

THE SOROKIN MULTIDIMENSIONAL INVENTORY OF LOVE EXPERIENCE (SMILE): DEVELOPMENT, VALIDATION, AND RELIGIOUS DETERMINANTS*

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This paper describes the development and validation of the Sorokin Multidimensional Inventory of Love Experience (SMILE), a 24-item scale based on the writing of sociologist Pitirim Sorokin. The SMILE contains six subscales of four items each, corresponding to what Sorokin termed the religious, ethical, ontological, biological, psychological, and social domains of love. Through confirmatory factor analysis, all factor loadings were found to be strong and statistically significant. A model specifying intercorrelations among all subscales exhibited good overall fit, although biological love was only weakly related to the other factors. Finally, through hierarchical OLS regression, religious measures were found to be significant determinants of scores on five of six subscales. This confirms Sorokin's hypothesis that affirming the experience of love is in part a function of religiousness. The SMILE promises to broaden the scope of social research on love and to promote investigation of this neglected psychosocial construct.

Throughout history, the writings of great poets, philosophers, saints, and mystics from across cultures and religions have proclaimed love—given and received—to be the essence of a life well lived. The experience of loving and being loved in return, moreover, may have certain consequences—an instrumentality, in the language of sociology. For 13th century Sufi master Jalaluddin Rumi, “Through love all that is bitter will be sweet” (Schimmel 1996:17). For 16th century Spanish Carmelite nun St. Teresa of Avila, “Love makes labour light. Love alone gives value to all things” (Clissold 1977:30). For 17th century French monk Brother Lawrence, “In the way of God, thoughts count very little. Love does it all” (Lawrence 1985:145). Finally, for 19th century Russian author Fyodor Dostoevski, “If thou love each thing thou wilt perceive the mystery of God in all” (as quoted in Bridges 1918:354).

Among scientific disciplines, only social psychology has directed systematic attention to love. This work has focused on features or sequelae of the romantic aspect of love and associated phenomena (e.g., dating behavior, sexual attraction, spousal affection, and loving attachments between pairs of people). A body of theoretical writing has emerged, along with interesting efforts to develop and validate measurement instruments. Together, this

work constitutes an emerging field of study that has come to be known as the psychology of love (Hendrick and Hendrick 2002; Sternberg and Barnes 1988).

Since its origins as an identifiable field in the early 1970s (Rubin 1988), the psychological study of love has sought to define and delineate boundaries of this construct and to formulate both conceptual and theoretical models (Pincus and Cabrera 1995). By the late 1980s, psychologists had succeeded in producing a variety of useful theories and models for understanding it (see Sternberg and Barnes 1988). Theoretical perspectives vary considerably, matching the breadth of orientations and subdisciplinary schools within academic psychology. Depending upon one's perspective, love has been conceptualized as an affect, attitude, behavior, or cognition (see Murstein 1988). Throughout the many published typologies and taxonomies, numerous types or dimensions of love have been identified or proposed: intimacy vs. passion vs. commitment (Sternberg 1986, 1988), adoration vs. appetitive vs. benevolent love (Benoit 1980), genuine vs. pseudo love (Fromm 1956), being vs. deficiency love (Maslow 1962), love vs. liking (Rubin 1970), romantic vs. conjugal love (Driscoll, Davis, and Lipetz 1972), and passionate vs. compassionate love (Berscheid and Walster 1978), among others. Further, theoretical writing on love has spanned almost the full scope of psychological schools: developmental, psychoanalytic, cognitive, behavioral, social, and, more recently, humanistic and transpersonal.

Accordingly, anything like a consensus, global definition of love has not been forthcoming. Little wonder that love has been referred to as "a subject whose boundaries recede with each attempt to characterize them" (Brown 1987:vii). Perhaps the best that one can do is this provocative insight: "Love is an Austro-Hungarian Empire uniting all sorts of feelings, behaviors, and attitudes, sometimes having little in common, under the rubric of 'love'" (Murstein 1988:33). In some ways this may be frustrating, but it does not necessarily present a barrier to empirical research. Because love means such different things to different investigators depending upon their worldviews and theoretical perspectives, prospective researchers are advised simply to settle on a precise operational definition that is appropriate for their specific study—one that is understandable and theoretically defensible in that context.

Efforts to develop and validate measurement instruments for love have tracked alongside the prevailing theoretical models of love put forth by psychologists. Existing scales and indices thus tend to emphasize assessment of loving transactions and attachments between romantic partners, spouses, or life companions. Early representative instruments include the Love Scale (Rubin 1970), the Eerotometer (Bardis 1971), and the Love-Eerotometer (Conte *et al.* 1983). Throughout the 1980s, more sophisticated multidimensional measures were developed, including the Love Component Scales (Critelli, Myers, and Loos 1986) and instruments based on Lee's (1973, 1988) multidimensional theory of love styles. This theory posits six variant styles or ways of loving and being loved by another, termed *eros*, *ludus*, *storge*, *mania*, *pragma*, and *agape*. Multi-item scales for these respective constructs have been developed in several formats, including the SAMPLE (Lasswell and Lobsenz 1980), versions of the Love Attitudes Scale (Hendrick and Hendrick 1986, 1990), and one-off efforts to modify items from the latter for use in specific contexts (e.g., Lin and Huddleton-Casas 2005). In the 1990s, sophisticated confirmatory factor analyses began to call into question some aspects of the latent structure of these measures (Rotzien *et al.* 1994; Thompson and Borrello 1992). More recently, a shortened version of the Love Atti-

tudes Scale was validated that uses a total of 24 items to assess the six styles of loving (Hendrick, Hendrick, and Dicke 1998). Instrument development outside of this tradition, such as the 21-item Compassionate Love Scale (Sprecher and Fehr 2005), has continued sporadically up to the present day.

Theoretical and psychometric work in the psychology of love has been limited in several key respects. This is not meant as a criticism of individual pieces of research or writing; as a whole, this work has been uniformly excellent and quite creative. Still, this field overall has maintained a narrow conceptual focus on romantic, sexual, marital, and dating relationships and attachments as defining the fullness of the construct of love. An emphasis on affectional bonds between two people reinforces the idea of love as a transaction between two individuals' psyches or behaviors. This psychological perspective on love serves to limit consideration of other broader and more contextual conceptions of love, including those that might encompass existential, sociocultural, or spiritual dimensions or expressions of love—e.g., love as an ideal, love as a force in nature, love of all beings as motivation for collective action, love as an attribute of a relationship with the divine, etc. Operationalizing these concepts, if possible, does not promise to be an easy task. Such efforts would require a theoretical perspective more inclusive than the current norm within the psychology of love.

