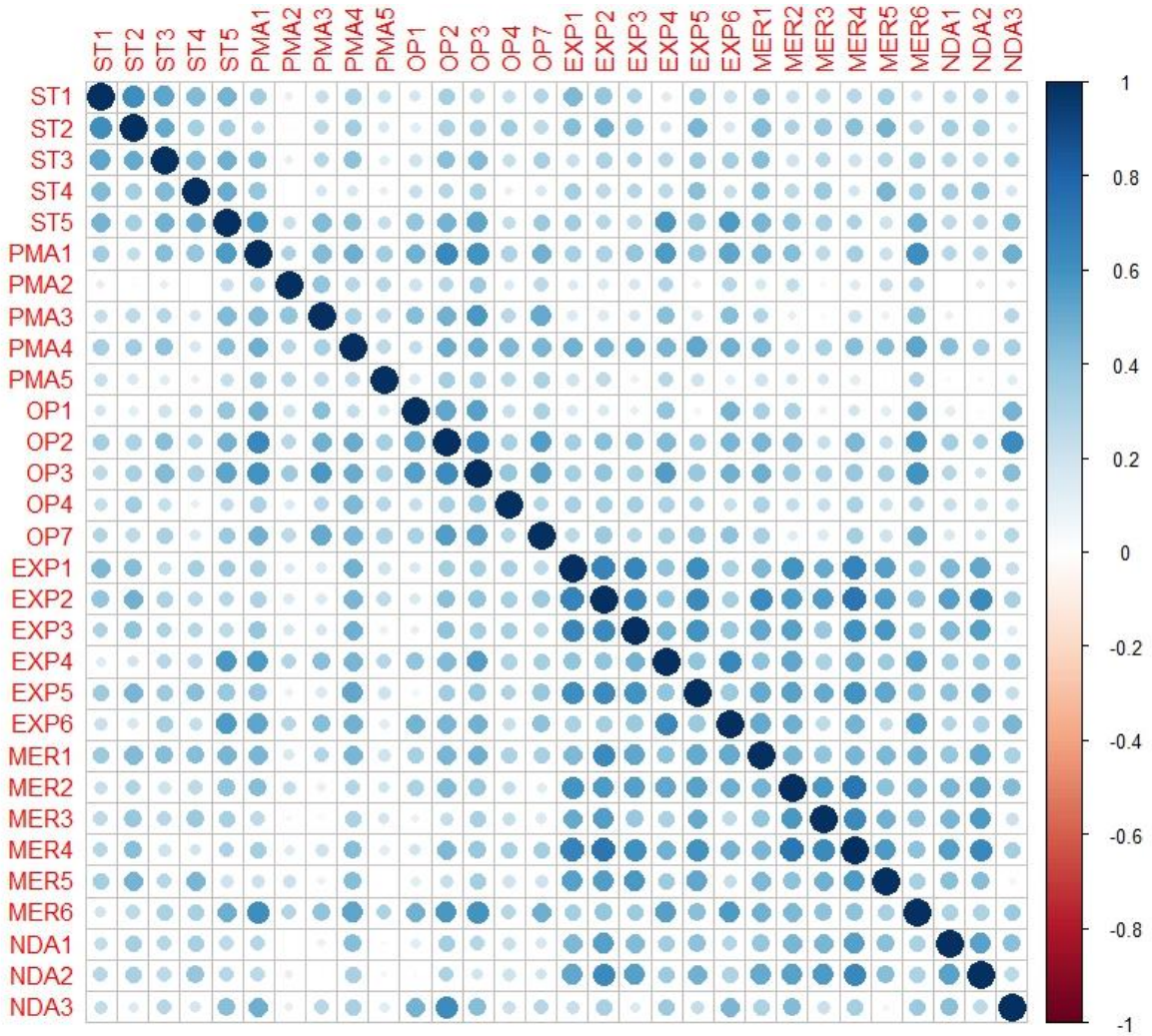


Note. N = 599. The potential Presence items span from ST to MER. ST = Stillness of Mind, PMA = Present Moment Awareness, OP = Openness to What Is, EXP = Expansion of Consciousness, and MER = Merging of Self. EDI = Ego-Dissolution.

The potential Expansion of Consciousness and Merging of Self items are more strongly correlated with one another as a group than the Ego-Dissolution items are correlated as a group with one another. A few of the Ego-Dissolution items are strongly correlated with the potential Expansion of Consciousness and Merging of Self items; however, other items are exhibiting weak positive or near-zero correlation with the potential Presence items. Overall, the potential Presence items, in particular the Expansion of Consciousness and Merging of Self items, are moderately positively correlated with the Ego-Dissolution items.

Figure 7

Correlation Plot of Potential Presence Items and Non-Dual Awareness Items

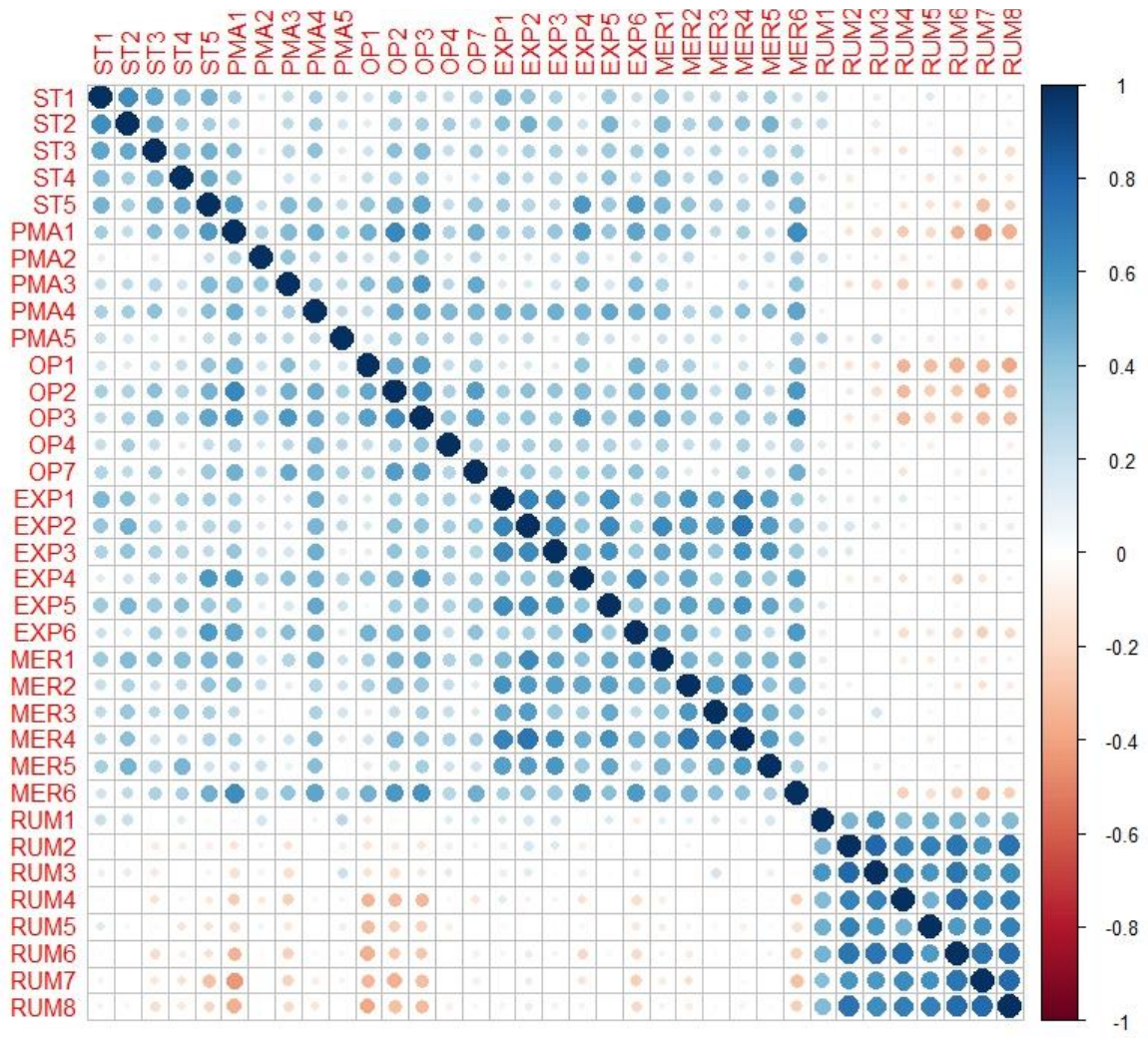


Note. N = 95. The potential Presence items span from ST to MER. ST = Stillness of Mind, PMA = Present Moment Awareness, OP = Openness to What Is, EXP = Expansion of Consciousness, and MER = Merging of Self. NDA = Non-Dual Awareness.

The three items composing Non-Dual Awareness are not strongly correlated with one another with inter-item bivariate correlations ranging from .53 to .27. Additionally, Non-Dual Awareness's internal consistency was weak (Cronbach's alpha = .67). Thus, although the items NDA1 and NDA2 appear to be correlating well with the Expansion of Consciousness and Merging of Self items, these results need to be interpreted with caution in light of the lower reliability and small sample size.

Figure 8

Correlation Plot of Potential Presence Items and Rumination Items

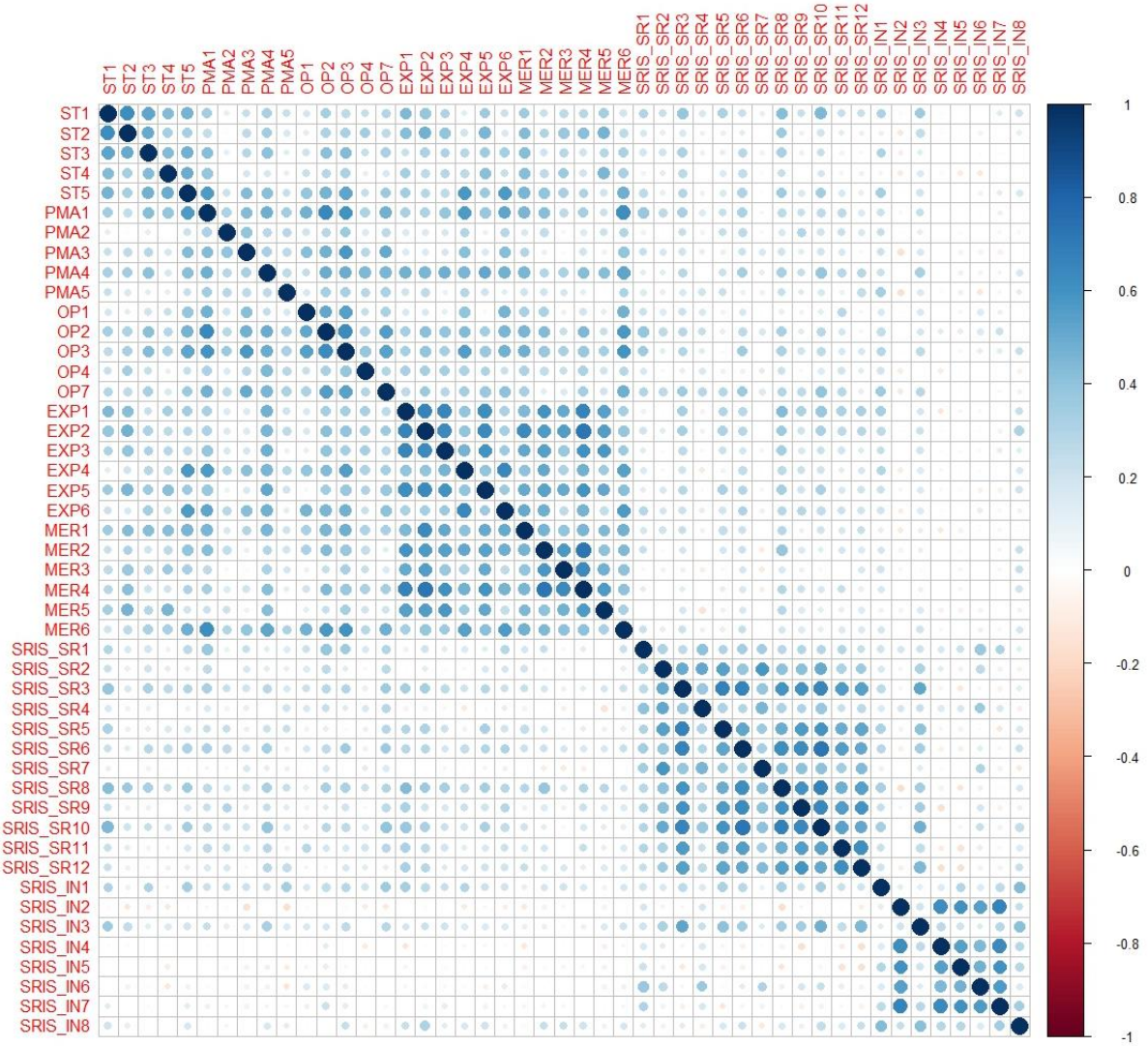


Note. N = 95. The potential Presence items span from ST to MER. ST = Stillness of Mind, PMA = Present Moment Awareness, OP = Openness to What Is, EXP = Expansion of Consciousness, and MER = Merging of Self. RUM = Rumination.

The Rumination items are all correlating well with one another. On average, the Rumination items have a modest negative correlation with the potential Presence items. The strongest negative correlations exhibited between the Rumination items and the Presence items occurred for items PMA1 and OP1–OP3. These items are as follows: "I sensed at the time that I was fully alive in the moment," "I welcomed what was happening to me for what it was," "My heart was open to the full experience," and "I found myself receptive to the experience as it unfolded."

Figure 9

Correlation Plot of Potential Presence Items and Self-Refection and Insight Items



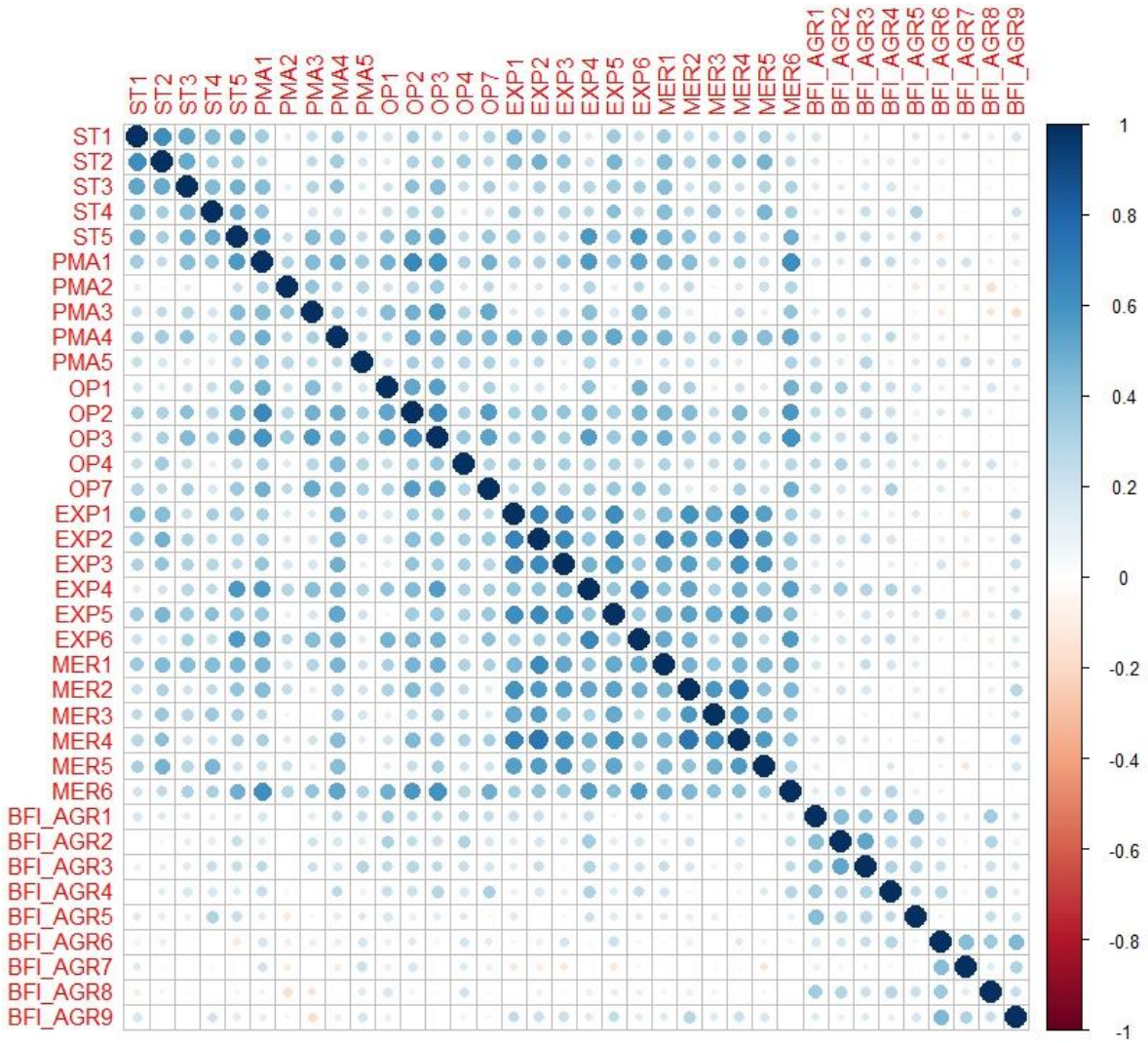
Note. N = 95. The potential Presence items span from ST to MER. ST = Stillness of Mind, PMA = Present Moment Awareness, OP = Openness to What Is, EXP = Expansion of Consciousness, and MER = Merging of Self. SRIS_SR = Self-Reflection and SRIS_IN = Insight.

