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# Exploring the Dimensions and Dynamics of Partnered Sexual Behaviours: Scale Development and Validation Using Factor and Network Analysis

Devinder S. Khera, *Western University*

Supervisor: Joel, Samantha., *The University of Western Ontario*

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# Abstract

Sexual behaviours are an integral part of most intimate relationships and can serve as mechanisms for building intimacy, enhancing emotional connection, and can serve as non-verbal communication to express care, love, and compassion for significant others. Sexually compatible behaviours are also associated with sexual satisfaction – something especially important given the downstream consequences of sexual satisfaction on relationship satisfaction, relationship stability, and general well-being. However, to date, no inclusive, psychometrically validated measure of partnered sexual interests and behaviours exists. Given the central role of sexual interests and behaviours in sexual satisfaction and in turn relationship quality, we sought to develop and validate a diverse and inclusive measure of partnered sexual interests and behaviours. We found the network psychometrics approach using Exploratory Graph Analysis and Unique Variable Analysis to be more inclusive and better suited to modelling the complexity of concrete item-level partnered sexual interests and behaviours in comparison to traditional factor analytic approaches.



## Keywords

Partnered sexual behaviours, network psychometrics, factor analysis, LGBTQ+, inclusivity, diversity

# Summary for Lay Audience

Sexual activities play a critical role in most intimate relationships, serving to deepen emotional bonds and can be used as non-verbal ways of expressing love and care. Being sexually compatible tends to lead to higher satisfaction within a relationship, with positive downstream impact on relationship quality, stability, and overall well-being. However, to date, we have no universal, validated method of measuring people's wide range of sexual interests and behaviours within a relationship.

Many current efforts to gauge sexual interests and behaviors are skewed towards heteronormative perspectives, which suggest heterosexuality as the default state. This bias can lead to a lack of visibility and marginalization of diverse sexual experiences and preferences, particularly in non-heteronormative groups. Traditional statistical methods used to analyze sexual preferences might also contribute to this bias, as they tend to downplay or dismiss less common sexual preferences, such as those diverging from typical heterosexual scripts.

We aimed to validate a measure that comprehensively and inclusively represents various sexual interests and behaviors for use in future research on sexual compatibility. We focused on two methods to develop and validate these measures: traditional factor analysis and network psychometrics. We believe that the network psychometrics approach can offer a more diverse and inclusive measurement of sexual behaviours, due to its ability to more accurately capture the complexity of sexual interests and behaviours. Compared to traditional methods like factor analysis, network psychometrics is less likely to yield heteronormative results, making it a promising tool for inclusive research practices.

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# Chapter 1

## 1 Introduction

Sexual behaviours are an integral part of most intimate relationships. For example, they serve as mechanisms for building intimacy and enhancing emotional connection (Birnbaum et al., 2006). They also serve as a form of non-verbal communication which can be used by partners to express care, love, understanding, and compassion for their significant other(s) (Metts & Cupach, 1989). Further, research has highlighted the importance of sexually compatible interests and behaviours, with greater compatibility being associated with higher sexual satisfaction (see de Jong & Reis, 2014). This is especially important given the downstream consequences of sexual satisfaction on relationship satisfaction, relationship stability, and general well-being (Sprecher, 2002; Sprecher & Cate, 2004). However, to date, no inclusive, psychometrically validated measure of sexual interests and behaviours exists in the context of partnered sexual activity. Given the central role of sexual interests and behaviours in sexual satisfaction and in turn relationship quality, it is important that we be able to accurately measure these diverse interests and behaviors.

Efforts to measure sexual behaviours and interests are frequently marked by the dominance of heteronormative perspectives, which likely bleed into the measurement of this complex construct. Heteronormativity can be described as the presumption that heterosexuality is the ‘default’ or ‘natural’ state. We argue that this presumption has likely influenced the construction and interpretation of many sexuality measures used in research, potentially rendering alternative experiences, interests, and preferences as comparatively less visible and marginalized. This issue is especially concerning given its implications for inclusivity and diversity of sexual experiences and interests in different sexual orientation subgroups. We argue that a potential contributing factor to this heteronormative focus is the statistical approach used in analyzing sexual preferences and behaviours, with traditional factor analytic approaches potentially marginalizing or rejecting less endorsed sexual preferences and interests – often those associated with non-

heteronormative or sexual interests that diverge from traditional heteronormative sexual scripts (e.g., bondage, discipline, sadism, masochism (BDSM), inclusion of others, etc.).

Our current research efforts were directed towards validating a diverse and inclusive measure of concrete, item-level sexual interests and behaviours to be used in future sexual compatibility research. With this goal in mind, we explored two psychometric approaches to scale development and validation: traditional factor analysis and network psychometrics. We propose network psychometrics approaches to scale development and validation can provide more diverse and inclusive measurement of concrete item-level sexual behaviours. Given the approaches ability to capture the diversity of interrelated psychological constructs such as sexual interests and behaviours, they are less likely to produce heteronormative results when compared to traditional approaches like factor analysis.

## 1.1 The Impact of Heteronormativity

Heteronormativity is the ingrained socio-cultural belief that heterosexuality – based on the gender binary – is the 'norm' or 'default' sexual orientation, and further positions gender/sex as binary and naturally complementary to one another (Habarth, 2015; van Anders et al., 2022; Warner, 1991). Heteronormativity stresses the importance of a binary gender/sex framework, traditional socio-cultural roles and scripts, and heterosexual relationships, emphasizing reproduction to maintain the normative social order (e.g., the nuclear family). Heteronormative beliefs and values are incredibly pervasive, with their influence impacting education, media representation, law and public policy, our everyday language, and daily social interactions and expectations (see Marchia & Sommer, 2019; Moore, 2020; van der Toorn et al., 2020; Warner, 1991).

The influence of heteronormativity also seeps into scientific research, stretching from overt exclusionary practices such as removing any data from LGBT participants to more subtle forms such as biased methodological and statistical approaches that oversimply or homogenize populations to fit the normative social order (see Ackley et al., 2023; Garofalo, 2011; Meyer & Wilson, 2009). These practices (e.g., poorly worded demographic items or using a biased factor analytic approach) may result in (un)intended

consequences of limiting psychological perspectives by excluding or misrepresenting the experiences of individuals who do not fit into the heteronormative framework (see Schilt & Westbrook, 2009). Additionally, these practices can influence the conceptualization and operationalization of sexuality constructs and their respective measurement through biased research questions, methodologies, and by extension biased statistical approaches and interpretation of results (see Gateley et al., 2022; Ingraham, 1994; Plante, 2006).

## 1.2 Existing Measures of Sexual Interests and Behaviours

Numerous measures have been proposed to capture the complexity of human sexual interests and activities. However, many of these measures lack modern psychometric validation, have a heteronormative focus, and/or lack diverse concrete item-level sexual interests and behaviours beyond the 'normative' sexual script (see Andersen & Broffitt, 1988; Bartels & Harper, 2018; de Jong & Reis, 2014; Hansen et al., 1999; Wilson, 1988). More contemporary research investigating sexual interests and activities primarily focus on prevalence rates, observed patterns, and correlates (e.g., age) using diversified item lists without psychometric validation of the underlying latent structure (e.g., Holvoet et al., 2017; Seto et al., 2012). Many measures also investigate themes such as frotteurism, voyeurism, and paedophilia/hebephilia – themes beyond the purview of partnered sexual interests and behaviours (see Brown et al., 2022; Seto et al., 2012; Wilson, 1988). In sum, existing measures suffer from a host of limitations, but most importantly, they fail to comprehensively capture the diversity of partnered sexual interests and behaviours. Given the reported impact of sexually compatible behaviours on relationship quality, it is important that we be able to accurately measure a fuller range of human sexual behaviours using modern psychometric approaches.

## 1.3 Can Factor Analysis Incentivize Heteronormativity in Sexuality Research?

One of the most frequently used psychometric approaches to scale development and validation is factor analysis. Factor analysis is a statistical technique that seeks to identify unobserved latent variables that account for the common variance among a set of observed indicators (Little, 2013). For example, we may have a survey measuring

different aspects of depression. The survey may include sleep, appetite, mood, energy, irritability, and social isolation items. Factor analysis can help us to determine whether these items correspond to a single unobserved underlying latent variable (e.g., depression) that influences all these items (i.e., a uni-dimensional factor structure) or whether these items may correspond to multiple unobserved factors (e.g., cognitive, affective, somatic, and social factors) that better explain the variation among the items (i.e., a multi-dimensional factor structure). Alternatively, this approach has also been used when describing the multiple factors related to sexual interests and fantasies using bifactor exploratory structural equation modelling. These factors may include normophilic sexual interests (i.e., those behaviours often described as "vanilla sex," which are typically socially accepted sexual interests), reciprocal rough/extreme sexual interests, assuming power, relinquishing power, and intrusive behaviours (e.g., observing others without their consent) (see Brown et al., 2022). These observed indicators (i.e., sexual behaviours) are thought to be caused by the unobserved latent variables (i.e., interest in a specific domain of behaviours such as rough sex), with the unobserved latent variables being independent of each other (the assumption of local independence) (see Edwards et al., 2018).

Traditional factor analysis approaches can provide a more parsimonious and interpretable representation of the common variance among a set of items. However, they may also ignore the unique variance and heterogeneity among those items. Further, traditional factor analytic approaches can potentially incentivize researchers to reject highly unique and less endorsed items (i.e., item sparseness) as they do not contribute meaningfully to the common variance among the items in the factor structure (see Bainter, 2017). Although rejecting these less endorsed items may provide researchers with a more parsimonious factor model (see DeVellis & Thorpe, 2022), this parsimony may also be problematic when attempting to represent a diverse range of experiences across different groups of respondents. This concern arises because the nuances may not be captured by the common factor structure due to high item uniqueness or low item endorsement. We argue that this approach can potentially homogenize complex psychological constructs—losing important aspects of a psychological construct which most respondents may not share—despite their importance for specific subgroups (e.g., specific sexual orientations).

In other words, when rejecting items with low endorsement or high uniqueness for a more parsimonious model, researchers may also lose nuanced insight into specific subgroups. For example, when developing and validating a measure for depression, an item such as “I have frequent thoughts of suicide” may have a low endorsement rate (i.e., a small mean) in the general population. However, this item may be essential for identifying more severe cases of depression or at-risk individuals. This oversimplification may be especially challenging when attempting to capture a more diverse perspective of sexual interests and behaviours. As such, we posit network psychometric approaches as viable and highly effective alternatives when modelling complex psychological constructs such as human sexuality.

## 1.4 A Brief Comparison of Factor and Network Models

In contrast to traditional factor analytic approaches, network analysis does not assume the existence of unobservable latent variables. Instead, network analysis models depict complex psychological constructs as a systematic network of interconnected observable variables (Borsboom & Cramer, 2013; Borsboom et al., 2021). Each variable (i.e., observed indicator) represents a node. The statistical associations among them (e.g., partial correlations) are represented as edges (or lines) in the network (see Borsboom et al., 2022; Borsboom et al., 2021, p. 5). Once again, using depression as an example, when using network analysis, we would not anticipate the unobserved latent variable of depression; instead, each item in our questionnaire would reflect a node and any connections between the items would be the associations between them (e.g., partial correlations). Network analysis assumes observed variables are mutually causal, with no underlying factor that causes them. In a factor model, items are thought to be measuring latent variables. Contrast this with a network model, where items (i.e., nodes) cluster to form communities (see Borsboom et al., 2021, p. 5). When using factor analysis, researchers assume an underlying latent cause for the shared variance among the observed indicators while modeling the unique variance of each item as error variance or “residual variance” not captured in the measurement model (Babyak & Green, 2010; Little, 2013). Contrast this with network models, which assume the shared variance is due to mutual influences among the variables while capturing the unique variance of each

item, not as error variance, but rather, node strength – a metric which reflects how much a variable is connected to other variables in the network (Borsboom et al., 2021; Christensen & Golino, 2021a). As such, unique variance reflected as node strength is based on partial correlations between variables, measuring the direct association between two variables after controlling for all other variables in a network, including their uniqueness (Christensen & Golino, 2021a).

## 1.5 How Can Network Psychometrics Be Applied to Sexuality Research?

Given our primary concern of accurately representing the diversity of sexual interests and experiences when using traditional factor analytic methods – especially when considering a highly diverse and interrelated construct such as sexuality – we propose using network psychometrics to model concrete item-level sexual interests and behaviours in different sexual orientations. For example, if provided with data from a measure of concrete item-level sexual interests and behaviours, researchers may be able to use network psychometrics to reveal meaningful differences in their structure and their influence on one another. This can be done by constructing network models for each subgroup using their responses, allowing us to graphically visualize and compare their networks. Each item in the visualization represents a node and the associations between them as lines representing their partial correlations. These lines (also referred to as edges) can be weighted by the magnitude of the partial correlation (e.g., shown as thicker lines) or coloured by their sign (i.e., positive – denoted as blue, or negative – denoted as red) (see Borsboom et al., 2021; Deserno et al., 2022). Further, researchers can draw upon numerous centrality metrics (i.e., metrics denoting the importance of a specific item in a network based on different criteria), connectivity (i.e., the density of edges present in a network), and network stability (i.e., the robustness of the network when considering sampling variation) (see Deserno et al., 2022; Fried et al., 2022).

Once constructed, these different models can be compared across specific sexual orientation groups to identify the similarities and differences in the patterns of associations (i.e., partial correlations) between pairs of different sexual behaviours while controlling for all other items in the network for a given subgroup of interest (see

Epskamp et al., 2018; van Borkulo et al., 2022). Specifically, researchers may find some sexual interests as being more central (i.e., more influential) or peripheral (i.e., less influential) in specific sexual orientations than others (e.g., non-penetrative versus penetrative sex). In contrast, other behaviours may overlap across various sexual orientations (e.g., giving and receiving oral sex). This approach will allow us as researchers to answer many interesting questions, such as: (1) which sexual behaviours are more or less strongly associated with one another in each sexual orientation subgroup, (2) whether networks of various sexual behaviours are similar or different across sexual orientations, (3) which sexual behaviours are the most central (i.e., influential) across sexual orientations, and (4) allow us to determine the stability and reliability of these sexual interest networks for each respective sexual orientation subgroup.

In addition to these research questions, network psychometrics also shows greater promise in being able to model complex psychological constructs using cutting-edge scale development and validation techniques such as Exploratory Graph Analysis (EGA) (see Christensen et al., 2018; Christensen et al., 2023).

## 1.6 The Exploratory Graph Analysis Toolkit

Using network psychometrics, we can explore or confirm the patterns of interdependence among observed indicators. Further, we can examine how influential each indicator is in the network. One such approach – coined Exploratory Graph Analysis (EGA) – allows researchers to visualize the structure of psychological constructs, such as personality traits and mental illnesses like depression and anxiety. We seek to apply this approach to diverse partnered sexual interests and behaviours.

One of the primary strengths of EGA is its ability to assist in the discovery of patterns in data by producing and examining graphical visualizations which can show clustered nodes that may correspond to distinct but interrelated dimensions called communities through a method called community detection (see Borsboom et al., 2021, p. 5; Christensen et al., 2018; Golino & Epskamp, 2017). If these communities align with theoretical expectations, it can provide researchers with initial evidence of construct validity for their measure (Golino & Epskamp, 2017). This approach can also be

beneficial when a researcher has limited or no specific hypotheses about the structure of the complex psychological construct being investigated (see Golino & Demetriou, 2017). With this in mind, we suggest network psychometric approaches such as EGA – specifically, community detection – may offer researchers a promising statistical modelling approach with equal or greater accuracy in determining the number of dimensions when compared to more traditional methods (e.g., parallel analysis; see Christensen et al., 2018), especially when the dimensions are anticipated to be highly correlated (Forkmann et al., 2018; Golino & Demetriou, 2017) – as is likely the case with dimensions reflecting sexual interests and preferences (see Brown et al., 2022).

