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Development and Validation of the Trait Sexual Motivation Scale (TSMS)

Marcel Weber[1], Dorota Reis[1], and Malte Friese[1]

[1]Department of Psychology, Saarland University

Author Note

Marcel Weber: https://orcid.org/0000-0002-0507-0070

Dorota Reis: https://orcid.org/0000-0002-0027-9713

Malte Friese: https://orcid.org/0000-0003-0055-513X

Corresponding Author

Correspondence concerning this article should be addressed to Marcel Weber, Department of Psychology, Saarland University, Campus A2 4, 66123 Saarbrücken, Germany. E-mail: marcel.weber@uni-saarland.de.

Abstract

Sexual motivation, the interest in sexual activity, affects people's thinking, feeling, and behavior. Common scales used to assess sexual motivation suffer from drawbacks that limit their validity and applicability. We therefore developed and validated the *Trait Sexual Motivation Scale* (TSMS), a brief, theory-driven self-report scale, over the course of four preregistered studies (N_{total} = 2,083). Results indicated good model fit, high internal consistency and stability of the second-order (i.e., trait sexual motivation) and first-order (i.e., cognition, affect, behavior) factor scores, and scalar measurement invariance for gender and relationship status. The TSMS correlated as expected with sexual and non-sexual constructs and predicted sexual outcomes cross-sectionally and prospectively in everyday life. Overall, the TSMS emerged as an economical, reliable, and valid measure of sexual motivation.

Keywords: sexual motivation, scale validation, nomological network

Development and Validation of the Trait Sexual Motivation Scale (TSMS)

Few spheres of life are as universally relevant as sexuality, and sexual motivation is a key aspect of people's sexuality. Typically understood as the intrinsic interest in sexual activity (Baumeister et al., 2001; Frankenbach et al., 2022; Stark et al., 2015), sexual motivation affects people's thinking, feeling, decision-making, and behavior. Sexual motivation can form, strengthen, and jeopardize both casual sexual encounters and long-term romantic relationships (Birnbaum, 2014; Birnbaum et al., 2019; Kim et al., 2021). In short, sexual motivation is highly relevant in almost every adult's life.

To elucidate the implications of sexual motivation for people's lives, how it differs or is similar across groups of people, how it relates to other sexual and non-sexual constructs, experiences, and behaviors, and how it may be affected by life circumstances, researchers need a valid measure of the construct. In the present research, we developed and validated the *Trait Sexual Motivation Scale* (TSMS), a brief, theory-driven self-report scale, over the course of four preregistered studies. Our goals were threefold and can be structured using Loevinger's (1957) seminal approach to construct validation. In the *substantive phase*, we relied on general literature on measurement and construct validation (Flake et al., 2017; Simms, 2008) to consider the specific needs of researchers interested in sexual motivation, concluded that a new instrument to assess sexual motivation is needed, and developed a first version of the TSMS. In the *structural phase*, we refined the scale and tested its properties. In the *external phase,* we specified the nomological network of (the) trait sexual motivation (scale) and tested the scale's ability to predict sexual outcomes and its incremental predictive value over key demographic variables and alternative measures of sexual motivation.

Measuring Sexual Motivation

As with any other trait, people differ in their typical level of sexual motivation (Baumeister et al., 2001; Frankenbach et al., 2022). The characteristics, antecedents, and consequences of trait sexual motivation have attracted the interest of many disciplines, including social, personality and

clinical psychology, medicine, sociology, and biology. Research from these fields has revealed the manifold implications of sexual motivation: Higher sexual motivation is associated with higher sexual and relationship satisfaction in couples (Kim et al., 2021). On average, men's sexual motivation is higher than women's (Baumeister et al., 2001; Frankenbach et al., 2022). Discrepancies in sexual motivation can pose a challenge for romantic relationships (Davies et al., 1999; Mark, 2012). Hormonal levels (e.g., estradiol, progesterone) predicted day-to-day fluctuations in sexual motivation in naturally cycling women (Roney & Simmons, 2013). Abnormally low or high sexual motivation can be detrimental to individuals and may therefore be clinically relevant (e.g., hyposexual desire disorder, Clayton et al., 2018).

In order to draw valid conclusions about sexual motivation and its relevance in daily life, good theorizing and measurement of sexual motivation are essential. Integrating work on measurement and construct validation in general (Flake et al., 2017; Loevinger, 1957) and the needs of sexual motivation research specifically, we see the following theoretical, empirical, and practical desiderata for instruments measuring sexual motivation.

First, before we measure, we should know what we want to capture. Simply put, what we can learn is limited if the definition and theoretical conceptualization of the construct remain vague. For sexual motivation, a precise definition is particularly important as the same construct appears under different names (e.g., sexual motivation, sex drive, libido; Spector et al., 1996) and different constructs appear under the same name (e.g., sex drive: intrinsic sexual motivation in general versus its biological component only; Baumeister et al., 2001; Levine, 2003). In addition, a clear theoretical conceptualization provides the basis for developing items that adequately capture the construct and helps to draw the line between valid indicators of sexual motivation and sexual criteria that may be related but are not part of the core construct (Frankenbach et al., 2022).

Second, validity cannot be taken for granted: Researchers need to make sure that instruments actually measure what they are supposed to measure: Are measurement models

derived from theory supported by the data (i.e., factorial validity)? Are associations with various constructs consistent with theory and prior research (i.e., nomological validity)?

Third, from a practical perspective, measures of sexual motivation should be widely applicable and allow for the statistical operations that researchers using the scale are likely to consider important. Sexual motivation scales are regularly administered to and compared across different populations, most notably across gender and relationship status. However, some scales include items that refer to a "partner" that may be difficult for single people to answer (e.g., How strong is your desire to engage in sexual activity with a partner?," Spector et al., 1996). Other scales assess people's motivation to seek new sexual encounters that may be difficult to answer for people who are in a sexually exclusive relationship (e.g., "I am constantly looking for a new sex partner," Stark et al., 2015). As a consequence, researchers have changed the wording of items (Park & MacDonald, 2022) or decided to omit partner-related items altogether when studying single people (Vallejo-Medina et al., 2020). These changes may affect the measurement properties of the scale and make comparisons across studies difficult. In addition, a prerequisite for valid intergroup comparisons is that the measure has the same meaning across groups (e.g., men and women). The extent to which such *measurement invariance* (or measurement equivalence) holds in the data is pivotal information because it determines which statistical operations can be validly performed with the scale (Luong & Flake, 2022; Putnick & Bornstein, 2016). In turn, measurement invariance is tied to the validity of statistical conclusions: Without knowledge of measurement invariance across the groups of interest, researchers risk comparing "apples with oranges" (Greiff & Scherer, 2018) and seemingly robust group differences may be biased (Nye & Drasgow, 2011).

Fourth, a valid sexual motivation scale should predict relevant sexual outcomes such as sexual cognitions, feelings, and behaviors. A particularly strong demonstration of criterion-oriented validity would be the prospective prediction of sexual outcomes in people's daily lives.

Fifth, although subordinate to the other desiderata, we consider brevity to be another beneficial characteristic. Given that sexual motivation is often assessed as one of several constructs

in large-scale online or experience-sampling studies, there is a growing need for an economical yet valid way of assessing sexual motivation.

Several measures of sexual motivation have been developed. The Sexual Desire Inventory (SDI, Spector et al., 1996), for instance, has contributed greatly to understanding the importance of (couple discrepancies in) sexual motivation for relationship and sexual satisfaction (Davies et al., 1999; Kim et al., 2021). (Variants of) the sex drive subscale of the Sexual Attitudes and Feelings Scale (SAF, Lippa, 2006) have been used in large-scale studies examining gender differences in sexual motivation across many nations and cultures (Lippa, 2009). The Sex Drive Questionnaire (SDQ, Ostovich & Sabini, 2004) has been used to examine the relationship between sexual motivation and sociosexuality (Simpson & Gangestad, 1991; for an overview of sexual motivation measures, see Stark et al., 2015). Although these and other measures have been instrumental in providing important insights into the nature of sexual motivation, none of them fully satisfies the key desiderata discussed in this section. Instead, all of these scales have either theoretical, empirical, and/or practical limitations. These limitations may compromise their construct validity, their widespread application, and their suitability for comparisons across groups and studies. We therefore concluded that researchers and practitioners would benefit from a new instrument that is based on a coherent theoretical conceptualization of sexual motivation and that has undergone an extensive validation process.