On average, the potential Presence items are slightly positively correlated with many of the Self-Reflection items, although some inter-item correlations between potential Presence items and Self-Reflection items appear to be zero. The Self-Reflection items are positively correlated with one another, and differentiate from nearly all of the Insight items, aside from IN3, “I usually have a very clear idea about why I've behaved in a certain way”. Most of the Insight items are moderate to strongly correlated

with one another, however three of them are only slightly positively correlated with each other. The Insight items are not correlated with the Presence items, with all of them near zero.

Figure 10

Correlation Plot of Potential Presence Items and Items from the Agreeableness Factor in the Big Five Inventory

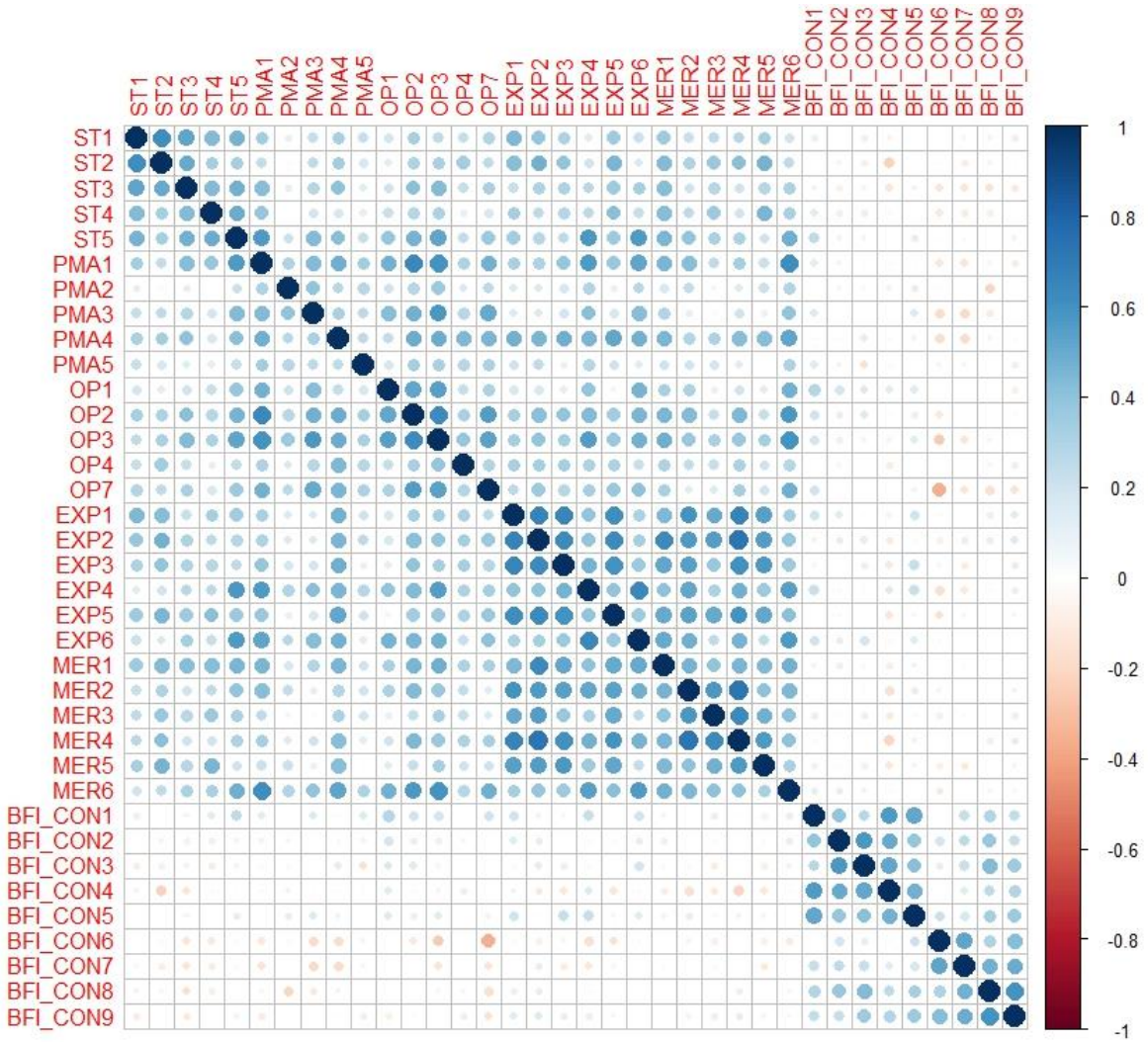


Note. N = 95. The potential Presence items span from ST to MER. ST = Stillness of Mind, PMA = Present Moment Awareness, OP = Openness to What Is, EXP = Expansion of Consciousness, and MER = Merging of Self. AGR = Agreeableness.

Some of the Agreeableness items have a very slight positive correlation with the potential Presence items. However, the Agreeableness items are correlating only modestly with one another. Thus, results need to be interpreted with caution due to this low reliability and small sample size.

Figure 11

Correlation Plot of Potential Presence Items and Items from the Conscientiousness Factor in the Big Five Inventory

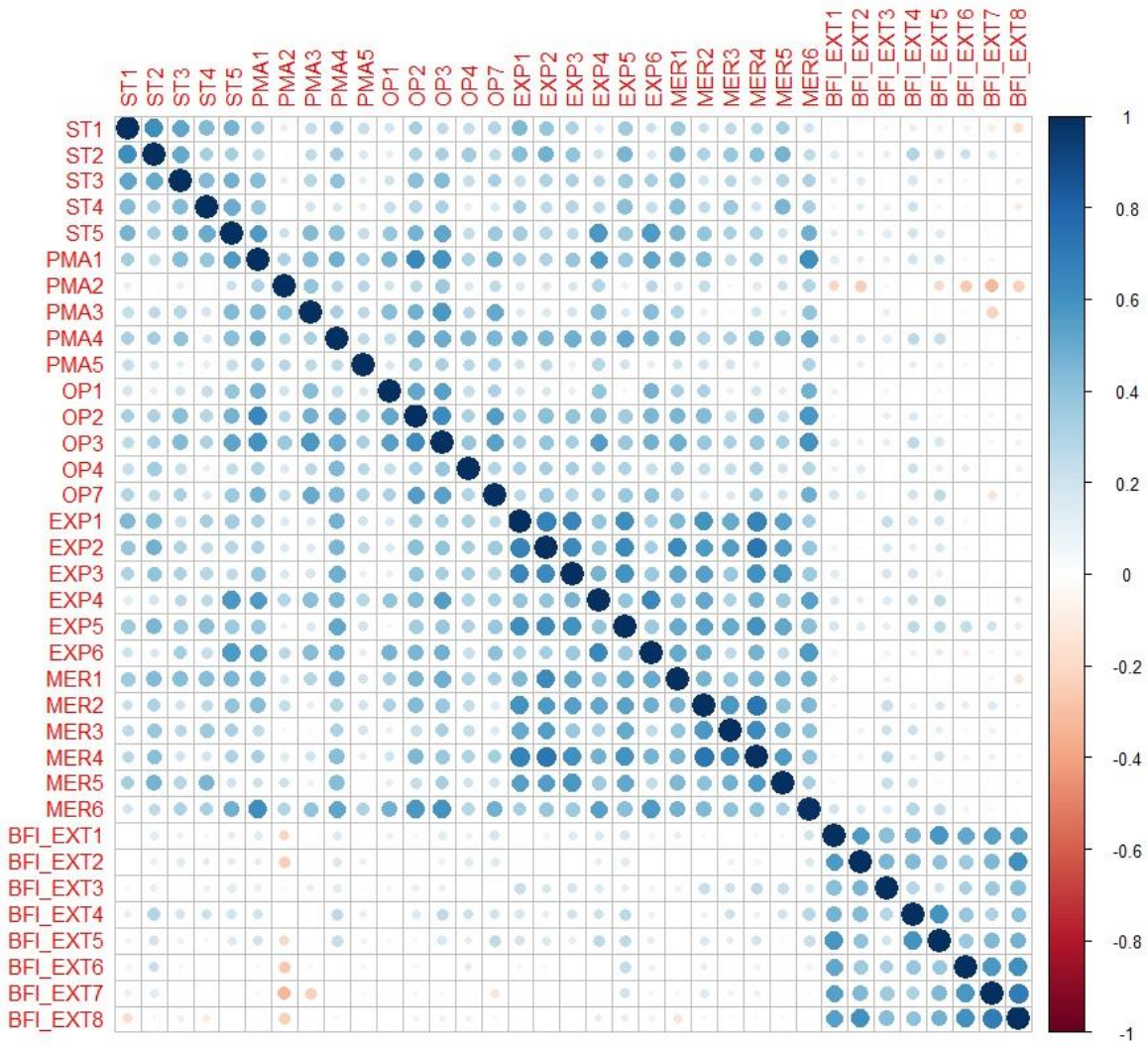


Note. N = 95. The potential Presence items span from ST to MER. ST = Stillness of Mind, PMA = Present Moment Awareness, OP = Openness to What Is, EXP = Expansion of Consciousness, and MER = Merging of Self. BFI_CON = Conscientiousness.

The vast majority of the Conscientiousness items are not correlated with the potential Presence items. The Conscientiousness items, for the most part, are moderately positively correlated with one another.

Figure 12

Correlation Plot of Potential Presence Items and Items from the Extraversion Factor in the Big Five Inventory

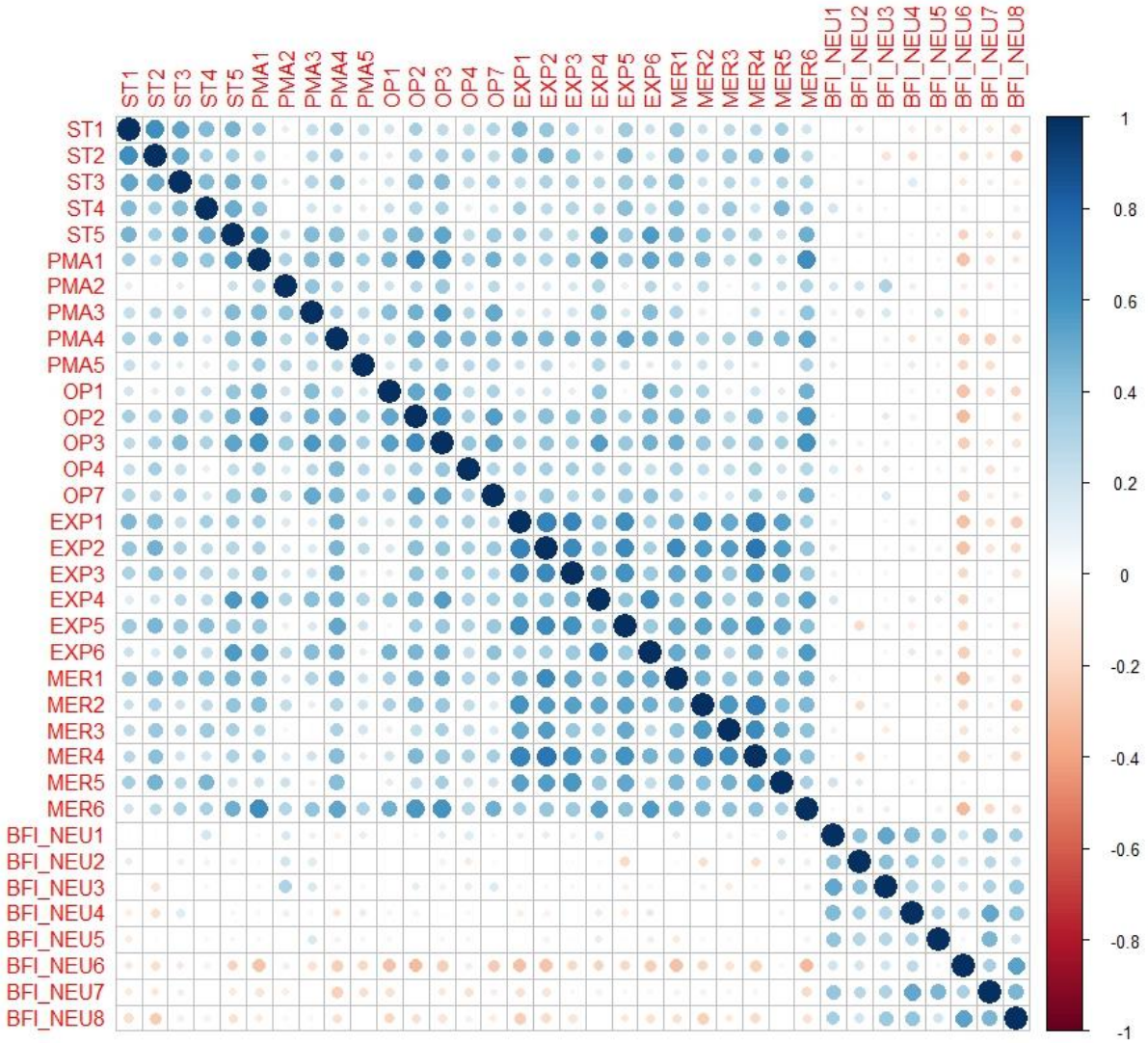


Note. N = 95. The potential Presence items span from ST to MER. ST = Stillness of Mind, PMA = Present Moment Awareness, OP = Openness to What Is, EXP = Expansion of Consciousness, and MER = Merging of Self. BFI_EXT = Extraversion.

On average, the Extraversion items appear have a near zero correlation with the potential Presence items. The Extraversion items are moderate to strongly positively correlated with one another.