In addition to using community detection, researchers can draw upon another approach from the EGA toolkit – Unique Variable Analysis (UVA) (see Christensen et al., 2023). Using bootstrapping – a statistical resampling technique that resamples a single dataset a set number of times – researchers can determine the probability with which an item will fall within its detected community and estimate how often that community will be replicated with precisely the same item structure. Further, UVA also provides researchers with guidance to combine similar items (or nodes) into composite nodes when local dependence is detected. Redundant or locally dependent nodes may reduce the accuracy with which communities are estimated and lead to inaccurate estimations of their internal structure (Christensen et al., 2023).

Although network psychometric approaches show great promise in modelling complex psychological constructs, they also come with a caveat that turns them into a double-edged sword. Unlike traditional factor models, which strive to provide a parsimonious and interpretable factor structure, network models strive to capture the complexity and diversity of relationships between items. This complexity and diversity can be challenging to estimate, interpret, and communicate (Borsboom et al., 2021). In other words, despite being a potentially more diverse and inclusive modelling approach for complex psychological constructs, researchers must also be able to explain the complex interrelations. With this caveat in mind, we look at the direction of the current research.

## 1.7 Current Research

The primary aim of the current research was to develop and validate a diverse and inclusive new measure of concrete item-level partnered sexual interests and behaviours using modern psychometric techniques (i.e., factor analysis and network analysis). To do this, we conducted two studies in which we oversampled LGBT individuals. The first study consisted of two samples of participants (Samples 1 and 2), who were each shown 124 items: 62 core items of interest were shared between the samples while an additional 62 items were unique to each sample. In total, 186 concrete item-level sexual interests and behaviours were shown to participants in Study 1. The primary goal of Study 1 was to reduce the initial item pool using EFA and to explore a potential factor structure for subsequent scale development and validation. In Study 2, we probed the reduced item list of sexual interests using exploratory factor analysis, confirmatory factor analysis, and network psychometrics. This exercise allowed us to directly compare the inclusivity of these psychometric scale development approaches. To what extent do these scale validation approaches allow us to accurately represent the diversity of sexual behaviours and interests that go beyond the heteronormative script?

# Chapter 2

# 2 Study 1

In Study 1, participants were shown 186 concrete item-level sexual interests and behaviours. The 186 items were split amongst three blocks, containing 62 items each: Block X, A, and B. Items in Block X were shown to both Samples 1 and 2. Block A was shown only to Sample 1, whereas Block B was shown only to Sample 2. Block X contained core items of interest, in addition to items used in previous research (see de Jong & Reis, 2014). Items were randomized in each block. By reducing the number of items each participant viewed, we hoped to reduce respondent burden (e.g., fatigue and disengagement) with a lengthy and repetitive survey. We also hoped to retain higher quality data by reducing the overall survey length by 33% in the hopes for a higher completion rate with fewer missing datapoints. Additionally, by treating them as two distinct samples, and assigning the core items of interest to both samples a priori, we can compare the overall suggested factor structure for each sample. The primary goal of the present study was to reduce the item pool using EFA and to explore a potential factor structure for subsequent scale development and validation (i.e., EFA and CFA) in Study 2.

## 2.1 Methods

### 2.1.1 Procedure and Participants

Participants who were 18+ years of age, romantically attached, and fluent in English were recruited and directed to an online survey. The study was described as “examining the role of sexual compatibility in relationship quality.” After providing informed consent, participants completed a demographics form, which included questions regarding age, gender, sexual orientation, gender/sex, relationship status, level of education, and ethnicity. Participants who did not qualify for participation (i.e., did not meet inclusion criteria) were directed out of the survey; qualifying participants responded to a brief demographics and the sexual interest measure. Following completion of the survey,

participants received an online debriefing form. Participants had a median response time of approximately 14 minutes.

Both Study 1 samples were recruited using online sampling in May of 2022. Recruitment included using Twitter, Reddit, Instagram, and other online recruitment websites. We placed a concerted effort at oversampling LGBT individuals through targeted (and moderator approved) recruitment in popular online subreddits r/lgbtstuies, r/sex, r/askgaybros, r/BisexualMen, r/bibros, r/bisexual, r/NonBinaryTalk, and r/psychologyofsex. All individuals who participated were entered to win one of four $25.00 (CAD/USD) Amazon Gift Cards. Participants' data were excluded if they failed 50% or more of the survey's attention checks, or if they withdrew their data during debriefing.

#### 2.1.1.1 Sample 1

A total of 186 respondents were recruited for the Sample 1 questionnaire. Five participants were excluded for failing 50% or more of the survey's attention checks and an additional 31 participant withdrew their data during debriefing[1]. The final sample consisted of 150 participants (49 men, 86 women, and 15 non-binary). Participants had a mean age of 24 years (range = 18-57; *SD* = 6.32). Most participants self-identified as cisgender (*n* = 136; 90.6%), and white (*n* = 108; 72%), and were in monogamous (*n* = 128; 85.3%), non-married, committed relationships (*n* = 110; 73.3%). A majority had at least some college/university education (*n* = 64; 42.6%). Approximately half of the participants self-identified as straight (*n* = 77; 51.3%). The rest of the sample identified as bisexual+[2] (*n* = 53; 35.3%), lesbian (*n* = 11; 7.3%), gay (*n* = 6; 4.0%), and asexual (*n* = 3; 2.0%). See Table 1 for detailed demographic details of Sample 1.

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[1] Data exclusions included 19 participants who withdrew and 12 who failed to answer the data withdrawal question.

[2] Plurisexual identity labels encompass individuals with sexual orientations that break free of monosexist categorizations (i.e., fixed attractions to a single binary gender) and can include those who self-identify as queer, pansexual, fluid, and bisexual (see Galupo, 2018; Galupo et al., 2015). These plurisexual individuals experience similar stigma and delegitimization by both straight and lesbian/gay communities (Herek, 2002; Gonzalez et al., 2021; Roberts et al., 2015). For the purposes of the present research, we group those who identify with a plurisexual sexual identity label as bisexual+,

**Table 1**

*Sample 1 Participant Demographics by Frequency*

| | Participants<br>*n* = 150 |
|---|---|
| **Age** | *M* = 24.5<br>(*SD* = 6.32) |
| **Gender Identity** | *n* (%) |
| Woman | 86 (57.3%) |
| Man | 49 (32.7%) |
| Non-Binary | 15 (10.0%) |
| **Gender/Sex** | |
| Cisgender | 136 (90.7%) |
| Transgender | 13 (8.7%) |
| Intersex | 1 (0.7%) |
| **Sexual Orientation** | |
| Straight | 77 (51.3%) |
| Gay | 6 (4.0%) |
| Lesbian | 11 (7.3%) |
| Bisexual | 42 (28.0%) |
| Pansexual | 11 (7.3%) |
| Asexual | 3 (2.0%) |
| **Ethnicity/Race** | |
| African/Black | 2 (1.3%) |
| White | 108 (72.0%) |
| South Asian | 6 (4.0%) |
| Asian/East Asian | 17 (11.3%) |
| Indigenous/Aboriginal | 2 (1.3%) |
| Hispanic/Latinx | 4 (2.7%) |
| Multiethnic/Specify | 9 (6.0%) |
| Prefer not to say | 2 (1.3%) |
| **Relationship Status** | |
| Casually dating | 16 (10.7%) |
| Non-married committed relationship | 110 (73.3%) |
| Married/civil union | 24 (16.0%) |
| **Monogamous Relationship** | |
| Yes | 128 (85.3%) |
| No | 22 (14.7%) |
| **Consensually Non-Monogamous** | |
| Yes | 21 (14.0%) |
| No | 1 (0.7%) |

| | |
|---|---|
| **Education** | |
| High school diploma | 20 (13.3%) |
| Some college/university | 64 (42.7%) |
| Completed undergraduate | 44 (29.3%) |
| Vocational degree/certificate | 3 (2.0%) |
| Postgraduate studies | 19 (12.7%) |

#### 2.1.1.2 Sample 2

A total of 188 respondents were recruited for the Sample 2 questionnaire. Seven participants were excluded for failing 50% or more of the survey's attention checks and an additional 35 participants withdrew their data during debriefing[3]. The final sample consisted of 146 participants (52 men, 85 women, and nine non-binary) took part in the Sample 2 questionnaire. Participants had a mean age of 25 years (range = 18-60; *SD* = 8.00). Most participants self-identified as cisgender (*n* = 133; 91.1%), white (*n* = 104; 71.2%), being in monogamous (*n* = 124; 84.9%), non-married committed relationships (*n* = 85; 58.2%), with a majority having at least some college/university education (*n* = 63; 43.2%). %). Again, just over half of the participants identified as straight (*n* = 83; 56.8%). The rest of the sample identified as bisexual+ (*n* = 46; 31.5%), lesbian (*n* = 6; 4.1%), gay (*n* = 5; 3.42%), and asexual (*n* = 6; 4.1%). Data exclusions included seven participants for failing the 50% attention check cut-off and an additional 35 participants who withdrew their data during debriefing. See Table 2 for detailed demographic details of Sample 2.

[3] Data exclusions included 19 participants who withdrew their data and 25 who failed to answer the data withdrawal question.

**Table 2**

*Sample 2 Participant Demographics by Frequency*

| | Participants<br>*n* = 146 |
|---|---|
| **Age** | *M* = 25.1<br>(*SD* = 8.01) |
| **Gender Identity** | *n* (%) |
| Woman | 85 (58.2%) |
| Man | 52 (35.6%) |
| Non-Binary | 9 (6.2%) |
| **Gender/Sex** | |
| Cisgender | 133 (91.1%) |
| Transgender | 12 (8.2%) |
| Intersex | 1 (0.7%) |
| **Sexual Orientation** | |
| Straight | 83 (56.8%) |
| Gay | 5 (3.4%) |
| Lesbian | 6 (4.1%) |
| Bisexual | 36 (24.7%) |
| Pansexual | 10 (6.8%) |
| Asexual | 6 (4.1%) |
| **Ethnicity/Race** | |
| African/Black | 3 (2.1%) |
| White | 104 (71.2%) |
| South Asian | 6 (4.1%) |
| Asian/East Asian | 11 (7.5%) |
| Hispanic/Latinx | 3 (2.1%) |
| Middle Eastern, North African, Arabic | 4 (2.7%) |
| Multiethnic/Specify | 14 (9.6%) |
| Prefer not to say | 1 (0.7%) |
| **Relationship Status** | |
| Casually dating | 29 (19.7%) |
| Non-married committed relationship | 85 (58.2%) |
| Married/civil union | 32 (21.2%) |
| **Monogamous Relationship** | |
| Yes | 124 (84.9%) |
| No | 22 (15.0%) |
| **Consensually Non-Monogamous** | |
| Yes | 16 (10.9%) |
| No | 6 (4.1%) |

| | |
|---|---|
| **Education** | |
| Some high school | 4 (2.7%) |
| High school diploma | 16 (11.0%) |
| Some college/university | 63 (43.1%) |
| Completed undergraduate | 51 (34.9%) |
| Vocational degree/certificate | 3 (2.1%) |
| Postgraduate studies | 9 (2.1%) |

### 2.1.2 Measures

We sought, modified, and created a diverse list of concrete item-level sexual behaviours an individual may desire or be willing to engage in with their partners. Given our focus of partnered sexual interests and behaviours, we sought items that could be deemed mutual interests (e.g., Ash and Logan both like the lights on during sex) and complementary interests that together comprise a sexual activity (e.g., Ash likes giving oral sex while Logan likes receiving oral sex). A total of 29 items were gathered from previous research investigating dyadic sexual compatibility (see de Jong & Reis, 2014), with an additional three items generated to create a complementary pairing (e.g., the original list contained "being told how attractive, hot, or sexy I am" and we generated the item "telling my partner how attractive, hot, or sexy they are"). In addition to these items, 141 items were gathered from MojoUpgrade, a website which helps couples explore their willingness to try new sexual activities. An additional five items were generated using the MojoUpgrade list to create three complementary pairings and two items for including trans* and non-binary persons in a sexual threesome. Finally, nine new items were created on themes relating to: (1) erotic food-pay – given the links to feeding practices and intimacy and between food and fetishism, (2) having consensual sex while under the influence of alcohol/cannabis (i.e., chemsex with common substances), and making loud sounds during sex (e.g., moaning, screaming, breathing, etc.) – resulting in a total of 186 concrete item-level sexual behaviours[4].

[4] All item-level sexual interests and behaviours and their item codes are provided in the Appendices in the Sexual Behaviour Item Codebook.

All 186 items were modified and/or rephrased to reflect self-ratings of enjoyment for these sexual activities (i.e., “When it comes to sex, I enjoy, or would enjoy”) using gender-neutral language where possible. Specific details about item modification can be found in the supplementary materials uploaded to Open Science Framework (OSF)[OSF Repository]. Participants responded to each item using a 7-point scale (1 = *not at all*, 7 = *strongly*). If any item contained reference to specific genitalia (e.g., “thrusting my penis between my partner’s breasts”), an additional “N/A” option was provided on the scale for respondents for whom the item was not applicable. Participants also had the ability to skip any items they did not want to answer by leaving the question blank. The 186 items were split amongst three blocks, containing 62 items each – Block X, A, and B. Items in Block X were shown to both Samples 1 and 2. Block A was only shown to Sample 1, while Block B was only shown to Sample 2. Items were presented in a randomized order in their respective blocks; however, Block X and its respective items were always shown first as they were used in previous research and were of particular interest given their departure from a heteronormative sexual script (see de Jong & Reis, 2014).

## 2.2 Results

### 2.2.1 Analytic Plan

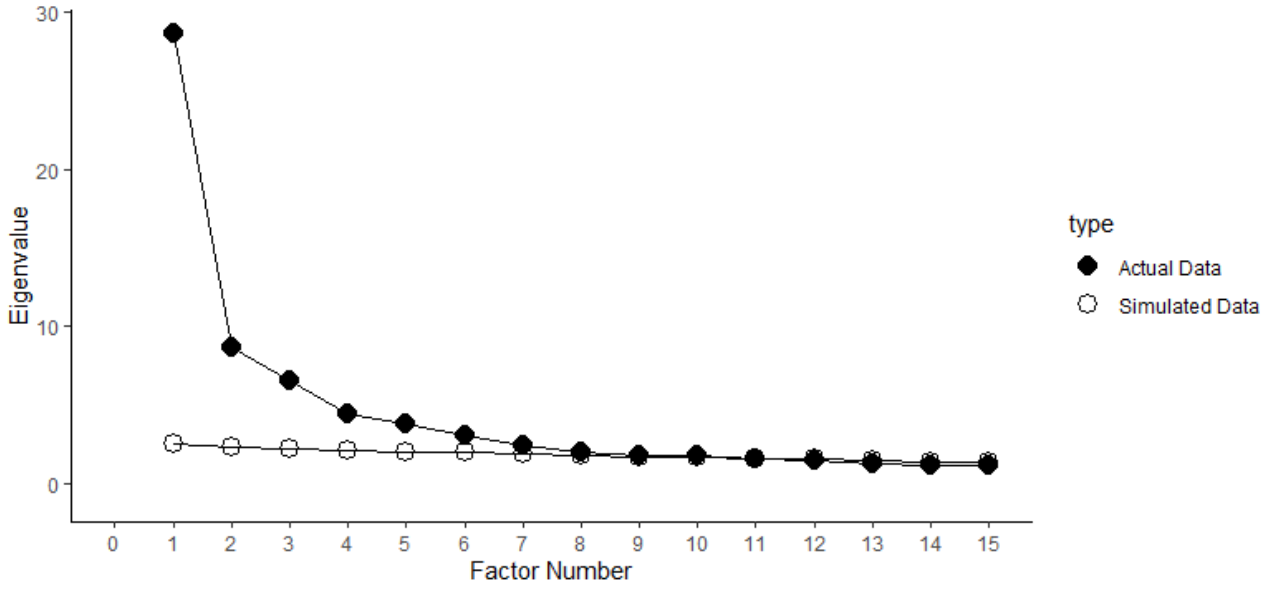
Using the data from Samples 1 and 2, we conducted an identical set of analyses for each sample. To determine the suggested number of factors for the items, we conducted a parallel analysis, followed by a visual scree plot analysis. Next, using both samples, we conducted a series of EFAs and compared them using a nested model comparison. Our goal was to pare down our item list for the subsequent study in which we would finalize our measure.