The Present Research

In the present research, we developed and validated the TSMS. This process followed the phases of construct validation introduced by Loevinger (1957), which will serve to structure the remainder of this article. In the *substantive* part of the validation process, we present a theoretical conceptualization of sexual motivation and generate a first version of the TSMS. In the *structural* part (Studies 1 & 2), we generate the final version of the scale and scrutinize its psychometric properties. In the *external* part (Studies 3 & 4), we test associations between the TSMS and other constructs and criteria (i.e., nomological and criterion validity).

Open Science Statement

We preregistered our research goals, hypotheses, and analytic strategies for all four studies prior to data collection. Exploratory non-preregistered analyses are transparently stated as such. Preregistration documents, data, scripts, and materials are openly available on the Open Science Framework (https://osf.io/ux9nk/). All studies were approved by the Institutional Review Board of Saarland University.

Part I: Substantive Phase

Theoretical Conceptualization of Trait Sexual Motivation

Profound theorizing about the conceptualization of the construct under investigation and its causal impact on test scores is an often overlooked but critical part of any validation process (Borsboom et al., 2004; Flake et al., 2017). The TSMS is based on a recent theoretical conceptualization that combines insights from trait theory with research on sexual motivation (Frankenbach et al., 2022). According to this conceptualization, trait sexual motivation manifests as relatively consistent patterns of thoughts, feelings, and behaviors, similar to other traits (McCrae & Costa, 2003; Roberts, 2009). Thus, people high in trait sexual motivation think about sex, desire sex, and have sex more often than people low in this trait (Frankenbach et al., 2022).

Sexual motivation also varies as a state within individuals. Even a person with a strong sexual motivation does not seek sexual pleasure all the time. The seeming conundrum between stable patterns of sexual thoughts, feelings, and behaviors on the one hand and strong intraindividual variability on the other hand is elegantly resolved by the idea of traits as density distributions of states (Fleeson, 2001; Fleeson & Jayawickreme, 2015; Roberts, 2009). Simply put, state sexual motivation varies over time as a function of various situational influences. However, over longer time spans (e.g., one week), the central tendency of the distribution of states is a reliable indicator of a person's trait sexual motivation, giving way to stable individual differences. Thus, measures can validly assess sexual motivation if they assess typical patterns in sexual motivation indicators over extended periods of time.

This integrated trait/state perspective fits well with the seminal sexual incentive motivation model, according to which sexual motivation requires the simultaneous presence of a sexually relevant stimulus (e.g., seeing or fantasizing about a potential partner) and an activated neural system (i.e., the central motive state; Ågmo & Laan, 2022b; Toates, 2009). The interplay of these two components, mediated by sexual arousal and sexual approach motivation, determines the occurrence of (partnered) sexual activity. Individuals high in sexual motivation may then be those who, on average, respond more readily to (a wider range of) sexually relevant stimuli (Ågmo & Laan, 2022a, 2022b). Previous work has used a large and heterogeneous variety of variables as indicators of sexual motivation (Baumeister et al., 2001). Without a clear rationale, it is difficult to determine which variables are valid indicators of sexual motivation and which may be related but distinct from the construct. The present conceptualization has clear implications for the measurement of sexual motivation. It specifies that the higher-order latent construct of sexual motivation manifests in the frequency of sexual cognitions (including thoughts, fantasies, or daydreams), sexual feelings (including desire or lust), and sexual behaviors (including solo masturbation or partnered sexual activity). These are the primary indicators of sexual motivation.

Scale Development

Our aim was to create a brief sexual motivation scale based on the theoretical conceptualization by Frankenbach and colleagues (2022). To this end, we sought to create items that are (a) easy to comprehend, (b) gender-neutral, and (c) representative of the three facets of sexual cognition, affect, and behavior. We developed a first eight-item version of the TSMS with three cognitive (e.g., “How often do you think about sex?”), three affective (e.g., “How often do you feel sexual desire?”), and two behavioral items (e.g., “How often are you sexually active [self-stimulation plus sex with another person?]”), all referring to frequencies “in a typical week” (see Table S1 in the supplementary online material [SOM] for the complete set of items).

These items allow individuals to report all cognitive, affective, and behavioral events, regardless of their origin and regardless of the person to whom they are directed or with whom they

are performed. This is particularly salient for the two behavioral items that assess the sum of individual and dyadic sexual events (e.g., masturbation and activities performed with another person). These item wordings allowed for capturing the various ways in which latent sexual motivation can manifest in sexual behavior, independent of a person's preferences and situational circumstances (e.g., availability of a sex partner). Imagine person S who is single and person R who is in a romantic relationship. Assume that the frequency with which S and R think about sex, have sexual desires, and become sexually active is identical, but that solitary sexual activities (e.g., self-stimulation) are more common for S, whereas dyadic activities are more common for R. The sexual motivation of both persons would arguably be very similar, even though it expresses itself somewhat differently in terms of the behavioral facet due to their different life circumstances. Being agnostic towards the specifics of sexual events helps the TSMS operate similarly regardless of respondents' relationship status and gender[1].

Part II: Structural Phase

Study 1: Scale Refinement

We designed a first preregistered study to transition from the initial item pool to a final version of the TSMS that is (1) easy to answer (for participants), (2) easy to process (for researchers), and (3) economical. Our specific aims were to empirically derive meaningful response categories and to shorten the scale to six items. A sample of N = 766 participants (49.9% female; 50.0% romantically involved; 78.1% heterosexual; age in years: M = 26.57, SD = 5.87, range: 18-41) recruited through Prolific.co completed the initial 8-item version of the TSMS using an open response format. As preregistered, the sample was randomly split into two subsamples. In the exploratory subsample, we used graphical and descriptive analyses to explore different ways of combining the open-ended responses into seven response categories. Separately for each item, we agreed on a winning solution of categorized data that approximated a normal distribution and facilitated a meaningful

[1]We value all gender identities. Because academic (and social) discussions about possible gendered expressions of sexual motivation usually contrast male and female sexuality, we follow previous research and focus on individuals who self-identify as male and female.

interpretation (e.g., 3-4x a week = every other day; 5-7x = up to once a day). These winning solutions were then tested in the independent confirmatory subsample. In both subsamples, the skewness and kurtosis of the categorized data were small (i.e., absolute values ≤ 1.26). Histograms and Q-Q plots showed no or marginal deviation from normally distributed data for all but two items (c3, b1). The proportion of participants answering zero was considerably higher for item b1 than item b2. We suspected that this was due to participants interpreting the word "plus" (item b1, see Table S1) as "having both events at the same time". Therefore, we adjusted the item wording to remove this ambiguity (i.e., "How often do you pleasure either yourself or another person sexually? [Please provide the total of all events.]"). In sum, Study 1 provided the final six-item version of the TSMS with empirically derived response categories (see Table 1).

[Table 1 near here]

Study 2: Reliability, Factorial Validity, and Measurement Invariance

Study 2 was designed to provide first evidence of the reliability, factorial validity, and measurement invariance of the TSMS. Regarding reliability, we examined (1) the extent to which different items capture the same first- and second-order factor(s) (i.e., *internal consistency*), and (2) the extent to which differences in the (latent) trait remain stable over time (i.e., *stability* over four weeks and three months). Regarding factorial validity, the theoretical conceptualization of sexual motivation presented in Part I implies a measurement model with the second-order factor trait sexual motivation, the three first-order factors cognition, affect, and behavior, and their respective indicators. We used confirmatory factor analysis (CFA) to examine the adequacy of this measurement model. Finally, we assessed the extent to which the psychometric properties of the TSMS are the same for men and women, and for singles and those in romantic relationships—that is, the measurement invariance of the scale across gender and relationship status.

Method

Participants and procedure. In total, *N* = 665 adult participants were recruited through Prolific.co. They agreed to complete the initial survey (T1) and two short follow-up surveys four

weeks (T2) and three months (T3) later. After applying our preregistered exclusion criteria, a final sample of N = 658 participants remained for T1 (50.0% female; 50.3% romantically involved; 74.4% heterosexual; age in years: M = 27.24, SD = 6.26, range: 18-41), of whom 85.9% and 69.8% also completed the surveys at T2 and T3, respectively (N_{T2} = 565, N_{T3} = 459). The three surveys were compensated separately (T1: £0.50; T2 and T3: £0.25 each); overall, the hourly wage was £7.50 (i.e., U.S. $10.33 at the time the study was launched). Participants who completed all three surveys received a 10% bonus (i.e., £0.10). In each survey, participants provided consent and then filled out the final version of the TSMS. Next, they answered background questions (e.g., age, sexual orientation) and data-quality questions (e.g., self-rated data quality, anonymity; T1 only).