Figure 13

Correlation Plot of Potential Presence Items and Items from the Neuroticism Factor in the Big Five Inventory

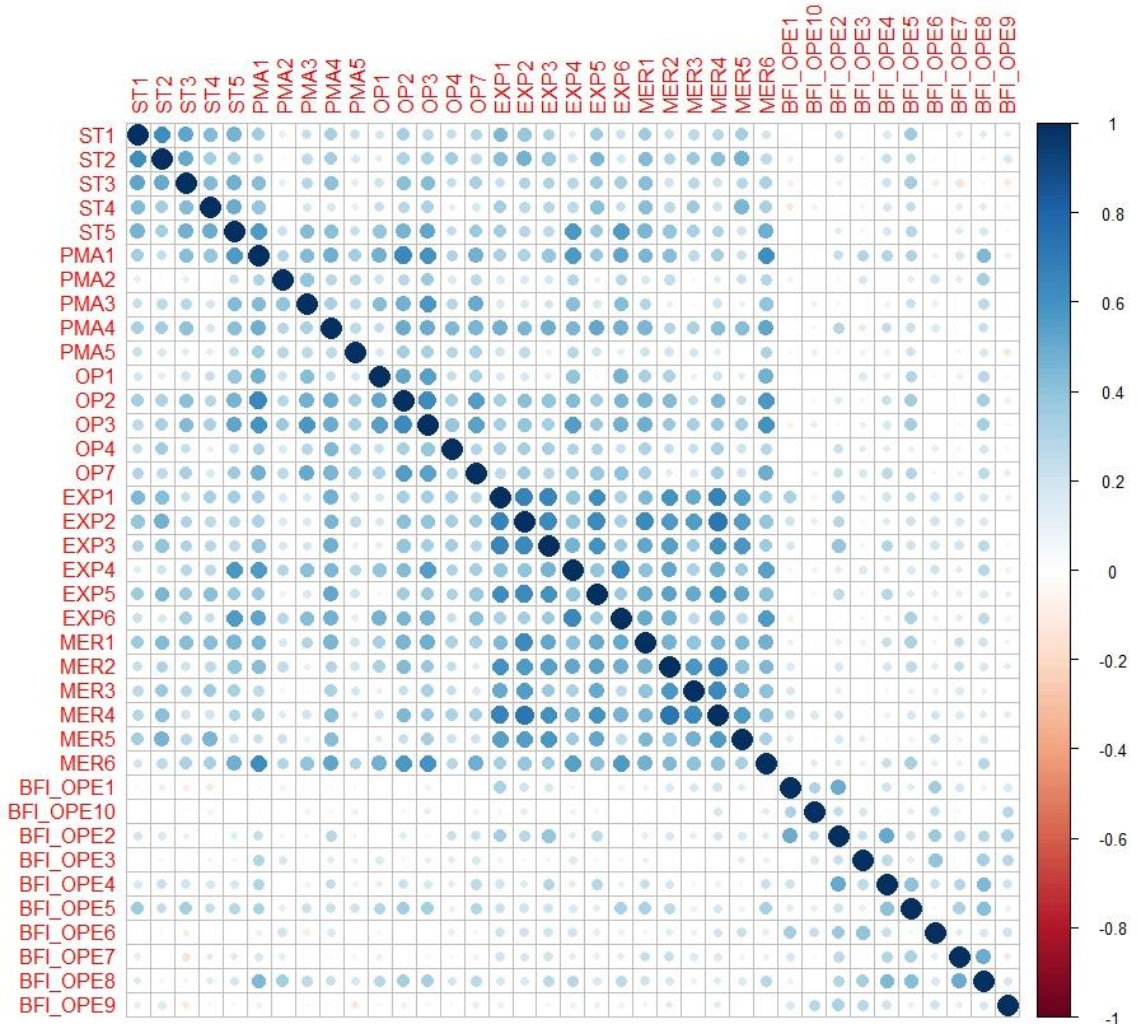


Note. N = 95. The potential Presence items span from ST to MER. ST = Stillness of Mind, PMA = Present Moment Awareness, OP = Openness to What Is, EXP = Expansion of Consciousness, and MER = Merging of Self. BFI_NEU = Neuroticism.

The Neuroticism items have a near zero correlation with the potential Presence items. Item NEU6, "Remains calm in tense situations," was reversed scored and appears to exhibit a modest negative relationship with the potential Presence items. However, that item is not correlating as strongly with the other Neuroticism items. The rest of the Neuroticism items are moderately positively correlated with one another.

Figure 14

Correlation Plot of Potential Presence Items and Items from the Openness to Experience Factor in the Big Five Inventory



Note. N = 95. The potential Presence items span from ST to MER. ST = Stillness of Mind, PMA = Present Moment Awareness, OP = Openness to What Is, EXP = Expansion of Consciousness, and MER = Merging of Self. BFI_OPE = Openness to Experience.

The Openness to Experience items are only modestly correlating with one another: many inter-item correlations are near-zero or only slightly positive. Thus, these results need to be interpreted with caution. Some of the Openness to Experience items are slightly positively correlating with the potential Presence items, whereas others have correlations very close to zero. Although conceptually, Openness to What Is is quite different from Openness to Experience, it is relevant to statistically assess these constructs given that they share the word "Openness." Within the Presence items, there are no patterns of certain potential factors being more correlated with Openness to Experience than others. This evidence suggests that Openness to What Is is measuring something distinctly different from Openness to Experience.

EFA Study 2: Replication Study with Nationally Representative Sample

Method

Before making any revisions to the conceptual model of Presence according to the new hierarchical three-factor solution, a near replication study was conducted with a new US nationally representative sample. We did not aim to create a scale that can be used only for college undergraduate students; rather, we intended that the Presence Scale be relevant for a wider population given the methodological and conceptual issues that have arisen from limiting oneself to a single type of population (Hanel & Vione, 2016). Using only convenience sampling during scale development, such as recruiting college students, is one of the most commonly reported limitations in scale development papers since it poses a threat to generalizability (Morgado et al., 2017). Thus, if within the development of the Presence Scale only college undergraduates were sampled, it would be unknown whether the latent model of Presence Scale would replicate when administered with a broader population. Therefore, it was a strength of this work that US nationally representative samples were recruited in the subsequent rounds of data collection.

Participants

A US nationally representative sample (N = 384) was recruited through Prolific in autumn 2022. Prolific is an online platform that pays participants to complete surveys and has been shown to have lower

rates of dishonesty, fewer attention check failures, and overall better data quality than other online survey platforms such as Mturk (Peer et al., 2022). In line with these findings, two attention checks were included in this study and none of the participants failed both, so all participants were included in the analyses. We specified to recruit a nationally representative sample which ensured that participants would be stratified across gender, age, and major ethnic groups proportional to the US population. For example, the proportion of 18 to 27-year-old Asian men in the sample will be proportional to this group's prevalence in the U.S. population. Participants responded from 46 out of the 50 US states, with similar proportions per region to the US census; Northeast (16.67%); Midwest (19.79%); South (41.41%); West (22.14%). Female participants composed 50.3% of the sample (N = 193). The racial and ethnicity demographics of the sample were as follows: White (71.35%), Black or African American (12.76%), Asian (5.47%), mixed race (4.69%), Hispanic or Latino/a/x (4.17%), Native American, American Indian, or Alaskan Native (1.04%) and 0.52% selected 'prefer not to say'. Participants ranged from 18 to 84 years old (M = 45.74, SD = 16.02), with 10.94% (N = 42) currently in college. Of the participants that were not in college, participants' level of education was the following: 4-year college degree (39.77%), some college (17.25%), Master's degree (16.08%), a high school degree or GED (9.36%), a 2-year college degree (7.02%), a Professional degree (3.51%), have some graduate education (3.51%), have a Doctoral degree (1.75%), some schooling with no degree (1.17%), and preferred not to say (0.58%). No participant responses were excluded for analyses as none of them failed more than one attention check and all had complete data.

Procedure

Participants were invited to complete the survey titled "A study of memorable experiences" on the Prolific platform. Participants were informed that they would be paid a rate of $10.50/hour or approximately $1.75 to complete the survey. Other than recruitment differences, the procedure for the Prolific sample mimicked that of the college EFA sample except for the following differences: 1) Scales responses were set to force-response, so if a participant skipped a question they would be asked to answer

the question before proceeding to the next page, and 2) A few additional questions were included for exploratory purposes.

Results

The potential Presence items were analyzed in R version 4.2.1 using the *psych* and *lavaan* packages (R Core Team, 2019; Rosseel, 2012; Revelle, 2023). The item responses were assessed for each Presence item and the mean skew was 0.91.

Item means, standard deviations, and correlations with one another were assessed and shown in Tables 7-9.

Table 7

Means, Standard Deviations, and Correlations of the Stillness of Mind Items: Prolific EFA Sample

Item	*M*	*SD*	1	2	3	4
1. ST1	5.17	1.80				
2. ST2	4.35	1.86	.46			
3. ST3	5.03	1.75	.48	.45		
4. ST4	5.16	1.75	.40	.35	.38	
5. ST5	5.43	1.58	.67	.41	.45	.36

Note. $N = 384$. *M* and *SD* are used to represent mean and standard deviation, respectively. All inter-item correlations were significant, below $p = .05$. See Table 1 to read the items that correspond with each item label.

Table 8

Means, Standard Deviations, and Correlations of the Present Moment Awareness and Openness to What Is Items: Prolific EFA Sample

Item	*M*	*SD*	1	2	3	4	5	6	7	8	9
1. PMA1	5.72	1.45									
2. PMA2	5.51	1.41	.30								
3. PMA3	5.41	1.45	.31	.44							
4. PMA4	5.32	1.58	.51	.46	.36						
5. PMA5	5.70	1.38	.49	.49	.42	.49					
6. OP1	5.98	1.35	.47	.27	.41	.27	.31				
7. OP2	5.96	1.32	.52	.34	.39	.46	.40	.56			
8. OP3	6.06	1.19	.48	.33	.36	.35	.35	.51	.55		
9. OP4	4.75	1.89	.28	.16	.28	.24	.16	.24	.27	.26	
10. OP7	6.02	1.10	.43	.39	.38	.41	.42	.50	.50	.55	.30

Note. $N = 384$. *M* and *SD* are used to represent mean and standard deviation, respectively. All inter-item correlations were significant, below $p = .05$. See Table 1 to read the items that correspond with each item label.

Table 9

Means, Standard Deviations, and Correlations of the Expansion of Consciousness and Merging of Self Items: Prolific EFA Sample

Item	*M*	*SD*	1	2	3	4	5	6	7	8	9	10	11
1. EXP1	4.67	1.91											
2. EXP2	4.47	1.95	.68										
3. EXP3	4.70	1.88	.73	.71									
4. EXP4	4.48	1.93	.60	.60	.58								
5. EXP5	4.54	1.89	.70	.69	.60	.60							
6. EXP6	4.77	1.90	.63	.63	.58	.74	.63						
7. MER1	5.05	1.76	.55	.57	.62	.60	.56	.58					
8. MER2	4.94	1.82	.57	.57	.58	.55	.56	.53	.57				
9. MER3	4.66	1.87	.60	.61	.61	.49	.55	.52	.58	.68			
10. MER4	4.71	1.96	.61	.61	.57	.56	.59	.62	.59	.65	.63		
11. MER5	4.31	1.98	.59	.69	.58	.56	.62	.62	.56	.59	.61	.63	
12. MER6	5.70	1.41	.47	.46	.45	.41	.49	.40	.43	.51	.45	.52	.45

Note. $N = 384$. *M* and *SD* are used to represent mean and standard deviation, respectively. All inter-item correlations were significant, below $p = .05$. See Table 1 to read the items that correspond with each item label.

Tests of dimensionality underlying the original hypothesized five lower-order factors were assessed using the same process described in the college sample's results section. Dimensionality results and EFAs on subsets of the data from the Prolific sample mimicked the findings from the college sample. Exploratory factor analyses were conducted in the same procedure as was done in the college sample. One-factor models were fitted to each of factors and were found to explain over 43.3% of the variance.

Next, EFAs were performed on the 27 items and once again, a hierarchical model with three lower-order factors was the strongest. The Schmid-Leiman item rotation was utilized to uncover this hierarchical structure (Schmid & Leiman, 1957). See Table 10 for loading results from the exploratory factor analysis. 59% of the variance in the items could be attributed to the hierarchical factor, or Presence. The scale exhibited strong reliability: Cronbach's alpha = 0.94; Omega Total = 0.96.

Table 10

Item Loadings for Prolific Sample EFA Results

Item	Factor loading			Presence
	1	2	3	g*
Factor with ST items				**0.54**
1. My mind felt like a calm, clear lake	0.16	0.00	**0.72**	
2. If you let a bucket of sandy water sit, the water becomes clear as the sand settles. It felt like my mind experienced something like that	**0.32**	-0.06	**0.45**	
3. There were moments when my mind felt still	0.20	0.10	**0.44**	
4. My mind was free from inner dialogue	0.11	0.12	**0.41**	
5. My mind felt settled	-0.08	0.21	**0.72**	
Factor with PMA & OP items				**0.71**
1. I sensed at the time that I was fully alive in that moment	0.17	**0.49**	0.21	
2. Even as I was immersed in the experience, there was a part of me that was aware of it	0.11	**0.57**	-0.16	
3. I was immersed in the experienced without getting lost in it	-0.02	**0.57**	0.07	
4. It was like I was aware of everything, moment by moment	0.30	**0.48**	-0.05	
5. I was conscious of myself experiencing the moment	0.06	**0.62**	-0.06	
6. I welcomed what was happening to me for what it was	-0.05	**0.58**	0.23	
7. My heart was open to the full experience	0.13	**0.58**	0.15	
8. I found myself receptive to the experience as it unfolded	-0.07	**0.69**	0.08	
9. My lack of judgment toward the experience helped me be open to it	0.22	0.15	0.19	
10. I accepted the reality of the experience for what it was	-0.06	**0.73**	0.04	
Factor with EXP & MER items				**0.78**
1. I felt a part of myself expanding outward	**0.81**	0.05	-0.05	
2. My consciousness extended outward as if toward a horizon	**0.87**	-0.08	0.02	
3. My consciousness expanded	**0.78**	0.04	-0.02	
4. I felt limitless	**0.68**	-0.01	0.17	
5. The core of my being radiated outward	**0.79**	-0.02	0.03	
6. A part of me felt boundless	**0.74**	-0.06	0.17	
7. I felt a deep sense of oneness	**0.58**	0.10	0.21	
8. I became a part of something greater than myself	**0.70**	0.19	-0.14	

9. My sense of self faded as I became part of something greater	**0.72**	0.08	-0.04
10. I seemed to merge with something beyond myself	**0.79**	0.07	-0.10
11. I felt my self merging with everything, as though I were a wave that merged back into the ocean	**0.75**	-0.03	0.10
12. I felt a part of it all	**0.33**	0.50	-0.07

Note. * these g loadings pertain to the higher loading for the Presence high-order factor. Factor loadings above 0.3 are in bold. The numbers next to each item are listed to indicate the number of items in each factor, not the item ID number.

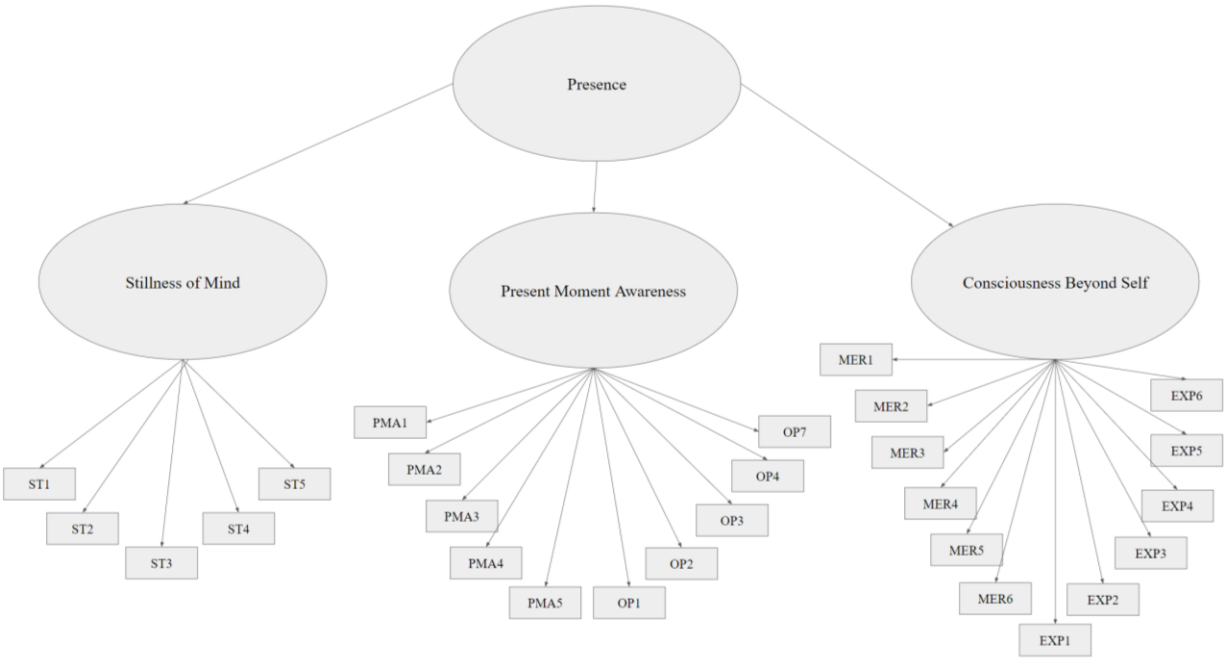
Reconceptualization with the New Hierarchical Model

Exploratory factor analyses in both the college sample and the Prolific sample indicated a hierarchical model with Presence, the higher-order factor, and three lower-order factors. This empirical evidence prompted our team to conceptually revise our factor names of Presence. Examining the lower-order factors, the hypothesized Stillness of Mind items composed one factor. Another factor was composed of items from the two hypothesized factors: Present Moment Awareness and Openness to What Is. Finally, Expansion of Consciousness and Merging of Self items made up a third factor. Given that this pattern illustrated in Figure 3 occurred in two different samples, the conceptualization of Presence needed to be revised by combining the factors that we had hypothesized would differentiate.