### 2.2.2 Sample 1

We first conducted a parallel analysis on the Sample 1 data using the ‘fa.parallel’ function in the “psych” package in R, which identified a potential 10-factor solution (see Revelle, 2022). A detailed scree plot of the parallel analysis for Sample 1 is provided in Figure 1.

**Figure 1**

*Parallel Analysis Scree Plot of 186 Partnered Sexual Behaviour Items (Sample 1)*




Using best practice recommendations for exploratory factor analysis (EFA) in sexuality research by Sakaluk and Short (2017), we closely inspected both the scree plot and the suggested solution by parallel analysis. It was observed that some factors retained only a single item or had poor factor loadings (e.g., below .40). Further, a visual scree plot analysis suggests the ten-factor solution may be overestimating factors based on the "elbow" rule (see Howard, 2016). As such, we conducted a series of EFAs and determined an 8-factor solution fit best. A nested model comparison of the 10 EFAs is provided in Table 3.

**Table 3**

*Fit of 1-10 Factor Models of the 186 Sexual Behaviour Items (Sample 1)*

| Model | $\chi 2$ | *df* | BIC | RMSEA | TLI |
|---|---|---|---|---|---|
| 1 | 23866.31 | 7502 | -13723.48 | 0.12 | 0.14 |
| 2 | 22686.34 | 7379 | -14287.14 | 0.12 | 0.18 |
| 3 | 21688.13 | 7257 | -14674.05 | 0.11 | 0.21 |
| 4 | 20983.86 | 7136 | -14772.04 | 0.11 | 0.22 |
| 5 | 20350.71 | 7016 | -14803.90 | 0.11 | 0.23 |
| 6 | 19763.09 | 6897 | -14795.27 | 0.11 | 0.23 |
| 7 | 19239.41 | 6779 | -14727.69 | 0.11 | 0.24 |
| 8 | 18797.19 | 6662 | -14583.66 | 0.11 | 0.24 |
| 9 | 18395.12 | 6546 | -14404.50 | 0.11 | 0.24 |
| 10 | 17946.55 | 6431 | -14276.85 | 0.11 | 0.24 |

We constrained the 128 items (Blocks X and A) from Sample 1 to 8 factors using an oblique Promax rotation. This 8-factor EFA cumulatively accounted for 50% of the total observed variance and displayed poor fit (RMSEA = .11, TLI = .24). Correlations between the eight factors ranged from weak ($r$ = -.06) to strong ($r$ = .69). A majority of items (39) flagged for multiple cross-loadings were discarded[5]. Items with factor loadings less than .55 were discarded based on the advice of Tabachnick and Fidell (2007), who follow Comrey and Lee (1992), suggesting more stringent cut-offs when items have different frequency distributions. In total, 61 items were retained (39 Block X and 22 Block A). See Supplementary Table 1 in the online materials for factor loadings and communalities of all 128 items from Sample 1 using the 8-factor solution [OSF Repository].

### 2.2.3 Sample 2

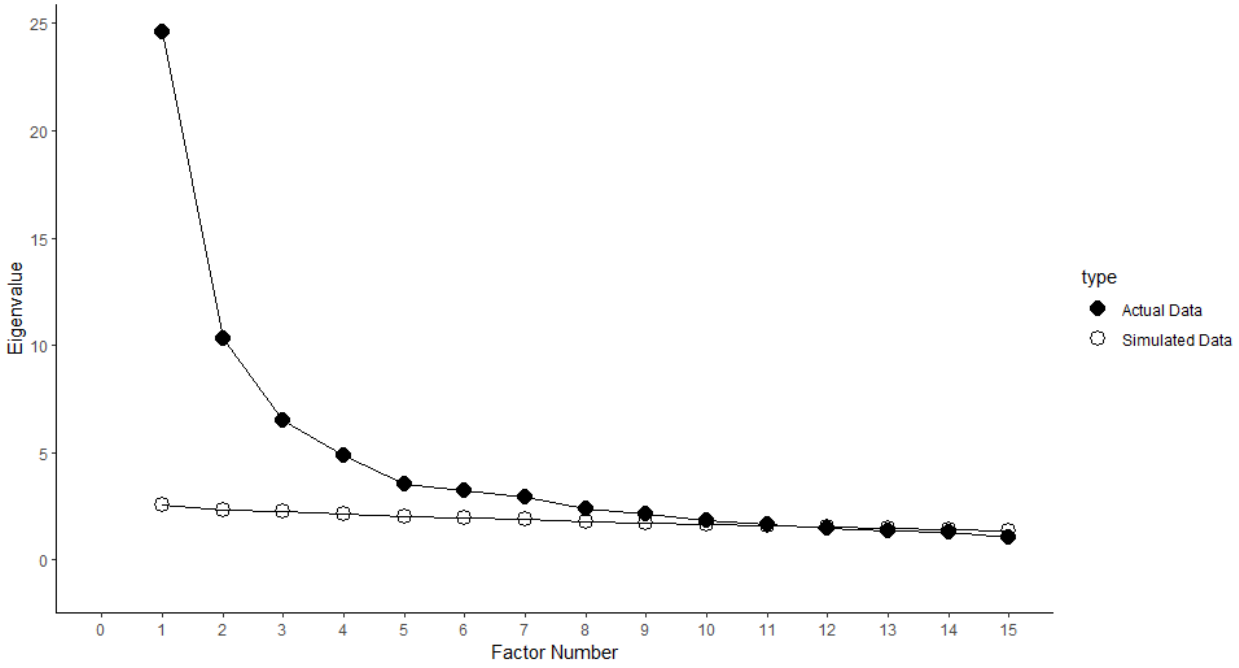
To determine the number of suggested factors for the Sample 2 data, we used the 'fa.parallel' function in the "psych" package in R, which identified a potential 10-factor solution in conjunction with a visual scree plot analysis (see Revelle, 2022; Sakaluk &

[5] All items flagged for multiple cross-loadings in Sample 1 were discarded except for Item 17 in Block X. This item displayed adequate a factor loading in Sample 2 and thus was retained for the next pilot study.

Short, 2017). A detailed scree plot of the parallel analysis for Sample 2 is provided in Figure 2.

**Figure 2**

*Parallel Analysis Scree Plot of the 186 Partnered Sexual Behaviour Items (Sample 2)*




We again observed that some factors retained only a single item or had poor factor loadings based on the suggested 10-factor solution. Again, a visual scree plot analysis suggested that the 10-factor solution may overestimate factors based on the "elbow" rule (see Howard, 2016). With this in mind, we conducted a series of EFAs and determined an 8-factor solution fit best. A nested model comparison of the 10 EFAs is again provided in Table 4.

**Table 4**

*Fit of 1-10 Factor Models of the 186 Sexual Behaviour Items (Sample 2)*

| Model | $\chi 2$ | *df* | BIC | RMSEA | TLI |
|---|---|---|---|---|---|
| 1 | 27390.69 | 7502 | -9996.32 | 0.13 | 0.09 |
| 2 | 26032.71 | 7379 | -10741.32 | 0.13 | 0.13 |
| 3 | 25075.10 | 7257 | -11090.93 | 0.13 | 0.14 |
| 4 | 24305.74 | 7136 | -11257.28 | 0.13 | 0.15 |
| 5 | 23685.64 | 7016 | -11279.34 | 0.13 | 0.16 |
| 6 | 23072.93 | 6897 | -11299.01 | 0.13 | 0.16 |
| 7 | 22530.63 | 6779 | -11253.24 | 0.13 | 0.16 |
| 8 | 22033.15 | 6662 | -11167.63 | 0.13 | 0.16 |
| 9 | 21608.87 | 6546 | -11013.81 | 0.13 | 0.15 |
| 10 | 21151.52 | 6431 | -10898.05 | 0.13 | 0.15 |

Using an oblique Promax rotation, we constrained the 128 items (Blocks X and B) from Sample 2 to eight factors. This 8-factor EFA solution cumulatively accounted for 49% of the total observed variance. It displayed poor absolute and relative fit (RMSEA = .11, TLI = .24). Correlations between the 8-factors ranged from weak ($r$ = .06) to moderate ($r$ = .46). Most items (28) flagged for multiple cross-loadings were discarded[6]. Once again, items with factor loadings less than .55 were discarded. In total, 71 items were retained (39 Block X and 32 Block B). See Supplementary Table 2 in the online materials for factor loadings and communalities of all 128 items from Sample 2 using the 8-factor solution [OSF Repository].

### 2.2.4 Discussion

Based on two initial samples of participants in relationships, we attempted to determine an initial factor structure by retaining 93 items (39 Block X, 22 Block A, 32 Block B) which captured various concrete item-level sexual interests, behaviours, and activities a person may desire or be willing to engage in with their partners. These behaviours ranged from being similar (e.g., liking the same thing during sex) to being complementary (e.g.,

[6] A majority of items flagged for multiple cross-loadings in Sample 2 were discarded except for Items 13, 18, 42, and 50 in Block X. These items displayed adequate factor loadings in Sample 1 and thus were retained for the next pilot study.

liking complementary acts which make a whole such as receiving and giving oral sex). Although most of these items loaded well onto their respective factors in Samples 1 and 2 when using an 8-factor solution, we observed some problematic indicators.

First, the total variance explained (TVE) by our 8-factor models for Samples 1 and 2 were 50% and 49%, respectively. Although there is no definitive threshold for TVE when using EFA, a common heuristic or rule of thumb is that a solution should account for approximately 50-60% of the total observed variance as a minimum (see Field, 2017; Hair et al., 2012). When factors do not capture most of the common variance in a dataset (e.g., > 50%), it could be argued that the factor structure may not provide a good summary of the observed patterns. Second, we observed numerous selective cross-loadings in both Samples 1 and 2. Although many of these cross-loadings fell below our loading cut-off of .55 and were discarded, these selective cross-loadings may indicate a more complex and interrelated structure better addressed with a different statistical approach (e.g., network analysis). Third, it is important to note that the absolute and relative fit indices indicated poor model fit for each EFA conducted. Absolute fit indices such as the Root Mean Square Error (RMSEA) are indicative of a better fit if values are smaller and closer to 0 (e.g., ≤ .06). In comparison, relative fit indices (also referred to as incremental fit indices) such as the Tucker-Lewis index (TLI) are indicative of a better fit if values are closer to 1 (e.g., .95 or greater) by comparing your defined model to the null model (i.e., the worst possible model) (see Hu & Bentler, 1999; Sakaluk & Short, 2017). These issues regarding the overall factor structure and model fit were concerning in both samples; however, these metrics were only one of the key issues we faced while developing a diverse and inclusive measure of sexual interests.

Beyond these psychometric concerns, it is worth noting that a large number of items were jettisoned from the original list of 186 item-level sexual behaviours, which may have resulted in a loss of diversity and nuance in sexual interests and preferences. For example, items pertaining to penetrative anal sex, anal stimulation, stimulating one's partner with toys, and numerous concrete oral sex behaviours were removed under the direction of a traditional factor analytic approach: a key concern when attempting to accurately represent diverse sexual experiences that deviate from heteronormative sexual

scripts. Despite these concerns, we next conducted a follow-up study with the reduced 93-item list based on the recommendations of the 8-factor solution EFAs from Study 1.

# Chapter 3

# 3 Study 2

In Study 1, we used exploratory factor analysis to reduce our initial item list of 186 behaviours to 93 items which comprised nine identified factors. We anticipated different facets of sexual interests and behaviours that had been observed in past research using exploratory structural equation modelling (see Brown et al., 2022); however, we encountered several difficulties in Study 1 which prompted us to explore additional statistical approaches to measurement modelling (e.g., network psychometrics). In Study 2, we administered the retained93 items to a new sample of diverse participants, with 54% identifying as LGBT. With this new sample, we sought to create a finalized list of concrete item-level partnered sexual behaviours and interests to be used in future sexual compatibility research. Given the model fit and item diversity issues identified in Study 1, we modeled the data from Study 2 using not only a factor analytic approach, but also a network psychometric approach. This strategy allowed us to compare the inclusivity of these psychometric scale development approaches. Providing researchers with valuable insight into whether one approach more accurately represents the diversity of sexual interests and experiences when considering the sexuality spectrum.

## 3.1 Methods

### 3.1.1 Procedure and Participants

Participants who were over the age of 18, romantically attached, and fluent in English were recruited and directed to an online survey. The study was described as “examining the role of sexual compatibility on relationship quality.” After providing informed consent, participants completed the demographics form. Participants who did not qualify for participation (i.e., did not meet inclusion criteria) were directed out of the survey; qualifying participants responded to a brief demographic questionnaire and the 93 sexual interest items. Following completion of the survey, participants received an online debriefing form. Participants had a median response time of approximately 11 minutes.

A total of 1264 participants were recruited using online sampling from late October to the end of November in 2022. Recruitment again included using Twitter, Reddit, Instagram, and other online recruitment websites. We again oversampled LGBT individuals through targeted recruitment (with moderator approval) in popular online subreddits (e.g., r/lgbtstuies, r/sex, r/askgaybros, r/BisexualMen, r/bibros, r/bisexual, r/NonBinaryTalk, and r/psychologyofsex). All individuals who participated were entered to win one of four $25.00 (CAD/USD) Amazon Gift Cards. As in Study 1, participant data was excluded if they failed 50% or more of the survey's attention checks (*n* = 268) – resulting in a total of 996 participants (391 men, 505 women, 99 non-binary, and 1 preferred not to say) who took part in the survey. To accommodate both an EFA and CFA the dataset was split into two randomly assigned subsets – the EFA and CFA subsets.

#### 3.1.1.1 Full Sample

A total of 1264 participants were recruited using online sampling from late October to the end of November in 2022. Participant data were excluded if they failed 50% or more of the survey's attention checks (*n* = 268), resulting in 996 participants (391 men, 505 women, 99 non-binary, and 1 preferred not to say) who took part in the survey. Participants had a mean age of 26.9 years (range = 18-71; *SD* = 8.21). Most participants self-identified as cisgender (*n* = 851; 85.4%), white (*n* = 692; 69.5%), being in monogamous (*n* = 811; 81.4%), non-married committed relationships (*n* = 566; 56.8%); additionally, some participants (*n* = 159, 16.0%) reported being in a consensually non-monogamous relationship. Our participants were well-educated, with most having at least some college/university education (*n* = 341; 34.2%). Further, most participants self-identified as straight (*n* = 473; 47.5%%), bisexual+ (*n* = 394; 39.6%), lesbian (*n* = 45; 4.5%), gay (*n* = 65; 6.5%), and asexual (*n* = 19; 1.91%). Over half of our participants were recruited from Reddit (*n* = 518; 52.0%). The full sample was used for the network psychometric approach. However, to accommodate both an EFA and CFA from a singular dataset, the full sample was split into two randomly assigned subsets. Detailed demographic breakdown of the full sample and each subset are provided in Table 5.