SOROKIN'S CONCEPTUAL MODEL OF LOVE

An entirely different approach to conceptualizing love is found in the work of the late Pitirim Sorokin. One of the seminal figures in 20th Century sociology, Sorokin's accomplishments are too vast to detail here beyond a brief summary. Born in Russia in 1889, he trained and later taught at the University of St. Petersburg. He served as personal secretary to Kerensky, and was under death sentence, at one time or another, by both the Czarists and the Bolsheviks before escaping to the U.S. He served as chairman of the sociology department at the University of Minnesota, then moved to Harvard where he founded the Department of Sociology. The multivolume *Social and Cultural Dynamics* (Sorokin 1957), his *magnum opus*, details how sociocultural change throughout human history manifests in cyclically alternating epochs of sensate, idealistic, and ideational value systems. Its publication gained Sorokin a reputation as a brilliant if maverick theorist and critic of social science. He capped his career by being elected president of the American Sociological Association as a write-in candidate (see Sorokin 1963; Tiryakian 1963). He died in 1968.

A decade prior to his retirement from Harvard in 1959, Sorokin undertook what became the focus of his work until the end of his life: the study of dimensions and patterns of love. With support from the Lilly Endowment, he established the Harvard Research Center in Creative Altruism in 1949, which served as a base of operations for his subsequent work on love. Throughout the 1950s, he dedicated himself to the topic, and his output was prolific: an important research study, summarized in *Altruistic Love: A Study of American Good Neighbors and Christian Saints* (1950a); two research symposia, proceedings of which were published as *Explorations in Altruistic Love and Behavior: A Symposium* (1950b) and *Forms and Techniques of Altruistic and Spiritual Growth: A Symposium* (1954a); and his most enduring contribution on love, his seminal *The Ways and Power of Love: Types, Factors, and Techniques of Moral Transformation* (1954b). He also published a fascinating and provocative essay entitled, "The Mysterious Energy of Love" (1958), since reprinted in a

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number of places. According to the late scientist and philosopher Willis Harman (1986:1), Sorokin's work on love is "one of the most important advances of the 20th century."

Sorokin's widespread reputation as a sociological maverick is exemplified by his stated influences and the referenced sources throughout his writings on love. In *Ways and Power of Love* (1954b), especially, he is more likely to cite and quote from the works and teachings of Dostoevski, Gandhi, and St. Paul, and the canonical writings of the saints and sages of non-Western religions, than the canon of classical theorists in sociology. While his earlier forays into elucidating and critiquing grand theory evinced a predilection to Russian behaviorism, a visible debt to the French utopians such as Saint-Simon and Comte, and some antipathy to the prevailing Chicago School, by the time of *Social and Cultural Dynamics* he functioned more as a historian, theologian, and aesthetician, and his subsequent ideas about love were truly *sui generis*, as far as sociological precedents.

Sorokin's basic perspective on love can be summarized as follows:

Love is like an iceberg: only a small part of it is visible, and even this visible part is little known. Still less known is love's transempirical part, its religious and ontological forms. For the reasons subsequently given, love appears to be a universe inexhaustible qualitatively and quantitatively. Of its many forms of being the following can be differentiated: religious, ethical, ontological, physical, biological, psychological, and social (Sorokin 1950b:3).

Sorokin referred to these seven forms of love—the religious, ethical, ontological, physical, biological, psychological, and social—as "aspects" of it. In conceptual and psychometric terms, these "aspects" would be better thought of as dimensions or domains (the term to be used henceforth). For Sorokin, *religious love* referred to experiencing the love of God or the Absolute; *ethical love* referred to identification of love with values such as goodness, truth, and beauty; *ontological love* referred to the instrumentality of love or loving to unify, harmonize, elevate, enrich, and empower; *physical love* referred to love expressed through affirmation of the unifying, integrating, and ordering energies of the universe; *biological love* referred to love expressed sexually and romantically and through passion; *psychological love* referred to love experienced emotionally through giving or receiving empathy, sympathy, kindness, and benevolence; and *social love* referred to love as manifested in meaningful interactions or relationship with others, as driven by sharing, helping, and altruism (Sorokin 1950c, 1954b). Throughout the 1950s, Sorokin traced the manifestation of these expressions of love through history, across cultures and societies, in literature and the creative arts, and in the lives and work of religious teachers, saints, avatars, mystics, social reformers, and common citizens.

Orthogonal to these seven domains of love, Sorokin also described what he termed the five "dimensions" (more like characteristics) of love: intensity, extensity, duration, purity, and adequacy. By his descriptions, these are akin to something like vectors—bidirectional continua along which love expressed in each of the seven domains might be further rated or described. One way to distinguish between these two axes would be to think of the seven domains of love as nouns and the five characteristics of love as adjectives. In his taxonomy, the *intensity* of love ranges between the "zero point" and "infinite love" (with hate, according to Sorokin, constituting its own separate intensity vector); the *extensity* of love ranges from love of oneself to love of all humankind and all sentient beings; the *duration* of love ranges from the shortest possible instant to lasting throughout the entire life of an individual or collectivity; the *purity* of love ranges from "love for love's sake" (*i.e.*, love

motivated by love alone) to “soiled love” (love as but a means to an end), a dichotomy similar in respects to the familiar sociological distinction between expressivity and instrumentality; and the *adequacy* of love ranges from identity to discrepancy between the subjective goal(s) of love actions and their objective consequence(s).

Of what are being termed Sorokin’s domains of love, only his biological love and, to a lesser extent, psychological love are consonant with the subsequent direction of most theoretical and psychometric work in the psychology of love. His writing on love actually predates nearly all work in that field, described earlier, but he is almost never cited by psychologists, nor, oddly enough, in the scant sociological writing on love by his contemporaries (e.g., Goode 1959). Perhaps this is because of his more sweeping conceptual orientation to the construct and his emphasis on macro-sociological and social-historical themes. His unique and holistic multidimensional vision of love, coupled with the scope and depth of his perspective, thus make his ideas about love well worth revisiting.

One such effort has been an ongoing project by the present investigators to develop and validate a multidimensional measurement instrument based on Sorokin’s conceptual model of the domains of love. This is an inherently hazardous task for three reasons. First, Sorokin has been dead for four decades, and thus cannot be consulted. Translating his sometimes obtuse writing on love into questionnaire items is therefore an inherently subjective and imprecise venture. Second, Sorokin was famously hostile toward efforts to create rating scales for use in studying psychosocial phenomena; he reserved phrases like “sham mathematics,” “quantophrenia,” “illusion,” and “the cult of numerology” for such work, as described in his *Fads and Foibles in Modern Sociology and Related Sciences* (1956). The only valid mathematical social science, he believed, was in the quantification of observable events, such as behaviors. Thus, he was not a fan of most psychometric research, to say the least, and he may have disapproved of any effort to operationalize his conceptual model of love. Third, a scale based on Sorokin’s taxonomy runs the risk of being mistakenly perceived as a statement of theory or as the investigators’ take on what love “really” is in contradistinction to work in the psychology of love reviewed earlier. In fact, it is neither. The intent of the present study is simply to operationalize Sorokin’s taxonomy of the domains of love for use in empirical social research—*i.e.*, to develop and validate a multidimensional measure so that patterns, determinants, and outcomes of his unique set of love-related constructs may be investigated by interested social scientists.