The updated three lower-order factors of Presence include: *Stillness of Mind, Present Moment Awareness,* and *Consciousness Beyond Self* (See Figure 15 below for the full model).

Figure 15

Conceptual Model of Presence before the Final CFA Study



Note. Presence is the higher-order factor. The three lower-order factors are Stillness of Mind, Present Moment Awareness, and Consciousness Beyond Self. The boxes represent items. See Table 1 for a list of which item corresponds to which item label.

Each factor's definition and a brief explanation is provided below; however, please see the Presence Scale Technical Report (Sabine et al., in progress) for a more in-depth explanation of these factors.

Stillness of Mind occurs when discursive thinking subsides and the mind is clear, calm, and settled. This definition did not change during this conceptual revision phase.

Present Moment Awareness occurs when one is open to and aware of the now, of the present moment, of being, even if one is involved in activity. This factor was created by combining the original Present Moment Awareness and Openness to What Is factors. The word "open" was intentionally added into a revised version of the Present Moment Awareness definition.

Consciousness Beyond Self occurs when one's consciousness seems to expand beyond the confines of the body and mind, and potentially the self merges – one experiences becoming One – with another entity or realm. Consciousness Beyond Self was created by theoretically combining Merging of

Self with Expansion of Consciousness. Note that the words “expand” and “merges” are used in relation to consciousness and the self respectively.

Item Elimination

Item elimination was approached through a tandem strategy balancing statistics and conceptual considerations in order to avoid construct underrepresentation. If a factor measures one specific aspect well but does not represent the full extent of that factor, then construct underrepresentation has occurred. This poses a threat to validity (Messick, 1989). Thus, when combining Present Moment Awareness and Openness to What Is factors into Presence Moment Awareness, and Expansion of Consciousness and Merging of Self into Consciousness Beyond Self, we sought to ensure that these new factors contained a balanced number of items from each of their original hypothesized factors in order to adequately represent both of the previously hypothesized factors.

Items were eliminated through a careful, deliberative process. The statistically worst-performing items, such as those with low loadings, high error, and cross-loadings, were identified early on as contenders for deletion. These results were presented to the research team. When the team agreed conceptually that none of these items recommended for deletion were paramount, EFAs were performed with a smaller subset of items. For the latter part of the item deletion process, Confirmatory Factor Analyses (CFAs) were also employed. Specifically, models were assessed with the same number of items (e.g. 20 items), but different groups of items were either included or excluded. Examining preliminarily fit indices for these models provided information regarding how including or deleting one item as opposed to another item might affect or improve fit in both the exploratory college and Prolific samples. After making a decision on which item to omit, new models with one fewer item (e.g. 19 items) were assessed and this process was repeated. At certain stages, modification indices were examined and two items (EXP4 and EXP6) were cut as they had an error covariance (See Table 11 for an explanation). Although we are aware of the issues stemming from overfitting, these two samples were pilot data and exploratory in nature, and a new sample was planned to be collected as the final stage of the Presence Scale development. This statistical process repeated in conjunction with meetings with the full team until

the Presence Scale was narrowed down to 14 items. Table 11 below explains the reasoning for each item's deletion in order of when the item was deleted.

Table 11

Presence Item Deletion Process: Moving from 35 Items to the Final 14 Items

Hypothesized Factor	Item(s) administered in EFAs	Reasoning for Deletion
Present Moment Immersion	PM-i1 - My whole being was involved in the moment PM-i2 - Nothing seemed to exist outside of the present moment PM-i3 - I felt fully immersed in the moment	**Note: These items were deleted early on during the EFAs, such that the final EFA results did not include these. This reiterates the reasoning for why these items were cut.** Present-Moment Immersion items were piloted to test whether they differentiated from Present-Moment Awareness items. Conceptually we believed that they were different and wanted to assess empirically whether this would occur. Statistically, they did differentiate. This conceptual and empirical support prompted deletion of all Present Moment Immersion items.
Present Moment-Related Contenders	PM-1 -Whatever I experienced brought me into the present moment PM-2 - I was simply in the now, not preoccupied with the past or future PM-3 - I wasn't thinking about what would happen next	**Note: These items were deleted early on during the EFAs, such that the final EFA results did not include these. This reiterates the reasoning for why these items were cut.** These Present Moment related items were piloted to test whether they were more closely related to Present-Moment Awareness or Present Moment Immersion. Statistically, they we more closely related to the Present Moment Immersion items. This conceptual and empirical support prompted deletion of all Present Moment Contender items.
Openness to What Is (New: Present Moment Awareness)	OP5 - I felt that I had opened up to a reality beyond my normal life OP6 - I felt that I had awakened to a reality different	**Note: These items were deleted early on during the EFAs, such that the final EFA results did not include these. This reiterates the reasoning for why these items were cut.** **Ultimately deleted for statistical reasons:** An EFA of the Openness to What Is items in both the College and Prolific samples indicated a 2-factor solution, with these two items grouping together as their own factor. Correlation plots indicated

	from my everyday experience	these items were correlating more so with the Expansion of Consciousness and Merging of Self items as opposed to the Openness to What Is Items. Confirming this, OP5 and OP6 were grouping with the Consciousness Beyond Self factor (EXP & MER items) in an EFA of all items. **Rationale for this decision:** These items were added shortly before the final round and the team had mixed reactions to these items. However, upon re-examination, the language "reality beyond my normal life" or "reality different from my everyday experience" is well-outside of the bounds of the Openness to What Is factor.
Openness to What Is (New: Present Moment Awareness)	OP4 - My lack of judgment toward the experience helped me be open to it	**Ultimately deleted for statistical reasons:** In the full EFA of the remaining items, this item's loading was the lowest, below .3, and it had the lowest commonalities and high error. **Rationale for this decision:** Non-judgmental is likely outside of the bounds of the Openness to What is and Presence. Additionally, it is also more taxing for participants to interpret and respond to this negatively worded item, as well as it may be hard to be aware to what extent one was lacking judgment.
Merging of Self (New: Consciousness Beyond Self)	MER6 - I felt a part of it all	**Ultimately deleted for statistical reasons:** In a full EFA, in both the college and Prolific sample, this item had a cross loading with the Consciousness Beyond Self factor and the Present Moment Awareness Factor. Its loading was below .3 for its hypothesized factor, and under .4 for the Present Moment Awareness Factor. **Rationale for this decision:** MER5 is a better item to help understand how one feels "a part of it all." This item also may not be inclusive of Merging of Self experience that aren't with everything and are with another person, being, or activity.
Expansion of Consciousness (New: Consciousness Beyond Self)	EXP4 - I felt limitless EXP6 - A part of me felt boundless	**Ultimately deleted for statistical reasons:** Modification Indices indicated that an error covariance was occurring between EXP 4 and EXP6, which was reducing CFA model fit. **Rationale for this decision:** Other EXP items are stronger. Additionally, the language "limitless" in EXP4 may be confusing and vague. The error covariance is conceptually plausible given these two items use similar words "limitless" and "boundless" which are feelings that are relatively abstract and have extremely similar meanings. This conceptually is less central to the core of the Consciousness Beyond Self factor.
Merging of Self (New: Consciousness Beyond Self)	MER1 - I felt a deep sense of oneness	**Ultimately deleted for statistical reasons:** After cutting all of the items above, the loading for MER1 was lowest in the Consciousness Beyond Self factor.

		Rationale for this decision: This item might be too broad and other items in this factor are stronger.
Present Moment Awareness (New: Present Moment Awareness)	PMA2 - Even as I was immersed in the experience, there was a part of me that was aware of it PMA3 - I was immersed in the experienced without getting lost in it	**Ultimately deleted for statistical reasons:** These items within the new Present Moment Awareness factor exhibited the lowest item reliability (under .4 for the Prolific sample, under .3 in the college sample). **Rationale for this decision:** Other items in the factor, such as PMA5 may better measure Present Moment Awareness. Some individuals might not understand what "getting lost in it" means and the two-part structure of these items can be harder for respondents to answer.
Openness to What Is (New: Present Moment Awareness)	OP7 - I accepted the reality of the experience for what it was. PMA4 - It was like I was aware of everything, moment by moment	**Ultimately deleted for statistical reasons:** We aimed to have five items in this factor, and when testing options of which five items from the seven contenders left, the five items not containing these two items had better CFA fit indices than other models of five items. **Rationale for this OP7 decision:** The phrase "accepted the reality" could be referring to something gloomy or neutral, which contrasts the definition of Presence as life-affirming. **Rationale for this PMA4 decision:** PMA5 is likely conceptually stronger. The word "everything" might be difficult for some people to respond to as well.
Stillness of Mind	ST2 - If you let a bucket of sandy water sit, the water becomes clear as the sand settles. It felt like my mind experienced something like that.	**Ultimately deleted for statistical reasons:** Unlike the other Stillness of Mind Items, this item had a weak cross-loading with the Consciousness Beyond Self items. Removing ST2 also improved CFAs fit indices of the Presence Model. **Rationale for this decision:** This two-sentence item is the longest in the scale and thus demands more cognitive resources to interpret. The process of the sand settling is rather lengthy, and this metaphor might not be as helpful for participants who were reflecting back on a brief experience.
Expansion of Consciousness (New: Consciousness Beyond Self)	EXP5 - The core of my being radiated outward	**Rationale for deletion:** All the remaining Consciousness Beyond Self items were strong with high reliability. This item was cut as the language "radiated" and "core of my being" the team was less drawn toward. Originally this language was included in hopes of finding other ways to address the idea of consciousness and expansion, but this back-up version was not needed.
Merging of Self (New:	MER2 - I became a part of	**Rationale for deletion:** This item was redundant with item, MER3, which also address "part of something greater." MER3

Consciousness Beyond Self)	something greater than myself	was stronger because it also included the sense of self fading and that item was included in the final scale.
Expansion of Consciousness (New: Consciousness Beyond Self)	EXP3 - My consciousness expanded	**Rationale for deletion:** We wanted this factor to have the same number of items as Present Moment Awareness. When looking at all of the items, EXP1, EXP2, and EXP3 seemed redundant with one another. Specifically, the words "expand" and "consciousness" are used in the other items, so this EXP3 item was not adding anything new. Additionally, it is best to minimize the word "consciousness" whenever possible as it is not inherently simple to understand. The other EXP item has additional language to guide the reader whereas this item has no additional guidance or information.

The final Presence Scale contains four Stillness of Mind items, five Present Moment Awareness items, and five Consciousness Beyond Self items, as is shown below in Table 12.

Table 12

Finalized Presence Scale Items and Item Labels

Item	Item Labels	Factor
My mind felt like a calm, clear lake	ST1	ST
There were moments when my mind felt still	ST3	ST
My mind was free from inner dialogue	ST4	ST
My mind felt settled	ST5	ST
I sensed at the time that I was fully alive in that moment	PMA1	PMA
I was conscious of myself experiencing the moment	PMA5	PMA
I welcomed what was happening to me for what it was	OP1	PMA
My heart was open to the full experience	OP2	PMA
I found myself receptive to the experience as it unfolded	OP3	PMA
I felt a part of myself expanding outward	EXP1	CBS
My consciousness extended outward as if toward a horizon	EXP2	CBS
My sense of self faded as I became part of something greater	MER3	CBS
I seemed to merge with something beyond myself	MER4	CBS
I felt my self merging with everything, as though I were a wave that merged back into the ocean	MER5	CBS

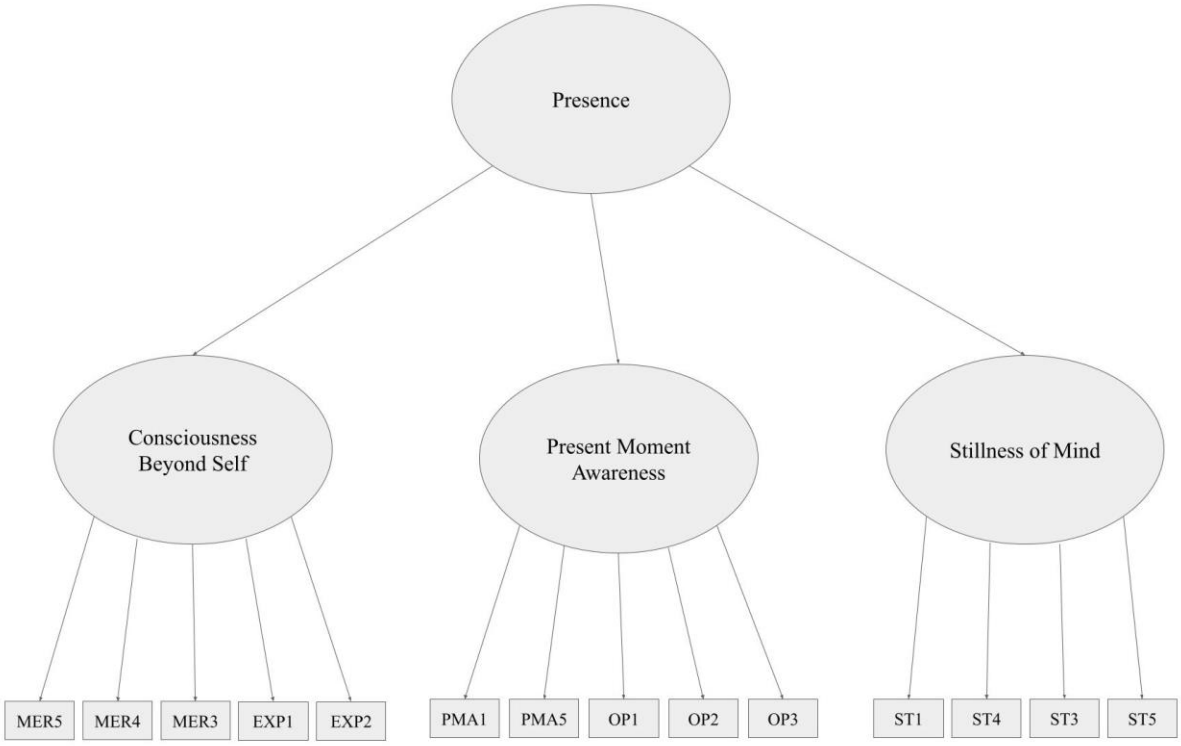
Note. The three factor labels are as follows: ST = Stillness of Mind; PMA = Present Moment Awareness; CBS = Consciousness Beyond Self. Item labels listed in column 2 correspond to the same item labels presented in Table 1.

The Stillness of Mind factor was conceptually narrower in scope, thus not requiring as many items as the other factors. From a statistical perspective, more items could have been retained within the Consciousness Beyond Self factor as many of those items exhibited strong psychometric properties. However, we purposely choose to have this factor contain the same number of items as the Present Moment Awareness for conceptual reasons (See Technical Report for more detail).

At this stage, our team had an agreed-upon model of Presence and its final items (See Figure 16), that we would test with a new sample:

Figure 16

Finalized Conceptual Model of Presence



Note. Presence is the higher-order factor. The three lower-order factors are Stillness of Mind, Present Moment Awareness, and Consciousness Beyond Self. The boxes represent items. See Table 12 for a list of which item corresponds to which item label.

CFA Study 3: Nationally Representative Sample

Method

Participants

A US nationally representative group of participants (N = 604) were recruited from the Prolific platform. This sample size was determined through running Monte Carlo simulations through the *SimSem* package in R using version (4.2.1) to estimate power (Pornprasertmanit et al., 2021; R Core Team, 2023). Confirmatory Factor Analyses on the combined EFA Prolific and College samples were assessed to obtain parameter estimates for the power analysis. These simulations specified that a sample size between 500-600 would be sufficiently powered to detect misfit. Three participants had incomplete qualitative data such that it was unclear whether they had an experience in mind and were omitted, thus leaving a total sample of 601 adults.