Preregistered analytic strategy.

Internal consistency and stability. First, we expected the first-order subscales (i.e., cognition, affect, behavior) to be internally consistent. Second, the global scale score should also be internally consistent—particularly when accounting for facet-specific differences. Third, the TSMS should measure sexual motivation as a relatively stable trait. Therefore, we expected that differences in TSMS scores would be stable over four weeks and three months, respectively. Reliability coefficients for internal consistency were the Spearman-Brown coefficient (ρ_{SB}) for the two-item subscales (Eisinga et al., 2013) and the partial coefficient omega ($\omega_{partial}$) as a measure of the reliability of the second-order factor when controlling for facet-specific variance components. For stability, we preregistered the stability estimator (Röseler et al., 2020), which takes into account the internal consistency of a scale and is therefore recommended over the test-retest reliability coefficient (r_{tt}).

Factorial validity. To assess model fit, we primarily relied on the comparative fit index [CFI] and the standardized root mean square residual [SRMR], as recommended by Hu and Bentler (1999, see also Niemand & Mai, 2018). We further report the χ^2 test statistic and additional fit indices (i.e., Tucker-Lewis index [TLI], root mean square error of approximation [RMSEA], non-preregistered). For the preregistered fit indices, we applied both traditional fixed cutoffs (CFI ≥ .95 and SRMR ≤ .09; Hu

& Bentler, 1999) and dynamic cutoffs that are tailored to the specific parameters of the scale and model under investigation (McNeish & Wolf, 2021; Niemand & Mai, 2018). We calculated the dynamic cutoffs using the web tool flexiblecutoffs.org (CFI ≥ .987 and SRMR ≤ 0.022; N = 658; df = 6, Niemand & Mai, 2018).[2] We used the R package *lavaan* (version 0.6-12; Rosseel, 2012) and applied effects coding (i.e., $M_{\text{loadings}} = 1$, $M_{\text{intercepts}} = 0$ at each level, see Little et al., 2006) to specify and test the proposed model.

Measurement invariance. To test whether the TSMS is measurement invariant across gender and relationship status, we used multigroup CFA (French & Finch, 2008; Xu & Tracey, 2017). This stepwise approach generates parallel measurement models for different groups (e.g., men and women) by specifying a series of nested models with increasingly strict restrictions. Following recommendations for higher-order models (Chen et al., 2005; Rudnev et al., 2018), we specified five nested models each for gender and relationship status (additional restrictions on top of those mentioned for previous models in parentheses): (M1) a configural model (no restrictions); (M2) a first-order metric model (equal first-order factor loadings across groups); (M3) a first- and second-order metric model (equal second-order factor loadings across groups); (M4) a first-order scalar model (equal intercepts of measured variables across groups); (M5) a first- and second-order scalar model (equal intercepts of first-order latent factors across groups). The models were then compared sequentially in terms of meaningful changes in CFI and SRMR (metric stages: ΔCFI ≥ .01 and ΔSRMR ≥ .03, scalar stages: ΔCFI ≥ .01 and ΔSRMR ≥ .03; Chen, 2007) as well as McDonald's NCI (ΔMNCI ≥ -.007; Kang et al., 2016). A detailed overview of which levels of measurement variance allow which operations is beyond the scope of this paper and can be found elsewhere (e.g., Chen et al., 2005; Putnick & Bornstein, 2016). One critical level, however, is the scalar measurement invariance of the second-order factor trait sexual motivation (M5): This level allows for the comparison of mean scale scores across groups (e.g., gender differences in sexual motivation).

[2] Dynamic cutoffs are not yet available for higher-order models. We thus determined dynamic cutoffs for an isomorphic one-level model with correlated latent factors "Cognition", "Affect", and "Behavior".

Results

Preliminary analyses, internal consistency, and stability. There were no missing values. For all items, skewness and kurtosis were small (i.e., absolute values < 1) and comparable to the results of Study 1. Internal consistency was high for all subscales ($\rho_{SB} \geq .86$) and for the total TSMS score when accounting for the first-order facets ($\omega_{partial} = .96$). In addition, TSMS scores were highly stable across four weeks (stability estimator = .92) and three months (stability estimator = .92).

Factorial validity. Figure 1 illustrates the variances and factor loadings of the proposed second-order model. Preregistered and non-preregistered fit indices in the total sample and in all subsamples indicated good model fit (Table 2). Non-preregistered exploratory analyses suggested that the proposed model described the data better than a simple one-factor model (see SOM, Table S2, for details).

[Figure 1 and Table 2 near here]

Measurement invariance and group differences. For gender, successive comparisons of the first four models revealed no differences (Table 3). Setting equal intercepts of the first-order latent factors across groups (model 5a) caused a noticeable increase in MNCI. However, the changes in CFI and SRMR were marginal, and model 5a fit the data adequately (CFI = .982, SRMR = .057). For relationship status, none of the model comparisons revealed any marked difference, and the most restrictive model 5b fit the data adequately (CFI = .984, SRMR = .042). These results suggest that the TSMS is measurement invariant at the scalar level for both gender and relationship status.

Measurement invariance at the scalar level allowed us to compare latent TSMS scores between men and women and between single and romantically involved persons. Replicating previous research (Baumeister et al., 2001; Frankenbach et al., 2022; Lippa, 2009), average TSMS scores were higher for men than for women ($z = 10.57$, $p < .001$, *standardized mean difference* = 86).

We found no evidence that TSMS scores differed between those in romantic relationships and those who were single (z = 0.83, p = .407, *standardized mean difference* = 0.07)[3].

[Table 3 near here]

Discussion

Study 2 revealed (1) internally consistent factor scores, (2) high relative stability of trait sexual motivation (scores) after periods of four weeks and three months, (3) an adequate fit of the proposed second-order model, and (4) scalar measurement invariance for gender and relationship status. Thus, the TSMS enables *comparing* trait sexual motivation *between* people of different genders and relationship statuses. Consistent with previous research (Baumeister et al., 2001; Frankenbach et al., 2022), TSMS scores indicated higher sexual motivation in men compared to women, providing initial evidence of convergent validity at the group level.

Part III: External Phase

Study 3: Nomological Validity, Criterion Validity, and Incremental Validity

The aims of Study 3 were twofold. First, we aimed to map the nomological network of sexual motivation as measured by the TSMS by examining associations with other sexual and non-sexual constructs. Second, we tested the extent to which the TSMS predicts sexual criteria (e.g., pornography use, time spent with sexuality) in isolation (i.e., criterion validity) and over and above gender, age, and an alternative measure of sexual motivation (i.e., incremental validity). We preregistered ranges of expected values for the nomological associations and minimum expected associations for the associations with sexual criteria.

Method

Participants, power, and procedure. The recruitment strategy and exclusion criteria were the same as those described in Study 1. Responses from N = 461 participants were collected through Prolific.co. The final sample consisted of N = 450 participants (51.1% female; 50.2% romantically

[3] For reference, group differences based on manifest scores were $t(656) = 11.57$, $p < .001$, $d = 0.90$, for gender, and $t(656) = 0.94$, $p = .346$, $d = 0.07$ for relationship status.

involved; 69.8% heterosexual; age in years: *M* = 27.10, *SD* = 6.12, range: 18-40). An effect size sensitivity analysis revealed that this sample size provides 80% power to detect small associations of *r* = .13 and 90% power to detect small to medium associations of *r* = .15 in the long run. Participants were paid £1.60, equivalent to an hourly wage of £8.00 (i.e., U.S. $11.28 at the time the study was launched). After giving informed consent, participants answered the TSMS, questions about sexual outcomes, other sexual and non-sexual constructs, and background and data quality questions.

Measures and preregistered analytic strategy. We preregistered all measures, the expected dimensionality of all multi-item measures, and the expected associations with all nomological and criterion measures. We report manifest associations between the TSMS and the nomological and criterion measures, respectively[4]. Qualitative descriptions of associations (e.g., "very small") follow the benchmarks suggested by Funder and Ozer (2019).