SOROKIN, LOVE, AND RELIGION

A critical subtext to Sorokin’s writings on the topic of love was his explicit affirmation of love as a religion-laden phenomenon. By that, he meant that the experience of love in all of its various forms and expressions, according to his taxonomy, is a function of characteristics of the religious life of individuals—their beliefs, attitudes, behaviors, and values regarding God, faith, and spirituality. For Sorokin, the capability of expressing and experiencing love, through whichever channels, derives from one’s ability to connect with something larger than oneself, and indeed is a marker of sorts for religiousness successfully internalized in one’s psyche and externalized through one’s actions in the world.

Specifically, Sorokin suggested that expressions of religion reflect a revealed “suprational, supraconscious, suprasensory Truth” (1954b:109) that serves to inspire people morally to act in ways that reflect an ethical instrumentality of religious faith. Through the agency of such God-attuned consciousness, Sorokin recognized, human beings could try “to reach

union with God, and God-centered love” (1954b:6); to recognize ethical truths and goods as “unified aspects of the Absolute Value of God” (1954b:6); to motivate recognition of and action undertaken to counteract the evil forces that threaten the “harmonious unity” (1954b:8) of all beings, and thus their very existence; and to encourage norms of behavior that sanction “the joy of giving and the joy of receiving” (1954b) and of solidarity, mutual aid, cooperation, and altruism, as taught by the Western monotheisms. Characteristic expressions of the lives of religious people, therefore, were seen by Sorokin as associated with or generative of, at least ideally, his domains of religious, ethical, ontological, and social love.

Regarding the other three domains—physical, biological, and psychological love—Sorokin was characteristically ambiguous. About physical love, Sorokin said very little. He seemed to define this as an affirmation of the oneness and wholeness of the physical universe, as in contemporary views reconciling physics and Eastern religion. But it is difficult to envision how, precisely, mainstream (*i.e.*, non-new-age) religious sentiments might be related to measures of such a construct. As by biological love Sorokin referred to a valuation of romantic and sexual relations as paramount among expressions of love, it is possible that normative expressions of religious behavior, beliefs, or attitudes, as assessed in social science investigations of general populations like the present study, may be unrelated or inversely related to scores on a respective subscale, although some theoretical correspondence has been proposed (Kirkpatrick and Shaver 1982). For psychological love, it is possible to see religion as a positive determinant, if this construct is assessed by measures tapping other-regard, but also as unrelated, if associated measures are drawn to reflect more of a self-focused striving toward actualization. Both senses are present within Sorokin’s writing on this domain.

Sorokin’s writing on the religious origins and implications of altruistic love was not as much of a coda or outlier in the larger context of his full career as is commonly assumed. This work was an important part of a larger program of writing based on his concept of “integralism.” According to Jeffries (2005:69), the foundational idea of this concept is that “the subject matter of the social sciences contains empirical-sensory, rational-mindful, and superrational-supersensory components . . . [opening] the spiritual and transcendental realm to consideration and analysis.” To operate under these assumptions served to locate Sorokin quite a bit outside the mainstream of mid-20th-Century sociological and psychological writing on religion. His discussion of transcendental functions of religion predated and anticipated theoretical writing in the social scientific study of religion that would not appear for another couple of decades with the emergence of transpersonal psychology. At the same time, his concern with the instrumentality of religion for both psychological adjustment and social behavior was very much in keeping with the best of contemporary behavioral (e.g., Allport 1979) and social (e.g., Lenski 1963) scientists. His interests and ideas may have been ahead of their time, but he was indeed a precursor of the modern religious social scientist. More to the point, his thesis is quite testable, provided that measures of his concepts can be developed and validated.

METHODS AND DATA

The data utilized in this analysis were collected in the Tidewater area of Virginia, in 1997-98, as part of a study of psychosocial and health-related correlates and outcomes of expressions of love. A secondary aim was to develop and validate a measure of love based

upon Sorokin's taxonomy of the domains of love, a measure intended for use both in the present study and subsequently by other investigators. The study was undertaken in several stages. These included a review of prior theoretical and empirical work, meeting with the project consultant to develop an item pool, creating a measurement instrument, pretesting the instrument, and implementing data collection. A self-administered survey instrument was distributed to a sample recruited from the outpatient population of an academic medical-center-based family practice clinic. The sample was limited to primary care patients (excluding children and excluding patients presenting with acute illnesses that would interfere with survey completion); the sampling frame comprised patients invited to participate each day over a period of approximately one academic year.¹ The final sample contained 205 respondents, representative of the clinical population according to all key sociodemographic indicators.

Surveys were distributed by a research assistant who approached potential respondents with study information and an IRB-approved consent form and questionnaire packet. She verbalized the anonymity of responses and answered any questions. Administration of the survey was conducted with implied consent. Upon completion, each respondent placed the completed survey in a sealed envelope and put it in a box on the intake registration table in the clinic waiting room. The survey was completed by most respondents in 15-20 minutes, while waiting for their appointment. No names or any other forms of personal identification appeared on the survey; all responses were completely anonymous.

The average age of respondents was 37.8 years. The sample was evenly split between Caucasians and African Americans. Three-quarters of respondents were female, and just under half were married and living together. Respondents averaged 1.7 children and a year of post-high-school education. Three-quarters were employed, gross annual household income averaged about \$25,000, about two thirds of respondents grew up in an urban area, and over 80% resided in a city. Respondents were somewhat less formally religious than national norms, but exhibited normative levels of private religiousness. Nearly three-quarters of respondents stated that they were in good or excellent health.

A pool of 72 items was developed through a careful reading of Sorokin's (1950c, 1954b) written descriptions of what he meant by love. Through pretesting, this was reduced to 67 items, several of which were reworked. Items were written to coincide, as closely as possible, with the exact words and phrases used in Sorokin's descriptions of his seven domains of love. Specifically, investigators carefully tracked through Sorokin's writings on each respective domain (e.g., religious love, psychological love) and then translated his ideas and words into brief statements to be affirmed by respondents (e.g., "God loves me," "Feeling loved takes away all my fear"). Within each domain, with one exception, an effort was made to draft at least one item to cover each of Sorokin's five characteristics of love (*i.e.*, intensity, extensity, duration, purity, and adequacy). The exception was for the domain that Sorokin termed physical love. According to his descriptions of this concept, which are at times ambiguous, it seemed that Sorokin was here referring less to a domain through which love is expressed than to certain beliefs about the nature of the physical universe. Items were written accordingly, and comprise a scale assessing beliefs about the physics of reality. Because this construct seems so fundamentally distinct from the rest of Sorokin's taxonomy of domains of love, investigators decided it was best kept separate from the other factors and thus was excluded from the instrument. It will not be considered further in the present paper.

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For the six remaining domains, each item consists of a brief statement, in the form of a self-rating, coded on a five-point Likert-type index (1 = "strongly disagree," 2 = "disagree," 3 = "undecided or no opinion," 4 = "agree," 5 = "strongly agree"). Through pretesting, this metric was found to be easily interpretable by respondents and elicited rapid responses and a reasonable distribution of scores.