Participants ranged from 18 to 80 years old (M = 44.47, SD = 15.64). 49.25% of participants identified as female, 47.92% identified as male, 1.99% identified as non-binary and 0.83% selected other or prefer not to respond. The racial ethnic breakdown of the sample was as follows: White (72.88%), Black or African American (12.81%), Two or more races (5.32%), Asian (4.83%), Hispanic or Latino/a/x (3.00%), ‘other’ or ‘prefer not to say’ (0.83%), Native American, American Indian or Alaskan Native (0.3%). 12.27% of participants were fluent in multiple languages. Participants responded from 45 US states, with similar proportions per region to the US census; Northeast (16.64%); Midwest (17.30%); South (43.26%); West (22.80%). Over half (52.75%) of participants had at least a four-year college degree.

Procedure

Participants who did not previously complete the EFA Prolific Presence study were invited to complete the survey titled, “A study of memorable experiences” on the Prolific Platform in the winter of 2023. Participants were informed that they would be paid a rate of $10.50/hour or approximately $3.85 to complete the survey. Other than recruitment differences, the procedure for this final round of data mimicked that of the previous samples; however, additional scales were administered to all participants in

this round. After completing the Presence scale (See Appendix H), participants were asked to keep their experience in mind and also respond to the following state measures on Mindfulness, Flow, Ego-Dissolution, Non-dual Awareness, and Rumination (See Appendices A-F). These state scales were presented in a random order. Then, participants were told to think about how they generally feel and completed the trait level Self-Reflection and Insight scale. All of these scales were set to force-response, so if a participant skipped a question they would be asked to answer the question before proceeding to the next page.

Information about these scales can be found in the methods section of the College sample EFA and in Appendices A–G. Reliability as measured by Cronbach's alpha and omega for this round of data collection was as follows: Mindfulness: Curiosity factor items (alpha = 0.91; omega total = 0.93), and Mindfulness Decentering factor items (alpha = 0.76; omega total = 0.82); Flow items (alpha = 0.93 ; omega total = 0.95); Ego-Dissolution items (alpha = 0.89; omega total= .93) NDA (alpha = 0.91;); Rumination items (alpha = 0.91; omega total = 0.94); Self-Reflection and Insight: Insight factor items (alpha = 0.86; omega total = 0.90) and Self-Reflection factor items (alpha = 0.93 ; omega total = 0.95).

Results

Data were analyzed in R using version 4.2.1 using the *psych* and *lavaan* packages (R Core Team, 2019; Rosseel, 2012; Revelle, 2023). Each Presence items' response distribution was assessed and the mean skew was -1.06. Descriptive statistics and inter-item correlations of the Presence items are shown below in Table 13.

Table 13

Means, Standard Deviations, and Correlations of the Presence Scale Items

Item	*M*	*SD*	1	2	3	4	5	6	7	8	9	10	11	12	13
1. ST1	5.39	1.66													
2. ST3	5.25	1.65	.63												
3. ST4	5.19	1.74	.54	.51											
4. ST5	5.64	1.43	.67	.60	.57										
5. PMA1	5.92	1.31	.44	.44	.41	.44									
6. PMA5	5.87	1.33	.30	.37	.27	.31	.54								
7. OP1	6.02	1.28	.41	.39	.42	.50	.57	.45							
8. OP2	6.06	1.26	.40	.36	.43	.47	.59	.43	.66						
9. OP3	6.04	1.19	.34	.34	.39	.44	.56	.43	.59	.62					
10. EXP1	4.87	1.85	.42	.45	.35	.38	.46	.32	.31	.38	.32				
11. EXP2	4.62	1.90	.46	.45	.34	.38	.38	.31	.26	.33	.32	.68			
12. MER3	4.74	1.84	.38	.41	.39	.36	.41	.31	.32	.34	.31	.60	.62		
13. MER4	4.75	1.89	.44	.49	.38	.37	.47	.33	.32	.37	.33	.71	.67	.64	
14. MER5	4.55	1.90	.47	.44	.36	.38	.43	.29	.27	.29	.30	.62	.70	.65	.69

Note. M and *SD* are used to represent mean and standard deviation, respectively. All item correlations were significant, below $p = .05$. See Table 12 for a list of which item corresponds to which item label.

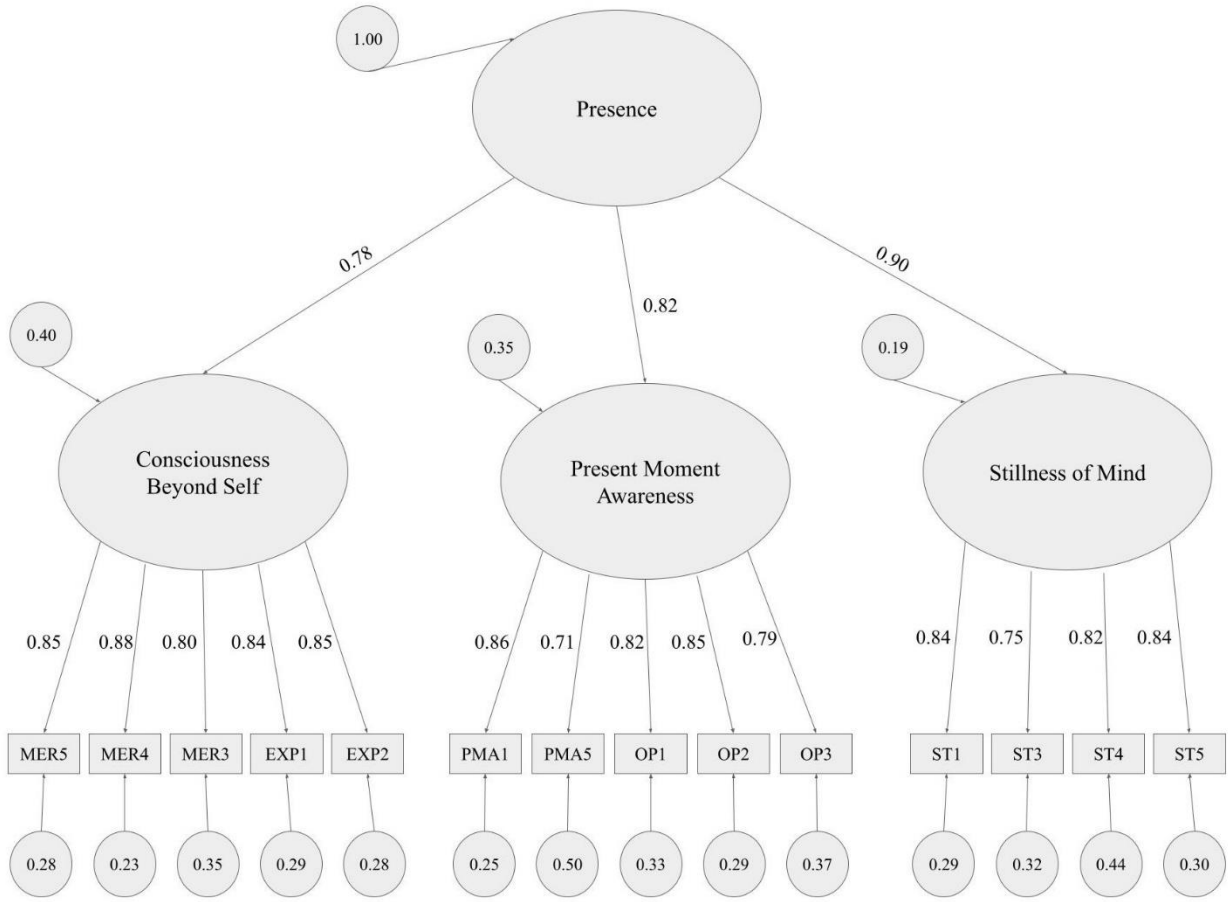
The Presence Scale exhibited strong reliability both when examining Presence total scores (Cronbach's alpha = 0.91; Omega total = 0.94) as well as examining the individual factors: Stillness of mind (Cronbach's alpha = 0.84; Omega total = 0.86), Present Moment Awareness (Cronbach's alpha = 0.86; Omega total = 0.88), and Consciousness Beyond Self (Cronbach's alpha = 0.91; Omega total = 0.92).

Part 1: Presence Scale Confirmatory Factor Analysis

Confirmatory Factor Analyses were conducted on the 14 Presence items with Presence as the higher-order factor and Stillness of Mind, Present Moment Awareness, and Consciousness Beyond Self as the lower-order factors. Weighed Least Squares adjusted for Means and Variances (WLSMV), as recommended for categorical indicators, was utilized in order to prevent biased loadings. The obtained results: CFI (Comparative Fit Index) of 0.988, RMSEA (Root Mean Squared Error of Approximation) of 0.058, and SRMR (Standardized Root Mean Square Residual) of 0.032, all passed the Hu and Bentler (1999) criteria of CFI > 0.95, RMSEA < 0.06, and SRMR < 0.08, meaning the data fit our hypothesized model (See Table 15). A completed path diagram depicting the CFA results is presented in Figure 17.

Figure 17

CFA Path Diagram of the Presence Scale.

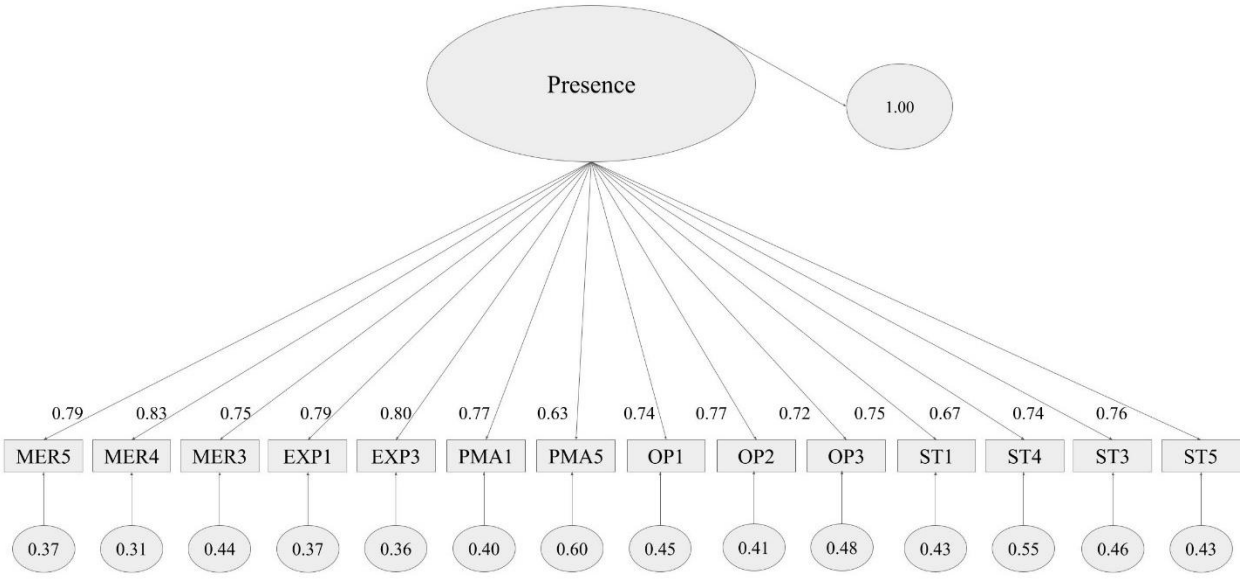


Part 2: Competing Models

To provide further credibility to the hierarchical three-factor model of Presence, two competing models were analyzed: a one-factor model and a two-factor non-hierarchical model. The unidimensional model assumes that Presence is measured directly though the items, and that Presence is not measured through any lower-order factors (See Figure 18 for CFA path diagram of this model). Results indicated that the hierarchical three-factor model of Presence had significantly better fit than the unidimensional model $\chi^2(77) = 1705.47$, $p < 0.001$, CFI = 0.868, RMSEA = 0.188, SRMR = 0.108.

Figure 18

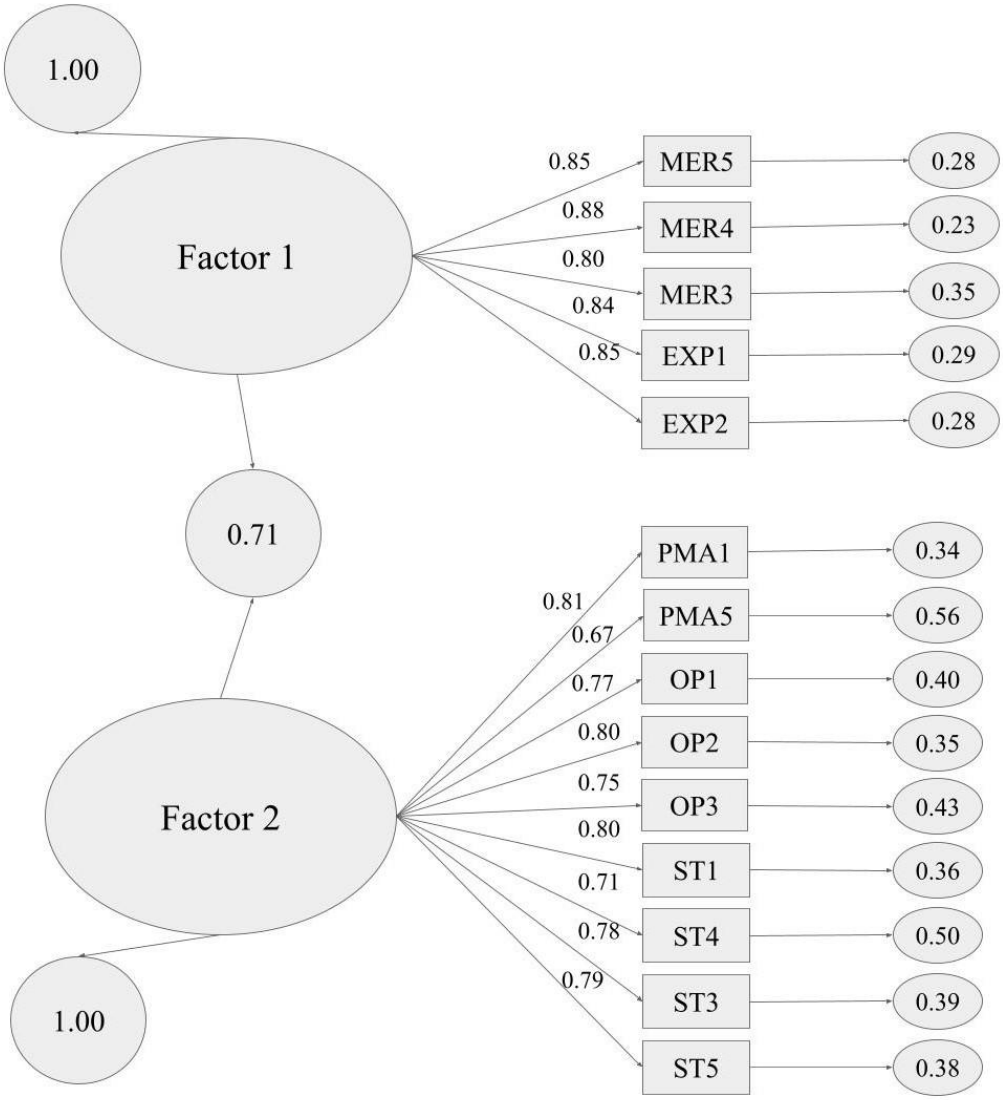
CFA Path Diagram of a Competing Model of Presence: A Unidimensional Model.



A two-factor model was next tested. One factor was composed of Consciousness Beyond Self Items, and the other factor was comprised of Stillness of Mind and Present Moment Awareness items. Collapsing the Stillness of Mind and Present Moment Awareness items would be a reasonable to test, as one could argue that items pertaining to the mind and awareness share greater conceptual similarity with each other than to items that refer to consciousness. Note that hierarchical models cannot be tested with only two lower-order factors. Thus, this model does not assume that the higher-order construct of Presence exists; but rather, the Presence items measure two correlated separate constructs. Some readers might think that Consciousness Beyond Self is considerably different from the rest of the Presence items, and question whether the 14 items might actually be measuring two different related constructs as opposed to our hypothesized model Presence. However, results indicated that this competing model had worse fit than our hierarchical three-factor model: $\chi^2(76) = 705.62$, $p < 0.001$, CFI = 0.949, RMSEA = 0.118, SRMR = 0.065 (See Figure 19).

