

# **Sexual Pleasure Matters**

Defining, Operationalizing, and Promoting Sexual Pleasure

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Von der Philosophisch-humanwissenschaftlichen Fakultät der Universität Bern auf Antrag  
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“A new area is opening up in my sexuality!”

Participant of PleaSure intervention study, 2021

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## Summary

The topic of sexual pleasure has recently gained attention and recognition as an essential aspect of sexual health. However, despite an increase in research on the subject, a lack of consensus remains on how to define, measure, and promote sexual pleasure.

This dissertation aims to address this gap in research by defining and investigating this complex aspect of human experience and its multifaceted nature. To achieve this goal, three research questions were addressed from a comprehensive and holistic approach. This included a thorough literature review, the development of a clear and precise definition, and a test of the validity of the construct through empirical research using both observational and experimental methods.

The first research question examines the conceptualization and definition of sexual pleasure, which is approached by developing an adapted sexual response framework that includes sexual pleasure as a central component and identifies various facets of state and trait sexual pleasure.

The second research question focuses on the operationalization and measurement of sexual pleasure. To address this, a self-report questionnaire called the Amsterdam Sexual Pleasure Inventory (ASPI) is developed to measure the various facets of sexual pleasure. The validity of the ASPI was established through an extensive psychometric evaluation, which demonstrated good properties.

The third research question addresses the promotion of sexual pleasure through testing an unguided 4-week online intervention for women. The results indicate that the intervention was effective in promoting one specific facet of sexual pleasure. Therefore, the construct used to measure sexual pleasure in the study seems to be sensitive to change, suggesting its potential utility in applied research in this field.

The research results are analyzed and discussed in depth, emphasizing potential avenues for future research and offering practical implications for their application. The

limitations and strengths of the dissertation are acknowledged, providing a comprehensive understanding of the research's overall contributions.

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## 1. General Introduction

In recent years, sexual pleasure has been discussed more openly. However, this has not always been the case. In the past, sexual pleasure was often stigmatized and even criminalized (Coleman & Bockting, 2013; De Block & Adriaens, 2013; Hoff & Sprott, 2009). In recent years, the field has advanced notably, and a more nuanced understanding of the topic has emerged (Kleinplatz, 2013). A wider range of research is now available on the topic, and it is generally viewed in a more complex and multifaceted way (Goldey et al., 2016; World Association for Sexual Health [WAS], 2019). Moreover, we know today that sexual pleasure is a vital aspect of a person's sexual health and general well-being (Mitchell et al., 2021). However, there is still no consensus on how to define, measure, or promote sexual pleasure. Even though sexual pleasure has been shown to be a multidimensional construct and more than just an orgasm (Fileborn et al., 2017; Goldey et al., 2016), it has been defined, operationalized, and addressed as just that in several studies (e.g., Braun, 2005; Kleinplatz et al., 2009). Although research on sexual pleasure has increased, it is still a relatively new field, and a lot of basic research, including establishing a clear, construct-appropriate, and evidence-based definition, still needs to be done (Jones, 2019). This will then enable applied research and guidelines to foster sexual pleasure in individuals.

Incorrect or inadequate definitions can lead to misunderstandings and misrepresentations of sexual pleasure, which can have negative consequences for both research and practice (Fried, 2021; Fried & Flake, 2018). For example, an overly narrow or physiological focus on sexual pleasure may fail to capture its subjective and multifaceted nature and the ways in which it can vary across individuals and contexts (Goldey et al., 2016). Furthermore, a lack of consensus on how to define and operationalize the construct can hinder research and the development of effective interventions for promoting and enhancing sexual pleasure (Cambon et al., 2019). Therefore, it is important that sexual pleasure is accurately

and appropriately defined and conceptualized so that applied research, such as intervention studies, can also benefit from this knowledge.

Thus, the aim of this dissertation is to address the gap in knowledge and research about sexual pleasure by defining and investigating this complex aspect of human experience and its multifaceted nature.

To this end, the paradigm shift that has taken place in sexual health is described further, and two models of sexual health are introduced. Introducing the paradigm shift in sexual health and the models of sexual health is crucial for gaining a more comprehensive understanding of the link between sexual pleasure and overall sexual health. Moreover, the introduction examines how sexual pleasure has been classified and understood in sexual health models. After that, the process of developing psychological constructs is briefly addressed. Against this background, the aims of the dissertation are stated, and the individual scientific articles that form part of the dissertation are presented. Subsequently, the results of these studies are discussed.

### **1.1 Paradigm Shift: From a Sex-Negative to a Sex-Positive Perspective**

In the previous century, sexuality was viewed through a rather gloomy prism that focused on related risks such as sexually transmitted diseases, sexual dysfunctions, unwanted pregnancies, and sexual violence, and understanding of what constituted “normal” sexual behavior was narrow (Fine & McClelland, 2006a; Higgins & Hirsch, 2008; Mitchell et al., 2021). Furthermore, in these obsolete approaches to sexual health, traditional societal norms and values were often prioritized over the well-being and autonomy of individuals (Schalet, 2011). These approaches prioritized reproductive health over sexual pleasure and stigmatized or shamed certain sexual behaviors and identities (Michaud, 2006; Santelli et al., 2006). Furthermore, they relied on fear or shame to discourage certain sexual behaviors and often

emphasized individual responsibility for sexual health rather than providing accurate and comprehensive information about how to make informed and empowered decisions about it (Michaud, 2006; Schalet, 2011). Such approaches to sexual health can be harmful and contribute to the perpetuation of harmful stereotypes, discrimination, and negative attitudes to sexuality (Burnes et al., 2017; Glickman, 2000).

Thus, the domain of sexual health has been largely dominated by a discourse on risk and danger (Anderson, 2013). However, promoting sexual health goes beyond alerting to the risks, preventing them, and treating their consequences (World Health Organization [WHO], 2006). Therefore, it is essential to abandon outdated approaches to sexual health and adopt a more sex-positive and inclusive approach that prioritizes the well-being and autonomy of all individuals (Santelli et al., 2006; Schalet, 2011).

The new sex-positive paradigm does not ignore the risks and dangers of sexuality and the roles these play in sexual health but emphasizes both sides of the coin in its holistic and integral approach. The new paradigm thus represents the beginning of a sex-positive wave that sheds new light on the fundamental understanding of sexual health (Ford et al., 2019; Mosher, 2017). Moreover, it emphasizes the importance of consent and respect in sexual encounters and seeks to destigmatize non-heteronormative and non-reproduction- oriented sexual practices (Ford et al., 2019; Ford, El Kak, et al., 2021; Williams et al., 2015). This approach provides education and resources that empower individuals to make informed and empowered decisions about their sexual health and well-being rather than relying on fear or shame to discourage certain behaviors (Higgins & Hirsch, 2008; Ivanski & Kohut, 2017; Schalet, 2011). It acknowledges the diversity of human sexuality and seeks to be inclusive of all individuals, regardless of their sexual orientation, gender identity, or relationship status (Nimbi et al., 2021; Williams et al., 2013). Overall, this approach has been shown to be effective in promoting positive sexual health outcomes and attitudes and provides a more

comprehensive, inclusive, and empowering approach to sexual health (Ford et al., 2019; Ford, El Kak, et al., 2021). Because this approach acknowledges that sexual pleasure is a fundamental aspect of human well-being and should be included in discussions about sexual health, it is often referred to as a pleasure-based approach (Ford, Corona-Vargas, et al., 2021; Mark et al., 2021).

Indeed, for an individual to reach a state of sexual health, it is important to foster their ability to attain and maintain sexual pleasure (Ford et al., 2019; Ford, El Kak, et al., 2021; Gruskin & Kismödi, 2020). This was not recognized until the beginning of the 21st century, when the World Health Organization (WHO, 2006) published their new definition of sexual health, which includes the ability to have pleasurable sexual experiences as a component of sexual health. According to the current working definition, “sexual health is a state of physical, emotional, mental and social well-being in relation to sexuality; it is not merely the absence of disease, dysfunction or infirmity” (WHO, 2006, p. 4). Moreover, sexual health involves fostering a positive and respectful attitude towards sexuality and sexual relationships and providing individuals with the opportunity to have pleasurable and safe sexual experiences free from coercion, discrimination, and violence. Achieving and maintaining sexual health requires the respect, protection, and fulfillment of the sexual rights of all individuals (WHO, 2006).

Two years later, in 2008, the World Association for Sexual Health (WAS) took a stand by explicitly highlighting sexual pleasure in their official declaration: “The right to sexual pleasure should be universally recognized and promoted (... as a component of holistic health and wellbeing)” (p. 18). The most recent version of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), published in 2017, emphasizes sexual pleasure as important from a clinical perspective by redefining sexual dysfunction as “a clinically significant disturbance in a person's ability to respond sexually or to experience sexual pleasure” (p. 423). This

redefinition shows that promoting sexual pleasure not only benefits sexual health but also plays an important role in decreasing risks, because unpleasurable sex is the catalyst for many sexual disorders and dysfunctions (Boul et al., 2008; Stephenson & Meston, 2015). Moreover, attainment of sexual pleasure despite physical dysfunction or disability is a commonly sought treatment goal in sex therapy (Rademacher et al., 2017).

These developments and advancements culminated in 2019 in the WAS Declaration on Sexual Pleasure, which summarizes and highlights the relevance of sexual pleasure to sexual health and finally establishes sexual pleasure as a cornerstone of clinical and scientific practice in addressing sexual health and sexual well-being (WAS, 2019). Even more recently, the World Sexual Health Day 2022, with the motto “Let's talk Pleasure,” underlined the importance of and current interest in considering sexual pleasure in research and clinical contexts (WAS, 2022).

By redefining sexual health in this way, research, practice, advocacy, and policy can focus not only on the prevention, management, and treatment of disease and dysfunction but also on the stimulation of sexual pleasure and sexual health optimization without falling prey to unapproachable ideals (Anderson, 2013; Ford et al., 2019). Encompassing pleasurable sex in the definition of sexual health has spurred a sex-positive perspective, which constitutes a paradigm shift similar to the introduction of positive psychology in psychology more broadly (Harden, 2014; Nimbi et al., 2021).