#### 3.1.1.2 EFA Subset

A total of 498 participants were randomly selected for the EFA subset (188 men, 267 women, and 43 non-binary). Participants reported a mean age of 27.1 years (range = 18-71; *SD* = 8.22). Most participants self-identified as cisgender (*n* = 424; 85.1%), white (*n* = 361; 72.5%), being in monogamous (*n* = 406; 81.5%), non-married committed relationships (*n* = 287; 57.6%); additionally, some participants (*n* = 77, 15.5%) reported being in a consensually non-monogamous relationship. Our participants were well educated, with most having at least some college/university education (*n* = 321; 32.7%). Further, most participants self-identified as straight (*n* = 227; 45.6%), bisexual+ (*n* = 212; 42.6%), lesbian (*n* = 19; 3.8%), gay (*n* = 31; 6.2%), and asexual (*n* = 9; 1.8%). Over half of our participants were recruited from Reddit (*n* = 258; 51.8%).

#### 3.1.1.3 CFA Subset

A total of 498 participants were randomly selected for the CFA subset (203 men, 238 women, 56 non-binary, and 1 prefer not to say). Participants reported a mean age of 26.7 years (range = 18-66; *SD* = 8.20). Most participants self-identified as cisgender (*n* = 427; 85.7%), white (*n* = 331; 66.5%), being in monogamous (*n* = 405; 81.3%), non-married committed relationships (*n* = 279; 56.0%); additionally, some participants (*n* = 81, 16.5%) reported being in a consensually non-monogamous relationship. Our participants were well educated, with most having at least some college/university education (*n* = 178; 35.7%). Further, most participants self-identified as straight (*n* = 246; 49.4%), bisexual+ (*n* = 182; 36.5%), lesbian (*n* = 26; 5.2%), gay (*n* = 34; 6.8%), and asexual (*n* = 10; 2.0%). Over half of our participants were recruited from Reddit (*n* = 260; 52.2%).

**Table 5**

*Study 2 Participant Demographics by Frequency*

| | **Full Sample** *n* = 996 | **EFA Subset** *n = 498* | **CFA Subset** *n = 498* |
|---|---|---|---|
| **Age** | *M* = 26.9 (*SD* = 8.21) | *M* = 27.1 (*SD* = 8.22) | *M* = 26.7 (*SD* = 8.20) |

| **Gender Identity** | *n* (%) | *n* (%) | *n* (%) |
|---|---|---|---|
| Woman | 505 (50.7%) | 267 (53.6%) | 238 (47.8%) |
| Man | 391 (39.3%) | 188 (37.8%) | 203 (40.8%) |
| Non-Binary | 91 (9.1%) | 38 (7.6%) | 53 (10.6%) |
| Specify | 8 (0.8%) | 5 (1.0%) | 3 (0.6%) |
| **Gender/Sex** | | | |
| Cisgender | 851 (85.4%) | 424 (85.1%) | 427 (85.7%) |
| Transgender | 139 (14.0%) | 71 (14.3%) | 68 (13.7%) |
| Intersex | 4 (0.4%) | 1 (0.2%) | 3 (0.6%) |
| **Sexual Orientation** | | | |
| Asexual | 19 (1.9%) | 9 (1.8%) | 10 (2.0%) |
| Bisexual | 308 (30.9%) | 161 (32.3%) | 147 (29.5%) |
| Gay | 65 (6.5%) | 31 (6.2%) | 34 (6.8%) |
| Lesbian | 45 (4.5%) | 19 (3.8%) | 26 (5.2%) |
| Pansexual | 86 (8.6%) | 51 (10.2%) | 35 (7.0%) |
| Straight | 473 (47.5%) | 227 (45.6%) | 246 (49.4%) |
| **Ethnicity/Race** | | | |
| African/Black | 49 (4.9%) | 21 (4.2%) | 28 (5.6%) |
| Asian/East Asian | 76 (7.6%) | 36 (7.2%) | 40 (8.0%) |
| Hispanic/Latinx | 45 (4.5%) | 25 (5.0%) | 20 (4.0%) |
| Indigenous | 5 (0.5%) | 2 (0.4%) | 3 (0.6%) |
| Middle Eastern, North African, Arabic | 17 (1.7%) | 7 (1.4%) | 10 (2.0%) |
| Multiethnic | 49 (4.9%) | 18 (3.6%) | 31 (6.2%) |
| Pacific Islander | 3 (0.3%) | - | 3 (0.6%) |
| Prefer not to say | 10 (1.0%) | 5 (1.0%) | 5 (1.0%) |
| South Asian | 48 (4.8%) | 23 (4.6%) | 25 (5.0%) |
| White | 692 (69.5%) | 361 (72.5%) | 331 (66.5%) |
| **Relationship Status** | | | |
| Casually dating | 208 (20.9%) | 97 (19.5%) | 111 (22.3%) |
| Married | 222 (22.3%) | 114 (22.9%) | 108 (21.7%) |
| Non-Married Committed Rel. | 566 (56.8%) | 287 (57.6%) | 279 (56.0%) |
| **Monogamous Relationship** | | | |
| Yes | 811 (81.4%) | 406 (81.5%) | 405 (81.3%) |
| No | 184 (18.5%) | 92 (18.5%) | 92 (18.5%) |
| **Consensually Non-Monogamous** | | | |
| Yes | 159 (16.0%) | 77 (15.5%) | 82 (16.5%) |
| No | 25 (2.5%) | 15 (3.0%) | 10 (2.0%) |
| **Education** | | | |
| Completed undergraduate | 315 (31.6%) | 160 (32.1%) | 155 (31.1%) |

| | | | |
|---|---|---|---|
| High school diploma | 100 (10.0%) | 52 (10.4%) | 48 (9.6%) |
| Postgraduate studies | 204 (20.5%) | 105 (21.1%) | 99 (19.9%) |
| Some college/university | 341 (34.2%) | 163 (32.7%) | 178 (35.7%) |
| Some high school | 11 (1.1%) | 4 (0.8%) | 7 (1.4%) |
| Vocational degree | 24 (2.4%) | 14 (2.8%) | 10 (2.0%) |

### 3.1.2 Measures

Participants were presented with the 93 retained items from Study 1. These items were presented in a single block, in randomized order. They captured various sexual preferences, behaviours, and activities an individual may desire or be willing to engage in (e.g., including others during sex, giving oral sex, etc.). These items were again prefaced with "When it comes to sex, I enjoy, or would enjoy" – reflecting self-ratings of enjoyment for these various sexual activities. Participants responded to each item using a 7-point scale (1 = *not at all*, 7 = *strongly*).

## 3.2 Results

### 3.2.1 Factor Analytic Approach

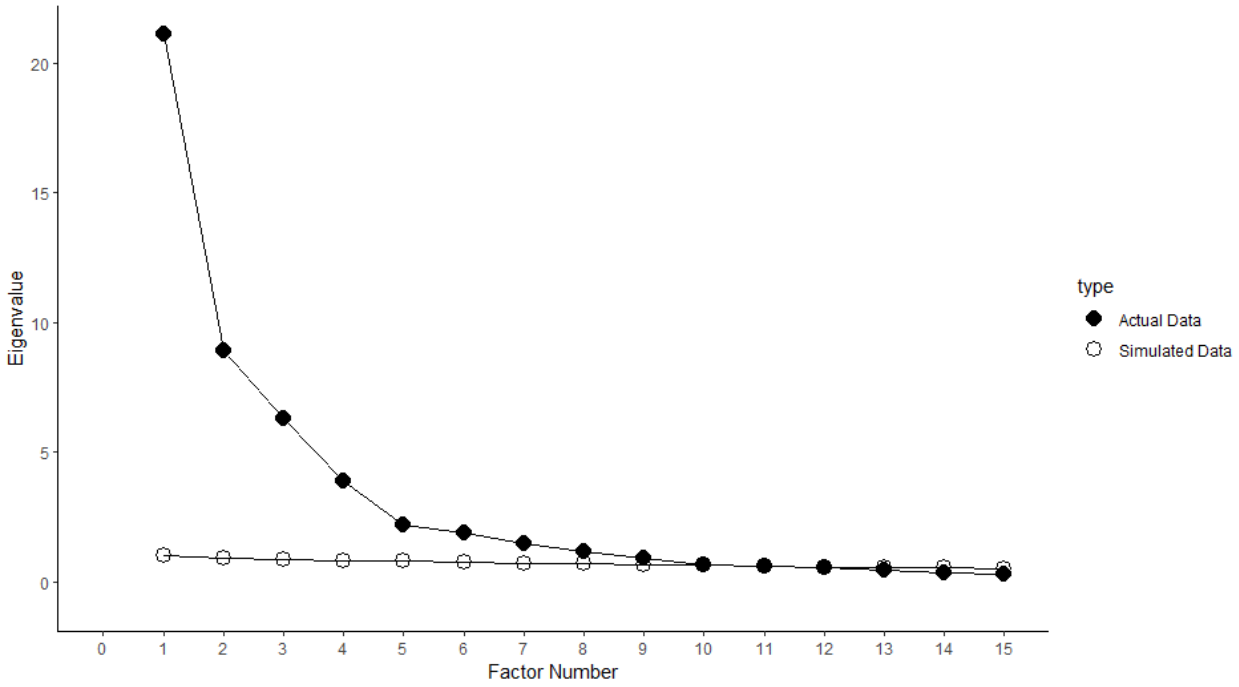
First, to accommodate both an EFA and CFA from a single dataset, we randomly assigned half of the dataset for the purposes of an EFA, whereas the other half was used for the purposes of a CFA. The primary goals of the EFA were to (1) provide insight into a final factor structure and (2) to further refine our list of 93 items to be used in the subsequent CFA. Using the randomly assigned EFA subset, we first determined the appropriate number of factors by conducting a parallel analysis, followed by a visual scree plot analysis. Based on the parallel analysis and visual scree plot analysis, we conducted a series of EFAs and compared them using a nested model comparison – paying particular attention to the 5- and 9-factor solutions. Based on the 9-factor solution and factor loading criterion, 39 out of 93 items were retained. Next, using the randomly assigned CFA subset, we conducted a CFA using the 39 retained items and a 9-factor solution provided from the EFA subset to validate our measure of sexual interests and behaviours using a confirmatory factor analytic approach.

#### 3.2.1.1 EFA Analyses

Examining only the EFA participant subsample, we used the 'fa.parallel' function in the "psych" package in R to determine the number of suggested factors, which identified a potential 9-factor solution (see Revelle, 2022). A detailed scree plot of the parallel analysis for Study 2 is provided in Figure 3.

**Figure 3**

*Parallel Analysis Scree Plot of the 93 Partnered Sexual Behaviour Items (Study 2)*




Upon closer inspection of the suggested 9-factor solution, we noted that the 9th factor was comprised entirely of items with factor loadings below our factor loading cut-off of .70, resulting in it being discarded in its entirety. A visual scree plot analysis indicated an "elbow" at a potential 5-factor solution. Using an oblique Promax rotation, we constrained the 93 items to the 5-factor and 9-factor solutions of interest. The 5-factor solution cumulatively accounted for 47.0% of the total observed variance; in contrast, the 9-factor solution accounted for 54.7%. Inter-factor correlations between the 5-factor solution ranged from weak (e.g., $r$ = .08) to ***strong (e.g., r = .59)***. In contrast, inter-factor correlations for the 9-factor solution ranged from weak (e.g., $r$ = .02) to ***strong (e.g., r =***

***.59)***. With this information in hand, we conducted a series of exploratory factor analyses (EFA) and determined the 9-factor solution fit best – in terms of descriptive fit indices (e.g., RMSEA = .06 and TLI = .77), lowest Bayesian information criterion (BIC = -12206.03), appreciable communalities (≥ 33% of the variance explained in each item), and in terms providing a logical solution which was somewhat compatible with previous categorizations of sexual behaviours (see Brown et al., 2022). A nested model comparison of the nine EFAs is provided below in Table 6.

**Table 6**

*Fit of 1-10 Factor Models of the 93 Sexual Behaviour Items*

| Model | $\chi 2$ | *df* | BIC | RMSEA | TLI |
|---|---|---|---|---|---|
| 1 | 25717.67 | 4185 | -273.69 | 0.10 | 0.30 |
| 2 | 21081.57 | 4093 | -4338.42 | 0.09 | 0.44 |
| 3 | 17314.63 | 4002 | -7540.19 | 0.08 | 0.55 |
| 4 | 14761.37 | 3912 | -9534.50 | 0.07 | 0.62 |
| 5 | 13180.98 | 3823 | -10562.14 | 0.07 | 0.67 |
| 6 | 12013.36 | 3735 | -11183.23 | 0.07 | 0.70 |
| 7 | 10967.40 | 3648 | -11688.87 | 0.06 | 0.73 |
| 8 | 10045.22 | 3562 | -12076.94 | 0.06 | 0.75 |
| 9 | 9388.22 | 3477 | -12206.03 | 0.06 | 0.77 |

Once again, following recommendations by Tabachnick & Fidell (2007), who suggest more stringent cut-offs when items have different frequency distributions, we adopted a factor loading cut-off of .70. Items with factor loadings less than the cut-off were discarded; all items with selective and complete cross-loadings were also discarded for being below this cut-off. The 9-factors encompassed the following themes 1) Inclusion of Others, 2) Assuming Power, 3) Rough/Extreme Sex, 4) Sex Talk, 5) Sexual Aides, 6) Relinquishing Power, 7) Fluid Bonding, and 8) Food-play. The 9$^{th}$ and final factor (and its respective items) was also discarded for falling below the factor loading cut-off criterion. The descriptive model fit indices indicated good absolute fit (RMSEA = .06) but continued to display poor relative fit (TLI = .77). In sum, 56 items were discarded from the original 93, resulting in a final 8-factor model comprised of 39 items. See Supplementary Tables 3 and 4 in the online materials for 5- and 9-factor solution

loadings and communalities of all 93 items from the EFA subset of Study 2 [OSF Repository].

#### 3.2.1.2 CFA Analyses

Next, using the CFA subset of participants, we fit two competing models using the 9-factor solution – including one model in which the nine factors were permitted to covary and a second model in which the nine factors were not permitted to covary (i.e., orthogonal). With the recommendations of Rhemtulla et al. (2012) in mind, all models were fit with robust maximum likelihood estimation using the 'lavaan' package in R (see Rosseel, 2012). Further, to maximize and retain unbiased participant data and to avoid deleting cases of partial data, missing data were addressed using Full Information Maximum Likelihood (FIML) estimation. Model evaluation followed traditional cut-offs of RMSEA ≤ .06, SRMR ≤ .08, TLI and CFI ≥ .95 (see Hu & Bentler, 1999). Both models used a fix-factor scale-setting and identification strategy (see Little, 2013). Using this evaluation strategy, latent variances were fixed to one, and all factor loadings were estimated.

In the first model, the 9-factors were permitted to covary. This model fit the data poorly based on traditional model cut-offs, based on both absolute metrics, $\chi 2(674) = 2738.24$, $p = 0$, RMSEA = 0.08, SRMR = 0.09, and relative metrics, TLI = 0.84, CFI = 0.85. The second model - in which the 9-factors had their covariances constrained to zero – also fit the data poorly based on our traditional model cut-offs, both based on absolute metrics, $\chi 2\ (702) = 3372.58$, $p = 0$, RMSEA = 0.09, SRMR = 0.17, and relative metrics, TLI = 0.80, CFI = 0.80. Furthermore, a nested model comparison revealed that the constrained model displayed significantly worse fit, $\Delta\chi 2\ (28) = 617.06$, $p = 0$. Thus, the best model (of the two considered) for the 39 retained items was the model with covaried factors. Standardized factor loadings for each of the 39 items are presented in Table 7 and latent correlations between the 8-retained factors are presented in Table 8.