Nomological measures. The included measures were expected to cover the continuum from very low (i.e., discriminant) to very high (i.e., convergent) associations with the TSMS. We expected very high correlations with alternative measures of sexual motivation ($r > .70$)[5], moderate to very large negative associations with sexual restraint ($-.40 \leq r \leq -.20$), small to large positive associations with sociosexuality ($.10 \leq r \leq .30$), and small to moderate negative associations with self-control ($-.20 \leq r \leq .00$). In addition, we expected small to moderate associations with the Big Five personality dimensions ($-.20 \leq r \leq .20$), which were likely to be positive for openness and extraversion, and negative for conscientiousness and agreeableness.

Sexual Attitudes and Feelings Scale: Sex Drive (SAF). Participants completed the 5-item SAF (Lippa, 2006) as an alternative measure of sexual motivation (e.g., "I have a high sex drive," ω = .84).

[4] We had pre-registered latent analyses using structural equal modeling, but one model showed insufficient fit. All other models fitted the data well and conclusions were identical to those drawn based on the manifest models.

[5] To demonstrate convergent and incremental validity, we used alternative measures of sexual motivation based on a theoretical conceptualization closely related to the one proposed here. If one were to distinguish between excitatory and inhibitory processes as proposed by the dual control model of sexual behavior, variants of the SES/SIS scales would have been natural candidates (Carpenter, et al., 2011; Janssen et al., 2002).

Sexual Desire Inventory (SDI). The SDI (Spector et al., 1996) assesses sexual desire with 14 items (e.g., "When you first see an attractive person, how strong is your sexual desire?"). Recent evidence suggests good fit of a model with three correlated factors ("solitary," "attractive-person based," and "partnered," see Mark et al., 2018). However, some researchers have raised concerns about the appropriateness of this model for single persons (Vallejo-Medina et al., 2020). Furthermore, it is common to calculate an overall SDI score (e.g., Jones et al., 2018), a practice that is consistent with our idea of a higher-order sexual motivation, but is not reflected in the model. We therefore preregistered adding a second-order factor (i.e., total sexual desire) and limiting confirmatory analyses to people in a relationship. Internal consistency was high (total sexual desire: $\omega_{partial}$ = .88; subscales: $\rho_{SB\ attractive\ person}$ = .89, $\omega_{solitary}$ = .89, $\omega_{partnered}$ = .89).

Sexual Restraint Scale (SRS). People differ in their sexual restraint—that is, in how much they resist (versus give in to) sexual urges. Six items from the SRS (Gailliot & Baumeister, 2007) were used to assess this construct (e.g., "I am very good at controlling my sexual urges," ω = .87).

Sociosexual Orientation Inventory (SOI-R). People with unrestricted sociosexuality positively evaluate, desire, and/or engage in uncommitted sexual relationships (Penke & Asendorpf, 2008; Simpson & Gangestad, 1991). The SOI-R consists of three subscales capturing sociosexual attitudes, desire, and behavior. Participants answered the three items that form the attitudinal subscale (e.g., "Sex without love is OK," ω = .79; Penke & Asendorpf, 2008)[6].

Brief Multidimensional Self-Control Scale (BMSCS). Self-control refers to the ability to control dominant responses, including thoughts, emotions, and behavioral impulses, and to avoid

[6] We assessed only sociosexual attitudes because the validity and interpretation of items measuring sociosexual desire (e.g., "How often do you have fantasies about having sex with someone with whom you do *not* have a committed romantic relationship?") and behavior (e.g., With how many different partners have you had sex within the past 12 months?") are likely to depend strongly on a person's relationship status (Lippa, 2009). Although sociosexual desire is thought to be a specific form of general sexual desire (Penke & Asendorpf, 2008), it is impossible to empirically disentangle these concepts for single people, whose desire by definition cannot refer to a relationship partner. For those in sexually exclusive relationships, behavioral items are likely to be of limited information because, unlike singles, having multiple sex partners requires sexual infidelity.

conflicts between dominant responses and long-term goals. We used the 8-item BMSCS to assess self-control (e.g., "I focus daily on my long-term goals," ω = 81; Nilsen et al., 2020).

Big Five Inventory 2 – Short Version (BFI-2-S). Previous research suggests small to medium associations between sexual motivation and Big Five personality traits, which were most pronounced for openness (positive relation), extraversion (positive), and conscientiousness (negative; Allen & Walter, 2018). We used the 30-item BFI-2-S (Soto & John, 2017), which assesses three facets of each Big Five dimension with two items each ($.78 \leq \omega_{partial} \leq .87$ for the five dimensions).

Criterion validity measures. The criteria were four types of sexual experiences and behaviors that we expected to be associated with trait sexual motivation—(1) pornography use, (2) orgasm frequency, (3) time spent with sexuality, and (4) age at first masturbation. We used or adapted face-valid one-item measures from previous research (see Table 4). We preregistered pornography use, orgasm frequency, and time spent with sexuality as primary outcomes. Age at first masturbation served as a secondary outcome for which we were less certain about obtaining an association with trait sexual motivation. *If* we found a negative correlation (i.e., higher sexual motivation linked with first masturbation earlier in life), this would strongly corroborate the proposed trait understanding of sexual motivation, because current levels of sexual motivation would then be linked to a sexual milestone that (in many cases) took place many years ago.

For each criterion, we tested the predictive value of the TSMS in isolation (i.e., *bivariate model*), over and above gender and age, which have been identified as important predictors of sexual events (i.e., *incremental model*), and compared the incremental values of the TSMS and the SAF as an alternative measure of sexual motivation[7] (i.e., *comparative model*). For bivariate associations, we expected very large positive associations with the primary outcomes (*r*s > .40) and a smaller negative association with age at first masturbation ($r < -.20$).

[7] We did not preregister comparing the TSMS with the SDI due to concerns about the SDI's validity for singles (Vallejo-Medina et al., 2020).

[Table 4 near here]

Results

Preliminary analyses: Reliability, factorial validity, and gender differences (non-preregistered replication). There were no missing values, and skewness and kurtosis were again small (i.e., absolute values ≤ 1.02). In a series of non-preregistered analyses, we replicated the high internal consistency ($\omega_{partial}$ = .96; $\rho_{SB\ cognition}$ = .86; $\rho_{SB\ affect}$ = .92; $\rho_{SB\ behavior}$ = .92) and factorial validity (CFI = .992, SRMR = .011) of the TSMS. In addition, we again found higher sexual motivation in men than in women (*standardized mean difference* = 0.77).

Nomological validity. Table 5 shows the associations between the TSMS and the nomological measures. Almost all of the associations were as expected. TSMS scores and the alternative measures of sexual motivation and sexual desire, respectively, were highly correlated (SAF: r = .71; SDI: r = .66), suggesting strong convergent validity. Associations between the TSMS and other sexual constructs were consistent with our predictions in terms of direction and magnitude (SRS [sexual restraint]: r = -.25; SOI [sociosexuality]: r = .22). Also as expected, the associations with the non-sexual measures (i.e., Big Five, self-control) were small to moderate (-.13 ≤ rs ≤ .05), suggesting strong discriminant validity. Figure 2 illustrates the nomological network of sexual motivation, furthering our understanding of the construct.

[Table 5 and Figure 2 near here]

Criterion validity and incremental validity. Bivariate models revealed significant positive associations between the TSMS and the primary criteria of pornography use, orgasm frequency, and time spent with sexuality (0.45 ≤ β ≤ 0.60, ps < .001, .198 ≤ R^2 ≤ .445), and with the secondary criterion of age at first masturbation (β = -0.24, p < .001, R^2 = .056). Table 6 summarizes the results of the incremental validity analyses. Incremental models indicated that both measures of sexual motivation explained additional variance beyond gender and age in all outcomes. The comparative model revealed that incremental effects of the SAF beyond gender, age, and the TSMS were found for time spent with sexuality (ΔR^2 = .025), but not for any other criterion (ΔR^2 ≤ .002). In contrast, the

TSMS had incremental effects beyond gender, age, and the SAF on all four outcomes (.043 ≤ ΔR^2 ≤ .129). Also, all criteria were more strongly associated with the TSMS than with the SAF.