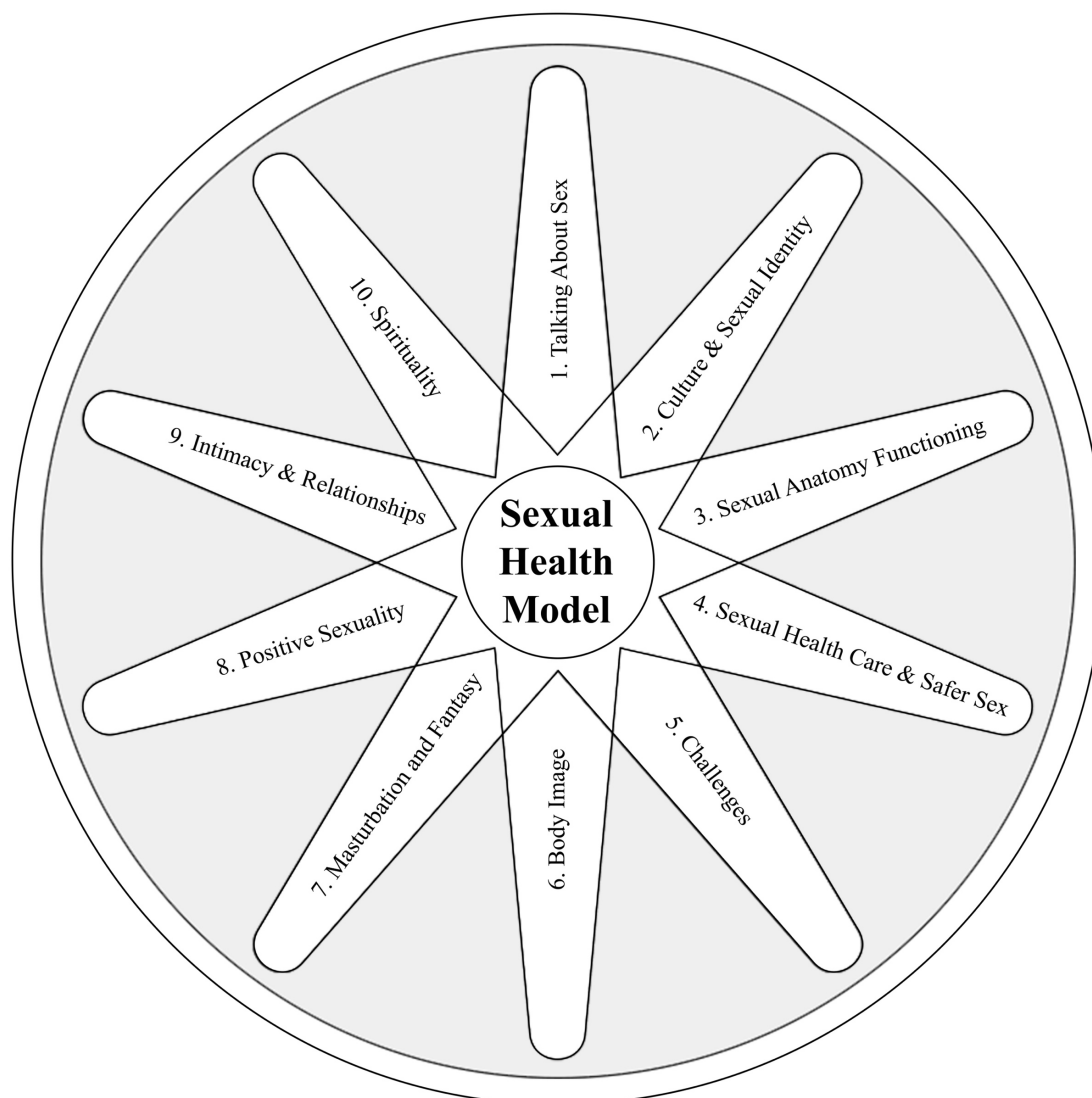
## **1.2 Models of Sexual Health**

The following subchapter introduces two models of sexual health that take a sex-positive view and recognize the importance of sexual pleasure in overall sexual health. The first model originates in the field of sex education, and the second comes from sex therapy. Despite their differing origins, commonalities between the models are identified to

demonstrate the role that sexual pleasure can play in models of sexual health and to further understand the relationship between sexual pleasure and sexual health.

### *1.2.1 The Sexual Health Model by Robinson et al. (2002)*

Robinson et al.'s (2002) sexual health model provides a holistic definition of sexual health and is the outcome of over two decades of sexuality education applied to HIV prevention. The Sexual Health Model has a sexually pluralistic and sex-positive focus at its core and defines 10 key components that are considered essential aspects of healthy human sexuality (Robinson et al., 2002). One of the 10 components, positive sexuality, refers to the ability to attain sexual competence through the ability to give and receive sexual pleasure. All 10 components can be found in the Model, provided in Figure 1. The model recommends that education and interventions addressing sexual health include all 10 of the components mentioned. Their application requires a format that allows open and explicit discussion about sexuality (Robinson et al., 2002). The model highlights the importance of adapting sexual health education to the unique problems, needs, experiences, and norms of the target population (Robinson et al., 2011).

**Figure 1.***Sexual Health Model by Robinson et al. (2002)*

### *1.2.2 Sexocorporel by Désjardins (1996)*

Sexocorporel is a model of sexual health that originated in the field of sex therapy and takes into account a comprehensive view of human sexuality that considers all of the physiological, personal, cognitive, and relational components that comprise the sexual experience (Bischof, 2012; Chatton et al., 2005; Desjardins, 1996). The physiological component involves feeling genital arousal and having a physical response. The personal component involves associating the experienced arousal and orgasm with positive feelings,

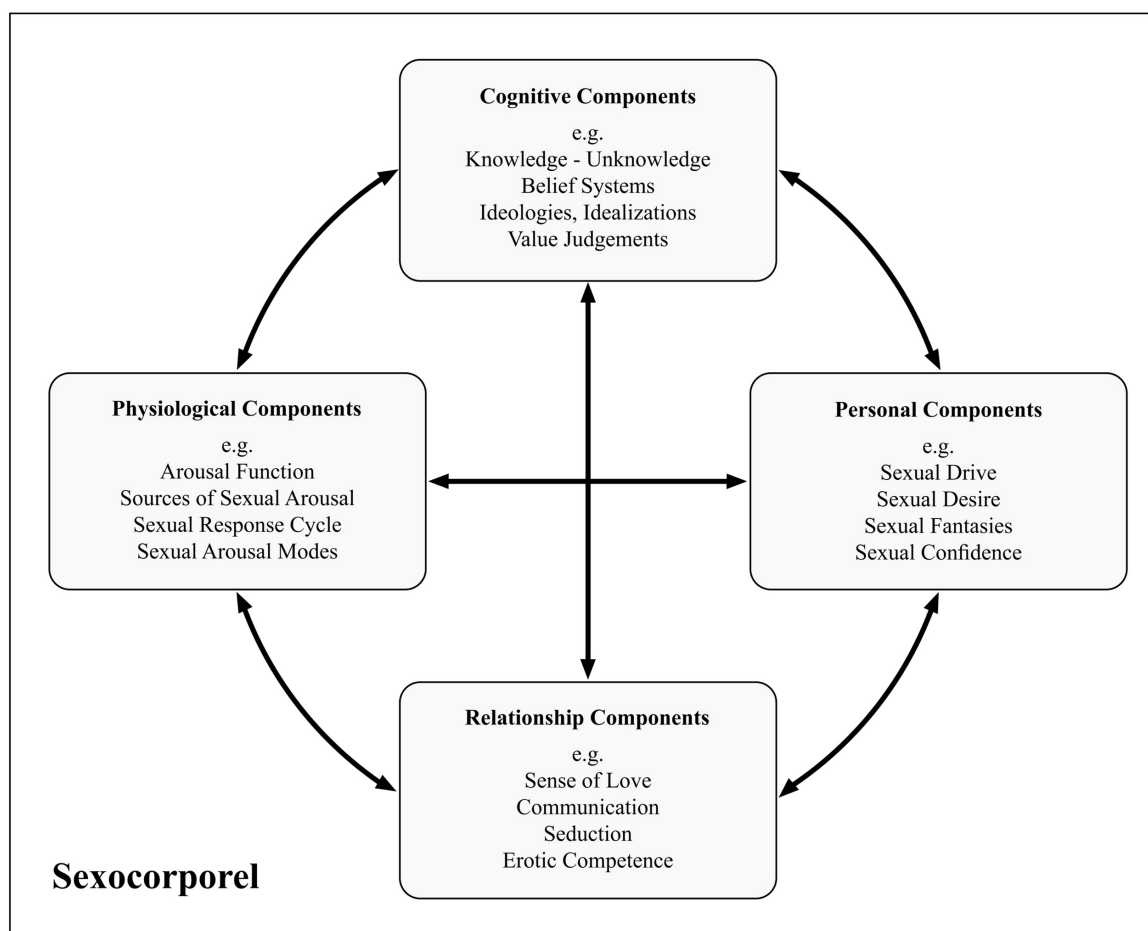


such as desire and increased self-esteem. The cognitive component involves ascribing positive meaning to the sexual experience, which can be influenced by both an individual's appraisals and contextual factors. The relational component involves the feeling of love and the ability to communicate (Bischof, 2017). Figure 2 provides a graphic depiction of the model.

According to this model, sexual health is anchored in the ability to experience sexual pleasure, and this experience depends on diverse individual knowledge and learning. Therefore, promoting sexual pleasure is considered a central goal of Sexocorporel (Bischof, 2012).

**Figure 2**

*Sexocorporel by Désjardins (1996)*



Both models rely on a holistic definition of sexual health and imply a sex-positive view either by explicitly mentioning it as one of 10 components in the model by Robinson et al. (2002) or by focusing on sexual pleasure, which is known to be part of a sex-positive approach (Bischof, 2012; Fava & Fortenberry, 2021; Philpott et al., 2021; Robinson et al., 2002). Sexual pleasure is thus relevant to both models of sexual health in different ways.

Robinson et al.'s (2002) sexual health model recognizes the high value of sexual pleasure by assuming that people who actively seek and experience pleasure are more inclined to engage in behaviors that protect their sexual health. Moreover, the component of positive sexuality within the model emphasizes the acquisition of sexual competence through the capacity for both giving and receiving sexual pleasure (Robinson et al., 2002). The Sexocorporel views sexual pleasure as the most important goal in sex therapy (Bischof, 2012).

In conclusion, it is evident that both these models of sexual health recognize the importance of sexual pleasure as an integral aspect of overall sexual health. Notably, neither of the models provides a clear definition of what constitutes sexual pleasure. However, some definitions exist, such as that provided by the Global Advisory Board for Sexual Health and Wellbeing (GAB, 2016), which defines sexual pleasure as

the physical and/or psychological satisfaction and enjoyment derived from solitary or shared erotic experiences, including thoughts, dreams and autoeroticism. Self-determination, consent, safety, privacy, confidence and the ability to communicate and negotiate sexual relations are key enabling factors for pleasure to contribute to sexual health and wellbeing. Sexual pleasure should be exercised within the context of sexual rights, particularly the rights to equality and non-discrimination, autonomy and bodily integrity, the right to the highest attainable standard of health and freedom of expression. The experiences of human sexual pleasure are diverse and sexual rights

ensure that pleasure is a positive experience for all concerned and not obtained by violating other people's human rights and wellbeing. (p.1)

Although this definition is widely cited as one of the most comprehensive in the field, it is important to note that it is just one of several definitions that exist and like all other definitions, it has not been thoroughly examined within a theoretical framework or empirically investigated. Additionally, qualitative studies suggest that sexual pleasure is a multifaceted construct, a characteristic that is not included in all of these definitions (Fileborn et al., 2017; Goldey et al., 2016).

In summary, over the past two decades, the relevance of sexual pleasure to sexual health and overall well-being has increased due to important policy, advocacy, and definitional work (Coleman et al., 2021; Gruskin et al., 2019; Landers & Kapadia, 2020). Even though there has been an increase in research on both sexual health and sexual pleasure, there is no commonly accepted, sufficiently precise definition yet that focuses on and specifies the multifaceted nature of sexual pleasure. To achieve a state of sexual health, the current understanding is that it is important to promote the individual's ability to achieve and maintain sexual pleasure (Ford et al., 2019; Klein, Laan, et al., 2022). Given the relevance of sexual pleasure to sexual health, we conducted an intervention study as part of this dissertation to examine ways of enhancing sexual pleasure. However, before something can be promoted conscientiously and with scientific foundation, it first has to be defined, operationalized, evaluated, and researched. Therefore, in the following chapter, a systematic approach is introduced to the process of establishing a new construct such as sexual pleasure.

### 1.3 Construct Development

Psychological constructs are theoretical concepts that are used to understand and explain various aspects of psychological reality (McAdams & Pals, 2007; Slaney & Garcia, 2015). The basis of studies on psychological constructs is the use of operationalizations and psychological measurements (Eid & Schmidt, 2014). Objective operationalizations and measurements are intended to produce reproducible effects that capture and establish underlying constructs (Döring & Bortz, 2016; Strauss & Smith, 2009). However, few of these procedures and measurements have undergone adequate quality evaluation, which leads to a lack of specific and stable phenomena and corresponding theories (Fried & Flake, 2018). This is also observed in research on sexual pleasure (e.g., Braun, 2005; Opperman et al., 2014).

Therefore, a comprehensive taxonomy followed by a multidimensional, inclusive definition and measurement instrument about sexual pleasure is needed both for epidemiological research and for outcome monitoring. Acquiring a more thorough comprehension of the various factors that play a role in sexual pleasure, such as personal, interpersonal, and societal factors, is crucial for healthcare professionals and researchers to better understand and enhance sexual health. To strengthen the validity of future research findings, better compare them with each other, and thus reconcile theory with empiricism, a uniform and standardized measurement instrument for sexual pleasure is essential (Fried & Flake, 2018). However, constructing and testing psychological constructs such as sexual pleasure can be a complex and challenging task, and it is important to approach this process with careful consideration and rigorous methodology (Hodson, 2021).