**Table 7**

*Standardized Factor Loadings of 39-Retained Sexual Behaviour Items*

| Factor Name | Item | Factor Loading | *SE* | *CI* |
|---|---|---|---|---|
| Inclusion of Others | X7 | 0.91 | 0.01 | [0.89, 0.93] |
| Inclusion of Others | X9 | 0.80 | 0.02 | [0.75, 0.84] |
| Inclusion of Others | B10 | 0.87 | 0.02 | [0.84, 0.90] |
| Inclusion of Others | X8 | 0.78 | 0.03 | [0.73, 0.83] |
| Inclusion of Others | X10 | 0.76 | 0.02 | [0.71, 0.80] |
| Inclusion of Others | X5 | 0.79 | 0.02 | [0.75, 0.84] |
| Inclusion of Others | X11 | 0.75 | 0.02 | [0.71, 0.80] |
| Inclusion of Others | X12 | 0.72 | 0.03 | [0.66, 0.78] |
| Inclusion of Others | A8 | 0.80 | 0.02 | [0.76, 0.85] |
| Inclusion of Others | A7 | 0.81 | 0.02 | [0.78, 0.85] |
| Inclusion of Others | B9 | 0.75 | 0.02 | [0.70, 0.79] |
| Inclusion of Others | X6 | 0.80 | 0.02 | [0.75, 0.84] |
| Assuming Power | X19 | 0.92 | 0.01 | [0.90, 0.94] |
| Assuming Power | X20 | 0.87 | 0.02 | [0.84, 0.90] |
| Assuming Power | X41 | 0.89 | 0.01 | [0.86, 0.92] |
| Assuming Power | A34 | 0.78 | 0.02 | [0.74, 0.82] |
| Assuming Power | A32 | 0.68 | 0.03 | [0.63, 0.74] |
| Rough/Extreme Sex | B35 | 0.76 | 0.04 | [0.69, 0.83] |
| Rough/Extreme Sex | B30 | 0.63 | 0.05 | [0.53, 0.73] |
| Rough/Extreme Sex | B31 | 0.64 | 0.05 | [0.53, 0.75] |
| Rough/Extreme Sex | B34 | 0.76 | 0.05 | [0.67, 0.86] |
| Sex Talk | B51 | 0.66 | 0.04 | [0.58, 0.74] |
| Sex Talk | X39 | 0.64 | 0.05 | [0.53, 0.74] |
| Sex Talk | X38 | 0.71 | 0.04 | [0.63, 0.79] |
| Sexual Aides | B38 | 0.46 | 0.04 | [0.39, 0.54] |
| Sexual Aides | B39 | 0.80 | 0.04 | [0.73, 0.86] |
| Sexual Aides | X26 | 0.88 | 0.03 | [0.81, 0.94] |
| Sexual Aides | B37 | 0.18 | 0.06 | [0.07, 0.29] |
| Relinquish Power | X18 | 0.88 | 0.02 | [0.84, 0.91] |
| Relinquish Power | X42 | 0.87 | 0.02 | [0.83, 0.91] |
| Relinquish Power | X21 | 0.87 | 0.02 | [0.83, 0.91] |
| Relinquish Power | A33 | 0.75 | 0.03 | [0.70, 0.80] |
| Fluid Bonding | B42 | 0.82 | 0.03 | [0.76, 0.88] |
| Fluid Bonding | X33 | 0.45 | 0.05 | [0.35, 0.55] |

| | | | | |
|---|---|---|---|---|
| Fluid Bonding | B40 | 0.82 | 0.03 | [0.76, 0.88] |
| Food-play | X57 | 0.88 | 0.02 | [0.83, 0.92] |
| Food-play | X59 | 0.88 | 0.02 | [0.84, 0.91] |
| Food-play | X58 | 0.87 | 0.02 | [0.83, 0.91] |
| Food-play | X60 | 0.89 | 0.02 | [0.85, 0.92] |

**Table 8**

*Latent Correlations Between 8 Retained Sexual Interest Factors*

| **Factor 1** | **Factor 2** | ***r*** | ***SE*** | ***CI*** |
|---|---|---|---|---|
| Inclusion of Others | Assuming Power | 0.28 | 0.05 | [0.18, 0.37] |
| Inclusion of Others | Rough/Extreme Sex | 0.38 | 0.04 | [0.30, 0.47] |
| Inclusion of Others | Sex Talk | 0.10 | 0.05 | [0.00, 0.20] |
| Inclusion of Others | Sexual Aides | 0.38 | 0.05 | [0.29, 0.47] |
| Inclusion of Others | Relinquish Power | 0.06 | 0.05 | [-0.04, 0.15] |
| Inclusion of Others | Fluid Bonding | 0.22 | 0.05 | [0.11, 0.32] |
| Inclusion of Others | Food-play | 0.16 | 0.05 | [0.06, 0.26] |
| Assuming Power | Rough/Extreme Sex | 0.17 | 0.06 | [0.06, 0.28] |
| Assuming Power | Sex Talk | 0.32 | 0.06 | [0.21, 0.43] |
| Assuming Power | Sexual Aides | 0.14 | 0.07 | [0.00, 0.28] |
| Assuming Power | Relinquish Power | -0.04 | 0.06 | [-0.15, 0.07] |
| Assuming Power | Fluid Bonding | -0.09 | 0.06 | [-0.20, 0.03] |
| Assuming Power | Food-play | 0.23 | 0.05 | [0.14, 0.33] |
| Rough/Extreme Sex | Sex Talk | -0.06 | 0.07 | [-0.19, 0.07] |
| Rough/Extreme Sex | Sexual Aides | 0.07 | 0.05 | [-0.03, 0.17] |
| Rough/Extreme Sex | Relinquish Power | 0.11 | 0.06 | [-0.01, 0.22] |
| Rough/Extreme Sex | Fluid Bonding | 0.30 | 0.06 | [0.18, 0.41] |
| Rough/Extreme Sex | Food-play | 0.25 | 0.05 | [0.16, 0.35] |
| Sex Talk | Sexual Aides | 0.39 | 0.06 | [0.28, 0.51] |
| Sex Talk | Relinquish Power | 0.44 | 0.05 | [0.34, 0.54] |
| Sex Talk | Fluid Bonding | 0.32 | 0.06 | [0.20, 0.43] |
| Sex Talk | Food-play | 0.34 | 0.05 | [0.24, 0.44] |
| Sexual Aides | Relinquish Power | 0.47 | 0.05 | [0.37, 0.57] |
| Sexual Aides | Fluid Bonding | 0.40 | 0.05 | [0.30, 0.50] |
| Sexual Aides | Food-play | 0.21 | 0.05 | [0.10, 0.31] |
| Relinquish Power | Fluid Bonding | 0.45 | 0.04 | [0.36, 0.53] |
| Relinquish Power | Food-play | 0.23 | 0.05 | [0.14, 0.32] |
| Fluid Bonding | Food-play | 0.13 | 0.05 | [0.03, 0.24] |

#### 3.2.1.3 Factor Analysis Summary

Starting with the 93 items retained from Study 1, we used traditional factor analytic approaches to validate a diverse and inclusive measure of sexual interests and behaviours. Participants in Study 2 ($n$ = 996) were randomly assigned to either the EFA ($n$ = 498) or CFA ($n$ = 498) subset. After random assignment, we conducted a series of EFAs on half of the dataset. We determined that a 9-factor model fit the data best. Using this 9-factor EFA solution, we trimmed our set of items from 93 to 39. Next, using these 39 items, we conducted a CFA. These 39 items loaded highly onto nine factors. The nine factors included 1) Inclusion of Others, 2) Assuming Power, 3) Rough/Extreme Sex, 4) Sex Talk, 5) Sexual Aides, 6) Relinquishing Power, 7) Fluid Bonding, and 8) Food-play. The 9$^{th}$ was dropped due to low-factor loadings (i.e., below .70 for all items). These categories appear indicative of different facets of sexual interests and behaviours that have been observed in past research (see Brown et al., 2022). However, the model fit indices displayed poor relative and absolute fit. As such, we explored another burgeoning psychological scale development and validation approach, network psychometrics.

### 3.2.2 Network Psychometrics Approach

Using the 'EGAnet' package in R, we first sought to determine whether the entirety of the Study 2 dataset was best generated from a factor or network model using artificial neural networks (see Christensen & Golino, 2021b). Based upon the recommendations of this approach, we conducted four stepwise follow-up analyses again using the 'EGAnet' package in R using exploratory graph analysis (EGA) and parametric bootstrapping. These four stepwise analyses involved: (1) initial estimations of dimensional consistency and item stability, (2) a test of the assumption of local independence and the merging of redundant items to reduce our item list using Unique Variable Analysis, (3) a re-estimation of dimensional consistency and item stability with a non-redundant item list to determine which additional items displayed low replicability and should be discarded, and (4) a final estimation of dimensional consistency and item stability metrics using our finalized sexual interest and behaviour items.

#### 3.2.2.1 Loadings Comparison Test (LCT)

Given our difficulties using traditional factor analytic approaches, we first tested whether network modelling would be a promising approach using the entirety of the dataset from Study 2. The LCT uses artificial neural networks to predict whether data is best generated from a factor or network model using the 'EGAnet' package in R (see Christensen & Golino, 2021b). Initially, the LCT used an algorithm which employed several heuristics based on simulations to compare network loadings[7] with factor loadings (Christensen & Golino, 2021a). The accuracy of these heuristics was then amplified by using several deep-learning neural networks – providing researchers with a powerful and promising tool to identify whether data were generated from a factor or network model (Christensen & Golino, 2021b).

To do this, the LCT tests three predictions. The first test involves bootstrapping multiple samples to predict the data-generating model by comparing network and factor loading means. The second involves the use of neural networks, which are used to make predictions based on the empirical data itself. The third test is based on the proportion each time a model is predicted as the data-generating mechanism across bootstraps (i.e., a factor model versus a network model for each resampled bootstrap) (Christensen & Golino, 2021a, 2021b). Following the guidelines presented by Christensen and Golino (2021b), we placed the most weight on the predictions provided by the proportion test, followed by the bootstrap and empirical tests. The proportion test is particularly valuable as it provides insight into the certainty of the data-generating model. With this in mind, we ran the loadings comparison test for Study 2. We determined that the proportion test predicted a network model as the data-generating model 100% of the time. Further, the bootstrap and empirical tests also predicted a network model as the data-generating model. These results suggest that when measuring sexual interests and behaviours, a network psychometrics approach to scale development may be the most promising

[7] Simulation studies have suggested that network loadings can provide similar information to factor loadings and can be used for item selection, factor scores, etc (see Christensen & Golino, 2021a).

avenue to explore. With these findings in mind, we used Exploratory Graph Analysis (EGA) to investigate our items from Study 2[8].

#### 3.2.2.2 Exploratory Graph Analysis

Using EGA and bootstrapping, initial estimations suggested eight distinct communities[9] with rough themes, including 1) Rough/Extreme Sex, 2) Assuming Power, 3) Inclusion of Others, 4) Normophilia, 5) Fluid Bonding, 6) Relinquishing Power, 7) Masturbation and Sexual Aides, and 8) Food-play. These dimensions were similar to those identified in the 9-factor CFA solution above. When investigating the stability of the items when attempting to replicate the original EGA structure, using 1000 replica samples through parametric bootstrapped EGA, we noted five items with replicability lower than the 75% cut-off recommended by Christensen & Golino (2021c). See Figure 4 for item stability metrics and a graph of the bootstrapped EGA network.

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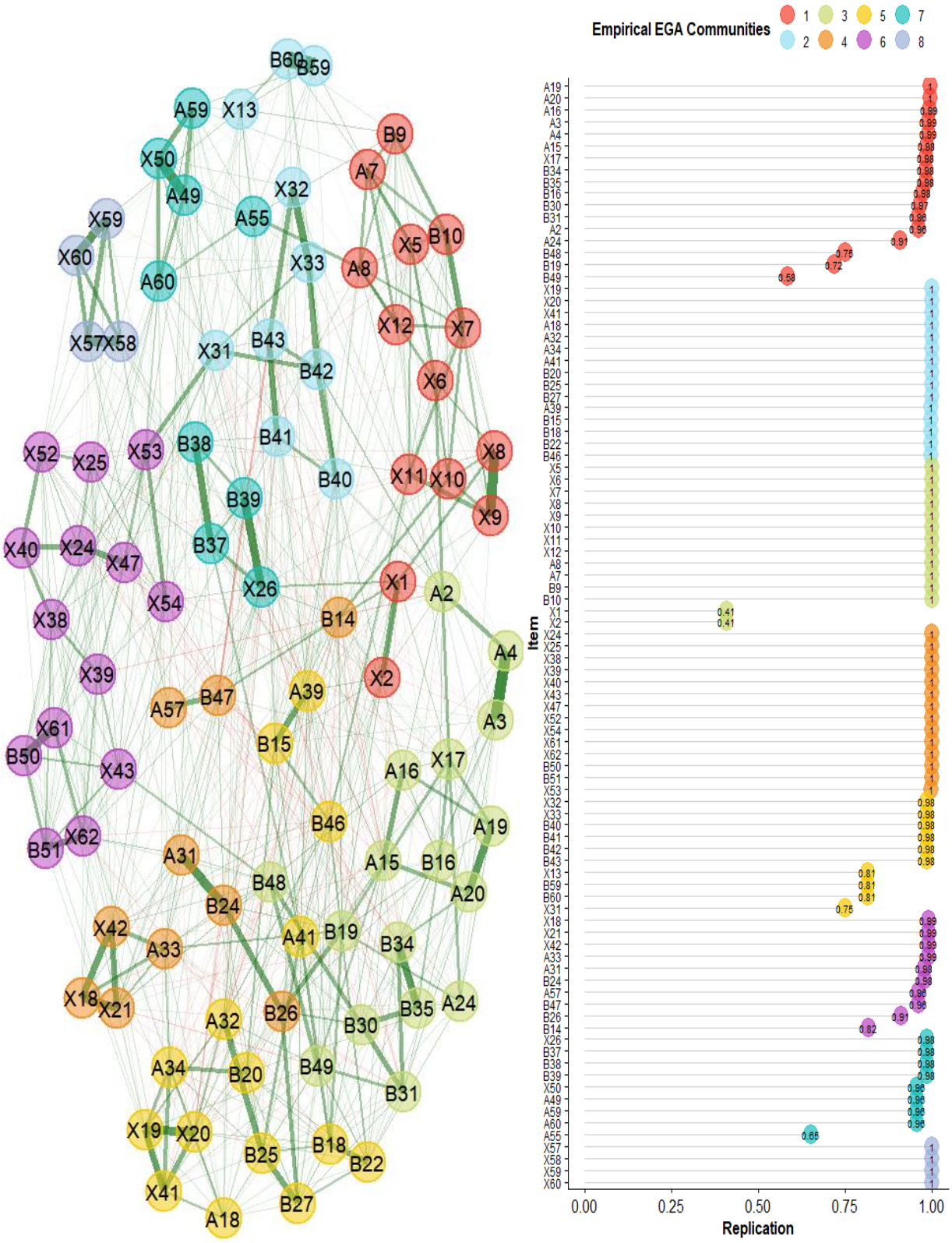
[8] We could not compute a LCT for Samples 1 and 2 from Study 1 due to a small sample size (i.e., insufficient data). This resulted in a covariance matrix which was not positive-definite. As such, this dataset was revisited after analyzing Study 2 using our EGA approach.

[9] These clustered items are also often referred to as dimensions or factors.

**Figure 4**

*Exploratory Graph Analysis of 93 Partnered Sexual Behaviour Items without UVA and Item Stability Metrics*



Further, the structural consistency – or the extent to which each dimension replicates with the ***exact same items*** – of multiple dimensions was low; however, the average item stability in each empirical EGA dimension was relatively high (see Table 9). Overall, the initial bootstrapped EGA suggested eight dimensions in 86.2% of the bootstrap samples, nine dimensions in 13.0% of the bootstrap samples, and seven dimensions in 0.8% of the bootstrap samples.