[Table 6 and near here]

Discussion

Replicating the results of Study 2, the TSMS was a highly reliable measure of sexual motivation with excellent model fit. Associations between the TSMS and alternative measures of sexual motivation or sexual desire were very high, indicating convergent validity. Associations with sexual restraint, sociosexuality, personality dimensions, and self-control were small to moderate and consistent with previous findings in terms of direction and magnitude, indicating discriminant validity. These associations provide new insights into the nomological network of sexual motivation.

We further found that the TSMS predicted pornography use, orgasm frequency, how much time participants spent with sexuality, and age of first masturbation. The latter finding is particularly noteworthy because it refers to a milestone in sexual development that occurred, on average, more than a decade earlier. These associations remained similar when controlling for gender and age, indicating incremental validity over these demographic variables. Finally, the TSMS showed superior predictive value compared to the SAF.

Study 4: Predictive Validity for Sexual Events in Everyday Life

Study 3 established the criterion validity of the TSMS by demonstrating its ability to predict the frequency of typical sexual behaviors. One potential criticism of Study 3 is that the predictors and criteria were assessed in the same session and required similar cognitive strategies (e.g., recalling and aggregating sexual behaviors over longer periods of time). Thus, it is possible that the associations were partially shaped by shared method variance. In addition, in Study 3, the TSMS "predicted" typical frequencies of sexual behaviors in the past. Study 4 therefore used experience sampling to test whether the TSMS predicts the frequency of future sexual events that are directly indicative of sexual motivation (i.e., sexual cognition, affect, and behavior), criterion outcomes (i.e.,

pornography use, time spent with sexuality), and further sexual experiences (i.e., sexual excitability, self-rated sexual motivation) in everyday life.

Method

Participants, power, and procedure. A total of *N* = 241 participants volunteered to take part in a 14-day experience-sampling study. Participants were again recruited through Prolific.co. The study consisted of three phases, the first two of which were relevant to this project (see preregistration). First, participants completed an intake survey in which they answered the TSMS as well as background and data quality questions (see Study 2). Second, *N* = 213 participants who met the preregistered inclusion criteria (see Study 2) entered a 14-day experience-sampling phase. Three mobile survey invitations per day (i.e., 42 in total, approximately 1 minute each) were sent through the Prolific system at 10 a.m., 3 p.m., and 8 p.m., and could be accessed within 60 minutes after receipt.[8] In each mobile survey, participants reported on sexual experiences and behaviors since receiving the previous signal. Participants who completed at least one mobile survey formed the final sample *(N* = 209; 50.2% female; 49.8% romantically involved; 70.8% heterosexual; age in years: *M* = 27.02, *SD* = 6.23, range: 18-40). They completed a total of *k* = 4,973 mobile surveys (23.8 on average per person; 56.7% of all mobile surveys). Sensitivity analyses calculated based on Arend and Schäfer (2019) revealed that in the long run, this would give us an 80% chance of detecting moderate associations (β = .21) between the TSMS and sexual experiences and behaviors. Including bonuses that depended on the number of surveys completed, participants could earn up to £11.00 (i.e., U.S. $14.60 at the time the study was launched; intake: £1.00; mobile surveys: £0.15 each; follow-up: £0.70; bonus: up to £3.00).

Measures and preregistered analytic strategy. During the intake session, participants completed the TSMS. In each of the mobile surveys, they reported on sexual events and downstream criteria in daily life. Face-valid one-item measures were used to maximize clarity and

[8] For technical reasons, some response periods exceeded 60 minutes. Rerunning the analyses based on responses collected within 60 minutes only did not alter any of the conclusions.

minimize attrition. First, participants answered four items assessing the frequencies of cognitive, affective, and solitary and dyadic behavioral sexual events since the last signal ("How many sexual thoughts and fantasies did you have?," "How often did you feel sexual desire or 'turned on'?," "How often did you masturbate or pleasure yourself sexually?," "How often did you have sex with another person?"). Participants then completed four items assessing the criterion outcomes and further sexual experiences. Pornography use was assessed in a dichotomous format ("Have you used sexually exciting or pornographic material [such as Internet sites, magazines, or movies]?," 1 = *no*, 2 = *yes*). Time spent with sexuality, self-rated sexual motivation, and sexual excitability ("Since receiving the last signal, [I spent a considerable amount of time with sexuality (e.g., fantasies, desire, activities, pornography)/I had a strong sex drive/it did not take much to get me sexually excited]") were assessed using 7-point scales (1 = *strongly disagree* to 7 = *strongly agree*).

To test the predictive validity of the TSMS, we used the R package *lme4* (version 1.1-30; Bates et al., 2014) to run (generalized) linear mixed models ([G]LMM) with observations in everyday life (level 1) nested within participants (level 2). TSMS scores were the manifest means of the six TSMS items. We used standard LMMs for normally distributed outcomes, GLMMs with a binomial distribution for binary outcomes, and GLMMs with a Poisson probability distribution for count outcomes.

Results and Discussion

The results are summarized in Table 7. We found strong positive associations between the TSMS and all seven outcomes (all *p*s < .001). Non-preregistered exploratory analyses further suggested that the TSMS was still significantly associated with all outcomes after gender and age were added to the models (all *p*s < .001). Taken together, the TSMS prospectively predicted sexual experiences and behavior in everyday life and showed incremental effects above and beyond important demographic predictors.

[Table 7 near here]

General Discussion

Sexual motivation is a central personality characteristic that shapes people's sexual experiences and behavior in both solitary and social contexts. Existing measures of sexual motivation leave open questions regarding their underlying theoretical conceptualization of sexual motivation, their (lack of) validation process, and their measurement invariance across gender and relationship status. We therefore developed and validated the theory-driven TSMS across four preregistered studies, following Loevinger's (1957) seminal structure for construct validation.

Substantive Phase: Theory-Driven Scale Development

We derived the items and factor structure of the TSMS from a theoretical conceptualization positing that the sexual motivation trait is a relatively stable and latent construct that manifests in cognitive, affective, and behavioral events whose frequencies can be used to measure the trait (Frankenbach et al., 2022).

Structural Phase: Categories, Factorial Validity, and Measurement Invariance

We empirically derived response categories for the TSMS (Study 1). All items were approximately normally distributed. CFA revealed excellent fit of the proposed measurement model (Studies 2 and 3). Multigroup CFA further revealed scalar measurement invariance allowing for intergroup comparisons regarding gender and relationship status. Replicating previous findings, these revealed a stronger sexual motivation in men compared to women.

External Phase: Nomological Associations and Criterion-Related Validity

The TSMS correlated highly with alternative measures of sexual motivation (SAF) and sexual desire (SDI), indicating strong convergent validity. Medium associations with sexual restraint and sociosexual attitudes and small associations with non-sexual constructs, including self-control and the Big Five, provided evidence for discriminant validity. Overall, the observed associations were consistent with our predictions, therefore indicating strong nomological validity. In addition, the TSMS predicted concurrently measured sexual outcomes (e.g., orgasm frequency, age at first masturbation), had incremental value over gender, age, and the SAF, and prospectively predicted

the frequency of sexual events (i.e., sexual fantasies/desires/activities), sexual criterion measures (e.g., pornography use), and other sexual experiences (e.g., sexual excitability) in everyday life. These results support the high practical relevance of the TSMS.

Developing an Ultra-Short Scale: The Brief Trait Sexual Motivation Scale (BTSMS)

With its six items, the TSMS is an efficient measure of sexual motivation. For use in studies in which each item is costly (e.g., panel studies, experience-sampling studies), we reasoned that an even briefer scale with decent psychometric properties would be welcome. We therefore developed the *Brief Trait Sexual Motivation Scale* (BTSMS) by combining the three items with the highest first-order factor loadings in Study 2 (i.e., c2: “sexual fantasies”; a1: “sexual desire”; b1: “pleasuring oneself/another person”). Repeating key analyses revealed that the BTSMS is internally consistent ($\omega = .85$), highly stable over four weeks and three months (stability estimator $\geq .98$), and replicates known gender differences (*standardized mean difference* = 0.88, Study 2). In addition, just like the six-item TSMS, the BTSMS showed meaningful nomological associations and significantly predicted all sexual outcomes cross-sectionally (Study 3) and prospectively (Study 4). For details, please consult the SOM, Tables S3-S5.