Therefore, a comprehensive review of the literature on construct development was conducted, and various approaches and recommendations from experts in the field were considered (e.g., Borsboom et al., 2021; Lambert & Newman, 2022; MacKenzie et al., 2011). From this synthesis, a set of eight steps were derived for establishing a psychological

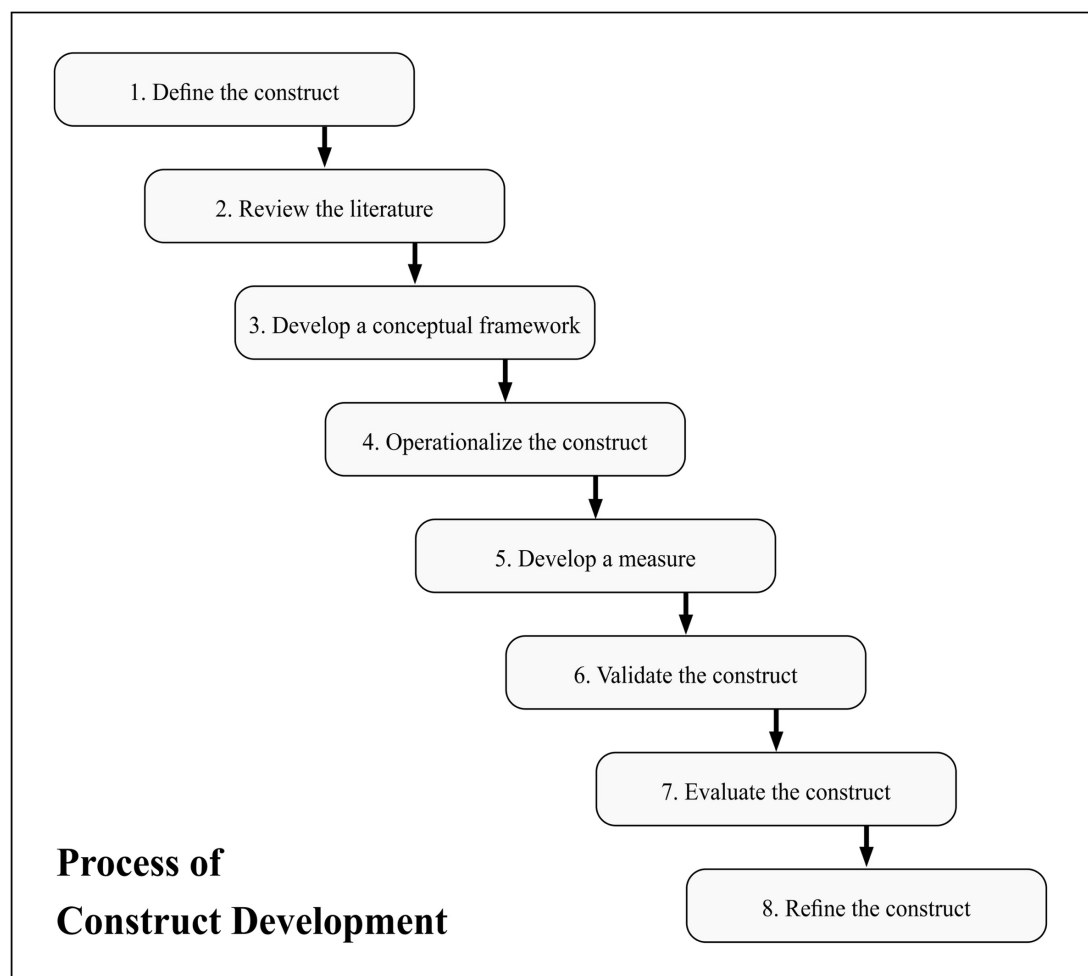
construct, which are presented in Figure 3. These steps represent a comprehensive approach to construct development that takes into account the existing guidelines and recommendations.

1. *Define the construct:* The first step in establishing a construct is to define it clearly and precisely. This involves identifying the key characteristics of the construct and specifying how it is distinct from other constructs.
2. *Review the literature:* A comprehensive review of the existing research on the construct is conducted to understand how it has previously been defined and operationalized.
3. *Develop a conceptual framework:* This review is used to develop a conceptual framework that outlines the key characteristics and dimensions of the construct.
4. *Operationalize the construct:* The operational definitions of the construct and its dimensions are clearly defined, including the specific measurement methods that will be used to assess it.
5. *Develop a measure:* A measure is developed that can be used to assess the construct. This may involve creating a self-report questionnaire, an observation measure, or some other type of assessment tool.
6. *Validate the construct:* Various methods are used to assess the validity and reliability of the construct and its operational definitions.
7. *Evaluate the construct:* The construct is then evaluated by examining the relationship between the measure and other related constructs and the ability of the measure to predict relevant outcomes. Additionally, its usefulness and practicality in applied research settings is examined.

8. *Refine the construct*: If the construct is found to be valid, it can be refined and further tested through additional research. If the construct is not found to be valid, it may be revised or abandoned in favor of another construct.

**Figure 3**

*The Process of Construct Development*



Following the steps for establishing a psychological construct helps to ensure the reliability and validity of the construct and the measures used to assess it. This, in turn, helps to advance our understanding of psychological phenomena and improve the accuracy and

precision of psychological research (Eronen & Bringmann, 2021; Oberauer & Lewandowsky, 2019).

#### **1.4 The Aim of the Dissertation and Research Questions**

In light of these developments and the current emphasis on sexual pleasure in research and clinical practice, it is important to investigate and understand sexual pleasure in a comprehensive and nuanced way. This includes considering the multifaceted nature of sexual pleasure and the importance of accurately defining and operationalizing it.

Therefore, the overarching goal of this dissertation is to examine the construct of sexual pleasure, to examine and understand it in its complexity, and to apply it in an intervention to test its practicability. The aims of this dissertation are

1. to define sexual pleasure in a theoretical manner, taking into account its various dimensions and components;
2. to operationalize sexual pleasure empirically, using a measurement instrument that captures its multifaceted nature; and
3. to use the findings from the first two aims to promote sexual pleasure among women by providing a better understanding of what it is and how it can be enhanced.

To pursue these aims, the following research questions have been formulated:

1. How can sexual pleasure be conceptualized and defined?
2. How can sexual pleasure be operationalized and measured?
3. How can sexual pleasure be promoted?

These research questions build upon each other, with answer to the first question providing a foundation for the subsequent ones.

## 1.5 Structure of the Dissertation

These research questions are addressed in three articles written as parts of this dissertation.

The first article, titled “Sexual Pleasure Matters—and How to Define and Assess It too. A Conceptual Framework of Sexual Pleasure and the Sexual Response,” presents a theoretical framework that captures the complex and multifaceted nature of sexual pleasure. The framework synthesizes theories from incentive motivation theory, attachment theory, and state–trait theory with the literature on sexual pleasure and demarcates sexual pleasure from related but distinct constructs such as sexual function and sexual satisfaction. The framework covers the experience of and tendency to seek sexual pleasure. Its operationalization through a measurement instrument provides a way to guide scientific research, sex counseling, and therapy by focusing on all facets of sexual pleasure.

The second article, titled “A Psychometric Study of a Trait and State Assessment of Sexual Pleasure—The Amsterdam Sexual Pleasure Inventory (ASPI 1.0)” provides a review of existing instruments for measuring sexual pleasure that highlights their limitations. The newly developed ASPI is then introduced. This is based on the conceptual framework presented in the first article of this dissertation. The ASPI is a self-report questionnaire that goes beyond existing tools by encompassing a range of facets of sexual pleasure, including its state and trait domains. The article presents results on the validity and reliability of the ASPI.

The third article, titled “Effectiveness of an Unguided Online Intervention for Sexual Pleasure in Women: A Randomized Controlled Pilot Study” presents an unguided 4-week online intervention named PleaSure, which was developed using the Sexocorporel approach and aims to promote sexual pleasure among women. Its effectiveness is evaluated through a randomized controlled pilot trial with a mixed-methods design in which the intervention group is compared to a waitlist control group in pre–post measurements over a 4-week period.



The ASPI, validated in the second article of the dissertation, is used to examine the facets of sexual pleasure that might be promoted by the intervention. The results of the study demonstrate the effectiveness of the PleaSure intervention in enhancing one specific facet of sexual pleasure.

In the following chapter, the three articles are presented in sequence. This is followed by the general discussion, in which the results of the three articles are analyzed and synthesized to answer the research questions and thus achieve the overall aim of the dissertation. Furthermore, an outlook for future research is provided that suggests potential directions for further research into sexual pleasure. In addition, practical implications are discussed, highlighting the relevance and potential usefulness of the findings for researchers, practitioners, and society as a whole. Subsequently, the limitations and strengths of the dissertation are addressed. Finally, the conclusion highlights key takeaways of this dissertation.

## 2. Scientific Articles

This chapter presents the following three articles that address the research questions of this dissertation.

### Article 1:

Werner, M.A., Borgmann, M., & Laan, E. (2023). *Sexual Pleasure Matters—and How to Define and Assess It too. A Conceptual Framework of Sexual Pleasure and the Sexual Response*. PsyArXiv. <https://doi.org/10.31234/osf.io/9a2nk>

### Article 2:

Borgmann, M., Brandner, L.M., D’Urso, D., Azevedo, F., Gonin-Spahni, S., Znoj. H.J., Werner, M.A. (2023). *A Psychometric Study of a Trait and State Assessment of Sexual Pleasure—The Amsterdam Sexual Pleasure Inventory (ASPI 1.0)*. PsyArXiv. <https://doi.org/10.31234/osf.io/2bxde>

### Article 3:

Borgmann, M., Brandner L.M., Affolter, L., Vonesch, J., & Gonin-Spahni S. (2023). *Effectiveness of an Unguided Online Intervention for Sexual Pleasure in Women: A Randomized Controlled Pilot Study*. PsyArXiv. <https://doi.org/10.31234/osf.io/s5cxt>

## **2.1 Article 1: Sexual Pleasure Matters—and How to Define and Assess It too. A Conceptual Framework of Sexual Pleasure and the Sexual Response**

This is a preprint of the manuscript that has been resubmitted for publication consideration at the *International Journal for Sexual Health*. It is currently undergoing review for the third time.

The preprint as well as earlier versions of the article can be found at

<https://doi.org/10.31234/osf.io/9a2nk>.

**Sexual Pleasure Matters – and How to Define and Assess It too.**  
**A Conceptual Framework of Sexual Pleasure and the Sexual Response.**

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### **Abstract**

Sexual pleasure is central to current understandings of sexual function, health, and wellbeing. In this article, we suggest that we lack a sufficiently specific, yet encompassing, definition of sexual pleasure and that we therefore lack comprehensive assessments of sexual pleasure. We introduce a definition of sexual pleasure and position it centrally in an adapted framework of the sexual response. In the framework, we include a taxonomy of rewards which can be retrieved from sex and thereby aim to capture the multifaceted nature of sexual pleasure. We arrive at the definition, framework, and taxonomy by integrating theories of sexual motivation and response with the literature on sexual pleasure and basic rewards. We position this literature within theories of affect and personality which allows us to differentiate between the experience of and the tendency to experience sexual pleasure (i.e., state versus trait sexual pleasure). We shortly discuss how this conceptualization of sexual pleasure could be reflected in self-report assessments to quantitatively assess sexual pleasure. The framework may aid to focus on the role of the diverse facets of sexual pleasure in sexual function, health, and wellbeing and contribute to giving sexual pleasure the center position it deserves in sex research and therapy.

*Keywords:* sexual pleasure, sexual response, state and trait, taxonomy, psychometrics.

At the beginning of the 21st century, the World Health Organization (WHO, 2002) included pleasure as a component in their definition of sexual health. This definition further championed the sex-positive perspective in sex research, practice, and advocacy (Fine, 1988; Philpott et al., 2006; Arakawa et al., 2013; Kleinplatz et al., 2009), assisted by efforts from the Global Advisory Board for Sexual Health and Wellbeing (GAB) and the World Association of Sexual Health (WAS). In this article, we aim to tackle a crucial puzzle piece in this sex-positive endeavor. We suggest that we should build on currently available definitions of sexual pleasure to make them more specific yet comprehensive and that such specification allows us to create more valid assessments of sexual pleasure. In this article, we have three main aims: (1) to provide a definition of sexual pleasure within a conceptual framework that positions pleasure within theories of the sexual response specifically, and within theories of *states* and *traits* more generally, (2) to describe a taxonomy of rewards which induce pleasure during sexual activity and which allows for a multifaceted perspective on sexual pleasure, and (3) to discuss how the definition, framework, and taxonomy interrelate with specifically structured assessments and research opportunities of (state and trait) sexual pleasure.