**Table 9**

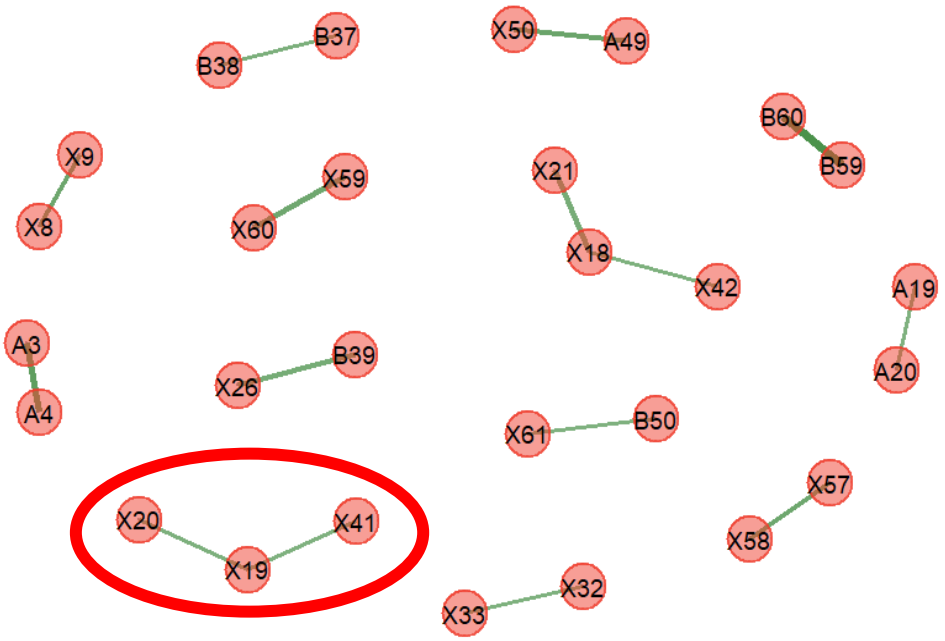
*Initial Dimensional Stability Estimates with Redundancy*

| Dimension | Structural Consistency | Average Item Stability |
|---|---|---|
| 1. Rough/Extreme Sex | 40.9% | 98.8% |
| 2. Assuming Power | 58.6% | 98.8% |
| 3. Inclusion of Others | 42.0% | 88.7% |
| 4. Normophilia | 77.1% | 96.1% |
| 5. Fluid Bonding | 99.8% | 93.1% |
| 6. Relinquishing Power | 99.9% | 97.0% |
| 7. Masturbation and Sexual Aides | 64.3% | 96.8% |
| 8. Food-play | 100% | 100% |

Next, using the 'EGAnet' package, we conducted a Unique Variable Analysis (UVA) to detect local dependencies – or in other words, to detect redundant items (i.e., nodes). Redundant or locally dependent nodes have been shown to reduce the accuracy with which communities are estimated. This redundancy can lead to inaccurate estimations of a dimension's internal structure (Christensen et al., 2023). Using the 'UVA' function, we ran a manual check of local dependency. We merged locally dependent nodes into composite nodes using weighted topographical overlap, a recommended significance threshold of $p \leq .25$, and a reduction approach which combined redundant variables into respective latent variables (see Christensen et al., 2023; Christensen et al., 2020). Using UVA, 13 cases of local dependence were identified (see Figure 5).

**Figure 5**

*Exploratory Graph Analysis Plot of Redundant Nodes using Unique Variable Analysis*




For example, item X19 – "being dominant towards my partner" (the target item) – was flagged for redundancy with items (1) X20 – "having my partner be submissive for me" and (2) X41 – "taking control of my partner" with a respective regularized partial correlation between X19 and X20 = .38 and X19 and X41 = .34 when controlling for all other items. Appendix C provides detailed regularized partial correlations for all items flagged for redundancy. No ad hoc latent variables were flagged for redundancy after completing UVA.

The UVA reduced our item list from Study 2 from 93 to 78. With this non-redundant dataset, we re-estimated the dimensionality of the remaining 78 sexual interest items. Overall, EGA suggested eight dimensions in 58.3% of the bootstrap samples, seven dimensions in 41.2% of the bootstrap samples, and six- and nine-dimensions in 0.4% and 0.1% of the bootstrap samples, respectively. However, the UVA selected the solution

with seven dimensions as the best structure[10]. A critical omission from the seven-dimension solution included the Masturbation and Sexual Aides dimension. The structural consistency – or the extent to which each dimension replicated with the ***exact same items*** – remained low for three dimensions; however, the average item stability in each empirical EGA dimension was relatively high (see Table 10).

**Table 10**

*Dimensional Stability Estimates without Redundancy after UVA*

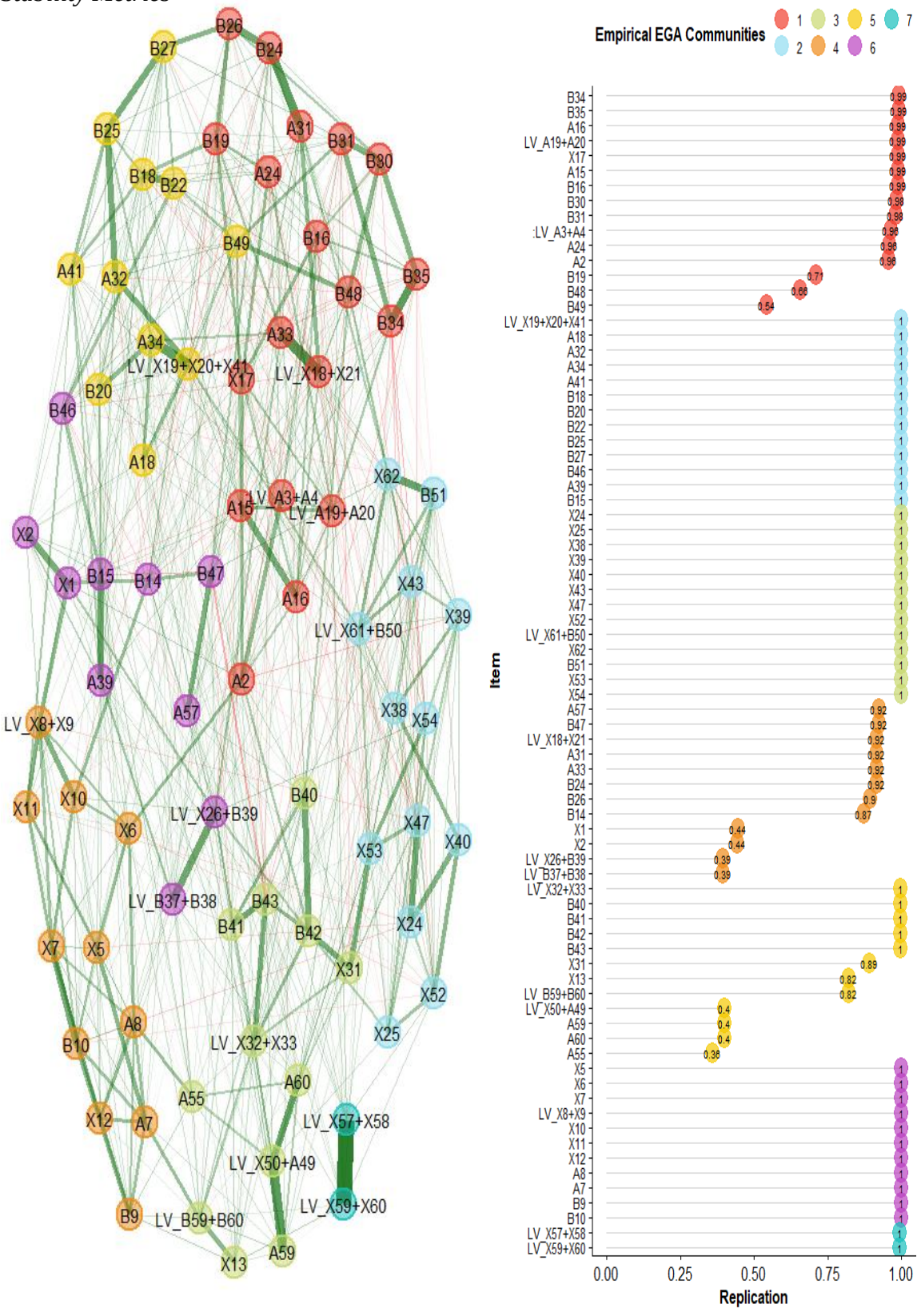
| Dimension | Structural Consistency | Average Item Stability |
|---|---|---|
| 1. Rough/Extreme Sex | 38.1% | 88.9% |
| 2. Assuming Power | 99.9% | 89.7% |
| 3. Normophilia | 99.9% | 93.8% |
| 4. Relinquishing Power | 30.7% | 87.3% |
| 5. Fluid Bonding | 32.6% | 97.6% |
| 6. Inclusion of Others | 100% | 83.6% |
| 7. Food-play | 99.5% | 100% |

Further, when checking the stability of the items when attempting to replicate the finalized EGA structure, using 1000 replica samples through parametric bootstrap EGA, we noted 11 items with replicability lower than the 75% cut-off recommended by Christensen & Golino (2021c); as such, these items were discarded. The discarded items primarily captured behaviours relating to partnered masturbation and sexual aides. See Figure 6 for item stability metrics without redundancy and a re-estimated bootstrapped EGA network graph.

[10] Currently, the EGAnet package does not have the functionality to provide dimensional consistency and item stability metrics for specific dimensional structures outside of the structure recommended by the 'itemStability' function. This will likely be updated in the future based on our correspondence with the package developers.

**Figure 6**

*Exploratory Graph Analysis of 78 Partnered Sexual Behaviour Items with UVA and Item Stability Metrics*



After discarding the 11 items with low replicability, we were left with a final set of 67 items. Using these final 67 items, we ran final structural consistency estimates without redundant items and low replicating items. Final structural consistency estimates were excellent for almost all factors (except #5, Fluid Bonding); average item stability estimates were excellent for all factors (see Table 11). The final bootstrap EGA suggested seven dimensions in 99.1% of the bootstrapped EGAs.

**Table 11**

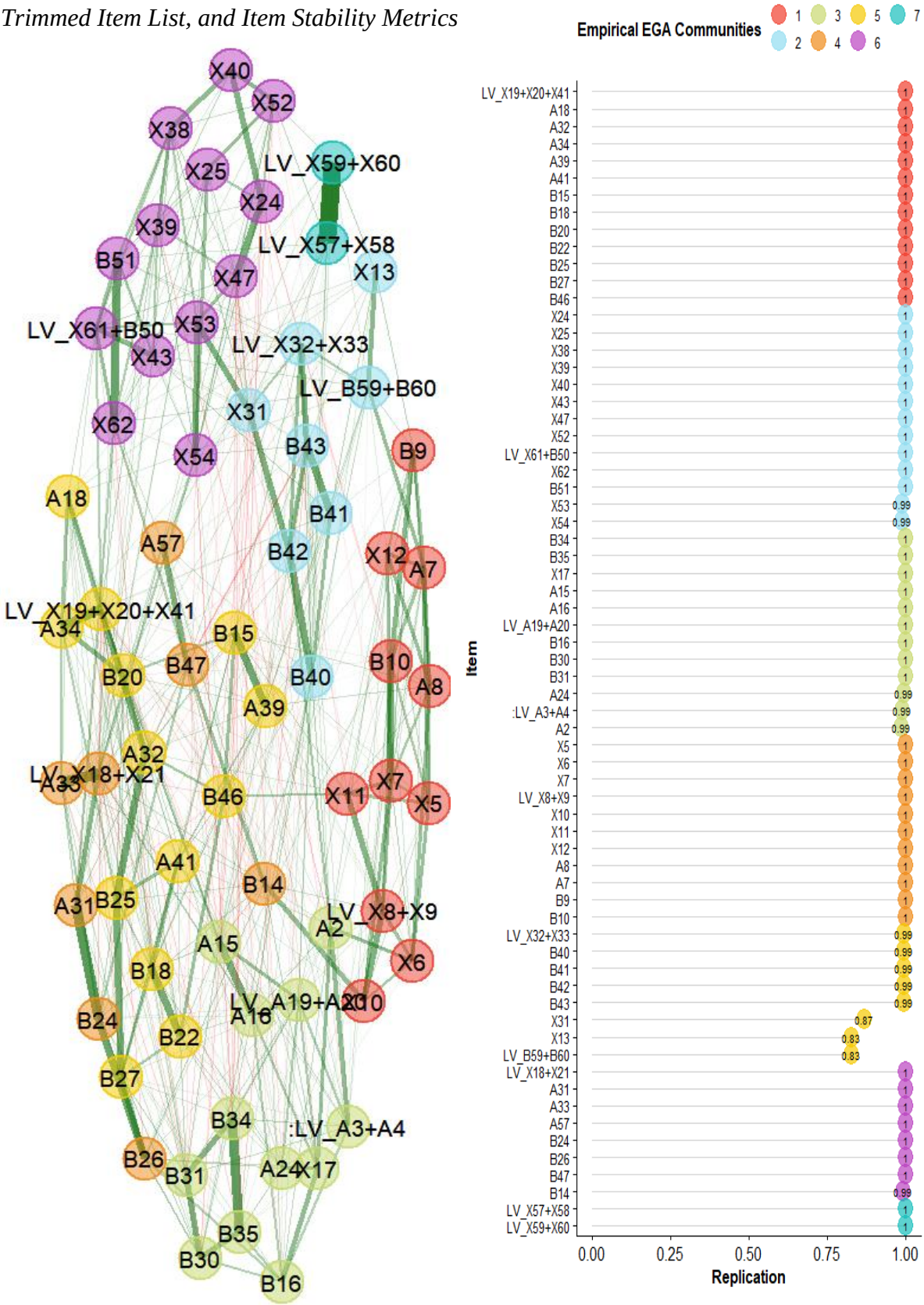
*Final Dimensional Stability Estimates without Redundancy and Items with Low Stability*

| Dimension | Structural Consistency | Average Item Stability |
|---|---|---|
| 1. Assuming Power | 100% | 98.5% |
| 2. Normophilia | 98.8% | 99.9% |
| 3. Rough/Extreme Sex | 98.1% | 97.1% |
| 4. Inclusion of Others | 100% | 100% |
| 5. Fluid Bonding | 72.3% | 99.9% |
| 6. Relinquishing Power | 99.2% | 99.6% |
| 7. Food-play | 99.9% | 99.4% |

Overall, our items displayed good to nearly perfect replicability. The dimension with the lowest replicable items corresponded to Fluid Bonding, with items ranging from 83% to 99% replicability. All other dimensions had excellent replicability ranging from 99% to 100%. See Figure 7 for item stability metrics for the final 67 items without redundancy and a graph of the bootstrapped EGA network.

**Figure 7**

*Final Exploratory Graph Analysis of 67 Partnered Sexual Behaviour Items with UVA and Trimmed Item List, and Item Stability Metrics*



#### 3.2.2.3 Network Analysis Summary

Using Exploratory Graph Analysis (EGA), we attempted to validate a diverse and inclusive measure of sexual interests and behaviours. Using the 93 retained items from Study 2 ($n$ = 996), we first conducted a Loadings Comparison Test (LCT) to confirm that a network model was indeed the most probabilistic data-generating mechanism. Next, we conducted initial dimensional consistency and item stability estimates using bootstrapped EGAs. A total of eight dimensions were identified; however, several dimensions displayed poor structural stability in terms of ***the extent to which each dimension replicated with the exact same items***. Item stability – ***or the probability that each item replicated in its respective dimension*** – was relatively strong, with only five items falling below the 75% replicability cut-off recommended by Christensen and Golino (2021c) (see Figure 4 and Table 9).