Theoretical and Practical Implications

Sexual motivation often plays an important role in research on romantic relationships and sexuality. To our knowledge, the TSMS is the first scale that has been constructed to apply equally to participants who are female, male, single or in a romantic relationship (Stark et al., 2015; Vallejo-Medina et al., 2020) and has also been empirically shown to be measurement invariant at the scalar level for gender and relationship status, allowing for mean-level comparisons across these groups. These excellent psychometric properties may be useful for researchers interested in gender differences (e.g., Baumeister et al., 2001; Frankenbach et al., 2022) or sexual desire discrepancies in couples. A vibrant literature seeks to answer the question of whether and under what circumstances differences in sexual motivation between partners in a romantic relationship may impact sexual and relationship satisfaction (e.g., Kim et al., 2020; Mark, 2012). In research involving heterosexual

couples, access to a scale that ensures the valid interpretation of empirical mean differences between genders is of particular value. Without evidence of measurement invariance, it is unknown whether and to what extent empirical within-couple differences in sexual motivation reflect actual differences on the construct level (Sakaluk et al., 2021).

On the theoretical level, previous research has debated whether the terms sexual motivation and sexual desire refer to the same or different constructs (e.g., Spector et al., 1996; Stark et al., 2015). Very high correlations between dedicated measures of sexual motivation (TSMS, SAF) on the one hand and a dedicated measure of sexual desire (SDI) on the other hand suggest that on the empirical level, these scales appear to measure the same construct. This suggests that the field may suffer from a jangle fallacy, in which different terms falsely suggest that they refer to different constructs, when in fact they refer to the same (Gonzalez et al., 2021). Note that in the theoretical conceptualization that guided the present research (Frankenbach et al., 2022), sexual affect (including desire) represents one of three facets of the overarching construct of sexual motivation. Other work that takes sexual desire as the overarching construct focusses on this affective facet and does not, or less prominently, include cognitive and behavioral facets (Birnbaum, 2018). Future work would benefit from more clearly delineating these constructs (or declaring them synonymous).

Strength, Limitations, and Future Research

One strength of the present research is its systematic orientation toward common standards of scale development and construct validation (Flake et al., 2017; Loevinger, 1957). Throughout this process, we relied on a theoretically grounded conceptualization of sexual motivation and used state-of-the-art methodology. For example, we used separate samples to empirically derive and test the response categories to avoid overfitting the solutions to one specific dataset (Study 1), implemented advances in study-specific decision criteria (i.e., dynamic cutoffs; Niemand & Mai, 2018) when assessing model fit (Studies 2-3), and tested predictive validity within an intensive-longitudinal experience sampling design (Study 4). Another strength is that we adhered to open

science practices by preregistering all studies, including exclusion criteria, fit indices, cutoffs, and decision criteria for model fit analyses, as well as expectations regarding nomological and criterion associations. All preregistrations, materials, and data are openly available on the OSF.

Notwithstanding these strengths, some limitations also warrant mention. First, all samples were recruited through online crowdsourcing platforms. Past research suggests that online samples are demographically heterogeneous (Goodman et al., 2013) and that Prolific.co samples provide high-quality data (Peer et al., 2021). In our studies, equal numbers of male and female, and single and romantically involved participants speak to at least some heterogeneity. Few failed attention checks and theoretically meaningful convergent and divergent associations further indicate that responses were valid. Thus, we are confident that the quality of our data is high, but future work will provide more conclusive evidence about the validity of the TSMS beyond online samples. Second, all participants were US residents. As sexuality is influenced by societal norms, this may also affect sexual motivation, its manifestations, and associations with related concepts. Preliminary findings from our lab suggest that the present results may generalize to at least some other Western societies, but more dedicated work examining cross-cultural similarities and differences is needed. In particular, future research should test whether the TSMS is measurement invariant across different cultures and languages. Third, because all measures were self-reported, associations between the TSMS and sexual criteria may be inflated by common-method bias (Podsakoff et al., 2012). In general, third-party reports can be a remedy to this problem. However, third-party reports are problematic when the issue is based on subjective perceptions or behavior that is difficult to observe (Brannick et al., 2010), both of which apply to sexual motivation. Therefore, we refrained from third-party reports, but followed recommendations to minimize common method bias by collecting predictors and criteria with different response formats (Podsakoff et al., 2012). Finally, our agenda was guided by Loevinger's (1957) perspective on validity, as expressed in recent recommendations for scale validation processes (Flake et al., 2017). An alternative way to establish validity would be to demonstrate that experimentally manipulating sexual motivation changes test scores in predicted

ways (Borsboom et al., 2004, 2009). Previous research showing that individuals report greater sexual desire and more frequent sexual behavior following exposure to sexual compared to neutral stimuli (e.g., movies, stories) suggests that an appropriate experimental manipulation would also cause situational shifts on a state-adapted version of the TSMS (Both et al., 2004; Goldey & van Anders, 2012). The extent to which experimental manipulations may or may not alter sexual motivation at the trait level is an interesting question and avenue for future research.

Conclusion

Sexual motivation plays a fundamental role in people's day lives. We developed the TSMS, a brief six-item sexual motivation scale that is grounded in theory and allows for an economical, reliable, and valid assessment of trait sexual motivation irrespective of gender and relationship status.

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Declaration of Interest Statement

The authors report there are no competing interests to declare.

Data Availability Statement

The data that support the findings of this study are openly available on the Open Science Framework at https://osf.io/ux9nk/.

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Table 1

Final 6-Item Version of the TSMS

Items	Response Categories
Sexual thoughts In a typical week: c1: How often do you think about sex? c2: How often do you have sexual fantasies?	1 = *0x a week*; 2 = *1-2x a week*; 3 = *3-4x a week (= every other day);* 4 = *5-7 times a week (= up to once a day)*; 5 = *8-14 times a week (= up to twice a day)*; 6 = *15-21 times a week (= up to three times a day)*; 7 = *more than 21 times a week (= more than three times a day).*
Sexual behaviors In a typical week: b1: How often do you pleasure either yourself or another person sexually? (Please provide the total of all events.) b2: How often do you either masturbate or have sex with someone else? (Please provide the total of all events.)	1 = *0x a week*; 2 = *1x a week*; 3 = *2x a week*; 4 = *3-4x a week (= every other day)*; 5 = *5-7 times a week (= up to once a day)*; 6 = *8-14 times a week (= up to twice a day)*; 7 = *more than 14 times a week (= more than twice a day)*.
Sexual feelings In a typical week: a1: How often do you feel sexual desire? a2: How often do you feel “turned on”?	1 = *0x a week*; 2 = *1-2x a week*; 3 = *3-4x a week (= every other day);* 4 = *5-7 times a week (= up to once a day)*; 5 = *8-14 times a week (= up to twice a day)*; 6 = *15-21 times a week (= up to three times a day)*; 7 = *more than 21 times a week (= more than three times a day).*

Note. Cognitive (c), affective (a), and behavioral (b) items. Item labels (e.g., c1) are intended to provide orientation for readers but were not presented to participants. Items c2, b1, and a1 form the Brief Trait Sexual Motivation Scale (BTSMS).

Table 2

Second-Order Model: Model Fit in Total Sample and Subsamples

Sample	*N*	χ^2	*df*	*p*	CFI	SRMR	TLI	RMSEA
Total	658	32.24	6	< .001	.992	.010	.981	.082
Women	329	7.32	6	.292	.999	.009	.998	.026
Men	329	26.12	6	< .001	.987	.016	.967	.101
Single	327	17.61	6	< .001	.993	.008	.984	.077
In a relationship	331	31.67	6	< .001	.985	.016	.962	.114

Table 3

Measurement Invariance of the TSMS Across Gender and Relationship Status

Model	χ^2	*df*	CFI	SRMR	MNCI	Δ χ^2	Δ*df*	*p*	ΔCFI	ΔSRMR	ΔMNCI
Gender											
Model 1a	33.44	12	.993	.012	.984	–	–	–	–	–	–
Model 2a	35.40	15	.993	.017	.985	1.96	3	.581	.000	.005	.001
Model 3a	39.48	17	.993	.036	.983	4.08	2	.130	-.001	.019	-.002
Model 4a	49.37	20	.990	.039	.978	9.89	3	.020	-.002	.003	-.005
Model 5a	77.60	22	.982	.057	.959	28.23	2	< .001	-.009	.018	-.019
Relationship Status											
Model 1b	49.28	12	.989	.012	.972	–	–	–	–	–	–
Model 2b	54.65	15	.988	0.20	.970	5.37	3	.147	-.001	.007	-.002
Model 3b	63.12	17	.987	0.38	.966	8.47	2	.015	-.002	.019	-.004
Model 4b	75.26	20	.984	0.41	.959	12.15	3	.007	-.003	.002	-.007
Model 5b	78.32	22	.984	0.42	.958	3.06	2	.217	-.000	.001	-.001

Note. Model 1: configural models (no constraints); Model 2: first-order metric models (i.e., models 1 plus equal first-order factor loadings across groups); Model 3: first- and second-order metric models (i.e., models 2 plus equal second-order factor loadings across groups); Model 4: first-order scalar models (i.e., models 3 plus equal intercepts of measured variables across groups); Model 5: first- and second-order scalar models (i.e., models 4 plus equal intercepts of first-order latent factors across groups; Chen et al., 2005; Rudnev et al., 2018).