In preliminary analyses, use of all 67 pretested items yielded satisfactory to very high internal-consistency reliability scores for five of the six domains of love: religious love ($\alpha = .94$), ethical love (.86), ontological love (.79), biological love (.78), and psychological love (.76). For the other subscale, social love, α -reliability was less than satisfactory (.56). This does not necessarily reflect on Sorokin's ideas and constructs. It was difficult at times to decipher his writing, which was often imprecise, and then translate it into viable survey items. It could be that the items were poorly conceived and/or worded by the investigators. This is an inherent stumbling block in developing an instrument based on someone else's theoretical writings, especially when the theorist cannot be consulted.

These high internal-consistency reliability values for five of the six subscales, coupled with evidence from exploratory factor analyses (not reported here) that each was unidimensional, encouraged development of reduced-item short forms for each of the subscales. This was recognized as a practical benefit, as well, as no new measure, especially assessing such an unusual construct, is likely to be favorably received if only available in an unwieldy 67-item version. The original version of one of the subscales, religious love, was utilized successfully in an analysis of health status (Levin 2001), published in this journal, and in a subsequent analysis of a measure of depressed affect (Levin 2002), but the length of the entire scale coupled with the small sample discouraged further use and stimulated development of a shortened version. The resulting instrument has been named the Sorokin Multidimensional Inventory of Love Experience, or SMILE. The exact wording of each item (Y_i) used in this final version of the SMILE, per each respective latent construct (η_i), is listed in Table 1.

It bears repeating that throughout his writings on this taxonomy Sorokin was at best vague and at worst inconsistent as to the precise nature of what these six domains of love represent: Types or kinds of love? Beliefs about the nature of love? Channels for or consequences of giving and receiving love? Domains of life in which loving emotions can be expressed and love, in general, experienced? For the most part, he seemed to favor something akin to the latter, which is why we have settled on the term *domains*. But elements of the other conceptions are present throughout descriptions of his taxonomy. In translating his ideas about love into a set of self-report items, we were thus at the mercy of his descriptions, which were in no way explicitly written for purposes of instrument development.

The objective here, to reiterate, is to operationalize love-as-defined-by-Sorokin while being as faithful as possible to the written descriptions of his ideas and concepts. For religious love (η_1), the respondent is asked to characterize God's attribute of love. For ethical love (η_2) and ontological love (η_3), the respondent is asked to affirm statements about the intrinsic nature and personal consequences of love or loving. For biological love (η_4), the respondent is asked to rate the salience or importance of romance relative to other expressions of love. Finally, for psychological love (η_5) and social love (η_6), the respondent is asked to rate his or her own feelings and values regarding acts of lovingkindness involving others.

Table 1: Item Descriptions of SMILE Indicators by Subscale

Latent Constructs	Observed Indicators
Religious Love (η_1)	<p>Y₁: I feel loved by God (or a higher power). (I) Y₂: God loves all living beings. (E) Y₃: God's love is eternal. (D) Y₄: God's love never fails. (A)</p>
Ethical Love (η_2)	<p>Y₅: Love is always beautiful. (I) Y₆: Love always makes things better. (A) Y₇: Acting out of love is always the best path to follow. (P) Y₈: Real love lasts forever. (D)</p>
Ontological Love (η_3)	<p>Y₉: When I feel loved, I feel complete peace of mind. (I) Y₁₀: Experiencing love helps me feel at one with the universe. (E) Y₁₁: When I'm kind, good things usually happen to me in return. (A) Y₁₂: Love for love's sake brings the greatest happiness. (P)</p>
Biological Love (η_4)	<p>Y₁₃: The purpose of my life is to maximize my pleasure. (P) Y₁₄: The more people who you have loved romantically the better. (E) Y₁₅: It is important for me to always be in a romantic relationship. (D) Y₁₆: Passionate romance is the greatest love of all. (A)</p>
Psychological Love (η_5)	<p>Y₁₇: Feeling loved is my greatest source of happiness. (I) Y₁₈: Feeling loved takes away all my fear. (A) Y₁₉: As long as I can remember, I have always been loved. (D) Y₂₀: Without having others to love, life wouldn't be worth living. (E)</p>
Social Love (η_6)	<p>Y₂₁: I have always been a devoted friend. (D) Y₂₂: Even strangers deserve our full respect. (E) Y₂₃: For a friend in need, I would sacrifice almost anything. (I) Y₂₄: The best kind of love is given freely. (P)</p>

Note: Letters in parentheses indicate to which of Sorokin's five characteristics ("dimensions") of love each item pertains: I = intensity; E = extensity; D = duration; P = purity; A = adequacy.

DATA ANALYSIS

Results are presented of analyses conducted in order to confirm a multidimensional measurement instrument comprising multi-item scales for six of Sorokin's domains of love. Through a strategy culminating in confirmatory factor analysis (CFA), preceded by more traditional psychometric analyses, the original list of items was reduced in number to the 24 contained in the SMILE.

For each domain, items whose factor loadings fell below .40 or whose absence resulted in a substantially higher α -reliability were deleted from the original list. Item pools were further reduced after examination of preliminary CFA results, with a goal of confirming a

set of subscales containing no more than four items apiece. Four-item indices are the smallest size possible to obtain an overidentified solution (Bollen 1989), a minimum requirement in order to use CFA to confirm a potentially stand-alone, unifactor scale. The limitation of each subscale to four items is also pragmatic: it results in a SMILE containing only 24 items, considerably briefer than the original inventory of 67 items and thus much more easily integrated into data collection efforts by prospective researchers.

Internal-consistency analyses were conducted using the CORR procedure with the ALPHA option in SAS 8.2 (SAS Institute 2001). Exploratory factor analyses were conducted using the principal components technique in SAS's FACTOR procedure. CFAs were conducted through a two-step process: (a) PRELIS 2.14 (Jöreskog and Sörbom 1993b) was used to convert raw data for each domain of variables into a polyserial matrix and an asymptotic covariance matrix, and (b) these in turn were used as input for weighted-least-squares (WLS) estimation in LISREL 8.14 (Jöreskog and Sörbom 1993a). WLS estimation has long been recommended for use with ordinal variables (Jöreskog 1990), such as the SMILE items, when one wishes to relax the assumption that data are multinormal (see Morris, Bergan and Fulginiti 1991). This is due to findings suggesting that maximum-likelihood (ML) estimation may be inappropriate for use with nonnormal data and may yield incorrect standard errors and biased overall fit (e.g., Finch and Zautra 1992). A strategy of WLS estimation seemed prudent, as preliminary analyses using the KANT 1.0 software program (MacIntosh 1991) revealed statistically significant levels of multivariate non-normality, kurtosis, and skewness in these data.²

A battery of goodness-of-fit indices was used, as each evaluates overall fit somewhat differently and no one index can fully characterize a model's suitability. For the GFI, AGFI, NFI, NNFI, CFI, IFI, and RFI indices, scores above .900 are believed to indicate a satisfactory fit (Hoyle and Panter 1995; Raykov, Tomer, and Nesselroade 1991), with scores close to 1.0 believed to be ideal (Bollen 1989). For the standardized RMR index, scores below about .05 are believed to indicate a good fit (Byrne 1989). This also applies to the RMSEA index (Sugawara and MacCallum 1993), although with small sample sizes, such as the present study, RMSEA may run somewhat high and thus appear to recommend rejection of an otherwise acceptable model (Rigdon 1996). For the relative likelihood ratio (χ^2/df), scores below about 3 or 4 are thought to indicate acceptable fit (Carmines and McIver 1981), although it, too, is considered less reliable when used with smaller samples (Marsh and Balla 1994).