Figure 19

CFA Path Diagram of a Competing Model of Presence: A Two-Factor Model.



Part 3: Validity Analyses

Means and standard deviations of the scales administered for validity purposes are shown in Table 14.

Table 14

Means and Standard Deviations of Items in the Scales Administered for Validity Analyses

Flow Items	*M*	*SD*	Flow Items	*M*	*SD*
Challenge-Skill Balance			Concentration on Task at Hand		
F_CS1	3.37	1.17	F_CO1	4.20	0.90
F_CS2	3.70	0.94	F_CO2	4.17	0.95
F_CS3	3.92	0.93	F_CO3	3.99	0.93
F_CS4	3.56	1.02	F_CO4	4.14	0.92
Action-Awareness Merging			Paradox of Control		
F_AA1	3.94	0.89	F_CN1	3.91	1.00
F_AA2	3.93	0.97	F_CN2	3.89	0.98
F_AA3	3.70	1.00	F_CN3	3.71	1.06
F_AA4	3.89	0.98	F_CN4	3.95	0.99
Clear Goals			Loss of Self-Consciousness		
F_CG1	4.03	0.93	F_SC1	4.16	1.01
F_CG2	4.08	0.89	F_SC2	4.00	1.04
F_CG3	3.98	0.98	F_SC3	4.08	1.01
F_CG4	3.80	1.06	F_SC4	4.22	1.00
Unambiguous Feedback			Transformation of Time		
F_UF1	3.89	0.90	F_TT1	3.81	1.11
F_UF2	3.57	1.02	F_TT2	3.88	1.08
F_UF3	3.70	1.00	F_TT3	3.50	1.19
F_UF4	3.66	0.96	F_TT4	3.40	1.25
Concentration on Task at Hand			Autotelic Experience		
F_CO1	4.20	0.90	F_AE1	4.46	0.95
F_CO2	4.17	0.95	F_AE2	4.04	1.03
F_CO3	3.99	0.93	F_AE3	4.42	0.94
F_CO4	4.14	0.92	F_AE4	4.47	0.85

Mindfulness Items	*M*	*SD*	Mindfulness Items	*M*	*SD*
Curiosity			Decentering		
M_C1	2.94	1.35	M_D1	3.60	1.26
M_C2	2.98	1.35	M_D2	3.83	1.24

M_C3	2.82	1.37	M_D3	2.78	1.34
M_C4	3.00	1.37	M_D4	3.60	1.17
M_C5	3.49	1.27	M_D5	3.78	1.07
M_C6	2.97	1.35	M_D6	2.91	1.31
			M_D7	2.78	1.40

Ego-Dissolution Items	*M*	*SD*	Ego-Dissolution Items	*M*	*SD*
EDI1	45.21	33.66	EDI5	43.34	34.07
EDI2	57.66	33.72	EDI6	69.71	30.74
EDI3	59.03	35.12	EDI7	47.32	35.51
EDI4	46.74	34.38	EDI8	42.06	33.73

Rumination Items	*M*	*SD*	Rumination Items	*M*	*SD*
RUM1	39.67	32.99	RUM5	20.69	28.45
RUM2	20.95	27.91	RUM6	15.49	24.93
RUM3	19.87	27.10	RUM7	14.29	23.89
RUM4	14.45	24.41	RUM8	15.51	24.48

Self-Reflection Items	*M*	*SD*	Self-Reflection Items	*M*	*SD*
SRIS_SR1	4.48	1.34	SRIS_SR7	4.49	1.42
SRIS_SR2	4.49	1.39	SRIS_SR8	4.54	1.18
SRIS_SR3	4.34	1.20	SRIS_SR9	4.43	1.18
SRIS_SR4	4.44	1.34	SRIS_SR10	4.51	1.16
SRIS_SR5	4.42	1.18	SRIS_SR11	4.37	1.26
SRIS_SR6	4.43	1.24	SRIS_SR12	4.48	1.13

Insight Items	*M*	*SD*	Insight Items	*M*	*SD*
SRIS_IN1	4.91	0.89	SRIS_IN5	4.49	1.34
SRIS_IN2	4.44	1.33	SRIS_IN6	4.49	1.37
SRIS_IN3	4.55	0.99	SRIS_IN7	4.20	1.42
SRIS_IN4	3.98	1.43	SRIS_IN8	4.45	1.13

Non-Dual Awareness Items	*M*	*SD*	Non-Dual Awareness Items	*M*	*SD*
NDA1	6.75	2.72	NDA3	7.86	2.48
NDA2	6.16	2.95			

Confirmatory Factor Analyses of Related Scales

As shown in Table 15, CFAs were individually conducted on the related scales to assess whether the expected model would fit this data.

Table 15

CFA Results on Presence, Mindfulness, Flow, Ego-Dissolution, Rumination, Self-Reflection and Insight

Construct(s)	Normal-Theory Chi-square	Robust Chi-square	Degrees of Freedom	P value	CFI	RMSEA	SRMR
Presence	116.024	223.701	74	0.000	0.988	0.058	0.032
Mindfulness	391.745	655.398f	64	0.000	0.945	0.124	0.072
Flow	1722.691	1384.654	584	0.000	0.906	0.098	0.048
Ego-Dissolution	112.887	77.116	20	0.000	0.968	0.069	0.044
Rumination	146.193	65.530	20	0.000	0.963	0.062	0.034
Self-Reflection and Insight	3592.730	2934.565	169	0.000	0.870	0.165	0.129

Note. N = 601. Non-Dual Awareness only has three items and it is just identified, thus fit could not be evaluated through a CFA.

A two-factor model was assessed for the Mindfulness items using WLSMV as an estimator to prevent biased loadings from the categorical scale data. CFI and RMSEA values were not within the Hu and Bentler (1999) criteria, meaning that the two-factor model did not fit this data.

A hierarchical 8 factor model was tested for Flow. WLSMV was originally used as an estimator; however, a warning message occurred likely because the data were not powered for this complex of a model. Thus, Robust Maximum Likelihood (MLR) was utilized as the estimator. Results indicate that CFI and SRMR are not within Hu and Bentler (1999) criteria. Thus, this model does not statistically fit the data.

A unidimensional model was tested for Ego-Dissolution using MLR as an estimator. MLR was used to correct for non-normality since that data were skewed to prevent biased estimates. RMSEA of 0.069 was slightly above the minimum Hu and Bentler (1999) criteria of 0.060. Thus, this this model nearly fit the data.

A unidimensional model was tested for Rumination using MLR as an estimator. The rumination data were skewed; thus, correcting for non-normality using MLR is appropriate to prevent biased estimates. CFI and SRMR values are within Hu and Bentler (1999) criteria; however, RMSEA was 0.062 slightly above the 0.060 recommendation. Thus, this model nearly fit the data.

A two-factor model was assessed for the Self-Reflection and Insight items using WLSMV as an estimator as the data were categorical. None of these results for CFI, RMSEA, or SRMR meet the standards for model fit as per the Hu and Bentler (1999) criteria.

It was surprising that most of the scales administered did not perform well in our sample, perhaps measurement invariance is to blame or perhaps this misfit might be because the validation of these other scales was not done properly. Overall, these results suggest that some of these other measures that are widely used in the field may need to be re-examined and re-analyzed using more modern psychometric techniques. It is also possible that the Ego-Dissolution Inventory might not have fit in this sample since only a minority of people in the qualitative section reported a psychedelic or other drug-related experience, and that scale might not work as well in non-psychedelic contexts. Additionally, some of the Flow State Scale items used the word “performance,” and although some participants’ experiences were related to performance, this similarly was in the minority of experiences and that could have also contributed error. Although it also might be the case that there was something unique or unusual with our sample, in three different samples (two EFAs and one CFA) the strong psychometric properties of Presence have been consistent.

Structural Equation Models of Presence and Other Scales

In order to assess the relationship between Presence and other constructs, Structural Equation Models were tested following the epistemological framework of the nomological networks proposed by

Cronbach and Meehl (1995) as an approach to construct validity. These structural equation modeling analyses allow for the relationships between the constructs to be assessed at a latent level. Examining model fit in conjunction with latent level correlations provide the information necessary to make inferences regarding Presence's relationships with other constructs. Below in Table 16 are the results of each of these tests, and Figures 18-23 depict the full path model results of these tests. All of the analyses aside from the Presence and Rumination model used WLSMV estimators as categorical data were included in these models. However, due to the skewness and sparseness of the extreme values in the responses to the Brief State Rumination Inventory, the WLSMV estimator would not run so MLR was used instead.

Table 16

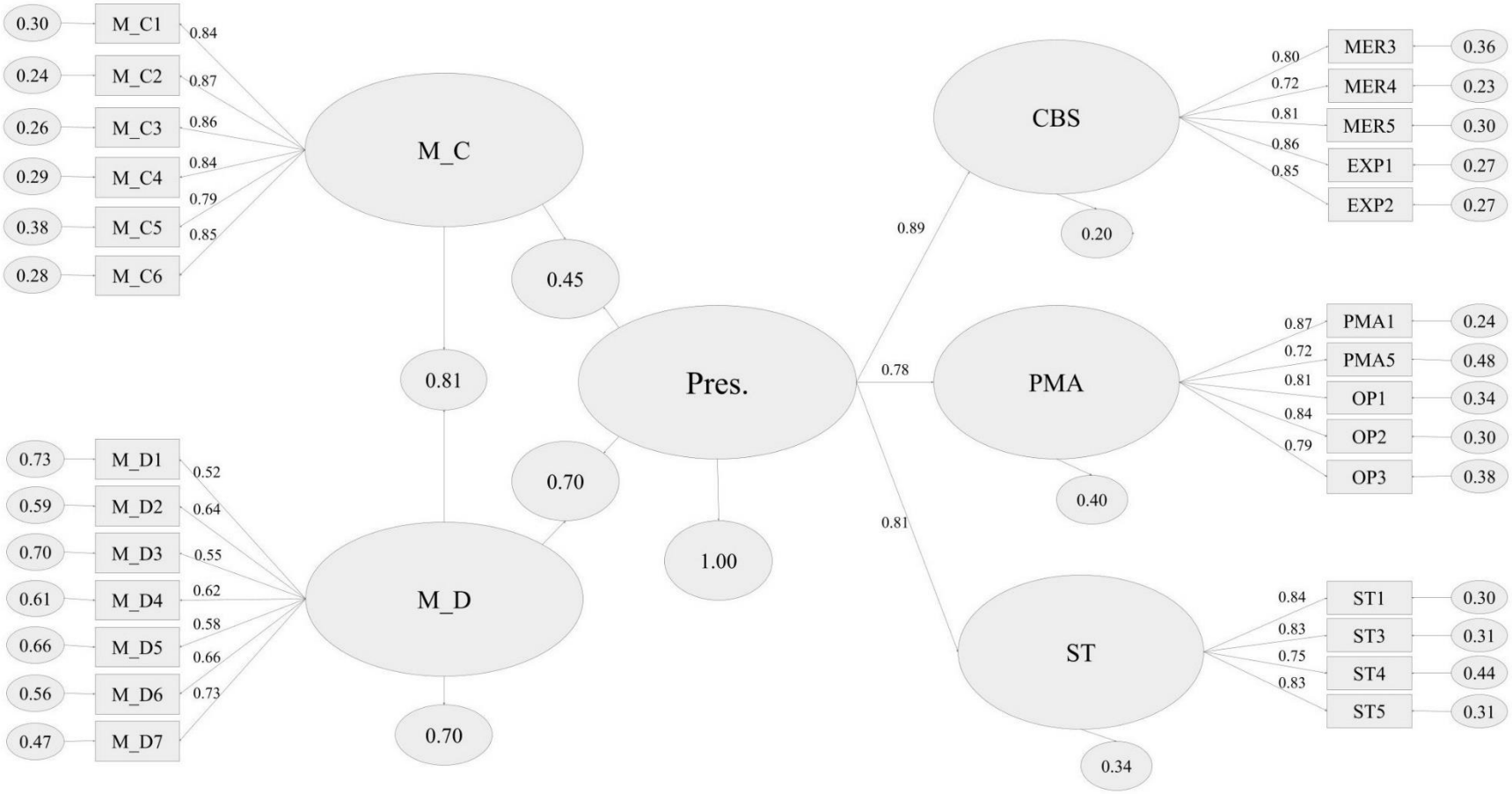
Structural Equation Model Results Examining Presence and Related Constructs

Constructs examined	**Latent Correlation**	**CFI**	**RMSEA**	**SRMR**
Presence & Mindfulness (TMS) (contains M_C & M_D)	Pres & M_C = 0.455 Pres & M_D = 0.697	0.912	0.094	0.085
Presence & Flow (FFS)	Pres & FFS = 0.701	0.838	0.083	0.099
Presence & Ego-Dissolution (EDI)	Pres & EDI = 0.663	0.929	0.116	0.082
Presence & Non-Dual Awareness (NDA)	Pres & NDA = 0.903	0.956	0.098	0.058
Presence & Rumination (BSRI)	Pres & BSRI = -0.155	0.954	0.045	0.072
Presence & Self-Reflection and Insight (SRIS)	Pres & SR = 0.237 Pres & INS = 0.226	0.901	0.096	0.092

Note. *N* = 601. TMS = Mindfulness; M_C = Curiosity factor, M_D = Decentering factor, SR = Self-Reflection, and INS = Insight.

Figure 20

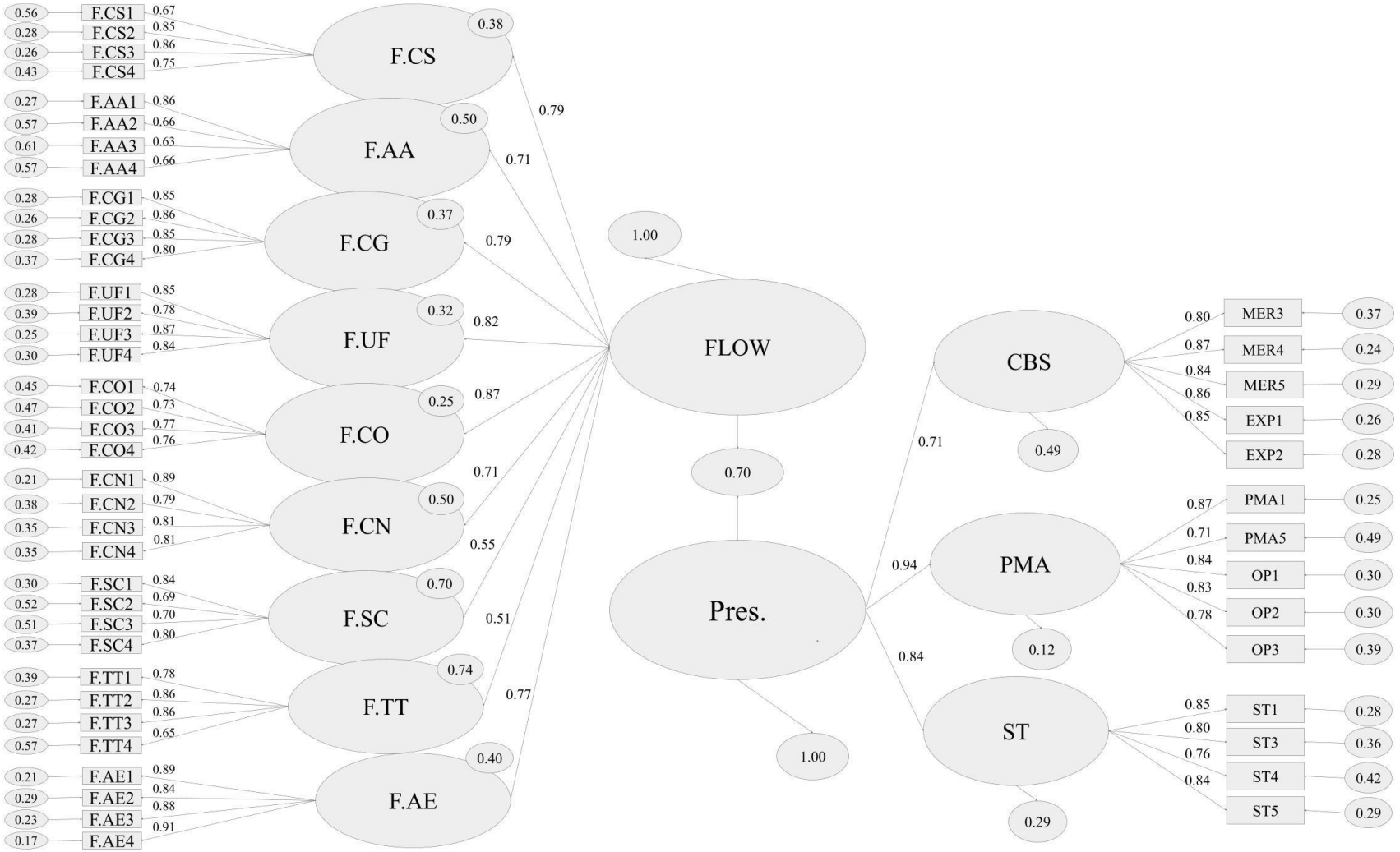
SEM Path Diagram of the Presence Scale and the Toronto Mindfulness Scale



Note. M_C = Curiosity factor, M_D = Decentering factor, Pres. = Presence, ST = Stillness of Mind, PMA = Present Moment Awareness, CBS = Consciousness Beyond Self.