## **1. A Conceptual Framework of Sexual Pleasure and the Sexual Response**

### **1.1 Aim 1: Where Does Sexual Pleasure Figure in the Sexual Response? From Sex Drive to Desire for Rewarding Sex**

#### ***1.1.1 Available Definitions of Sexual Pleasure***

Sexual pleasure has regularly hidden from view during the advent of sexology as a science (Clark, 2006; Jones, 2019). A few bold theorists revived the discussion of sexual pleasure and aimed to understand and advocate for this historically contentious concept (Clark, 2006; Ford et al., 2019). These contributions served as an important foundation for the WAS Declaration on Sexual Pleasure, have informed our understanding of sexual pleasure

and its definition (Ford et al. 2019; 2022), and their descendants were essential to create the base from which we can endeavor further. We suggest that we can build on our currently available definitions of sexual pleasure to become more specific yet comprehensive. Table 1 provides an overview of existing definitions of sexual pleasure.

We noted two areas of convergence and divergence across the existing definitions: (1) sexual pleasure is conceptualized as unifacted or multifaceted, and (2) can be conceptualized as a state or a trait.

(1) On the one hand, sexual pleasure is narrowly defined as a unifacted, sensory or sensual, experience such as in the experience of pleasurable, enjoyable, or satisfactory “sex” and “sensations during sex”, or equated with the experience of orgasm. On the other hand, sexual pleasure is broadly defined as covering different types of experience such as cognitive and emotional experiences next to physical and sensory experiences. Theorists suggest that these different experiences result from and are related to different kinds of activities and sources (e.g., internal and external stimuli or stimulus situations, such as fantasy, tactile stimulation, physical closeness, intimacy, connection, bonding, safety, the partner’s pleasure, or spontaneity and flow). In other words, these conceptualizations suggest that there is either one kind or source of, or different kinds or sources of, sexual pleasure.

(2) Furthermore, some theorists have conceptualized sexual pleasure as an experience, or equivalent to a state of satisfaction or wellbeing derived from sexual activity, while others propose that, conceptually, sexual pleasure should also include a more trait-like psychological tendency or capacity (e.g., the ability to enjoy sex, or entitlement to and self-efficacy to enjoy). In other words, theorists suggest that sexual pleasure can be conceptualized as a momentary or contextual experience (a state) and a tendency for experiences (a trait). Thus, sexual pleasure has been defined as a *unifacted* or *multifaceted state* as well as a *unifacted* or *multifaceted trait*.

**Table 1***Definitions of Sexual Pleasure*

Source	Definition
Guggino & Ponzetti (1997) cited and adapted in Katz & Schneider (2015, p. 453)	“[Sexual] Pleasure includes positive feelings of satisfaction, [excitement,] love, and romance.” [information in brackets added to this sentence from other parts of the same article]
Abramson & Pinkerton (2002, p. 8)	“Sexual pleasure consists of those positively valued feelings induced by sexual stimuli. Notice that this conceptualization encompasses a broad range of sexual pleasures, from the soothing sensations of sensual massage, to the explosion of feeling that accompanies orgasm.”
Horne & Zimmer-Gembeck (2006, p. 126)	“Sexual pleasure is defined as a sense of well-being derived from the experience of being sexual and, as such, is an essential component of sexual subjectivity.”
De la Garza-Mercer (2007, p. 108)	For the sake of discussion [...] and simplicity, sexual pleasure primarily refers to the positive physical and subjective sensation and emotional experience resulting from stimulation of the genitals, breasts, and other erogenous zones. In this way, “sexual pleasure” encompasses a narrow range of direct behaviors that set in motion the aforementioned thoughts and behaviors that are more distally related to the fundamental factor of genital stimulation.
Philpott et al. (2006, p. 23)	“Sexual pleasure is the physical and/or psychological satisfaction and enjoyment one derives from any erotic interaction.”
Higgins & Hirsch (2008) cited in Anderson (2013, p. 209)	No definition established. However, they propose five components of sexual pleasure:  [...] something that feels good, spontaneity and flow, closeness, partner’s pleasure, and eroticization of safety. The diversity of these components highlight the range of physical, emotional, and social factors that are at play in the experience of sexual pleasure; since sexual pleasure is often



	(although certainly not always) experienced with another person, interpersonal experiences are often involved in pleasure.
Züricher Institut für klinische Sexologie und Sexualtherapie (ZISS, 2013, p. 9)	“Sexual pleasure is the ability to enjoy sexual arousal. [...] Since the brain and body form a functional unity, an improvement of the arousal function will directly affect sexual pleasure and, consequently, the ability to orgasm.”
Global Advisory Board for Sexual Health and Wellbeing (GAB, 2016)	“Sexual pleasure is the physical and/or psychological satisfaction and enjoyment derived from solitary or shared erotic experiences, including thoughts, dreams and autoeroticism.”
Goldey et al., (2016, p. 2148)	Sexual pleasure is highly multifaceted, encompassing physical experiences (e.g., sensory stimulation), cognitive experiences (e.g., getting outside the self), and emotional experiences (e.g., trust), as well as experiences that challenge mind-body dualisms (e.g., autonomy, which could facilitate intense genital pleasure and unique emotional experiences).
Fahs & Plante (2017, p. 1)	“Analysis revealed four themes in women’s descriptions of good, happy and joyous sex: (1) Physical pleasure, wanting and orgasm; (2) Emotional connection and relationship satisfaction; (3) Comfort and naturalness; (4) Control over sexual scripts.”
Fileborn et al. (2017, pp. 2106 & 2107)	No definition established. However, their results suggested that, for some [men], sexual pleasure was about bonding, intimacy and closeness, while for others, the corporeal, embodied pleasures of orgasm were most central. [...] ‘Pleasurable’ sex occurred for many of our participants at the nexus of intimacy, bonding and physical pleasure.
Kelly et al. (2017, p. 249)	“Women might experience a form of ‘connection pleasure’ which we understood as the pleasure or satisfaction they derived from feeling connected and close to their partner while experiencing emotional intimacy.”

World Association of Sexual Health (WAS, 2019)	Definition adapted from GAB-definition, including following addition: “fantasies, emotions and feelings can also be sources of sexual pleasure.” (“Sexual pleasure is the physical and/or psychological satisfaction and enjoyment derived from shared or solitary erotic experiences, including thoughts, <i>fantasies</i> , dreams, <i>emotions</i> , and <i>feelings</i> .”) [italics added to highlight changes]
Halwani (2020, p. 122)	Sexual pleasure (a) is usually both pleasure-as-sensation and pleasure-as-enjoyment, with (b) the former playing a central role in that the latter typically depends on it and in that it explains why people seek or avoid sexual activity; (c) sexperience machines and other far-fetched cases notwithstanding, it is not an entity detachable from the activity but supervenes on it; and (d) is generally distinguished from nonsexual pleasure through the notion of ‘arousal felt in the genitalia’, itself to be supplemented by a phenomenological or physiological account of ‘arousal’.
Vigil et al., (2021, p. 327)	“We operationalized sexual pleasure as conscious, positive evaluations of physical sensations during sex, either localized in the genitals or throughout the body.”

*Note.* We included statements which followed the structure of “Sexual pleasure is...”, or something similar, followed by a conceptual or explanatory definition, or themes which specify how sexual pleasure is defined by interviewees in qualitative studies. We have reviewed more articles than those presented in the table but excluded articles from the table which did not formulate a definition as specified above and articles which referred to one of the definitions in the table. For a list of the reviewed articles, see the supplementary material.

### ***1.1.2 Sexual Pleasure: Proposed Conceptual Definitions***

We propose that sexual pleasure should be conceptually, and especially operationally, defined as a multifaceted concept, encompassing several *state-like* and *trait-like* domains. At its core, we define state sexual pleasure as the *experience of positive affect* (“*feeling good*”) *during sexual activities* (a *positively valenced* emotional state; cf. Smuts, 2011). We argue

that such positive affect is experienced when an activity is *rewarding*, that is, sexual pleasure is experienced when *anticipating and receiving rewards during sexual activities*. Such rewards are diverse, allowing for the multifaceted nature of state pleasure (see the section “A Multifaceted Taxonomy of Sexual Pleasure – Rewards Retrievable from Sexual Activity”). We define trait-like sexual pleasure as the *tendency to enjoy sexual activities*, that is, the tendency to experience state pleasure during sexual activities. This tendency is a function of the *contextual likelihood* to encounter rewarding sexual activities and the *capacity to enjoy* sexual activities. The capacity to enjoy sexual activities includes the (a) *propensities* (“*congenital predisposition*”) and (b) *abilities* (“*nurtured disposition*”) to experience rewards and the (c) *capabilities* (“*skills*”) to attain the rewards provided by sexual activities. We define sexual activity as all human actions which are geared towards or associated with *non/conscious central representations of genital arousal* within a *stimulus context which affords sexual construction of interoceptive experience*.

In sum, we propose that a person who (1) is (a) predisposed and learning to be (b) able and (c) capable of experiencing and attaining rewards during activities (2) which are associated with non/conscious central representations of genital arousal within stimulus contexts which afford sexual construction of interoceptive experience, and who (3) is given the opportunity to engage in such activities which also offer the conditions to experience and attain rewards (4) will experience sexual pleasure during these sexual activities, as long as inhibitory mechanisms are relatively less active.

### ***1.1.3 A Note on State and Trait Sexual Pleasure***

Within both the available and our proposed definitions, we see that theorists have conceptualized sexual pleasure as a momentary experience or a tendency for experience. This conceptual difference has been referred to as state and trait conceptualizations of affective

responses and has been particularly influential in operational definitions of affective responses. For instance, Spielberger (1972; 1983) conceptually and operationally differentiated state anxiety in response to a specific situation and trait proneness to experience anxiety in response to situations. Dawson and Chivers (2014) discussed state sexual desire in response to sexual stimulation and typical trait tendencies to experience sexual desire across situations. Differentiating between state and trait conceptualizations and operationalizations of sexual desire has led to crucial insights regarding the alleged difference in sexual desire between cis men and cis women. On average, cis women do not appear to differ from cis men in (momentary assessments of the level of) state sexual desire but do differ in (self-report assessments of) trait sexual desire (Dawson & Chivers, 2014). Different definitions of a concept lead to different research conclusions about the concept.

Following our above definition, state sexual pleasure should, strictly, be conceptually defined as the experience of positive affect during *a concrete situation* in which sexual activity takes place *at a specific moment in time* (Dawson & Chivers, 2014; Schmitt & Blum, 2020). Trait sexual pleasure should be conceptually defined as the tendency to experience such state sexual pleasure across situations. However, a sexual pleasure “trait” concept comprises two ways of conceptualizing the “trait” which results in “trait” sexual pleasure remaining ambiguous.

Traits can be *loosely* conceptualized as “dimensions of [...] *relatively stable* psychological (affective, cognitive, motivational, and behavioral) *differences* among people” (Condon et al., 2021, p. 924, italicization added for clarification; Fleeson, 2001; Fleeson & Jayawickreme, 2015). A trait can also *strictly* be conceptualized as a “relatively stable, consistent, and enduring *internal characteristic* that is *inferred* from a pattern of behaviors, attitudes, feelings, and habits in the individual” (APA, n.d.-a) which “[...] *determines* an individual’s behavior across a range of situations” (APA, n.d.-b; italicization added for

clarification). That is, a trait can be defined as a *summary* description of the typical experience of a person as well as an endogenous *causal* determinant of the experience of a person which is *inferred* from the pattern of the typical experience of a person (Fleeson, 2001; Fleeson & Jayawickreme, 2015; DeYoung, 2015).

In our proposed conceptual framework, we include both conceptualizations of traits: “loose” trait sexual pleasure as *individual differences in usually experienced state sexual pleasure across situations* and “strict” sexual pleasure traits as *individual differences in capacities to enjoy sexual activity*. Individual differences in usually experienced state sexual pleasure are a function of individual differences in the capacities to enjoy sexual activity *and* differences in the likelihood to encounter rewarding sexual situations. That is, individual differences in traits in the loose sense (the tendency to experience state sexual pleasure) do not only result from individual differences in the strict sense (the capacities to experience state sexual pleasure) but also systematic differences in the kind of situations people are (cap)able *and* allowed to encounter.