Besides confirming four-item latent constructs for each domain of love, using WLS estimation, an effort was made to structurally model the SMILE as a whole. This involved simultaneous estimation of all six measurement models specified in oblique form through a freed symmetric matrix of structural-error variances (ψ s) among the six latent constructs. In less technical terms, a fully intercorrelated six-factor model was tested, guided by the hypothesis that all of the SMILE subscales are significantly associated with each other due, ostensibly, to some amount of hypothetical common variance ("love").

In conducting this particular analysis, a couple of barriers arose preventing the use of WLS for this application. First, one of the special matrices required as input by this estimator, namely the asymptotic covariance matrix, is a well established data hog. For PRELIS to create such a matrix successfully required a sample size far in excess of what was available in the present study. In fact, in preliminary analyses, the program shut down and refused to generate the matrix. Second, the number of parameters to estimate in a six-dimensional

measurement model of 24 indicators—all of the factor loadings (λ_{ϵ} s), all of the error terms (ϵ s), all of the structural correlations (ψ s)—even had it been possible, would have far exceeded the robustness of the procedure to produce reliable results. Again, sample size was the limiting factor. While WLS is a generally reliable estimator at low sample sizes (Dolan 1994), models incorporating a large number of observed indicators, such as this one, are often unable to be estimated reliably, or at all, for strictly algorithmic reasons. In these situations, estimation is known to become especially problematic, or impossible, at sample sizes at or below about 200 respondents (Bentler and Chou 1987), as in the present study.

The first barrier necessitated use of ML estimation, which uses a more manageable covariance matrix as input; the second barrier created a need to reduce the number of estimated parameters. The usual solution for this latter problem in structural modeling is to use single-item summary-scale versions of latent constructs, known as composites. Such measures' factor loadings (λ_y s) and error terms (ϵ s) are scaled according to a metric based upon a formula derived from the α -reliability of the summary-scale version of respective constructs. This has the additional benefit of producing interval-like measures conducive to ML estimation.³ In the present analysis, single-item summary indices were thus created for each SMILE subscale, and CFA was run using composites with loadings and errors fixed according to an algorithm derived from reliability estimates (see Liang, Lawrence, Bennett, and Whitelaw 1990).

Finally, analysis of potential religious determinants of the domains of love was straightforward: a simple two-step, hierarchical OLS regression of scores on each 4-item SMILE subscale on each of a battery of nine religious variables, both before (Model I) and after (Model II) controlling for effects of familiar sociodemographic correlates of both religion and myriad psychosocial constructs. In light of the presence of some multicollinearity among religious variables (observed in preliminary analyses), this strategy was deemed appropriate. The objective of this analysis was simply to identify any religious correlates of these domains of love, and thus validate Sorokin's expectancy of a general religion-love relationship, not to structurally model all of love's possible determinants. For this analysis, a variety of public and private religious behaviors and more subjective religious self-ratings was assessed, including measures of religious attendance, private prayer, saying grace, reading the Bible, listening to religious TV or radio, self-rated religiosity, self-rated spirituality, feeling close to God, and the importance of faith.⁴ Sociodemographic variables included age, race/ethnicity, sex, marital status, employment status, education, income, and urbanicity.⁵ This analysis was conducted using the REG procedure in SAS.

RESULTS

CFA yielded excellent four-item measurement models for all six domains of love contained in the SMILE. For each individual measurement model, indices of overall fit were in the ideal range (see Table 2) and all factor loadings (λ_y s) were strong and statistically significant (see Table 3). For five of the six domains of love, these shortened versions of the original inventories also provide highly reliable indices for use as summary scales. Except for the measure of psychological love, no appreciable diminution in α -reliability was encountered in relation to the longer versions of these respective subscales, as reported earlier. The four-item measure for social love, moreover, was considerably more reliable than in its lengthier form in the original battery of items.⁶

Table 2.
Overall Fit of Confirmatory Factor Models for Each SMILE Subscale

Subscale	Fit Indices											
	χ^2 (df)	p	χ^2/df	GFI	AGFI	NFI	NNFI	CFI	IFI	RFI	RMR	RMSEA
Religious Love (η_1)	1.88(1)	.170	1.88	.999	.987	.998	.995	.999	.999	.990	.024	.068
Ethical Love (η_2)	1.26(1)	.261	1.26	.998	.985	.997	.996	.999	.999	.983	.022	.034
Ontological Love (η_3)	.849(1)	.357	.849	.999	.986	.997	1.00	1.00	1.00	.980	.015	.000
Biological Love (η_4)	1.43(1)	.233	1.43	.997	.969	.989	.979	.996	.997	.932	.022	.050
Psychological Love (η_5)	.801(1)	.371	.801	.998	.984	.995	1.01	1.00	1.00	.970	.022	.000
Social Love (η_6)	.000(1)	.985	.000	1.00	1.00	1.00	1.04	1.00	1.01	1.00	.000	.000

Table 3: Completely Standardized WLS Estimates and α -Reliability for Each SMILE Subscale

Parameter	α -Reliability	WLS Estimates ^a
Factor loadings (λ_y s) and measurement errors (ϵ s) for:		
Religious Love (η_1) ^b	.92	
$\lambda_{11}^y (\epsilon_1)$.890 ⁺ (.208)
$\lambda_{21}^y (\epsilon_2)$.940 (.117)
$\lambda_{31}^y (\epsilon_3)$.965 (.068)
$\lambda_{41}^y (\epsilon_4)$.914 (.164)
Ethical Love (η_2) ^c	.84	
$\lambda_{52}^y (\epsilon_5)$.770 ⁺ (.407)
$\lambda_{52}^y (\epsilon_6)$.908 (.175)
$\lambda_{72}^y (\epsilon_7)$.750 (.438)
$\lambda_{82}^y (\epsilon_8)$.780 (.392)
Ontological Love (η_3) ^d	.74	
$\lambda_{93}^y (\epsilon_9)$.703 ⁺ (.506)
$\lambda_{10,3}^y (\epsilon_{10})$.557 (.690)
$\lambda_{11,3}^y (\epsilon_{11})$.747 (.442)
$\lambda_{12,3}^y (\epsilon_{12})$.624 (.611)
Biological Love (η_4) ^e	.70	
$\lambda_{13,4}^y (\epsilon_{13})$.509 ⁺ (.741)
$\lambda_{14,4}^y (\epsilon_{14})$.660 (.564)
$\lambda_{15,4}^y (\epsilon_{15})$.556 (.691)
$\lambda_{16,4}^y (\epsilon_{16})$.721 (.480)
Psychological Love (η_5) ^f	.65	
$\lambda_{17,5}^y (\epsilon_{17})$.474 ⁺ (.775)
$\lambda_{18,5}^y (\epsilon_{18})$.566 (.679)
$\lambda_{19,5}^y (\epsilon_{19})$.586 (.656)
$\lambda_{20,5}^y (\epsilon_{20})$.608 (.630)
Social Love (η_6) ^g	.74	
$\lambda_{21,6}^y (\epsilon_{21})$.537 ⁺ (.711)
$\lambda_{22,6}^y (\epsilon_{22})$.585 (.658)
$\lambda_{23,6}^y (\epsilon_{23})$.714 (.491)
$\lambda_{24,6}^y (\epsilon_{24})$.884 (.218)