Figure 21

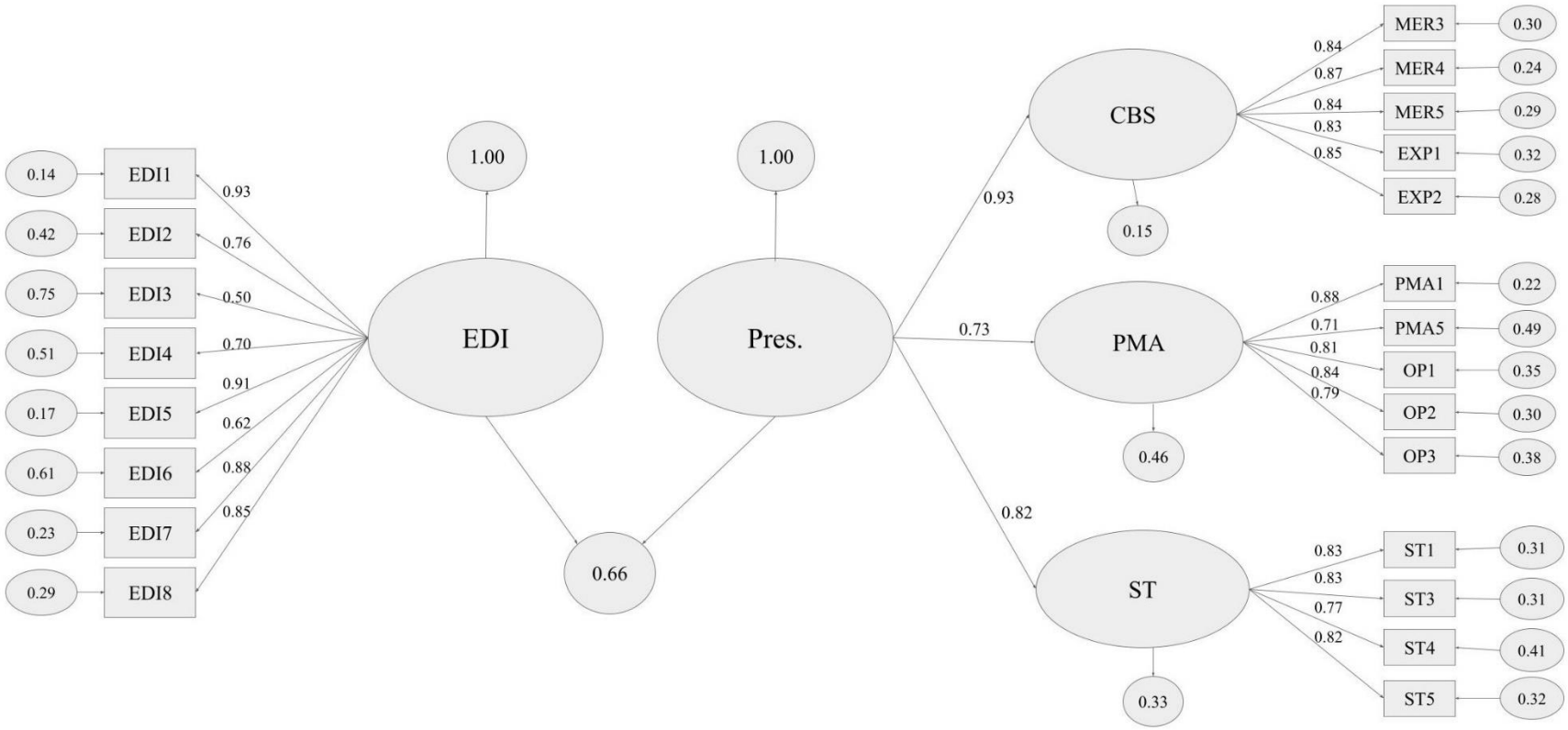
SEM Path Diagram of the Presence Scale and the Flow State Scale



Note. The Flow factor labels are as follows: F.CS = Challenge-skill balance, F.AA = Action-awareness merging, F.CG = Clear goals, F.UF = Unambiguous feedback, F.CO = Concentration on task at hand, F. CN = Paradox of control, F.SC = Loss of self-consciousness, F.TT = Transformation of time, F.AE = Autotelic experience. Pres. = Presence, ST = Stillness of Mind, PMA = Present Moment Awareness, CBS = Consciousness Beyond Self.

Figure 22

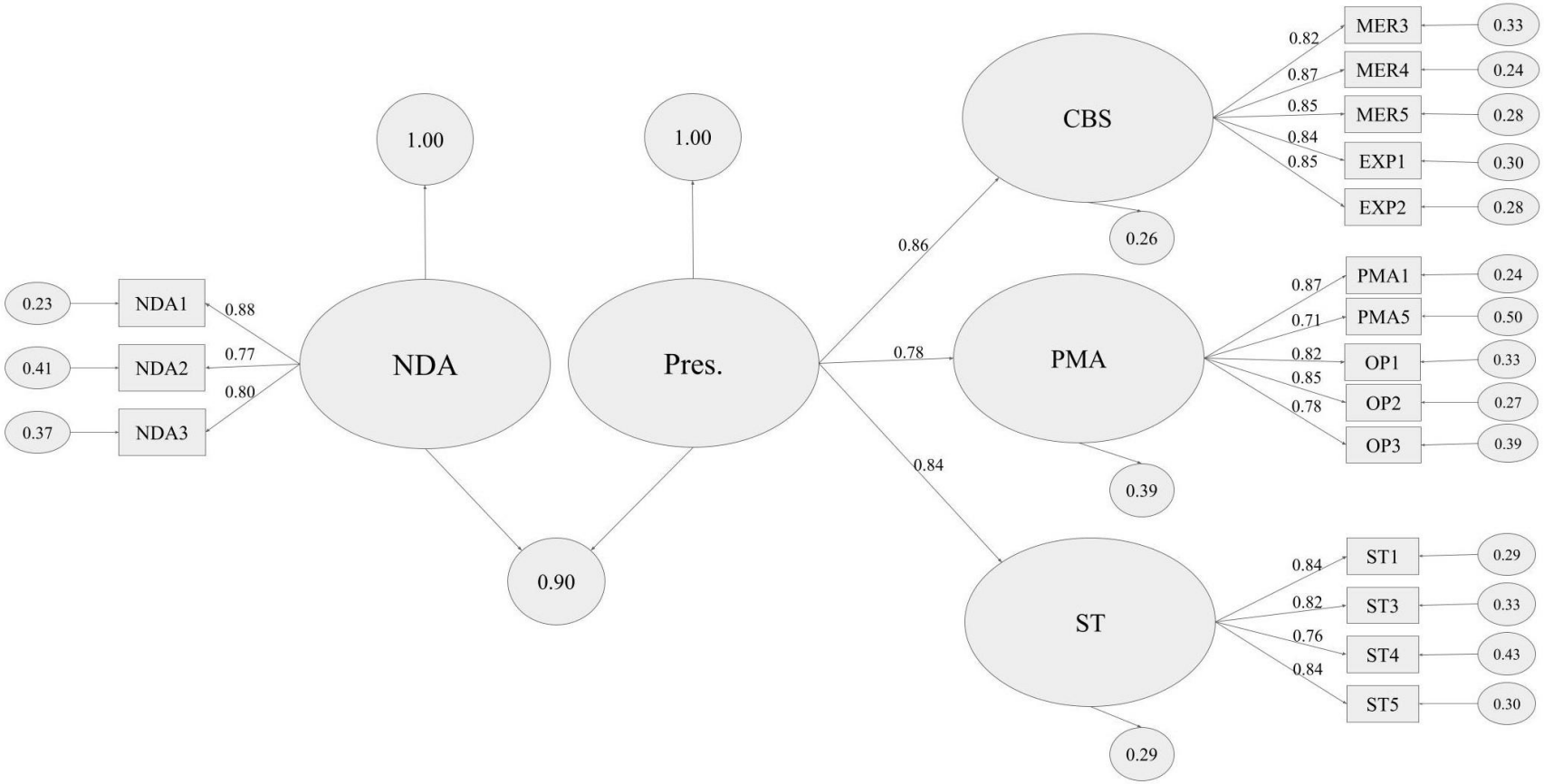
SEM Path Diagram of the Presence Scale and the Ego-Dissolution Inventory



Note. EDI = Ego-Dissolution Inventory, Pres. = Presence, ST = Stillness of Mind, PMA = Present Moment Awareness, CBS = Consciousness Beyond Self.

Figure 23

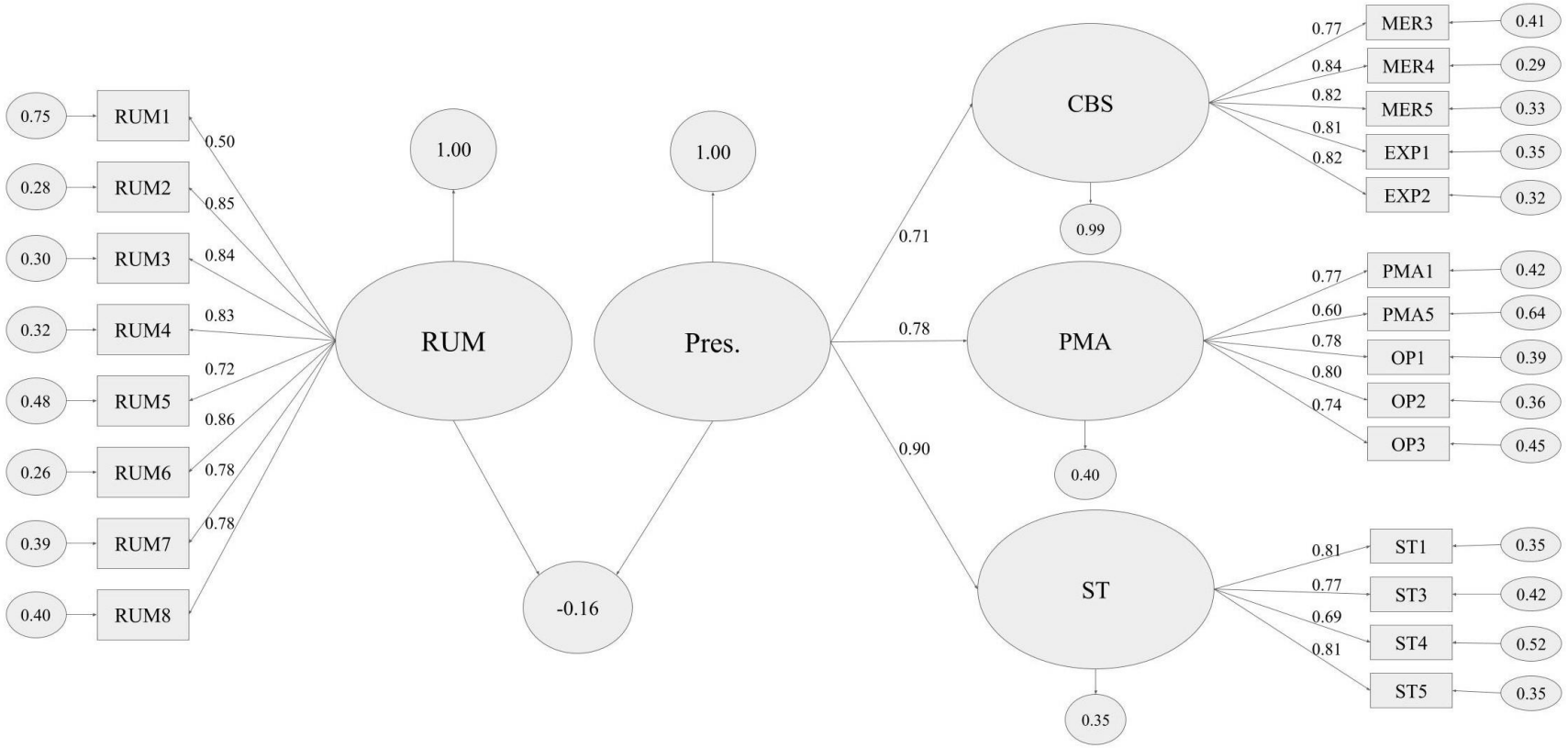
SEM Path Diagram of the Presence Scale and the Non-Dual Awareness State Scale



Note. NDA = Non-Dual Awareness. Pres. = Presence, ST = Stillness of Mind, PMA = Present Moment Awareness, CBS = Consciousness Beyond Self.

Figure 24

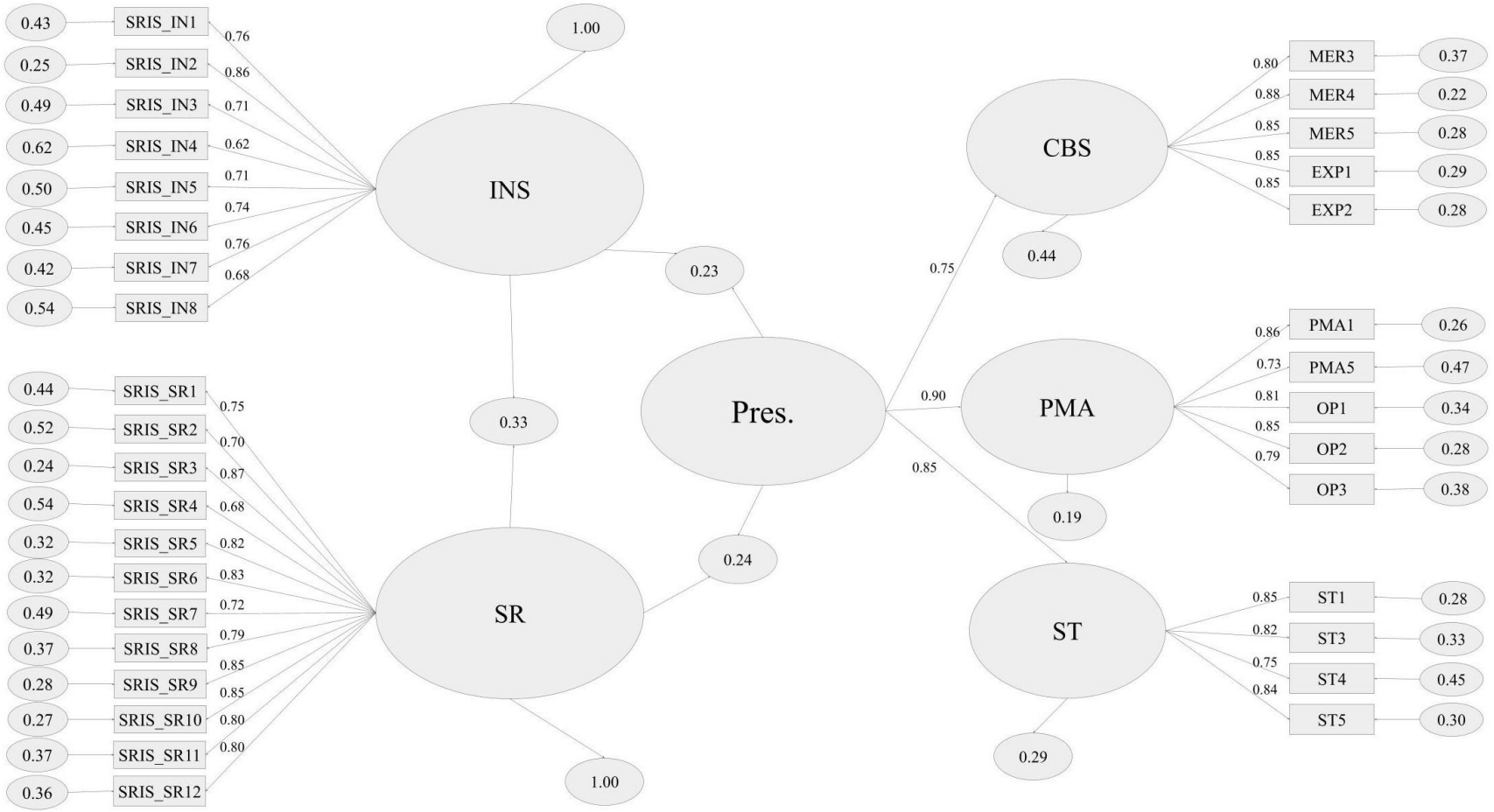
SEM Path Diagram of the Presence Scale and the Brief State Rumination Inventory



Note. RUM = Rumination, Pres. = Presence, ST = Stillness of Mind, PMA = Present Moment Awareness, CBS = Consciousness Beyond Self.