With these initial estimates in hand, we next sought to identify any cases of local dependency in the form of redundant items (i.e., network nodes or observed indicators). Redundant items are those which have been flagged for violating the assumption of local independence, where variables remain correlated after being conditioned on a latent variable. Violating this assumption can lead to model misspecification, biased model parameters, and inaccurate estimations of internal structure. These issues are a concern for both traditional factor analytic approaches and emerging network psychometric approaches (see Christensen et al., 2023). Using Unique Variable Analysis, we were able to identify a total of 13 cases of local dependency, comprised of a total of 28 items (see Figure 5). These 28 items were reduced to 13 composite latent variables, taking our total list from 93 to 78 items. We again estimated dimensional consistency and item stability metrics using this set of non-redundant items. The bootstrapped EGA suggested eight dimensions in 58.3% of the bootstrapped samples and seven dimensions in 41.2%. Comparison of the seven- and eight-dimension solutions only differed with respect to the Masturbation and Sexual Aides dimension; all others were identical. We retained the 7-dimensional structure based on its recommendation by the ‘itemStability’ function in the ‘EGAnet’ package. The dimensions displayed varied structural consistency ranging from poor (30.7%) to excellent (100%) regarding ***exact structural replication***. Once again,

average item stability remained strong, ranging from 83.6% to 100% replicability. However, 11 items were flagged for having replicability estimates ≤ 75%; these items were discarded, leaving us with a final list of 67 items (see Table 10 and Figure 6).

Finally, we used this reduced list of 67 items to estimate final dimensional consistency and item stability metrics. The seven dimensions (i.e., factors) displayed acceptable to excellent structural consistency (i.e., the ***extent to which each dimension replicated with the exact same items***) – ranging from 72.3% to 100%. Further, the average item stability (i.e., ***the probability that each item replicated in its respective dimension***) was excellent for all dimensions – ranging from 97.1% to 100%. In sum, we were left with a measure that spanned seven dimensions and was comprised of 67 items (see Table 11 and Figure 7), with strong replicability and consistency metrics.

## 3.3 Discussion

The primary aim of the present study was to create a finalized list of concrete item-level partnered sexual behaviours and interests to be used in future sexual compatibility research. Given the model fit and item diversity concerns raised during Study 1, we opted to model the data from Study 2 using not only a factor analytic approach, but also a network psychometric approach using exploratory graph analysis (EGA). This strategy allowed us to compare whether one approach more accurately represented the diversity of sexual interests and experiences across the sexuality spectrum.

When continuing to use the traditional factor analytic route with EFA in Study 2, we continued to observe selective cross-loadings. Despite these cross-loadings falling below our cut-off of .70 and being discarded, they continued to indicate a more complex and interrelated factor structure, as the factors were likely not completely orthogonal or independent (Costello & Osborne, 2005). This was also echoed in our nested model comparison which indicated worse fit for the orthogonal (i.e., constrained) model. In other words, despite our factors being somewhat interrelated, they did not significantly influence our final results given the criterion used to trim the item list. However, these observations did suggest that our data were more interconnected than we had anticipated. Previous research has shown that CFA tends to fail when factors are highly correlated,

this is because highly correlated factors may indicate that they are not distinct factors, reducing the accuracy of the factor structure (see Golino & Demetriou, 2017). Consistent with these results, recent research has indicated that sexual interests and fantasies comprise a more complex and interrelated factor structure (e.g., Bifactor using Exploratory Structural Equation Modelling), which basic CFA alone may not be able to address (see Brown et al., 2022).

In addition to these issues related to the factor structure, we also continued to note poor metrics regarding model fit. The final 9-factor covaried model displayed poor absolute and relative fit regarding descriptive fit indices. This again may indicate that sexual interests and behaviours are highly complex psychological constructs, and this complexity is not always captured by traditional factor analytic methods (see Brown et al., 2022). In sum, these findings suggest that the patterns in our dataset are better addressed with a more nuanced modelling approach, one which can more adequately represent this complexity (e.g., network psychometrics).

Alongside the continued concerns regarding factor structure and overall model fit, we also continued to observe a worrisome trend regarding item diversity. In Study 1, our EFA suggested jettisoning 50% of our original item list (186 items to 93). This trend continued when using EFA in Study 2 with 60% of our items (56) being discarded from our list of 93 sexual behaviours. In discarding these items, we lost a significant degree of diversity and nuance when representing our participants partnered sexual behaviours. In addition to the items on penetrative anal sex, anal stimulation, stimulating one's partner with toys, and numerous concrete oral sex behaviours that were jettisoned in Study 1, the EFA approach in Study 2 resulted in discarding over half of our remaining items. Of particular interest were items from the Sex Talk factor (e.g., items on normophilic sexual interests like kissing, cuddling, foreplay, and manual genital stimulation), the Sexual Aides factor (e.g., items specifically about partnered masturbatory behaviours), the Rough/Extreme Sex factor (e.g., items on more extreme forms of reciprocal BDSM-play), and the Fluid Bonding factor (e.g., "giving oral sex") which contained our final item on oral sex. Many of these discarded behaviours have shown to be more, or equally, prevalent in the sexual repertoires of LGBT couples (see Chandra et al., 2013; Dodge et

al., 2016; Herbenick et al., 2017; Holvoet et al., 2017; St Lawrence et al., 1989; Ybarra et al., 2016). In our own data from Study 1 and 2, many of these behaviours were also observed to have consistently higher endorsement rates (i.e., mean scores) in LGBT versus heterosexual participants. For example, across all samples, all items inquiring about partnered masturbatory behaviours and the use of sex toys in various contexts showed greater endorsement in self-identified LGBT participants in comparison to heterosexual participants. Further, all behaviours that were discarded from the Rough/Extreme Sex factor also showed higher endorsement in LGBT versus heterosexual participants. Losing these sexual behaviours not only impacted item-level diversity, but also impacted the diversity of our factor structure.

As a byproduct of discarding 80% of our original item list, some of our final factors became oversimplified. For example, items in Sex Talk and Rough/Extreme Sex factor were very similar. This is because the Sex Talk factor lost numerous items on normophilic sexual interests (e.g., items on kissing, cuddling, foreplay, and creating a romantic atmosphere) whereas the Rough/Extreme Sex factor lost additional items that went beyond the heteronormative script (e.g., using chastity devices, felching, being spanked with toys, and urolagnia) (see Supplementary Table 4 in online materials – OSF Repository). Although discarding these items resulted in a more parsimonious model, doing so came with the trade-off of losing important nuanced information regarding people's sexual behaviours. This oversimplification is especially troublesome when attempting to capture an incredibly diverse and complex psychological construct such as human sexuality. Some may argue a lower endorsement of these behaviours indicates a lower degree of importance, given most respondents do not endorse them. However, we disagree, given these behaviours are vital from a diversity and inclusivity perspective when attempting to accurately represent the experiences of participants across the sexuality spectrum.

Given the continued concerns regarding factor structure, model fit, and item diversity raised through the factor analytic approach from Studies 1 through 2, we probed the full dataset from Study 2 using network psychometrics. Using an iterative process with exploratory graph analysis, we refined our dimensional consistency (i.e., the extent to

which each dimension replicated with the ***exact same items***) and item stability (i.e., the probability that each item replicated in its respective dimension) estimates. Redundant nodes – those which shared a significant degree of overlap – were combined to form latent variables, and a final estimation of dimensional consistency and item stability metrics yielded a 7-dimensional solution with excellent replicability (99.1%).

In addition to this high degree of replicability, we also retained a more diverse and inclusive measure of item-level sexual behaviours – 72% of items (67 in total) were retained from the 93-item list, in comparison only 40% which were retained using factor analysis. Items that were retained using network psychometrics, but were discarded in the factor analysis approach, included those in the Rough/Extreme Sex dimension that went beyond the heteronormative script (e.g., items on using chastity devices, urolagnia, and more extreme forms of reciprocal BDSM-play), the Normophilic dimension (e.g., items on kissing, cuddling, foreplay, creating a romantic atmosphere, and manual genital stimulation), and Fluid Bonding which contained our last item on oral sex. Despite retaining these additional items using a network psychometrics approach, a key set of behaviours on partnered masturbation and using sexual aides (i.e., sex toys in various contexts) were not retained in the final 7-dimensional solution. The loss of these items (and their respective dimension) is discussed further below. Overall, the retention of these 67 items provides us with a more accurate representation of diverse sexual interests across the sexuality spectrum, when compared to the traditional factor analytic approach.

# Chapter 4

# 4 General Discussion

Across two studies, we sought to develop and validate a diverse measure of item-level partnered sexual interests and behaviours by oversampling LGBT participants. Participants were shown a list of various partnered sexual interests and behaviours and provided self-ratings of enjoyment for these sexual activities. With our primary goal of accurately representing the diverse and varied experiences across the sexuality spectrum, we argue that network psychometric approaches such as EGA provide researchers with a promising tool in this regard.

Using traditional factor analytic approaches provided us with a questionable factor structure, poor model fit, and the jettisoning of approximately 80% of our original item list – reducing it from 186 to 39 items from Study 1 to 2. We also observed the loss of key sexual interests and behaviours (e.g., items on partnered masturbation, penetrative anal sex, anal stimulation, and various concrete oral sex behaviours) and an oversimplification of our factors. In other words, when using the factor analytic approach, we failed to accurately represent the diversity of sexual interests and behaviours in our final measurement model.

Compared to the traditional factor analytic approach, the network psychometrics approach using EGA provided us with a final set of 67 items, despite starting with only 93, retaining approximately 72% of the items with excellent replicability. The dimensions represented a more diverse array of item-level sexual interests and behaviours while simultaneously modelling their complexity and interrelatedness. Although we retained more items using the EGA approach, we still lost key item-level sexual behaviours on partnered masturbation and sexual aides. The loss of these items is problematic, given their importance in specific LGBT subgroups. For example, partnered masturbation and sexual aides (e.g., vibrators, dildos, other toys) may be more prevalent in LGBT populations given their departure from traditional sexual scripts, generally more liberal attitudes towards sexuality, and practicing lower-risk/safer sexual behaviours (see

Diamond & Savin-Williams, 2000; Herbenick et al., 2009, 2010; Rosario et al., 2006; Rosenberger et al., 2012; St Lawrence et al., 1989; Wood et al., 2017). Interestingly, the items on partnered masturbatory behaviours and sexual aides comprised an eighth dimension during initial EGA estimations, and estimations after combining redundant items. The 8-dimension solution accounted for 58.3% of all bootstrapped exploratory graph analysis after combining redundant variables. However, the 7-dimension solution was recommended as the final solution; possible reasons for this are discussed in the limitations section. Finally, although network models have shown a promising ability to model complex psychological constructs, they are also potentially less parsimonious and more challenging to interpret and communicate (see Borsboom et al., 2021). However, despite these inherent challenges, our network modelling efforts provided logical and interpretable dimensions that captured a greater degree of diversity in sexual interests and behaviours when compared to factor analysis. With these results in mind, we have two brief recommendations based on our experiences.

## 4.1 Recommendations

First, we highly recommend future research efforts seeking to develop and validate new measures should consider incorporating the Loadings Comparison Test (LCT) into their modelling workflow. The LCT uses artificial neural networks to determine the most likely data-generating model (i.e., a factor versus network model). To do this, the LCT tests three predictions. The first test involves bootstrapping multiple samples to predict the data-generating model by comparing network and factor loading means. The second involves the use of neural networks, which are used to make predictions based on the empirical data itself. The third test is based on the proportion each time a model is predicted as the data-generating mechanism across bootstraps (i.e., a factor model versus a network model for each resampled bootstrap). The proportion test is particularly valuable as it provides insight into the certainty of the data-generating model. For example, researchers have used the LCT to confirm that 2800 observations from the International Personality Item Pool's (see Goldberg, 1999) Big Five Inventory (BFI; see John et al., 1991), are indeed best represented by a factor model, rather than a network model (see Christensen & Golino, 2021b). In our case, the LCT indicated with 100%

certainty that the network approach was the best data-generating model for Study 2. In sum, the LCT is an extremely low-cost investment – both in terms of the coding knowledge required and time – which provides researchers with key information when seeking to determine (with certainty) whether traditional factor analysis versus network analysis is a better fit for the data.

Second, in addition to the LCT, we also strongly recommend incorporating exploratory graph analysis (EGA) into your modelling workflow. EGA is a powerful tool which provides graphical visualizations, dimensional consistency (i.e., the extent to which each dimension replicated with the ***exact same items***), and item stability (i.e., the probability that each item replicated in its respective dimension) estimates. It also provides researchers with promising tools to combine redundant items (i.e., locally dependent nodes) using Unique Variable Analysis. EGA is comparable to parallel analysis and performs better when dealing with multiple strongly correlated latent dimensions (i.e., factors). It also provides users with graphical visualizations, in addition to the items in their respective dimensions – key item-level information not provided by parallel analysis (see Golino & Epskamp, 2017). Recent research using the EGA toolkit has been applied to explore and confirm patterns in interrelated and complex psychological constructs such as personality traits, intelligence, and depressive symptoms (see Christensen et al., 2018; Christensen & Golino, 2021b; Golino & Demetriou, 2017; Murri et al., 2020). Together, these EGA tools are a promising approach to scale development and validation by allowing researchers to explore, confirm, and communicate complex interrelated data patterns.

## 4.2 Limitations

Although our research was able to provide insight into how factor analysis and network psychometric approaches can impact diversity and inclusivity regarding construct measurement, it was not without its limitations. Given the low sample sizes for Samples 1 and 2 from Study 1 and our inability to analyze the data using a Loadings Comparison Test (LCT) on these samples, we cannot (with certainty) say that a network model would be the best data-generating model with all 186 items. However, we could argue that it is

highly likely given the increase in system complexity by doubling the number of items (i.e., nodes).

What are the next steps toward developing a diverse and inclusive measure of sexual interests and behaviours? We intend to use the data from Study 1 to inform us on which items should be brought back to the 93 items initially retained for Study 2. To do this, we will compare mean scores for all items in Samples 1 and 2 in LGBT versus heterosexual participant groupings. Although we recognize that binary categorizations are not ideal with respect to sexual orientation groupings (see Toronto Bisexual Network, 2016), they remain informative in terms of which items may be relevant for individuals that are likely to depart from heteronormative scripts. As such, we identified several items with high mean scores in the LGBT group; in comparison these same items had lower or equal endorsement rates in the heterosexual group (e.g., items on anal stimulation/penetration, receiving oral sex, and the use of sexual aides in additional contexts like double penetration). Further, when using exploratory graph analysis, items on partnered masturbatory behaviours and sexual aides comprised an eighth dimension; however, the final network measurement model did not include this dimension. We believe that this 8$^{th}$ dimension is important when representing diverse sexual behaviours across the sexuality spectrum. With this 8$^{th}$ dimension in mind, it may be worthwhile to expand upon partnered masturbatory behaviours (a form of outercourse) by including other forms of partnered masturbation such as self-stimulation facilitated by talking/texting a partner. Further, we could also include other forms of prevalent outercourse such as frot (reciprocal stimulation by rubbing phalluses together), tribbing (reciprocal stimulation by rubbing vulvas together), and other forms of manual genital stimulation without penetration (e.g., dry humping). In addition to these behaviours, bringing back additional items on sexual aides in various contexts may provide us with a more complete picture of sexual interests and behaviours – potentially providing us with this missing 8$^{th}$ dimension or potentially even two additional dimensions with themes on sexual aides and partnered masturbatory/outercourse behaviours, respectively.