^aAll estimates are completely standardized and are significant at the $\alpha = .05$ level, at least. The symbol + indicates a constrained parameter, necessary for estimating the measurement model for each latent construct.

^bA correlated measurement-error (ϵ) term was freed in order to obtain this solution ($\theta_{21}^e = .088$).

^cA correlated measurement-error(ϵ) term was freed in order to obtain this solution ($\theta_{65}^e = .171$).

^dA correlated measurement-error (ϵ) term was freed in order to obtain this solution ($\theta_{10,9}^e = .348$).

^eA correlated measurement-error (ϵ) term was freed in order to obtain this solution ($\theta_{16,15}^e = .295$).

^fA correlated measurement-error (ϵ) term was freed in order to obtain this solution ($\theta_{18,17}^e = .426$).

^gA correlated measurement-error (ϵ) term was freed in order to obtain this solution ($\theta_{22,21}^e = .214$).

CFA was then conducted on an oblique model of the six domains of love. Findings were obtained through ML estimation using single-item, composite versions of each latent construct, as described earlier. Because composites require fixing all factor loadings and error terms to predetermined values, this model had no free parameters to estimate. In the lan-

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guage of LISREL, the model was fully saturated (*i.e.*, no degrees of freedom), and the concept of overall fit could not be evaluated. Structural relationships among constructs could be examined, however, and 11 of 15 intercorrelations among the six domains were statistically significant (see Table 4). All of the nonsignificant correlations involved the biological love subscale, which was significantly associated only with psychological love, and only moderately so. Two of these nonsignificant associations, with religious love and ontological love, were actually in an inverse direction and small in magnitude. This presented an opportunity to rerun the analysis with these latter two parameters fixed to zero, thus enabling estimation of overall fit indices without substantively changing the magnitude or significance of the other parameter estimates. This reanalysis yielded an excellent overall fit ($\chi^2 = 2.70$ [2 df], $p = .259$, $\chi^2/\text{df} = 1.35$, GFI = .993, AGFI = .932, NFI = .985, NNFI = .968, CFI = .996, IFI = .996, RFI = .886, RMR = .047, RMSEA = .051)—a function, in part, of so many fixed parameters, but also due to strong associations among the latent constructs. Taken together, these results indicate that five of Sorokin's six domains of love as captured in the SMILE—all but biological love—are highly interrelated and appear to share a common source of variance.⁷

Significant bivariate associations with religious indicators (Model I) were found for five of the six SMILE subscales, and the patterning of results is provocative (see Table 5). First, religious variables are ubiquitously and positively associated with religious love, not surprisingly given the likely conceptual overlap, but also with ethical love, ontological love, and social love; and not at all for psychological love. Second, significant religious associations with biological love are fewer and inverse—that is, higher scores are associated with *less* religiousness. Third, there are no statistically significant associations between any of the sociodemographic variables and scores on any of the love subscales (not shown, to con-

Table 4.
Intercorrelations^a among SMILE Subscales

Latent Construct	Religious Love (η_1)	Ethical Love (η_2)	Ontological Love (η_3)	Biological Love (η_4)	Psychological Love (η_5)
Religious Love (η_1)					
Ethical Love (η_2)	.444***				
Ontological Love (η_3)	.422***	.606***			
Biological Love (η_4)	-.112	.114	.165		
Psychological Love (η_5)	.194*	.342***	.470***	.265**	
Social Love (η_6)	.276**	.307***	.300**	-.117	.369***

* $p < .05$, ** $p < .01$, *** $p < .001$.

^aStructural correlation coefficients (ψ s).

Table 5.

Hierarchical OLS Regressions of SMILE Subscales on Religious Indicators

Independent Variables	Religious Love		Ethical Love		Ontological Love		Biological Love		Psychological Love		Social Love	
	Model I Model II		Model I Model II		Model I Model II							
	β (se)	β (se)	β (se)	β (se)	β (se)	β (se)						
Religious Attend.	.31(.15) ^e	.31(.17) ^e	.22(.16) ^b	.18(.18) ^a	.13(.12)	.04(.14)	.02(.13)	-.03(.15)	.03(.12)	-.04(.13)	.18(.10) ^a	.19(.12) ^f
Prayer	.57(.14) ^e	.59(.14) ^e	.29(.16) ^c	.25(.17) ^b	.22(.12) ^b	.17(.13) ^a	-.06(.13)	-.08(.14)	.03(.13)	-.03(.13)	.24(.10) ^b	.25(.11) ^b
Say Grace	.22(.65) ^b	.20(.77) ^a	.20(.65) ^a	.15(.77)	.19(.50) ^a	.09(.58)	-.08(.54)	-.03(.62)	-.16(.50)	-.13(.58)	.14(.43)	.13(.51)
Read the Bible	.40(.12) ^c	.41(.14) ^c	.26(.13) ^c	.23(.15) ^a	.17(.10) ^a	.08(.11)	-.18(.11) ^a	-.24(.12) ^b	-.16(.10)	.08(.11)	.19(.08) ^a	.20(.10) ^a
Relig. TV/radio	.39(.12) ^c	.48(.14) ^c	.24(.13) ^b	.21(.15) ^a	.23(.10) ^b	.12(.12)	-.04(.11)	-.11(.13)	.06(.10)	-.03(.12)	.13(.09)	.12(.11)
S-R Religiosity	.45(.31) ^e	.42(.33) ^e	.18(.35) ^a	.10(.37)	.08(.27)	.00(.27)	-.06(.29)	-.09(.30)	.02(.27)	-.02(.28)	.25(.22) ^b	.24(.24) ^b
S-R Spirituality	.26(.40) ^e	.26(.40) ^e	.11(.42)	.11(.42)	.14(.32)	.14(.31)	-.24(.32) ^b	-.22(.34) ^b	.08(.31)	.07(.32)	.19(.26) ^a	.20(.27) ^a
Close to God	.66(.25) ^e	.67(.26) ^e	.32(.32) ^c	.26(.35) ^b	.25(.25) ^b	.18(.26) ^a	-.18(.26) ^b	-.21(.28) ^a	.14(.25)	.11(.26)	.17(.21) ^a	.17(.23)
Import. of Faith	.56(.23) ^e	.60(.25) ^e	.27(.28) ^c	.23(.31) ^b	.22(.21) ^b	.15(.23)	-.12(.23)	-.18(.24) ^a	.08(.21)	.04(.23)	.21(.18) ^b	.22(.20) ^a

^ap < .05, ^bp < .01, ^cp < .001.