Figure 25

SEM Path Diagram of the Presence Scale and the Self-Reflection and Insight Scale



Note. INS = Insight, SR = Self Reflection. Pres. = Presence, ST = Stillness of Mind, PMA = Present Moment Awareness, CBS = Consciousness Beyond Self.

As hypothesized, Presence has a modest negative relationship with Rumination, given the latent correlation of -0.155. These results of discriminant validity can be trusted as this model of Presence and Rumination fits the Hu and Bentler (1999) Criteria.

The rest of the models with Presence and other constructs did not fit the Hu and Bentler (1999) criteria. If all these models did fit, it would be problematic to obtain these high correlations between Presence and Mindfulness, Flow, Ego-Dissolution, and Non-Dual Awareness. However, since the CFAs did not fit the other scale data, and the data did not fit these subsequent structural equation models, there is not evidence to suggest that these other scales measure what they were intending to measure. Meaning, Presence is positively correlated with something in each of these scales; however, it is unknown what that something is. It may be the case that all of these constructs are poorly measuring aspects of Presence.

Additionally, Non-Dual Awareness had the highest latent correlation with Presence; however, once again this cannot be trusted as there is poor data-model fit. A three-item scale does not have as strong properties as a longer, more robust scale. The validation of this three-item shortened version was also only validated in one sample of 53 individuals. Thus, although a high correlation was obtained, Presence is correlating highly with something that is not Non-Dual Awareness. It may be the case that Non-Dual Awareness is contaminated with a very specific type of construct irrelevant variance: Presence. Given the strong psychometric properties of Presence, it may be the case that the Presence Scale may be making the state Non-Dual Awareness Scale redundant: not the other way around.

The latent correlations between Presence and Self-Reflection and Insight were modest positive values. Once again, however, the CFA results for the Self Reflection and Insight scale revealed poor psychometric properties in this sample, and the subsequent Structural Equation Models did not fit. It appears that Self-Reflection and Insight do not pose as barriers to entering Presence or endorsing the Presence Scale. However, future research would be needed to ascertain the relationship more fully between these constructs and other measures of Self-Reflection and Insight could be considered.

Conclusion

This Master's Thesis embarked on reporting the psychometric and validity results from the final three datasets utilized within the Presence conceptual and scale development project. It serves as a part of a larger body of forthcoming work on Presence, including a Technical Report and a research article. A careful, critical statistical and conceptual approach to developing, refining, and validating the Presence Scale was employed, such that the hierarchical, three-factor factor model has been vetted by over 1,500 participants in one college student sample and two nationally representative samples, as well as by experts in our research team. Presence, a state of being which many have experienced but might find difficult to describe with words, is now something measurable. And with the creation of this powerful tool and potential benchmark of human flourishing, comes the opening of many new directions of future research.

This research also serves as a strong starting point for better understanding the relationships between Presence and other constructs: Mindfulness, Flow, Ego-Dissolution, Non-Dual Awareness, Rumination, and Self-Reflection and Insight. Puzzlingly, none of these scales, aside from the Brief State Rumination Inventory, demonstrated strong enough psychometric properties to make meaningful inferences between Presence and these other constructs. However, given that Presence has the strongest psychometric properties of all the measures in the $N = 601$ US nationally representative sample, we have confidence in this new measure and urge researchers working with topics related to Mindfulness, Flow and Self-Transcendence to perhaps revisit some of their measures and also consider Presence.

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Appendix A

Toronto Mindfulness Scale

	Not at all	A little	Moderately	Quite a bit	Very much
I was curious about each of the thoughts and feelings I was having.	o	o	o	o	o
I experienced my thoughts more as events in my mind than as a necessarily accurate reflection of the way things 'really' are.	o	o	o	o	o
I was aware of my thoughts and feelings without over-identifying them.	o	o	o	o	o
I was curious about what I might learn about myself by taking notice of how I react to certain thoughts, feelings, or sensations.	o	o	o	o	o
I was curious about my reactions to things.	o	o	o	o	o
I was more concerned with being open to my experiences than controlling or changing them.	o	o	o	o	o
I approached each experience by trying to accept it, no matter whether it was pleasant or unpleasant.	o	o	o	o	o
I experienced myself as separate from my changing thoughts and feelings.	o	o	o	o	o
I was receptive to observing unpleasant thoughts and feelings without interfering with them.	o	o	o	o	o
I was curious about what I might learn about myself by just taking notice of what my attention gets drawn to.	o	o	o	o	o
I remained curious about the nature of each experience as it arose.	o	o	o	o	o
I was more invested in just watching my experiences as they arose, than in figuring out what they could mean.	o	o	o	o	o
I was curious to see what my mind was up to from moment to moment.	o	o	o	o	o

Appendix B

Flow State Scale

	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I really enjoyed the experience.	o	o	o	o	o
I was not worried about my performance during the event.	o	o	o	o	o
I was aware of how well I was performing.	o	o	o	o	o
The experience left me feeling great.	o	o	o	o	o
I knew clearly what I wanted to do.	o	o	o	o	o
I was not concerned with what others may have been thinking of me.	o	o	o	o	o
My attention was focused entirely on what I was doing.	o	o	o	o	o
I knew what I wanted to achieve.	o	o	o	o	o
It was no effort to keep my mind on what was happening.	o	o	o	o	o
It was really clear to me that I was doing well.	o	o	o	o	o
I felt I was competent enough to meet the high demands of the situation.	o	o	o	o	o
It felt like time stopped while I was performing.	o	o	o	o	o
I felt like I could control what I was doing.	o	o	o	o	o
I really enjoyed the experience.	o	o	o	o	o
I knew what I wanted to achieve.	o	o	o	o	o
At times, it almost seemed like things were happening in slow motion.	o	o	o	o	o
I performed automatically.	o	o	o	o	o
It was really clear to me that I was doing well.	o	o	o	o	o
It was no effort to keep my mind on what was happening.	o	o	o	o	o
I was not worried about my performance during the event.	o	o	o	o	o
I did things spontaneously and automatically without having to think.	o	o	o	o	o
At times, it almost seemed like things were happening in slow motion.	o	o	o	o	o
I felt like I could control what I was doing.	o	o	o	o	o
My attention was focused entirely on what I was doing.	o	o	o	o	o
I performed automatically.	o	o	o	o	o
It was really clear to me that I was doing well.	o	o	o	o	o

It was no effort to keep my mind on what was happening.	o	o	o	o	o
I was completely focused on the task at hand.	o	o	o	o	o
My attention was focused entirely on what I was doing.	o	o	o	o	o
I had total concentration.	o	o	o	o	o
My abilities matched the high challenge of the situation.	o	o	o	o	o
I was completely focused on the task at hand.	o	o	o	o	o
I was challenged, but I believed my skills would allow me to meet the challenge.	o	o	o	o	o
I had a strong sense of what I wanted to do.	o	o	o	o	o
I felt in total control of my body.	o	o	o	o	o
I did things spontaneously and automatically without having to think.	o	o	o	o	o
My goals were clearly defined.	o	o	o	o	o

Appendix C

Ego-Dissolution Inventory

	Slider scale
I felt far less absorbed by my own issues and concerns	0 (No, not more than usually) – 100 (Yes, I experienced this completely/entirely)
I experienced a dissolution of my "self" or ego	0 (No, not more than usually) – 100 (Yes, I experienced this completely/entirely)
I lost all sense of ego	0 (No, not more than usually) – 100 (Yes, I experienced this completely/entirely)
I experienced a decrease in my sense of self-importance	0 (No, not more than usually) – 100 (Yes, I experienced this completely/entirely)
I felt at one with the universe	0 (No, not more than usually) – 100 (Yes, I experienced this completely/entirely)
All notion of sense and identity dissolved away	0 (No, not more than usually) – 100 (Yes, I experienced this completely/entirely)
I felt a sense of union with others	0 (No, not more than usually) – 100 (Yes, I experienced this completely/entirely)
I experienced a disintegration of my "self" or ego	0 (No, not more than usually) – 100 (Yes, I experienced this completely/entirely)

Note. In Qualtrics, participants responded to each item on a slider scale from 0 to 100 with endpoints labeled as shown above.

Appendix D

State Non-Dual Awareness Scale

	Not at all									Very much
I experienced all things seeming to unify into a single whole.	o	o	o	o	o	o	o	o	o	o
I felt surrounded and filled with a blissful warmth or energy.	o	o	o	o	o	o	o	o	o	o
I experienced all sense of self and identity dissolve away	o	o	o	o	o	o	o	o	o	o

Appendix E

Brief State Rumination Inventory

	Slider scale
I wondered why I always feel the way I do.	0 (completely disagree) – 100 (completely agree)
I wondered why I couldn't respond in a better way.	0 (completely disagree) – 100 (completely agree)
I was thinking: “why can’t I handle things better?”	0 (completely disagree) – 100 (completely agree)
I wondered why I react the way I do.	0 (completely disagree) – 100 (completely agree)
I was rehashing in my mind recent things I’ve said or done.	0 (completely disagree) – 100 (completely agree)
I was thinking: “why do I have problems other people don’t have?”	0 (completely disagree) – 100 (completely agree)
I was reflecting about my mood.	0 (completely disagree) – 100 (completely agree)
It was hard for me to shut off negative thoughts about myself.	0 (completely disagree) – 100 (completely agree)

Note. In Qualtrics, participants responded to each item on a slider scale from 0 to 100 with endpoints labeled as shown above.

Appendix F

Self-Reflection and Insight Scale

	Strongly disagree	Disagree	Somewhat disagree	Somewhat agree	Agree	Strongly agree
I am very interested in examining what I think about	o	o	o	o	o	o
Thinking about my thoughts makes me more confused	o	o	o	o	o	o
My behavior often puzzles me	o	o	o	o	o	o
I am usually aware of my thoughts	o	o	o	o	o	o
I have a definite need to understand the way that my mind works	o	o	o	o	o	o
I frequently examine my feelings	o	o	o	o	o	o
I don't often think about my thoughts	o	o	o	o	o	o
I'm often aware that I'm having a feeling, but I often don't quite know what it is	o	o	o	o	o	o
I don't really think about why I behave in the way I do	o	o	o	o	o	o
I usually know why I feel the way I do	o	o	o	o	o	o
Often I find it difficult to make sense of the way I feel about things	o	o	o	o	o	o
It is important to me to be able to understand how my thoughts arise	o	o	o	o	o	o
I usually have a very clear idea about why I've behaved in a certain way	o	o	o	o	o	o
I often think about the way I feel about things	o	o	o	o	o	o
I'm often confused about the way that I really feel about things	o	o	o	o	o	o
It is important to me to try to understand what my feelings mean	o	o	o	o	o	o
It is important for me to evaluate the things that I do	o	o	o	o	o	o
I frequently take time to reflect on my thoughts	o	o	o	o	o	o
I rarely spend time in self-reflection	o	o	o	o	o	o
I am not really interested in analyzing my behavior	o	o	o	o	o	o

Note. In Qualtrics, each item option column (e.g., Strongly disagree, Disagree) was equally spaced.

Appendix G

Big Five Inventory

	Strongly Disagree	Disagree a little	Neither agree nor disagree	Agree a little	Strongly agree
Is talkative	o	o	o	o	o
Tends to find fault with others	o	o	o	o	o
Does a thorough job	o	o	o	o	o
Is depressed, blue	o	o	o	o	o
Is original, comes up with new ideas	o	o	o	o	o
Is reserved	o	o	o	o	o
Is helpful and unselfish with others	o	o	o	o	o
Can be somewhat careless	o	o	o	o	o
Is relaxed, handles stress well	o	o	o	o	o
Is curious about many different things	o	o	o	o	o
Is full of energy	o	o	o	o	o
Starts quarrels with others	o	o	o	o	o
Is a reliable worker	o	o	o	o	o
Can be tense	o	o	o	o	o
Is ingenious, a deep thinker	o	o	o	o	o
Generates a lot of enthusiasm	o	o	o	o	o
Has a forgiving nature	o	o	o	o	o
Tends to be disorganized	o	o	o	o	o
Worries a lot	o	o	o	o	o
Tends to be lazy	o	o	o	o	o
Is emotionally stable, not easily upset	o	o	o	o	o
Is inventive	o	o	o	o	o
Has an assertive personality	o	o	o	o	o
Can be cold and aloof	o	o	o	o	o
Perseveres until the task is finished	o	o	o	o	o
Can be moody	o	o	o	o	o
Values artistic aesthetic experiences	o	o	o	o	o
Is sometimes shy, inhibited	o	o	o	o	o
Is considerate and kind to almost everyone	o	o	o	o	o
Does things efficiently	o	o	o	o	o
Remains calm in tense situations	o	o	o	o	o
Prefers work that is routine	o	o	o	o	o
Is outgoing, sociable	o	o	o	o	o
Is sometimes rude to others	o	o	o	o	o
Makes plans and follows through with them	o	o	o	o	o
Gets nervous easily	o	o	o	o	o
Likes to reflect, play with ideas	o	o	o	o	o
Has few artistic interests	o	o	o	o	o
Has an active imagination	o	o	o	o	o
Tends to be quiet	o	o	o	o	o
Is generally trusting	o	o	o	o	o
Likes to cooperate with others	o	o	o	o	o

Is easily distracted	o	o	o	o	o
Is sophisticated in art, music, or literature	o	o	o	o	o

Appendix H

Presence Scale

	Not at all	Very slightly	A little	Moderately	Quite a bit	Very much	Completely
My mind felt like a calm, clear lake.	o	o	o	o	o	o	o
There were moments when my mind felt still.	o	o	o	o	o	o	o
My mind was free from inner dialogue.	o	o	o	o	o	o	o
My mind felt settled.	o	o	o	o	o	o	o
I sensed at the time that I was fully alive in the moment.	o	o	o	o	o	o	o
I was conscious of myself experiencing the moment.	o	o	o	o	o	o	o
I welcomed what was happening to me for what it was.	o	o	o	o	o	o	o
My heart was open to the full experience.	o	o	o	o	o	o	o
I found myself receptive to the experience as it unfolded.	o	o	o	o	o	o	o
I felt a part of myself expanding outward.	o	o	o	o	o	o	o
My consciousness extended outward as if toward a horizon.	o	o	o	o	o	o	o
My sense of self faded as I became part of something greater.	o	o	o	o	o	o	o
I seemed to merge with something beyond myself.	o	o	o	o	o	o	o
I felt my self merging with everything, as though I were a wave that merged back into the ocean.	o	o	o	o	o	o	o

Note. In Qualtrics, each item option column (e.g., Not at all, Very slightly) was equally spaced.