## 4.3 Implications

Our findings highlight the importance of critically evaluating methodological approaches and whether they can accurately serve different populations. Without this critical evaluation, we may unintentionally contribute to limiting psychological perspectives by excluding the experiences of individuals who do not fit into the predominant heteronormative framework. Without thoughtful consideration of our methodological approach, we may unintentionally influence the conceptualization of sexuality constructs and their respective measurement through biased research questions, methodologies, and statistical approaches. These biases can greatly impact the interpretation and narrative behind of our research findings. For example, relationship research has, until recently, focused on distinguishable dyads (i.e., couples who can be differentiated based on certain characteristics like gender/sex). This focus, on the distinguishable characteristic of gender/sex has conveniently allowed for gender-based comparisons in heterosexual couples who often ascribe to a heteronormative relational script; however, this convenience is detrimental as it does not translate to serving same-sex couples. For example, early research investigating dyadic conflict and patterns of change in marital quality have explicitly had dyads separated into the roles of "husbands" and "wives", leaving no room for experiences beyond the heteronormative relational script (see Bodenmann et al., 2007; Bolger et al., 1989; Lavner & Bradbury, 2010; Neff & Karney, 2007). Such limitations are problematic from a diversity perspective as they can overemphasize the heteronormative framework, limit research based on other important distinguishable characteristics (e.g., ethnicity, disability status, etc.), ignore the impact of intersectionality, and hinders the scientific representation of indistinguishable dyads.

## 4.4 Conclusion

With the goal of developing a diverse and inclusive measure of sexual interests and behaviours, we explored two psychometric approaches to scale development and validation: traditional factor analysis and network psychometrics. We found using network psychometrics, specifically exploratory graph analysis, provided us with a more diverse and inclusive measure of sexual interests and behaviours when compared to a traditional factor analytic approach. This result is promising news for sexuality and

relationship researchers looking to inclusively represent the experiences of different populations more accurately. However, simply having a promising tool at our disposal does not suffice. We must consider the broader implications of our methodological approaches and how they often fail to serve different populations of interest – rendering these individuals marginalized and less-visible in scientific research.

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# Appendices

## Appendix A: Non-Medical Research Ethics Board (NMREB) Approval

Western Research

**Date:** 6 May 2022

**To:** Dr. Samantha Joel

**Project ID:** 120858

**Study Title:** Perceptions of Sexual Preferences Study: A further investigation into the role of perceptual accuracy, sexual similarity, and sexual complementarity

**Short Title:** Perceptions of Sexual Preferences Project

**Application Type:** NMREB Initial Application

**Review Type:** Delegated

**Full Board Reporting Date:** 03/Jun/2022

**Date Approval Issued:** 06/May/2022 09:57

**REB Approval Expiry Date:** 06/May/2023

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Dear Dr Samantha Joel

The Western University Non-Medical Research Ethics Board (NMREB) has reviewed and approved the WREM application form for the above mentioned study, as of the date noted above. NMREB approval for this study remains valid until the expiry date noted above, conditional to timely submission and acceptance of NMREB Continuing Ethics Review.

This research study is to be conducted by the investigator noted above. **All other required institutional approvals and mandated training must also be obtained prior to the conduct of the study.**

**Documents Approved:**

| Document Name | Document Type | Document Date | Document Version |
|---|---|---|---|
| PSP Project Measures and Items | Online Survey | 28/Mar/2022 | |
| Debriefing Form - Study 1 | Debriefing document | 22/Apr/2022 | Clean |
| Debriefing Form - Study 2 | Debriefing document | 22/Apr/2022 | Clean |
| Flyer Advert - Study 1 | Recruitment Materials | 22/Apr/2022 | Clean |
| Reddit Script - Study 1 | Recruitment Materials | 21/Apr/2022 | Clean |
| Social Media Advert - Study 1 | Recruitment Materials | 22/Apr/2022 | Clean |
| Flyer Advert - Study 2 | Recruitment Materials | 22/Apr/2022 | Clean |
| Reddit Script - Study 2 | Recruitment Materials | 22/Apr/2022 | Clean |
| Social Media Advert - Study 2 | Recruitment Materials | 22/Apr/2022 | Clean |
| Mass Email Recruitment - Study 1 | Recruitment Materials | 21/Apr/2022 | Clean |
| Mass Email Recruitment - Study 2 | Recruitment Materials | 21/Apr/2022 | Clean |
| Website Advert - Study 2 | Recruitment Materials | 22/Apr/2022 | Clean |
| LOI and Consent Form - Study 1 | Implied Consent/Assent | 21/Apr/2022 | Clean |
| Website Advert - Study 1 | Recruitment Materials | 22/Apr/2022 | Clean |
| LOI and Consent Form - Study 2 | Implied Consent/Assent | 02/May/2022 | Clean |

**Documents Acknowledged:**

| Document Name | Document Type | Document Date | Document Version |
|---|---|---|---|
| Screening Questionnaire - Study 2 | Screening Form/Questionnaire | 19/Mar/2022 | |
| Screening Questionnaire - Study 1 | Screening Form/Questionnaire | 20/Mar/2022 | |

## Appendix B: Sexual Behaviour Item Codebook

| Item Code | Item Wording |
|---|---|
| A1 | having semen sucked out of my vagina or anus after sex (felching) |
| A2 | sucking semen out of my partner's vagina or anus after sex (felching) |
| A3 | giving my partner a golden shower |
| A4 | having my partner give me a golden shower |
| A5 | having my partner use chemicals on me (menthol, toothpaste, ben-gay) |
| A6 | using chemicals (menthol, toothpaste, ben-gay) on my partner |
| A7 | letting another person/people/couples watch us have sex (live) |
| A8 | watching other couples/people have sex (live) |
| A9 | receiving triple penetration from my partner and two other people |
| A10 | giving triple penetration to my partner with two other people |
| A11 | having my sexual pictures/film shown over the internet (with consent) |
| A12 | showing sexual pictures/film of my partner over the internet (with consent) |
| A13 | being fondled by my partner in a public setting (e.g., restaurant/theater) |
| A14 | fondling my partner in a public setting (restaurant/theater) |
| A15 | having my partner be a 24/7 slave |
| A16 | being a 24/7 slave for my partner |
| A17 | being commanded and denied orgasms by my partner |
| A18 | commanding and deny orgasms for my partner |
| A19 | acting as furniture to be used by my partner |
| A20 | having my partner act as furniture to be used by me |
| A21 | roleplaying non-consensual sexual activity and resisting my partner (e.g., token resistance) |
| A22 | roleplaying non-consensual sexual activity and having my partner resist me (e.g., token resistance) |
| A23 | having my partner wear hoods or half-hoods |
| A24 | wearing hoods or half hoods for my partner |
| A25 | being submissive and worshipping one of my partner's body parts (e.g., feet) |
| A26 | having my partner be submissive and worship one of my body parts (e.g., feet) |
| A27 | being bitten by my partner |
| A28 | biting my partner |
| A29 | striking my partner with a cane |
| A30 | having my partner strike me with a cane |
| A31 | being spanked by my partner's hand |
| A32 | spanking my partner with my hand |
| A33 | being tied down or otherwise restrained by my partner (e.g., using rope or handcuffs) |
| A34 | using restraints on my partner (e.g., using rope or handcuffs) |
| A35 | being blindfolded by my partner |
| A36 | blindfolding my partner |

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|---|---|
| A37 | having my partner wear earplugs during sex |
| A38 | wearing earplugs during sex |
| A39 | having my partner use a butt plug |
| A40 | using a butt plug |
| A41 | using nipple clamps on my partner |
| A42 | having my partner use nipple clamps on me |
| A43 | sitting on my partner's face and be given oral sex |
| A44 | having partner sit on my face as I give oral sex |
| A45 | having my partner cum on my breasts/neck (receiving a pearl necklace) |
| A46 | cumming over my partner's breasts/neck (giving a pearl necklace) |
| A47 | making my partner swallow/taste their own cum/genital fluids |
| A48 | having my partner make me swallow/taste my own cum/genital fluids |
| A49 | mutually masturbating |
| A50 | listening to romantic music while having sex |
| A51 | having sex while on my period |
| A52 | having sex while my partner is on their period |
| A53 | having my partner talk dirtier to me |
| A54 | talking dirtier to my partner |
| A55 | watching porn together |
| A56 | thrusting my penis between my partner's breasts |
| A57 | having my partner's penis thrust between my breasts |
| A58 | shaving each other |
| A59 | being watched by my partner while I masturbate |
| A60 | watching my partner masturbate |
| A61 | waking my partner up with consensual sex |
| A62 | being woken up with consensual sex by my partner |
| B1 | having my partner strip or give me a lap dance |
| B2 | stripping or giving a lap dance to my partner |
| B3 | having pictures taken by my partner |
| B4 | taking pictures of my partner |
| B5 | having my partner give a sensual/erotic massage |
| B6 | giving my partner a sensual/erotic massage |
| B7 | having sex in the shower, tub, pool, or hot tub |
| B8 | dousing ourselves in oil/mud/paint/milk/pies during sex |
| B9 | going to a pleasure resort with partner |
| B10 | participating in a large orgy (more than 4 people) |
| B11 | receiving double penetration from my partner and another person |
| B12 | giving double penetration to my partner with another person |
| B13 | mutually show pictures of us having sex over the internet |
| B14 | being double penetrated by my partner (i.e., the use of one's penis and/or toys) |
| B15 | double penetrating my partner (i.e., the use of one's penis and/or toys) |
| B16 | having my partner torture my genitals |

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|---|---|
| B17 | torturing my partner's genitals |
| B18 | having my partner wear a ball gag |
| B19 | wearing a ball gag for my partner |
| B20 | having my partner be suspended while having sex (e.g., using rope) |
| B21 | being suspended while having sex with my partner (e.g., using rope) |
| B22 | having my partner wear a dog collar with a leash |
| B23 | wearing a dog collar with a leash for my partner |
| B24 | being spanked by my partner with toys (whip/paddle) |
| B25 | spanking my partner with toys (whip/paddle) |
| B26 | having my partner use a riding crop on me |
| B27 | using a riding crop on my partner |
| B28 | having my hair pulled by my partner |
| B29 | pulling my partner's hair |
| B30 | being punched or hit by my partner during sex |
| B31 | punching or hitting my partner during sex |
| B32 | having my face slapped during sex |
| B33 | slapping my partner's face during sex |
| B34 | directing a weapon (e.g., knife, gun) at my partner during sex (i.e., knife and gun play) |
| B35 | having a weapon (knife, gun) directed at me during sex (i.e., knife and gun play) |
| B36 | using sex furniture (such as a sex swing or ramp) |
| B37 | wearing a cock ring (vibrating/non-vibrating) during sex |
| B38 | having my partner wear a cock ring (vibrating/non-vibrating) during sex |
| B39 | using toys (e.g., dildos, vibrators, cockrings, etc.) while having sex |
| B40 | having my partner cum on my face (receiving a facial) |
| B41 | cumming on my partner's face (giving a facial) |
| B42 | swallowing my partner's cum |
| B43 | having my partner swallow my cum |
| B44 | 69'ing with partner |
| B45 | listening to more aggressive (rap/rock) music while having sex |
| B46 | having my partner wear stockings and/or high heels during sex |
| B47 | wearing stocking and high heels for my partner during sex |
| B48 | being called obscene words (bitch, slut, whore, etc.) by my partner |
| B49 | calling my partner obscene words (bitch, slut, whore, etc.) |
| B50 | having my partner be more vocal |
| B51 | being more vocal towards my partner during sex |
| B52 | being shown what my partner likes from porn |
| B53 | showing partner how I like something from porn |
| B54 | being shaven by my partner |
| B55 | shaving my partner |
| B56 | waking my partner up with consensual oral sex |
| B57 | being woken up with consensual oral sex by my partner |

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|---|---|
| B58 | using mirrors while having sex |
| B59 | filming ourselves having sex |
| B60 | taking pictures of us having sex |
| B61 | having longer teasing and foreplay sessions |
| B62 | swapping cum with my partner |
| X1 | getting penetrated by my partner with a strap-on |
| X2 | penetrating my partner with a strap-on |
| X3 | being given a foot job |
| X4 | giving my partner a foot job |
| X5 | having sex with another person while my partner watches |
| X6 | watching my partner have sex with another person |
| X7 | including another couple in sex (small orgy) |
| X8 | including another trans* person in sex (ménage-a-trois) |
| X9 | including another non-binary person in sex (ménage-a-trois) |
| X10 | including another man in sex (menage-a-trois) |
| X11 | including another woman in sex (menage-a-trois) |
| X12 | having sex monogamously with other couples (don't touch other couples) |
| X13 | having sex in a place where you might get caught |
| X14 | being licked anally by my partner (receive analingus) |
| X15 | licking my partner's anus (analingus) |
| X16 | having my partner wear a chastity device |
| X17 | wearing a chastity device for my partner |
| X18 | having my partner be dominant towards me |
| X19 | being dominant towards my partner |
| X20 | having my partner be submissive for me |
| X21 | being submissive for my partner |
| X22 | roleplaying in costumes |
| X23 | Talking about our sexual fantasies |
| X24 | Hugging/cuddling/snuggling afterward |
| X25 | Lots of foreplay |
| X26 | Being stimulated with toys |
| X27 | Stimulating my partner with toys |
| X28 | Giving anal stimulation or anal sex/penetration |
| X29 | Receiving anal stimulation or anal sex/penetration |
| X30 | Receiving oral sex |
| X31 | Giving oral sex |
| X32 | having my partner taste my bodily fluids |
| X33 | Tasting my partner’s bodily fluids |
| X34 | Sex with receiving partner below, penetration from behind (e.g., "doggy-style") |
| X35 | Having sex more often |
| X36 | Trying new positions or different places |
| X37 | Fantasizing during sex |

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| X38 | Telling my partner how attractive, hot, or sexy they are |
| X39 | Being told how attractive, hot, or sexy I am |
| X40 | Talking lovingly about our feelings for each other |
| X41 | Taking control of my partner |
| X42 | Being taken control of |
| X43 | Hearing my partner talk dirty |
| X44 | Talking dirty to my partner |
| X45 | Rough play or rough-housing |
| X46 | Quickies |
| X47 | Kissing |
| X48 | Role-playing different characters or scenarios |
| X49 | Using erotica (e.g., video, magazines, books, etc.) |
| X50 | Masturbating with my partner |
| X51 | Having the lights on |
| X52 | Creating a romantic atmosphere (e.g., candles, music, going out on a date) |
| X53 | Stimulating my partner's genitals by caressing or fondling with my hands/fingers |
| X54 | Having my genitals stimulated, caressed, or fondled by partner's hand/fingers |
| X55 | having consensual sex while high on cannabis |
| X56 | having consensual sex while drunk |
| X57 | having my partner feed me food during foreplay or sex (e.g., strawberry, chocolate, whip cream, etc.) |
| X58 | feeding my partner food during foreplay or sex (e.g., strawberry, chocolate, whip cream, etc.) |
| X59 | having my partner eat food off me during foreplay or sex (e.g., whip cream) |
| X60 | eating food off my partner during foreplay or sex (e.g., whip cream) |
| X61 | hearing my partner make loud sounds during sex (e.g., moaning, screaming, breathing, etc.) |
| X62 | making loud sounds during sex (e.g., moaning, screaming, breathing, etc.) |

**Appendix C: Regularized Partial Correlations for Redundant Items**

| Target Item | Redundant Item #1 ($r_{partial}$) | Redundant Item #2 ($r_{partial}$) |
|---|---|---|
| A3 | A4 (.55) | |
| A19 | A20 (.39) | |
| B37 | B38 (.37) | |
| B59 | B60 (.67) | |
| X8 | X9 (.48) | |
| X18 | X21 (.39) | X42 (.32) |
| X19 | X20 (.38) | X41 (.34) |
| X26 | B39 (.44) | |
| X32 | X33 (.38) | |
| X50 | A49 (.45) | |
| X57 | X58 (.43) | |
| X59 | X60 (.41) | |
| X61 | B50 (.38) | |

*Note.* Locally dependent nodes (i.e., those flagged for violating the assumption of local independence) were merged into composite nodes using weighted topographical overlap, a recommended significance threshold of $p \leq .25$, and a reduction approach which combined redundant variables into respective latent variables (see Christensen et al., 2023; Christensen et al., 2020).