Notes: In each cell, “Model I” denotes gross results (separate bivariate regression for each respective religious variable) and “Model II” denotes net results (model controlling for effects of all eight sociodemographic variables). Results are reported as standardized (β) regression coefficients and standard error (se) terms.

serve space). Finally, 27 of 33 significant bivariate associations between religious variables and love subscales remained significant after controlling for effects of sociodemographic variables, and one suppressor effect emerged.

DISCUSSION

To summarize, the SMILE is a 24-item, six-factor inventory that assesses love according to a taxonomy developed by Sorokin. Analyses resulted in four key findings. First, reliable summary scales are available for the six domains of love contained in the SMILE. Second, well-fitting latent-factor measurement models were validated for all six domains. Third, overall, the SMILE satisfactorily operationalizes the domains of love as proposed by Sorokin in his taxonomy: as a set of distinct but mostly interrelated constructs. Fourth, religious indicators are significant determinants of scores for five of six domains of love. In sum, these findings indicate that the SMILE is suitable for use by social scientists seeking to explore determinants and outcomes of these concepts so creatively postulated by Sorokin over half a century ago.

Notable among these findings is the absence of a structural relationship between biological love and four of the remaining five subscales, as well as its lack of positive religious determinants. Apparently, this construct is conceptually distinct from the others, with the exception of a small, statistically significant correlation with psychological love. Interestingly, biological love, which in Sorokin's lexicon refers to the domain of romantic or sexual passion or attachment, is most similar to the usual conceptualization of love within the psychology of love field. Sorokin's psychological love, with its emphasis on feelings related to interpersonal attachments, is also consonant with some definitional approaches within that field. While it was significantly associated with the other love subscales, it uniquely had no gross or net religious determinants.

The implication for social scientists is plain: not only does the traditional orientation within the psychology of love field exclude other possible takes on love, but these other domains of love may not even be empirically associated with the constructs and concomitant measures of love used by psychologists. Nor do they appear to be positive functions of religiousness. Use of the SMILE thus can nicely build on existing work by psychologists by expanding empirical research to additional love-related domains, notable for their religious antecedents.

Another interesting observation is the ubiquity of the findings regarding religious determinants of love. Every one of the nine measures of religious expression was associated with multiple domains of love, and four of the domains of love had multiple, positive associations with religious variables. Public and private religious behavior and subjective religious self-ratings were significantly associated with the experience of the love of God (religious love), identification of love with ultimate values (ethical love), affirmation of the instrumentality of love for human life (ontological love), and valuation of altruistic behavior (social love). These findings should encourage us to expand our expectations with respect to the instrumental functions of religiousness, in general, for positive-psychological and other-regarding experiences, such as love. Social scientists of religion, collectively, have demonstrated the salience of religious indicators, generally, as correlates or determinants of so many important human constructs. To that can be added love, the greatest of all the human virtues.

Greater sociological attention to love, and related constructs, is not just desirable but requisite if such experiences are to be understood within the larger context in which they arise. In Sorokin's discussion of what he termed the "psychological" and "sociologicistic" schools, he observed that whereas psychologists' typical approach to intrapsychic phenomena is to "[take] them as variables . . . and interpret social phenomena as their derivative or manifestation," sociologists by contrast explain them "through social conditions . . . [as] a derivative of the transindividual processes of interaction and societal circumstances" (Sorokin 1928:600). Granted, these characterizations may be overstated and by now are over 80 years old, but they accurately describe in part both strengths and weaknesses of current research on love, dominated as it is by positive psychologists. Among the human virtues of stated interest in their field, love is the most other-regarding of all, and thus seems most poised to benefit from both a broader conceptual understanding and a more contextual theoretical basis.

Any expansion of scholarly research and writing on the topic of love would be a welcome development for positive psychology, where love has occupied a marginal status compared to more popular constructs such as forgiveness (McCullough, Pargament, and Thoresen 2000), gratitude (Emmons and Shelton 2002), optimism (Peterson 2000), hope (Snyder 2000), and spirituality (Park 2003). This is a shame, as, according to two prominent figures within the field, "[W]e view love as a central concept within a linked, dynamic structure of other positive concepts" (Hendrick and Hendrick 2002:481) and, indeed, "one of the most important defining qualities of life" (Hendrick and Hendrick 2002:472). There are no intractable barriers to a renaissance of love research, besides perhaps a perception that the topic is "soft" and thus potentially embarrassing, professionally, for prospective investigators (Hendrick and Hendrick 2002). The SMILE, and instruments developed to assess features of altruism, in general, could go a long way toward promoting a broader perspective on love that could prove attractive to investigators in disciplines outside of psychology. This has already happened for several concepts under the rubric of positive psychology, notably forgiveness (McCullough, Pargament, and Thoresen 2000).

A higher profile for research on love has been envisioned for the past decade. In 1998, a three-day conference sponsored by the John Templeton Foundation brought together psychologists and social scientists, along with representatives from the National Institutes of Health and other academic fields, to promote research on what it termed "classical sources of human strength," another way to describe those other-regarding virtues or essential capacities of substantive interest within positive psychology. Subsequently, a set of white papers was prepared for each of eight constructs, including love, and published as a special thematic journal issue (McCullough and Snyder 2000). Each report summarized existing theoretical perspectives and assessment instruments pertaining to a respective construct, and outlined how such measures might be used in psychosocial and sociomedical research (Snyder and McCullough 2000). The report on love provided a comprehensive summary of theory and measurement, and detailed how love might be incorporated into social-epidemiologic research (Levin 2000). This latter topic is taken up in considerable depth, with an emphasis on mid-range theory-building, in a recent publication (Levin 2007).

The conference and its proceedings were seminal events for positive psychology. They served to jumpstart several fields of study, most prominently around forgiveness and love, each benefiting from the subsequent largesse of the Templeton Foundation. The Institute for Research on Unlimited Love (IRUL), newly relocated to Stony Brook University, was

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established to promote research on altruistic and compassionate love and service, a take on love explicitly indebted to Sorokin (Post 2003). IRUL has since funded dozens of studies on the impact of love, broadly defined, conducted by researchers in fields as disparate as sociology, psychology, evolutionary biology, human development, neuroscience, epidemiology, and medicine. This funding program complemented an earlier initiative by the Fetzer Institute, also underwritten by Templeton, to support pilot studies of love. The synergy among IRUL, Templeton, Fetzer, and other partners continues to support not just research but educational programs, scientific conferences and symposia, and scholarly publications (e.g., Post *et al.* 2002; Post *et al.* 2003).