#### ***1.1.4 State Sexual Pleasure as the Affect Component of Sexual Desire and Lust***

Several early theories of the sexual response and behavior, i.e., state sexual responses, can be understood from drive (reduction or induction) perspectives of motivation (APA, n.d.-c; d) in which state sexual pleasure was mentioned only indirectly. Such perspectives assumed that sexual behavior is triggered when an organism’s internal equilibrium is disturbed, that sexual behavior aims to restore an organism to a sexual “set-point”, and that restoring such equilibrium is what is pleasurable about sexual experiences. For instance, Freud (1909) conceptualized sexual motivation as an internal “continuously increasing” force, a state of “libidinous” tension, which can be relieved through “unburdening of the seminal vesicles” (p. 148; see also, Both et al., 2005; Everaerd et al., 2001). Notably, Masters and Johnson’s sexual

response curve (Masters & Johnson, 1966) and its adaptations by Kaplan (1979) and Levin (2001) seemed to imply that release or reduction of arousal/tension equals pleasure, embodied within the experience of orgasm. Even though these perspectives differed in terms of how the arousal/tension was set in motion - either being triggered by deprivation or by an arousing stimulus - they all implied that pleasure was a side-effect of quenching internal arousal/tension (see also Janssen, 2011, and the historical overview in Toates, 2014, and Pfaus, 1999; as well as Hilgard & Marquis, 1961a; Hilgard & Marquis, 1961b). These theories thereby implied that all kinds of arousal/tension release are equally pleasurable and that pleasure only figures at the end of the sexual response. As an unfortunate yet crucial consequence, these theories of sexual responding hid pleasure from conceptualization, because pleasure hides within the unified construct of diminishing arousal (Janssen, 2011).

Incentive Motivation Theory (IMT) of sexual response and behavior combined and furthered aspects of these perspectives (Singer & Toates, 1987; Bindra, 1978; Berridge, 2018) which set the stage for a broader perspective on pleasure to step into conceptual focus. IMT proposed that sexual responding is not only dependent on characteristics of the organism (e.g., its' deprivation) as drive reduction theories suggested, nor that it is only dependent on (un)conditioned stimulus characteristics inducing responses and reactions as drive induction theories suggested (i.e., stimulus characteristics). According to IMT, an organism learns when to predict and expect, and when and how to attain and consume stimuli that induce *reward*. However, it depends on the current sensitivity of the organism whether stimuli are being processed as rewarding and on the availability of rewarding stimulus situations in the environment (Bindra, 1978; Singer & Toates, 1987; Toates, 2009, 2014; Both et al., 2005; Laan & Both, 2008; Berridge, 2018; 2019).

Initially, IMT and its predecessors did not clearly specify why a rewarding stimulus is experienced as “rewarding” (Bindra, 1978; Singer & Toates, 1987; Hilgard & Marquis,

1961a; Hilgard & Marquis, 1961b). In 1993, Robinson and Berridge's reward-behavior cycle specified the consequences of interaction with unconditioned and conditioned rewarding stimuli into *wanting* and *liking* responses during the anticipation, attainment, and consumption of such "rewarding", i.e., wanting and liking inducing, stimuli. *Wanting* is related to the (previously experienced) salience of the reward and reflected in the action readiness and sustenance exerted in response to signals of reward and punishment (Berridge, 1996; 2019; Gola et al., 2016). *Liking* is related to the (previously experienced) positive valence of the rewarding stimulus and reflected in the hedonic impact of anticipating<sup>1</sup>, attaining, and consuming a reward, and is considered synonymous with non/conscious pleasure (Georgiadis & Kringelbach, 2012; Georgiadis et al., 2012; Berridge & Kringelbach, 2009). That is, a reward compels action and is experienced as positive.

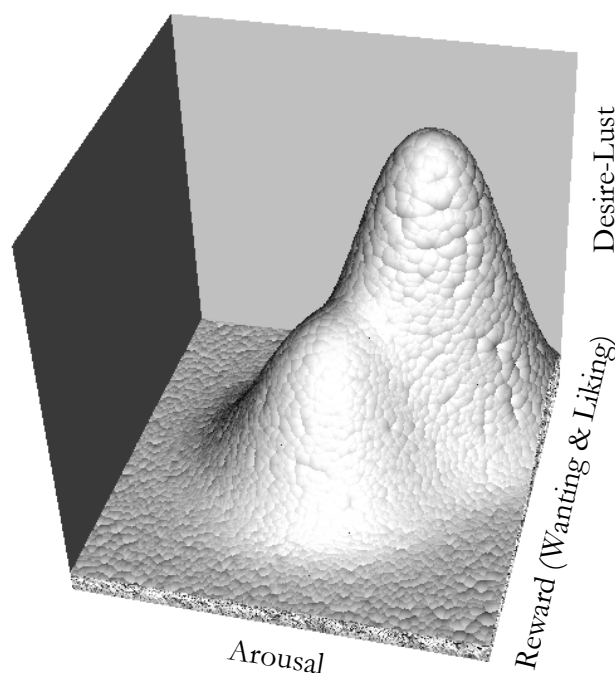
IMT, in combination with wanting and liking from the reward-behavior cycle, allows us to conceptualize the sexual response as an "emo(tiva)tional" affective state that emerges when an individual experiences changes in action preparation, action readiness, and action evaluation (Frijda, 1988, p. 493; cited in Henckens & Everaerd, 2020; Henckens et al., 2020). That is, the sexual response can be conceptualized as an affective response (cf. Berridge, 2018; Frijda, 1993; LeDoux, 2012; Barrett & Simmons, 2015), which *emerges* (Singer & Toates, 1987; Barrett, 2013, 2009) from arousal<sup>2</sup> *and* anticipatory and consummatory reward (wanting + liking) derived by the organism during sexual stimulus processing (Everaerd, 2002; Frijda, 1993; Henckens & Everaerd, 2020; Smid & Wever, 2019; Janssen et al., 2000). When arousal and anticipatory reward processes during stimulus processing reach consciousness, the organism may experience the nonconscious emotivation as the consciously emergent feeling of desire (cf. Everaerd, 2003, p.85; Hermans et al, 2013, cited in Henckens & Everaerd, 2020).

We therefore suggest that a “sexual” stimulus (situation) could be characterized by three overarching aspects: (1) its “sensory intensity” (defined by changes in arousal), (2) its reward “competence” which includes (a) its salience (defined by changes in wanting) and (b) (positive) valence (defined by changes in liking) and (3) its “relevance” (defined by changes in sexual meaning/connotation). Sensory stimulus “intensity” is associated with changes in the strength of (central nervous system representation of) physiological, including genital, *arousal* (cf. Ågmo, 2008, 2011; De la Garza-Mercer, 2007; Halwani, 2020; Hoffmann, 2017; Paredes & Ågmo, 2004; Pfaff, 1999; Toates, 2009). A stimulus is or becomes “competent” (Damasio, 2001) when the stimulus signals the availability of or represents a conditioned or unconditioned reward (cf. Both et al., 2020; Oei et al., 2014). Stimuli are and become “relevant” by socioculturally reinforced sexual meanings/connotations during sexual development (cf. Barrett, 2013; Toates, 2014; Jackson & Scott, 2007; Gripsrud, 2008).

Practically, these conceptual distinctions allow us to hypothesize how the sexual response might be(come) “dysfunctional”. For instance, when someone perceives physiological, including genital, arousal – a phenomenon which is sometimes called *subjective* arousal (cf. Meston & Stanton, 2019) – they do not necessarily experience desire, since they might not associate sufficient reward value with the stimulus triggering the arousal; nor would they experience desire when experiencing wanting without sufficient anticipatory liking, because it might be experienced as urge rather than desire (cf. Briken, 2020; Prause et al., 2017). Also, cis women and cis men might differ in concordance, i.e., their reporting of subjective arousal to visual stimuli even though they show a comparable genital response, because what they report is the difference between arousal versus arousal + reward (wanting and liking) with women potentially responding with less reward to (non-self-selected, i.e., potentially incompetent) visual sexual stimuli (cf. Maunder et al., 2021).



In sum, pleasure is not a mere side-effect of arousal/tension reduction. Pleasure, i.e., anticipatory and consummatory liking, is experienced when anticipating, attaining, and consuming rewarding stimuli. For sexual desire to emerge<sup>3</sup>, a sensitive organism has to be triggered by arousing and rewarding sexual stimuli, which have attained or (de)potentiated their intensity, competence, and relevance through their developmental conditioning history. Desire does not emerge from increasing tension, but in response to the expectation of rewarding sex (Halwani, 2020). Thus, synthesizing sexual response curves à la Masters and Johnson with the reward-behavior-based sexual pleasure cycle (Robinson & Berridge, 1993; Georgiadis & Kringelbach, 2012; Georgiadis et al., 2012), we suggest that the sexual response should be visualized as a surface rather than curve (see Figure 1), encompassing stimulus-induced arousal *and* reward, emerging into anticipatory desire and consummatory lust (see also the discussion of “erotic sensuality” in Komisaruk & Rodriguez, 2021).

**Figure 1***A Sexual Response Surface*

*Note.* This graphic represents an illustrative visualization of a sexual response surface. This representation should not be overinterpreted as its shape needs to be verified by simulations and modeling of empirical data. For instance, a cusp surface (Huby, 1991; Levin, 2017) might better represent what happens during sexual responding, rather than the shape which is visualized here for illustrative purposes.

### ***1.1.5 Sexual Responsiveness – Trait Sensitivity to Arousing or Rewarding Stimuli, or both?***

To experience a sexual response, IMT argues that an organism needs to be sufficiently responsive to detect and respond to stimulus characteristics. IMT proposes that the sexual response system’s “sensitivity of incentive motivational circuitry” (Toates, 2009, p. 175) determines the sexual system’s responsiveness to sexual stimuli and thereby shapes its sexual response output. The inclusion of such an individual-difference concept connects the *state* of sexual responding (experience of arousal, wanting, and liking) within an intense and

competent sexual context to the strict *traits* of the sexual response system (differences in responsiveness due to differences in sensitivity; cf. also Byrne & Schultz, 1990; Cervone, 2004; both cited in Gijs et al., 2009). Thus, there are not only intra-individual and inter-individual differences in the sexual response due to differences in the availability and strength of intense and competent sexual stimuli, but also trait-like intra-individual and inter-individual differences that relate to differences in sexual responsiveness to the same stimulus situation (within people over time and between people at a time, respectively).

A frequently utilized and researched strict trait-like concept, similar to sexual *responsiveness*, is called sexual *excitation*. According to the Dual Control Model of Sexual Response (Janssen & Bancroft, 2007), sexual excitation and sexual inhibition represent “two neurophysiological systems, one relevant to activation and the other to suppression of sexual response” (p. 199). However, the “sensitivity of incentive motivational circuitry” (Toates, 2009, p. 175) seems to denote a different trait-like concept than sexual excitation. While the “sensitivity of incentive motivational circuitry” seems to connote *reward*, and specifically *wanting* sensitivity (Toates, 2014, p. 143; Toates, 2009, p. 173), sexual excitation seems to connote sexual *arousability* (cf. Whalen, 1966) with sexual arousability either denoting *arousal* and/or *wanting* sensitivity. Most importantly, intra-individual and inter-individual differences in *liking* (i.e., pleasure) hide from view yet again because the theories focus on intra-individual and inter-individual differences in arousal and wanting, but not liking, sensitivity. Such conceptual and verbal conflation might result from the previously mentioned fact that the sexual response, à la Masters and Johnson, has traditionally been seen to encompass only one, potentially all-encompassing, output - sexual arousal - rather than arousal *and* reward (wanting and liking).