Table 4

Criterion Validity: Constructs, Instruments, Items, Reliability, and Preregistered Predictions

Criterion	Item wording	Response options	Prediction
Pornography use	"During the past year, how often did you view pornographic material (such as internet sites, magazines, or movies)?" ("New Family Structures Study", documented in Regnerus et al., 2016)	1 = never, 2 = once a month or less; 3 = 2-3 days a month; 4 = 1-2 days a week; 5 = 3-5 days a week; 6 = (almost) every day	$r > .40$
Orgasm frequency	"During the last year, how many orgasms did you have in a typical week? It does not matter how the orgasm was achieved (e.g., masturbation, sexual encounters, wet dreams)." (Klein et al., 2015)	Open response format (__ orgasms a week)	$r > .40$
Time spent with sexuality	"Please think of a typical day in the last year: Please estimate the amount of time you spent with sexual fantasies, sexual urges, and sexual behavior." (adapted from Klein et al., 2015)	1 = *not at all;* 11 = *more than 3 hours*	$r > .40$
Age at first masturbation	"At what age did you masturbate for the first time?" (adapted from Pinkerton et al., 2003)	Open response format (At the age of __ years)	$r < -.20$

, using a 7-point rating scale (1 = *strongly disagree* to 7 = *strongly agree*).

sexual desire?," 1 = *no desire* to 9 = *strong desire*). Recent evidence ...

Table 5

Nomological Validity of the TSMS: Constructs, Instruments, Preregistered Predictions, and Results

Constructs	Instruments	$r_{expected}$	$r_{observed}$	*t*	*df*	*p*
Sexual motivation	Sexual Attitudes and Feelings Scale, Subscale "Sex Drive" (SAF; Lippa, 2006)	$r \geq .70$	.71	21.09	448	< .001
Sexual desire	Sexual Desire Inventory 2, "Total Sexual Desire" (SDI; Spector et al., 1996)	$r \geq .70$	.66	13.26	224	< .001
Sexual restraint	Sexual Restraint Scale (SRS; Gailliot & Baumeister, 2007)	$-.40 \leq r \leq -.20$	-.25	-5.46	448	< .001
Sociosexuality	Revised Sociosexual Orientation Inventory (SOI-R, Subscale "Attitudes"; Penke & Asendorpf, 2008)	$.10 \leq r \leq .30$	.22	4.89	448	< .001
Self-control	Brief Multidimensional Self-Control Scale (BMSCS; Nilsen et al., 2020)	$-.20 \leq r \leq .00$	-.05	-1.02	448	.308
Big Five	Big Five Inventory, short version (BFI-2-S; Soto & John, 2017)					
O: Openness		$.00 \leq r \leq .20$	.03	0.73	448	.468
C: Conscientiousness		$-.20 \leq r \leq .00$	-.13	-2.78	448	.006
E: Extraversion		$.00 \leq r \leq .20$	-.03	-0.70	448	.485
A: Agreeableness		$-.20 \leq r \leq .00$	-.07	-1.50	448	.135
N: Neuroticism		$-.20 \leq r \leq .20$	.02	0.43	448	.668

Note. t, *df*, and *p* refer to two-tailed tests of correlations with the TSMS against zero (i.e., no correlation).

Table 6

Criterion Validity of the TSMS

	Pornography use			Orgasm frequency			Time spent with sexuality			First masturbation (Age)		
Model	*β*	R^2	ΔR^2	*β*	R^2	ΔR^2	*β*	R^2	ΔR^2	*β*	R^2	ΔR^2
M1. Covariate Model		.285***			.075***			.028**			.013	
Gender	1.04***			0.54***			0.33***			-0.11		
Age	-0.17***			0.01			-0.06			0.11*		
M2a. Incremental Model: TSMS		.482***	.197[a]***		.328***	.253[a]***		.203***	.175[a]***		.071***	.058[a]***
Gender	0.68***			0.13			0.02			0.10		
Age	-0.19***			-0.01			-0.07			0.11*		
TSMS	0.48***			0.54***			0.45***			-0.26***		
M2b. Incremental Model: SAF		.361***	.076[a]***		.199***	.124[a]***		.185***	.157[a]***		.029**	.016[a]**
Gender	0.85***			0.31***			0.06			-0.02		
Age	-0.17***			0.02			-0.05			0.10*		
SAF	0.29***			0.37***			0.42***			-0.13**		
M3. Comparative Model		.483***	.001[b]/.122[c]***		.328***	.000[b]/.129[c]***		.228***	.025[b]***/.043[c]**		.073***	.002[b]/.044 [c]***
Gender	0.68***			0.13			0.04		*	0.09		
Age	-0.19***			-0.01			-0.06			0.11*		
SAF	-0.04			0.03			0.22***			0.06		
TSMS	0.51***			0.52***			0.30***			-0.30***		

* $p < .05$; ** $p < .01$; *** $p < .001$. [a]compared to M1; [b]compared to M2a; [c]compared to M2b. To present easily interpretable values, we standardized all continuous variables and left gender in its original metric (e.g., average change in SD units of pornography use if a person is male rather than female).

Table 7

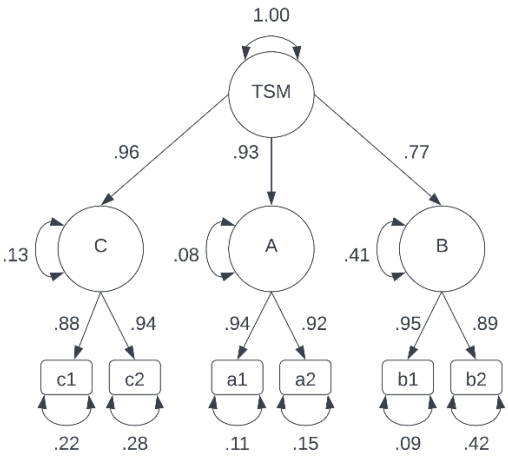
Predictive Validity of the TSMS: Associations with Sexual Outcomes in Everyday Life

Criterion	B	*SE*	$CI_{B\ 95\%}$	*z*	*p*	Effect
Event Frequencies						
Cognition	0.50	0.04	[0.42, 0.57]	13.41	< .001	1.64[a]
Affect	0.51	0.04	[0.44, 0.59]	13.27	< .001	1.67[a]
Behavior	0.55	0.06	[0.44, 0.67]	9.58	< .001	1.74[b]
Criterion Outcomes						
Pornography use	0.54	0.08	[0.39, 0.69]	6.98	< .001	1.71[b]
Time spent with sexuality	0.42	0.04	[0.34, 0.51]	9.63	< .001	0.15[c]
Further Sexual Experiences						
Self-rated sex drive	0.63	0.05	[0.53, 0.73]	12.80	< .001	0.24[c]
Sexual excitability	0.58	0.05	[0.49, 0.68]	12.21	< .001	0.21[c]

Note. Intercepts are not displayed for the sake of clarity. Behavior (0 = *no*, 1 = *yes*) contains information from solitary and dyadic events (preregistered) to prevent zero inflation. Effect sizes are [a]incidence rate ratios for event frequencies (IRR values greater than 1 indicate a positive association between TSMS scores and event frequencies), [b]odds ratios for binary outcomes (positive association: OR > 1), and [c]$R^2_{marginal}$ (i.e., proportion of the total variance explained by the fixed effect; Nakagawa et al., 2017) for continuous outcomes (positive association: $R^2_{marginal} > 0$).