To conclude, this effort to develop a measurement instrument based on the work of Sorokin was intended to broaden options available to social scientists seeking to investigate love. Because of his antipathy toward psychosocial assessment, it is no small irony that Sorokin himself may not have supported this project. The SMILE can serve several important purposes: to enable empirical testing of theories developed by Sorokin and others as to determinants and outcomes of love; to broaden the perspectives of psychologists and social scientists seeking to assess different types and expressions of love and of faith-directed virtues, in general; to contribute to efforts of others who also seek to “harden” the study of love; and to raise the profile of love—and, importantly, of social context—within the new field of positive psychology. This in turn, one hopes, will attract social scientists who will begin to engage love, in all its forms, with the scholarly attention that it deserves but which, to now, has been limited.

NOTES

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¹Because this project represented a preliminary psychometric validation study for a measurement instrument intended for use with similar populations, the nonprobability but systematically drawn sample of respondents was of a type considered satisfactory for these purposes (see Bailey 1982).

²For all six 4-item SMILE subscales, each respective test of multivariate non-normality (K^2), multivariate skewness (Wb1), and multivariate kurtosis (Wb2) was statistically significant, indicating rejection of the null hypothesis. That is, the raw data for each subscale contained excessive multivariate non-normality, skewness, and kurtosis. Results: religious love ($K^2 = 546.44$, $p < .001$; Wb1 = 20.747, $p < .001$; Wb2 = 10.771, $p < .001$), ethical love ($K^2 = 164.09$, $p < .001$; Wb1 = 10.543, $p < .001$; Wb2 = 7.275, $p < .001$), ontological love ($K^2 = 94.36$, $p < .001$; Wb1 = 8.610, $p < .001$; Wb2 = 4.497, $p < .001$), biological love ($K^2 = 40.33$, $p < .001$; Wb1 = 5.379, $p < .001$; Wb2 = 3.376, $p < .001$), psychological love ($K^2 = 10.74$, $p < .01$; Wb1 = 1.979, $p < .05$; Wb2 = 2.612, $p < .01$), social love ($K^2 = 96.88$, $p < .001$; Wb1 = 8.608, $p < .001$; Wb2 = 4.773, $p < .001$).

³This strategy is well known to sociologists and has been used for two decades in analyses of a variety of psychosocial constructs (e.g., Krause, Liang, and Yatomi 1989).

⁴Coding schemata for religious variables: *religious attendance* (“How often do you attend religious services?”, coded: 1 = never, 2 = about once per year, 3 = several times per year, 4 = about once per month, 5 = 2-3 times per month, 6 = once a week, 7 = more than once a week), *prayer* (“About how often do you pray?”, coded: 1 = never, 2 = less than once per month, 3 = about 2-3 times per month, 4 = about once per week, 5 = several times per week, 6 = once a day, 7 = more than once a day), *grace* (“At your meals at home, do you usually say grace or a blessing or give thanks before eating?”, coded: 1 = no, 2 = yes), *read Bible* (“How often do you read

the Bible or the scriptures of your particular religion?"; coded: 1 = never, 2 = about once per year, 3 = several times per year, 4 = about once a month, 5 = 2-3 times per month, 6 = once a week, 7 = several times per week, 8 = every day), *religious TV/radio* ("How often do you watch religious TV programs or listen to religious radio programs?"; coded: 1 = never, 2 = about once per year, 3 = several times per year, 4 = about once a month, 5 = 2-3 times per month, 6 = once a week, 7 = several times per week, 8 = every day), *self-rated religiosity* ("How religious would you say you are?"; coded: 1 = not religious at all, 2 = not too religious, 3 = fairly religious, 4 = very religious), *self-rated spirituality* ("How spiritual would you say you are?"; coded: 1 = not spiritual at all, 2 = not too spiritual, 3 = fairly spiritual, 4 = very spiritual), *close to God* ("How close do you usually feel to God?"; coded: 1 = do not believe in God, 2 = not close at all, 3 = not too close, 4 = fairly close, 5 = very close), *importance of faith* ("How important to you is religious faith in your daily life?"; coded: 1 = not important at all, 2 = not too important, 3 = fairly important, 4 = very important, 5 = the most important part of my life).

⁵Coding schemata for sociodemographic variables: *age* (in years), *race/ethnicity* (collapsed to: 1 = White or Caucasian, 0 = African American or Black; Hispanic or Latino; or Asian or Asian American), *sex* (1 = female, 0 = male), *marital status* (collapsed to: 1 = married, 0 = never married, separated, divorced, or widowed), *current employment status* (collapsed to: 1 = working full-time, 0 = working part-time, not employed, or retired), *education* (highest grade of school completed), *gross household income last year* (11 categories from 1 = under \$4,000 to 11 = \$50,000 or above), *residence/urbanicity* (collapsed to: 1 = city, 0 = small town, suburbs, or country/rural area).

⁶Using the original list of items developed for the social love subscale, $\alpha = .56$, as noted in Measures. The four-item version contained in the SMILE is considerably more reliable ($\alpha = .74$), as reported in Table 3. Reduced-item short-form versions of lengthier inventories are oftentimes not just favorable for pragmatic reasons but psychometrically more satisfactory, as well.

⁷As a supplemental test, the analysis was replicated this time grouping items together according to Sorokin's five characteristics of love (*i.e.*, intensity, extensity, duration, purity, adequacy). The intent was to investigate whether the SMILE captures these five characteristics as well as it does of the domains of love. While the SMILE was of course not explicitly constructed to be used in this way, this opportunity was taken to check whether the SMILE reliably reproduced these concepts described by Sorokin. As before, composites were used in estimation, so a clever fix was again needed to enable estimation of the fully saturated model: two correlated-error variance (ψ) terms found to be almost identical led to the model being rerun with an equality constraint. Overall fit was excellent ($\chi^2 = .002$ [1 df], $p = .962$, $\chi^2/df = .002$, GFI = 1.00, AGFI = 1.00, NFI = 1.00, NNFI = 1.03, CFI = 1.00, IFI = 1.00, RFI = 1.00, RMR = .001, RMSEA = .000)—again, a function of so many fixed parameters and the fact that all ten intercorrelations among measures of the five characteristics were strong and statistically significant at the $\alpha = .001$ level (ψ s ranged from .546 to .812). However, α -reliability scores for each of the constituent summary scales were uniformly poor (intensity = .61; extensity = .31; duration = .44; purity = .44; adequacy = .55). Taken together, these findings suggest that the factor complexity of the SMILE items may exceed one with respect to these five characteristics. Since the SMILE was not explicitly constructed to cut the pie along this axis, and this empirical analysis is ambiguous, it is not recommended that the SMILE be reconfigured for use as a measure of the characteristics of love—just the domains of love, as described by Sorokin.

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