We are not the first to (re)iterate a difference, at least conceptually, between arousal and reward circuitries, and that each of these could exhibit strict trait-like differences

(Whalen, 1966; Frijda, 2008; Henckens & Everaerd, 2020; Eysenck, 1967; Gray, 1982; Carver & White, 1994; Corr, 2009; Janssen & Bancroft, 2007). For instance, we might call the overall state-output of the whole sexual response system its sexual *response* and its individual trait-difference sexual *responsiveness*. Sexual excitation in interaction with sexual inhibition (Janssen & Bancroft, 2007) might validly denote individual differences in overall responsiveness, since their interaction seems to encompass individual differences across all state circuitries, i.e., arousal, wanting, and liking, as well as aversion-circuitries (Bancroft, 1999; sometimes referred to as sensitivity of the overall nervous system; Toates, 2009, p. 170). We would suggest that arousability (Eysenck, 1967; Whalen, 1966; Janssen & Bancroft, 2007) denotes trait-like differences of the arousal circuitry, that incentive reward sensitivity (DeYoung, 2015) denotes trait-like differences in wanting circuitry, and that general reward sensitivity (Toates, 2009) denotes trait-like differences across both wanting and liking circuitries. We will discuss our suggestion for trait-like differences in the liking circuitry in the following sections.<sup>4</sup> Figure 2 offers a visual overview of our conceptual suggestions.

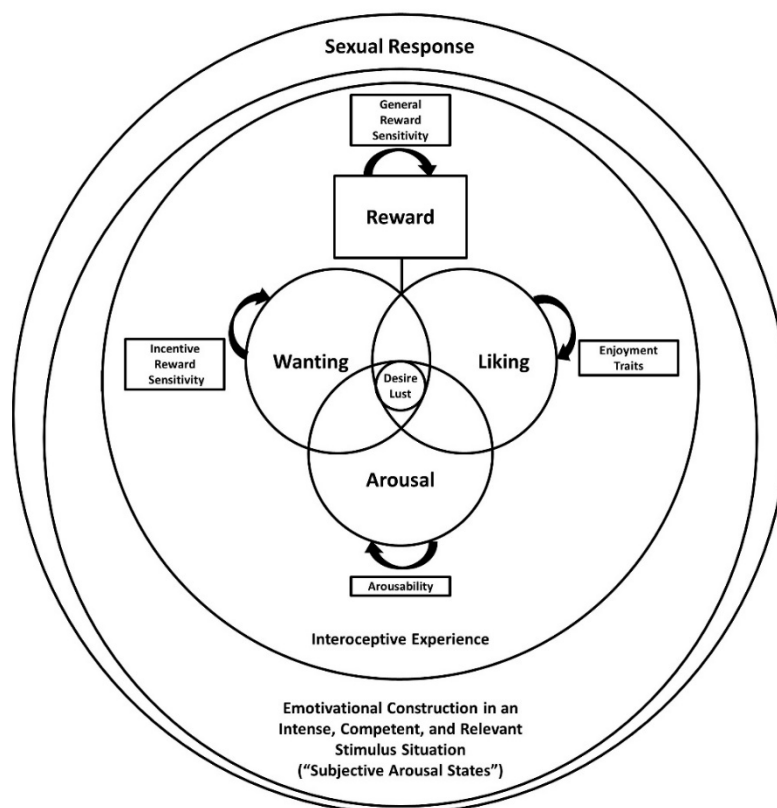
### ***1.1.6 Learning When and Where to Attain Rewarding Sex***

According to IMT, the sensitivity to incentives and rewards is determined by nutrient deficits and hormonal sensitization (Berridge, 2001; Bindra, 1978; Toates, 1986). This implies that the (strict trait) sensitivity, rather than being fixed across time, can change according to nutrient deficits and changes in hormonal milieu. Importantly, Both et al. (2007, p. 329) argued that “sexual motivation does not emerge through a [nutrient] deficit signaled by the hypothalamus” since there is no sexual nutrient deficit or sexual tissue need which would require the hypothalamus to signal a survival emergency when such “sexual set-points” deviate from some needed level (see also, Hardy, 1964, cited in Hardy, 1989; Beach, 1956, cited in Singer & Toates, 1987). It follows that the sensitivity of the sexual response system

changes through hormonal sensitization but that this hormonal sensitization adapts by another regulatory mechanism than hypothalamic homeostasis (Berntson & Cacioppo, 2007).

**Figure 2**

*A Diagram of Sexual Response Concepts*



*Note.* The diagram does not specify causal mechanisms but conceptual relations and hierarchies.

We suggest that the sexual response system regulates arousal, wanting, and liking states homeostatically, i.e., it reacts and corrects, *but* that it adapts, i.e., anticipates, prepares, and adjusts, its trait sensitivities heterostatically (or allostatically, as some might want to call it; see Quintana & Guastella, 2020, for the inspiration to this argument; as well as Schulkin, 2003, and Caldwell, 2002) through learning mechanisms. IMT implies that organisms do not

only sexually react once an unconditioned stimulus is present, but that they anticipate and prepare metabolically and energetically to the expectation of unconditioned positive and negative *future* deviations in the environment (i.e., opportunities and threats) based on *previous* sexual experiences (Schulkin, 2003; Barrett & Simmons, 2015). We suggest that the capacity to anticipate and prepare for a rewarding opportunity, i.e., respond with wanting and liking to the anticipation of rewards, is enabled by a sensitized sexual response system which adapts its sensitivities according to experience with rewarding sexual experiences in certain environments (Ramsay & Woods, 2016).

As a result, the sexual response can be conceptualized as circular across time (Basson, 2000; Hayes, 2011) rather than linear (Masters & Johnson, 1966; Kaplan, 1979; Levin, 2001), because sexual learning attaches feed-forward loops to the sexual response (Ågmo & Laan, 2022), with the experiences during a sexual response event affecting sexual response events in the future through, among others, adaptation of the sensitivities of the sexual response system (Ramsay & Woods, 2016). Similarly, Basson (2000) visualized the female sexual response as a cycle with stimuli and experiences playing a role in feed-forward processes, in contrast to the sequential, linear, and self-contained process implied by sexual response curves. Relatedly, we argue that learning from sexual events changes future sexual stimulus aspects through classical and operant associative conditioning, *and* through adaptation of the traits of the sexual response system, such as its reward sensitivity (Ramsay & Woods, 2016; cf. Meston, 2000; Henckens & Everaerd, 2020; Goldey & van Anders, 2015; Macoveanu et al., 2016; Tobiansky et al., 2018). Contrary to Basson (2000), we would suggest that such feed-forward adaptation is applicable to all (rather than only female) sexual response systems.

In sum, humans do not need to have sex periodically to survive, but should *become* sensitive to signals in the environment that propose a potentially valuable opportunity for procreation and recreation and *learn* that such opportunities are available and how to attain

them. Learning changes the competence of stimuli by associative learning, by teaching an individual how and where to attain rewards, and by sensitizing an individual's response system in an environment rich with rewarding opportunities.

## **1.2 Aim 2: A Multifaceted Taxonomy of Sexual Pleasure – Rewards Retrievable from Sexual Activity**

### ***1.2.1 Pleasure as State - The Experience of Liking in Response to Rewards***

State liking and wanting specify what processes make a reward rewarding, and learning and conditioning principles describe how stimuli can take on reward value and become incentives. However, how do rewards become rewarding? What is the unconditioned stimulus that triggers state liking and wanting without any previous learning history such that unconditioned liking and wanting can be conferred from the unconditioned stimulus to conditioned stimuli (Hilgard & Marquis, 1961a; Hilgard & Marquis, 1961b)? In other words, are there unconditioned, i.e., primary, or at least universal rewards experienced during sexual activities which all humans (and potentially, mammals) like and want during sexual activity?

Research in rodents suggests that liking associated with orgasm reflects a critical component of reward and reinforcement, which represents strong evidence for orgasm being an unconditioned reward. (Pleasurable) Orgasm is associated with strong endogenous opioid release and opioid action appears necessary for learning through sexual experience (Ågmo & Berenfeld, 1990; Georgiadis & Kringelbach, 2012; Paredes, 2014; Pfaus et al., 2012).

However, we suggest that state sexual pleasure encompasses *any experience of state liking during sexual activity*, i.e., not only the anticipatory and consummatory liking connected to or triggered by anticipation of the potentially primary rewarding stimulus situation of orgasm. As Goldey et al. (2016) and Fileborn et al. (2017) pointed out, orgasm represents only one of multiple experienced rewards during sex (see also the discussion in *Sexual Pleasure versus*

*Pleasure during Sex* below and critiques by Tiefer, 2004, and Fahs & Plante, 2017, Opperman et al., 2014, and Kleinplatz et al., 2009). We therefore suggest that, since liking is experienced when anticipating, attaining, and consuming rewards, *any reward* anticipation, attainment, or consumption *during sex* should be able to trigger *pleasure during sex* (cf. Smuts, 2011). The question then becomes what kinds of rewards, next to orgasm, humans anticipate, attain, and consume during or via sexual activity.

To identify these potential rewards, we refer to the literature we label the *basic sexual and psychological rewards literature* (which is usually called the basic *needs* literature; Prentice et al., 2014)<sup>5</sup>. In the “sexual” rewards literature, Van Anders et al. (2011) noted that sex is rewarding because it offers erotic and nurturance rewards (see also, Diamond, 2003; Goldey et al., 2016; Toates, 2009). Following their Steroid/Peptide Theory, they argue that erotic rewards are (evolved to be) rewarding to facilitate reproduction, while nurturance rewards are (evolved to be) rewarding to facilitate parent-offspring and couple attachment (Diamond, 2003; Van Anders, 2015; Van Anders et al., 2011). In addition, Goldey et al.’s (2016) interviewees noted that pleasuring and sharing pleasure with the partner was experienced as rewarding, as well as feeling autonomous and explorative during sex (see Hargons et al., 2018 and Pascoal et al., 2014, for similar findings, and Opperman et al., 2014 and Brown et al., 2018, for the importance of shared pleasure). In an exploratory study, Werner et al. (in preparation) factor-analyzed and summarized a broad list of items referring to different rewarding aspects of sexual activity into domains referring to pleasure retrieved from arousal, pleasure retrieved from being intimate and connecting with sexual partners, pleasure retrieved from pleasuring sexual partners, and feeling competent and confident about oneself and one’s body. Additional studies referred to in Table 1 pointed to feeling connected and experiencing ease and flow as rewarding aspects of sexual activity.



In the “psychological” rewards literature, such as the framework of Self-Determination Theory (Ryan & Deci, 2000), autonomy, competence, and relatedness are said to be rewarding, suggesting that feeling un-coerced and in control during sex (autonomy), engaging sexual skills (competence), and connecting and cooperating with sexual partners (relatedness; Smith, 2007) act as rewarding aspects of sexual activity. According to Maslow (1943) there are basic physiological, safety, love, esteem, and self-actualization rewards. According to Grawe (2004) pleasure, attachment, self-esteem enhancement, and orientation & control are rewarding. Physiological rewards and pleasure refer to the fact that being in physiologically pleasurable states is rewarding; safety refers to reward experienced from being in a protective and predictable environment; love and attachment refer to the rewarding state of building and experiencing a positive relationship with a reference person; self-esteem enhancement proposes that having and building a positive self-image is rewarding; orientation and control refers to the rewarding state of feeling able to control one's own environment by taking action (Peters & Ghadiri, 2013); and self-actualization refers to the reward experienced from authentic peak experiences (APA, n.d.-e). Dweck (2017) suggested acceptance, predictability, and competence leading to control, self-esteem and trust as basic rewards. Talevich et al. (2017) suggested meaning, communion, and agency as basic rewards. A recent special issue edited by Vansteenkiste et al. (2020) argued that beneficence (“individual’s perception of having a positive impact on others”), novelty (“individual’s perception of experiencing or doing something new”), and morality (“individual’s perception of being and acting morally”) could be added to the basic reward list.

We integrate all of these “sexual” and “basic psychological” rewards into the following taxonomy of rewards that might be anticipated, attained, and consumed during sexual activities and thereby induce the experience of state pleasure during sex (see also Table 2 and Habermacher et al., 2014; 2020; and Pittman & Zeigler, 2007 for a similar synthesis in

a nonsexual domain): *Sensual Pleasure* (encompassing basic sensory, physiological as well as erotic rewards), *Bonding Pleasure* (encompassing nurturance, relatedness, connection, love, acceptance, communion, and attachment and parts of trust and safety), *Interaction Pleasure* (encompassing sharing pleasure, relatedness, beneficence, and parts of morality), *Pleasure-related Validation* (encompassing esteem and self-esteem enhancement) and *Pleasure-related Mastery* (encompassing competence, orientation & control, agency, and parts of autonomy, predictability, control, and self-actualization). That is, we conclude that sex serves, and can be coopted to serve, sensual rewards, bonding rewards, interaction rewards, and self-validation and mastery.