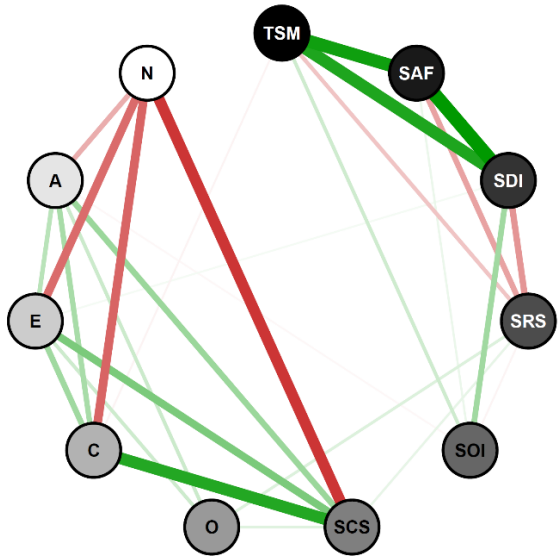
Figures and Figure Captions

Figure 1. *Second-Order Confirmatory Factor Analysis of the Final Version of the TSMS*



Note. Factor loadings and (residual) variances are standardized. C = Cognition; A = Affect; B = Behavior; TSM = Trait Sexual Motivation

Figure 2. *Nomological Network of Trait Sexual Motivation as Measured by the TSMS*



Note. Associations between the TSM(S) and measures of sexual motivation (SAF), sexual desire (SDI), sexual restraint (SRS), sociosexuality (SOI), self-control ([BM]SCS), and the BFI-2-S subscales openness (O), conscientiousness (C), extraversion (E), agreeableness (A), and neuroticism (N). Thicker lines represent stronger positive (*green*) or negative (*red*) associations; small associations ($|r| < .1$) are hidden for clarity.

Supplement

Table S1

First Version of the TSMS (8 Items)

In a typical week:

Cognition	How often do you think about sex? How often do you have sexual fantasies? How often do you have sexual daydreams?
Behavior	How often are you sexually active (self-stimulation plus sex with another person)? How often do you engage in sexual activities (whenever you masturbate or have sex with a partner)?
Affect	How often do you feel sexual desire? How often do you feel like having sex? How often do you feel “turned on”?

Note. The first version of the TSMS used an open response format.

Table S2

Simple One-Factor Model: Model Fit in Total Sample and Subsamples

Sample	*N*	χ^2	*df*	*p*	CFI	SRMR	TLI	RMSEA
Total	658	557.89	9	< .001	.840	.067	.733	.304
Women	329	324.12	9	< .001	.797	.076	.661	.326
Men	329	243.87	9	< .001	.845	.076	.741	.282
Single	327	270.39	9	< .001	.852	.062	.753	.298
In a relationship	331	304.93	9	< .001	.824	.074	.707	.315

Table S3

Nomological Validity of the BTSMS: Constructs, Instruments, Preregistered Predictions, and Results

Constructs	Instruments	$r_{expected}$	$r_{observed}$	*t*	*df*	*p*
Sexual motivation	Sexual Attitudes and Feelings Scale, Subscale "Sex Drive" (SAF; Lippa, 2006)	$r \geq .70$	.68	19.67	448	< .001
Sexual desire	Sexual Desire Inventory 2, "Total Sexual Desire" (SDI; Spector et al., 1996)	$r \geq .70$	.65	12.96	224	< .001
Sexual restraint	Sexual Restraint Scale (SRS; Gailliot & Baumeister, 2007)	$-.40 \leq r \leq -.20$	-.23	-5.02	448	< .001
Sociosexuality	Revised Sociosexual Orientation Inventory (SOI-R, Subscale "Attitudes"; Penke & Asendorpf, 2008)	$.10 \leq r \leq .30$	.21	4.62	448	< .001
Self-control	Brief Multidimensional Self-Control Scale (BMSCS; Nilsen et al., 2020)	$-.20 \leq r \leq .00$	-.03	-0.69	448	.493
Big Five	Big Five Inventory, short version (BFI-2-S; Soto & John, 2017)					
O: Openness		$.00 \leq r \leq .20$	.06	1.25	448	.210
C: Conscientiousness		$-.20 \leq r \leq .00$	-.12	-2.53	448	.012
E: Extraversion		$.00 \leq r \leq .20$	-.03	-0.60	448	.546
A: Agreeableness		$-.20 \leq r \leq .00$	-.05	-1.10	448	.274
N: Neuroticism		$-.20 \leq r \leq .20$	.01	0.16	448	.870

Note. t, *df*, and *p* refer to two-tailed tests of correlations with the TSMS against zero (i.e., no correlation).

Table S4

Criterion Validity of the BTSMS

	Pornography use			Orgasm frequency			Time spent with sexuality			First masturbation (Age)		
Model	*β*	R^2	ΔR^2	*β*	R^2	ΔR^2	*β*	R^2	ΔR^2	*β*	R^2	ΔR^2
M1. Covariate Model		.285***			.075***			.028**			.013	
Gender	1.04***			0.54***			0.33***			-0.11		
Age	-0.17***			0.01			-0.06			0.11*		
M2a. Incremental Model: BTSMS		.475***	.190[a]***		.300***	.225[a]***		.203***	.175[a]***		.063***	.050[a]***
Gender	0.69***			0.17			-0.01			0.08		
Age	-0.19***			-0.01			-0.07			0.11*		
BTSMS	0.47***			0.51***			0.45***			-0.24***		
M2b. Incremental Model: SAF		.361***	.076[a]***		.199***	.124[a]***		.185***	.157[a]***		.029**	.016[a]**
Gender	0.85***			0.31***			0.06			-0.02		
Age	-0.17***			0.02			-0.05			0.10*		
SAF	0.29***			0.37***			0.42***			-0.13**		
M3. Comparative Model		.475***	.000[b]/.114[c]***		.303***	.003[b]/.104[c]***		.231***	.028[b]***/.046[c]**		.063***	.000[b]/.034[c]***
Gender	0.69***			0.15			-0.04		*	0.08		
Age	-0.19***			-0.01			-0.06			0.11*		
SAF	-0.01			0.09			0.23***			0.02		
BTSMS	0.47***			0.45***			0.30***			-0.26***		

* $p < .05$; ** $p < .01$; *** $p < .001$. [a]compared to M1; [b]compared to M2a; [c]compared to M2b. To present easily interpretable values, we standardized all continuous variables and left gender in its original metric (e.g., average change in SD units of pornography use if a person is male rather than female).

Table S5

Predictive Validity of the BTSMS: Associations with Sexual Outcomes in Everyday Life

Criterion	B	*SE*	$CI_{B\ 95\%}$	*z*	*p*	Effect
Event Frequencies						
Cognition	0.50	0.04	[0.43, 0.57]	13.51	< .001	1.65[a]
Affect	0.51	0.04	[0.43, 0.58]	13.00	< .001	1.66[a]
Behavior	0.54	0.06	[0.42, 0.65]	9.05	< .001	1.71[b]
Criterion Outcomes						
Pornography use	0.54	0.08	[0.39, 0.70]	6.94	< .001	1.72[b]
Time spent with sexuality	0.42	0.04	[0.34, 0.51]	9.61	< .001	0.15[c]
Further Sexual Experiences						
Self-rated sex drive	0.62	0.05	[0.53, 0.72]	12.41	< .001	0.23[c]
Sexual excitability	0.58	0.05	[0.48, 0.67]	11.89	< .001	0.20[c]

Note. Intercepts are not displayed for the sake of clarity. Behavior (0 = *no*, 1 = *yes*) contains information from solitary and dyadic events (preregistered) to prevent zero inflation. Effect sizes are [a]incidence rate ratios for event frequencies (IRR values greater than 1 indicate a positive association between BTSMS scores and event frequencies), [b]odds ratios for binary outcomes (positive association: OR > 1), and [c]$R^2_{marginal}$ (i.e., proportion of the total variance explained by the fixed effect; Nakagawa et al., 2017) for continuous outcomes (positive association: $R^2_{marginal} > 0$).