Note that probably not all of these rewards need to be experienced to their full extent during sexual activity to experience pleasure during sex. It is likely that the state pleasure facets do not act as summative components that can be added up to express ever more satisfying or healthy forms of sexual experience. Future research needs to establish when, to what extent, and in what constellation the rewards result in “good-enough” (Metz, & McCarthy, 2007) or “optimal” sex (Kleinplatz et al., 2009). For instance, some people might use sex more or less to retrieve bonding-related rewards, and some might do so only in certain situations or relationships. Specifically, we would suggest that sexual preferences (e.g., Hill, 2021), general personality traits (Nobre, 2013; Barlow, 1986), and “key partner/context/event-specific enabling factors” (GAB, 2016; Fava & Fortenberry, 2021) interact with the experience of rewards to predict sexual satisfaction, health, and wellbeing. We have not (yet) fully included autonomy and predictability, ease and flow, exploration and novelty, and self-actualization and meaning in the taxonomy. We discuss the reasons for these decisions in the discussion.

### ***1.2.2 Strict Pleasure Traits - The Capacity to Experience Liking (Attain and Experience Rewards) during Sex***

We discussed that strict traits of the organism's sexual system explain why there are differences in the sexual response between people at a moment in time and within people over time in response to equally competent stimulus situations. We also argued that just because such traits might be prepared and more stable than state-like experiences, this does not imply that such traits do not adapt to experience. We argue that learning from experience modifies the capacities of the organism, which includes the sensitivity to rewards, in addition to other pleasure-related abilities and capabilities of the individual. Thus, we suggest that the state experience of pleasure (through the anticipation, attainment, and consumption of sensual, bonding, and interaction rewards and mastery and validation) is a function of such rewards being available during sexual activities (the situation) and certain prepared and adapted trait-like capacities of the individual (the person), just like the experience of response is dependent on the availability of an intense, competent, and relevant stimulus situation (the situation) and the current responsiveness of the organism (the person) which make them (cap)able to attain and experience arousal and reward.

For someone to respond with the experience of sensual pleasure to an intense, competent, and relevant stimulus (situation), we suggest that the organism's arousal circuitry would have to be sufficiently arousable and the reward system would have to be sufficiently sensitized. The latter implies that the individual would need to have experienced certain kinds of stimulation as something that brings reward or would need a reward system that is (consistently) sensitized by other means (for instance, drugs; Lorvick et al., 2012; menstrual cycle effects, or spill-over from other environmental triggers; Toates, 2014). We label the ability to enjoy stimulation *Arousal Enjoyment* and define it as the ability to enjoy sensual stimulation and its psychophysiological consequences. We define sensual stimulation as

exposure to external and internal stimuli of varying modalities/senses. In sum, an individual needs to exhibit the propensity to be sensually stimulated (have an arousable arousal system), and needs to have developed the ability to enjoy, i.e., respond with anticipatory and consummatory liking to, such stimulation.

Similar to sensual pleasure, we suggest that the experience of pleasure related to bonding depends on the human propensity to bond and a person's developed attachment strategies. Attachment strategies are reflected within someone's attachment style, which is based on positive experiences within bonds with caretakers (Dewitte, 2012, 2014; Hazan & Shaver, 1987; 1994). We label the ability to enjoy bonding during sex *Bonding Enjoyment* and define it as the ability to experience and enjoy the bonding-related rewards of sexual interactions. That is, the individual needs to have the propensity to attach and needs to have developed the ability to feel attached and enjoy bonding-related rewards during sexual activity.

We suggest that the tendency to feel *Pleasure-related Mastery* during sexual activity is facilitated by the capability we label *Enjoyment-related Self-Efficacy* and that the tendency to feel *Pleasure-related Validation* is facilitated by the ability we label *Enjoyment-related Self-Worth*. We define *Enjoyment-related Self-Efficacy* as the confidence and competence (knowledge and skills on how) to engage in pleasurable sexual activities and *Enjoyment-related Self-Worth* as the evaluation of one's sexual worthiness and feeling deserving of positive sexual experiences. Finally, we label the capability which facilitates the experience of *Interaction Rewards* as *Interaction Enjoyment* and define it as the capability to enjoy pleasuring and being pleased by a sexual partner, i.e., the capability to enjoy the sharing of pleasure. We would suggest that *Enjoyment-related Self-Efficacy* and *Enjoyment-related Self-Worth* also facilitate the experience of the other rewards, since knowing how to create a

sexually competent situation and feeling deserving of such experiences should facilitate experiencing sexually competent situations.

In Table 2 we provide an overview of all state and trait pleasure domains. Table 2 also aims to point out the subtle but crucial conceptual difference between the strict and loose traits, with strict traits referring to the above trait capacities for pleasure, while loose traits refer to the tendency to experience state pleasure associated with the different rewards across situations. In Figure 3, we visually summarize a work-in-progress sexual response system in which we indicate where the strict sexual pleasure traits might potentially modulate state sexual responding.

### ***1.2.3 What Sexual Pleasure is (not)***

**Sexual Pleasure versus Pleasure during Sex.** Some readers might argue that what we come to call sexual pleasure is not sexual pleasure and that only sensual pleasure should be labelled sexual pleasure. This issue partakes in the discussion between essentialist views on basic emotions versus constructionist views of emotions (Gendron & Barrett, 2009; Stevenson et al., 2011). Across these schools of thought, we ask what essentially defines a *sexual* experience and what separates a *sexual* from *other* emotivational experiences. That is, we ask whether all emotivations have distinct and unique brain modules, physiological fingerprints, and activating stimuli that differentiate them from each other, or whether there are basic affective ingredients (e.g., arousal, wanting, liking) which emerge into an emotivational experience of fear, anger, or sexual desire based on embodied emotivational states within a context (see Barrett, 2017, 2006; Barrett et al., 2015; Berridge, 2018; 2019; Mosher & MacIan, 1994; Peterson & Janssen, 2007, cited in Stevenson et al., 2011).

**Table 2**

*Proposed Domains of (the Loose Trait Tendency for) State Sexual Pleasure and (Strict) Sexual Pleasure Traits*

Domain	(Strict/Loose) Trait Facets	State Facets
Hedonic Domain	<i>Arousal Enjoyment</i> The ability/tendency to enjoy sensual stimulation and its psychophysiological consequences.	<i>Sensual Pleasure</i> Level of experienced pleasure through sensual stimulation and its psychophysiological consequences.
	<i>Bonding Enjoyment</i> The ability/tendency to experience and enjoy the bonding-related rewards of sexual interactions.	<i>Bonding Pleasure</i> Level of experienced (pleasure through) feelings of closeness, affection, safety, and security during sexual interactions.
Interpersonal Domain	<i>Interaction Enjoyment</i> The capability/tendency to enjoy pleasuring and being pleased by a sexual partner (i.e., enjoying the sharing of pleasure).	<i>Interaction Pleasure</i> Level of pleasure experienced during sharing pleasure and from interaction with a sexual partner.
	<i>Enjoyment-related Self-Efficacy</i> Self-perceived confidence and competence (knowledge and skills on how) to engage in pleasurable sexual activities./ The tendency to be confident and competent about engaging in pleasurable sexual activities.	<i>Pleasure-related Mastery</i> Level of experienced mastery in creating pleasurable sexual activities.

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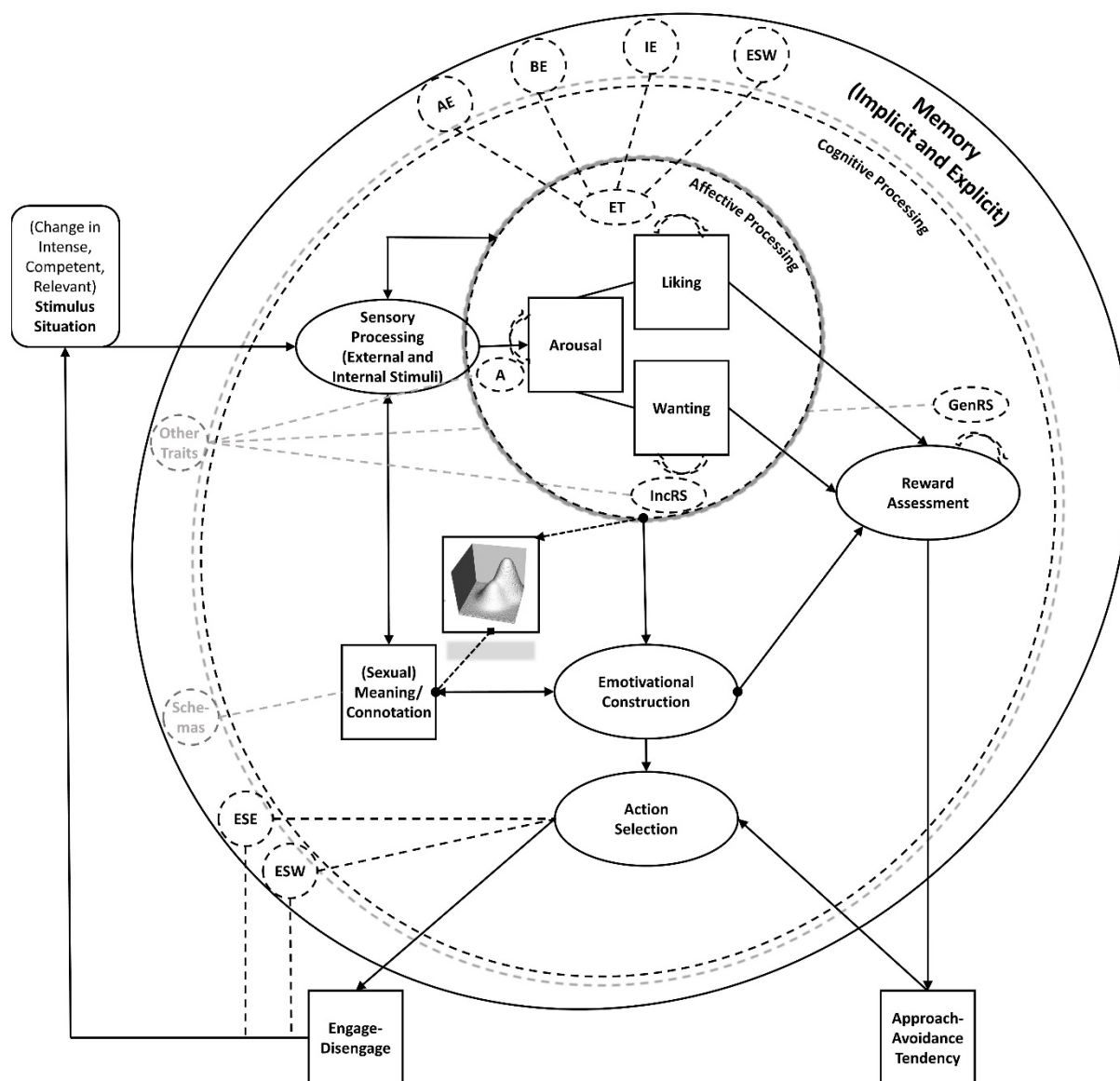
<i>Enjoyment-related Self-Worth</i>	<i>Pleasure-related Validation</i>
Evaluation of one's sexual worthiness and feeling deserving of positive sexual experiences.	Level of perceived worthiness to experience positive sexual experiences
/The tendency to evaluate oneself as sexually worthy and deserving of positive sexual experiences.	and experienced self-validation during sex.

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*Note.* Note that the state-domains include the word pleasure, while the trait-domains include the word enjoyment and that we differentiate between abilities (as more trait-like dispositions for experience) and capabilities (as more trait-like skills to bring about experience). Hereby, we aim to stress the difference between states of experience versus strict traits for bringing about experience.

**Figure 3**

*A (Work in Progress) Diagram of the Sexual Response System*



*Note.* This diagram is based on and inspired by the work of Toates (2009), Bancroft (1999), Everaerd et al. (2001), Janssen et al. (2000), Barrett (2017), DeYoung (2015), and Robinaugh et al. (2019). AE = Arousal Enjoyment; BE = Bonding Enjoyment; IE = Interaction Enjoyment; ESW = Enjoyment-related Self-Worth; ESE = Enjoyment-related Self-Efficacy; ET = Enjoyment Traits; A = Arousability; IncRS = Incentive Reward Sensitivity; GenRS = General Reward Sensitivity. Double arrows indicate that the respective processes feed back



into each other during processing. Strict traits act as parameters of the functioning of the state-processes (how strongly, quickly, frequently these re/act)<sup>4</sup>. The sexual response surface is added to show that the response emerges as the output of affective processing within context through emotivational construction. The diagram is not exhaustive. For instance, future diagrams need to incorporate inhibitory processes.

The underlying question of such readers might be what the primary liking-inducing *sexual* reward is which then induces *sexual* pleasure rather than pleasure associated with enjoying food or scratching an itch (Komisaruk & Rodriguez, 2021). We assume many would answer sensual rewards and sensual pleasure, including orgasm. However, using orgasm-related reward to define sexual pleasure assumes that orgasms and its prequels are inherently positively valenced and inherently sexually relevant (cf. Prause, 2011) – assumptions which can be countered with four phenomena. First, (reflex-)orgasms can be experienced during rape but are perceived as an aversive experience (see for a review Levin & van Berlo, 2004) potentially because general, including genital, arousal and potentially negatively valenced wanting (i.e., urge to fight, flee, freeze) are triggered and perceived, but without an association with liking (absence of positive valence; Sugrue & Whipple, 2001). Second, orgasm (incl. ejaculation) can occur without the experience of pleasure associated with this type of orgasm, also called anhedonic or pleasure dissociative orgasm (e.g., Rosenbaum & Pollack, 1989; Parish et al., 2021). Third, orgasms can be experienced as aversive even in consensual sexual encounters (Chadwick et al., 2019). Fourth, pleasurable orgasms can be experienced outside of sexually relevant situations and in absence of frequently used forms of stimulation (e.g., Kinsey et al., 1998; Wells, 1983; Austin, 2016). That is, orgasms are not necessarily pleasurable, and pleasurable orgasms are not necessarily sexual; liking during an experience constructed as sexual is. It then becomes a conceptual discussion whether sexual

pleasure shall be reserved to liking that is related to (the anticipation of) the sensations of pleasurable orgasm or whether any liking induced by rewards *during* sex can be called sexual pleasure (cf. Boul et al., 2008), as long as the emotivational experience which emerges from such liking is constructed to be sexual (see also, Hoffmann, 2017, for an extensive review on the learning of response and action patterns that many might consider “primary” or “innate”).

Importantly, specifically sensual pleasure has been shown to associate with painless penetrative intercourse (Brauer et al., 2014) potentially due to opioid-related analgesic effects (Paredes, 2014; Gianotten et al., 2021) and enhanced genital arousal (Toates, 2009, p. 170 & 173). Thus, sensual pleasure during sex appears to be a prerequisite for those who want to practice penetrative sexual activity. However, integrating the above reminds us that it is not only about sensual rewards but also other types of rewards that induce liking during sex and that are retrieved through sexual activity, especially if we broaden sexual activity to encompass more than penetration. We argue that *liking* during sex is *liking* during sex, irrespective of which reward induces it, and that pleasure during sex can be induced by a variety of rewards. People (can) choose from a buffet of options, as long as they are allowed, able, and capable to cook with each other or for themselves.

**Sexual Pleasure, Sexual Satisfaction, Sexual Health, and Sexual Wellbeing.** Furthermore, sexual pleasure is often conflated with sexual satisfaction because satisfaction can be defined as reward gratification (i.e., satiety through “drive reduction”) which is understood as pleasurable. However, sexual pleasure differs from sexual satisfaction, because satisfaction seems to reflect someone’s evaluative balance-sheet between expectations and perceived reality rather than their actual experience of rewards (see also, McClelland, 2011). For instance, someone who repeatedly experiences pain during sexual activities might be satisfied once such pain ceases, rather than that such satisfaction reflects that they experience rewards

during sexual activities. Just as the absence of disease does not define health (WHO, 2002), so does the absence of pain or aversion not define pleasure.

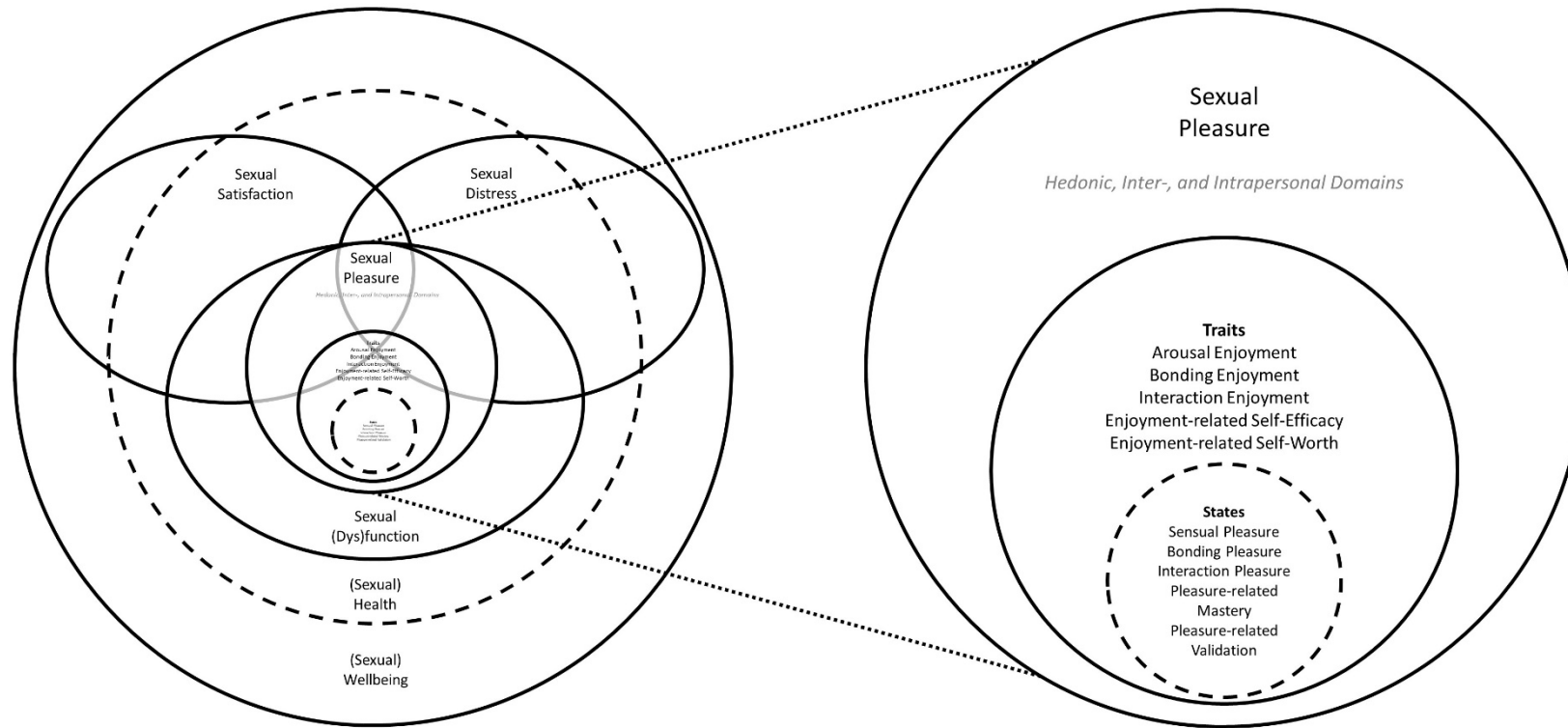
Sexual pleasure should also be distinguished from sexual health and sexual function. Thanks to the WHO and WAS, sexual pleasure has been recognized as part of sexual health, which implies that sexual health encompasses more than sexual pleasure and that the terms should not be used synonymously (Fava & Fortenberry, 2021). Also, research has repeatedly shown that it is foremost a lack of pleasure associated with sexual dysfunction that predicts sexual distress, rather than the loss of sexual function per se (Stephenson & Meston, 2015; Pascoal et al., 2020).

Finally, sexual pleasure also partakes in sexual wellbeing, with wellbeing encompassing more than sexual pleasure (Fortenberry et al., 2019, Fava & Fortenberry, 2021). According to the GAB definition, sexual pleasure is not synonymous with but contributes to an individual's (and their partners') sexual health and wellbeing by means of "key enabling factors": "Self-determination, consent, safety, privacy, confidence and the ability to communicate and negotiate sexual relations" (GAB, 2016). This suggestion implies that an individual can experience pleasure without such pleasure contributing to their own or their partners' health and wellbeing. Such "partner/context/event-specific factors" (Fava & Fortenberry, 2021) are not all included in the pleasure-traits of our taxonomy because they are not all part of an individual's trait repertoire but denote qualities of the sexual situation and interaction (e.g., availability of protection against STIs or unwanted pregnancy and interpersonal safety and privacy), a limitation which we will discuss further in the following section on assessment. We also do not include more distal enabling psychosocial factors for the experience of sexual pleasure, such as a positive body image, which probably facilitate and therefore predict the experience of rewards but should not be equated with it or be included in a pleasure (trait) assessment (see for a review of such predictive factors, Reis et

al., 2021 and Fava & Fortenberry, 2021). For a visual summary of the suggested conceptual distinctions, we refer the reader to the diagram in Figure 4.

**Figure 4**

*A Diagram of Sexual Pleasure and its Conceptual Relatives.*



*Note.* The diagram does not specify causal mechanisms but conceptual overlap. We offer this visual alternative to the verbal conceptual specifications in the text.

### **1.3 Aim 3: Assessing Sexual Pleasure - How Conceptual Definitions and Operational Definitions Interrelate**

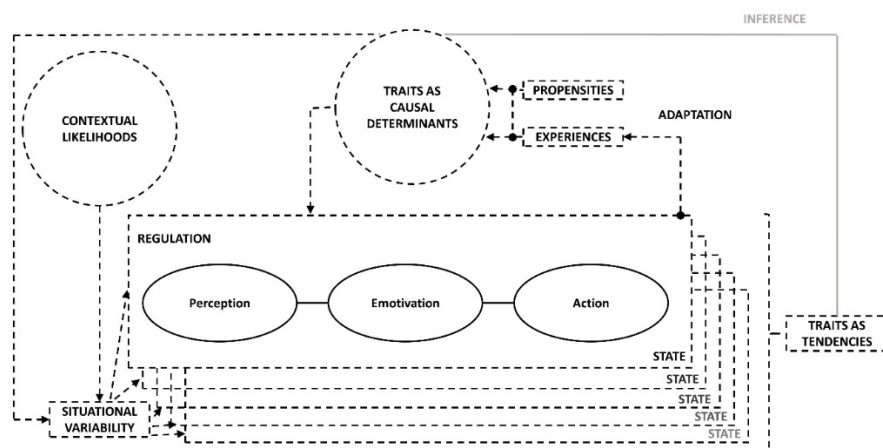
We suggest that an encompassing sexual pleasure assessment battery should assess state sexual pleasure, loose trait sexual pleasure, and strict sexual pleasure traits associated with the different rewards. How we assess sexual pleasure has implications for how the concept can be defined and interpreted (cf. Markus, 2008; Jackson & Maraun, 1996). For instance, assessing differences in sexual pleasure in terms of unifacted or multifaceted pleasure has implications on where and whether to intervene: is someone satisfied by the presence of or distressed by the absence of sensual pleasure or bonding pleasure? Assessing differences in sexual pleasure in terms of state or trait sexual pleasure has implications for how to intervene: do we need to strengthen strict sexual pleasure capacities or the competence of usually experienced stimulus situations in order to help people experience more state and loose trait sexual pleasure?

The question whether self-report trait-assessments assess traits in the loose sense as tendencies for experience or whether they allow us to infer traits in the strict sense as internal causes of experience has long been discussed by personality psychologists (e.g., DeYoung, 2015; Fleeson, 2001; Mischel, 2009). This discussion about operational definitions relates back to the conceptual question whether behavior in the moment (state) or across moments (loose traits) is a result of the person (traits in the strict sense) or situations (qualities of stimuli) (Mischel, 2009; Fleeson & Nettle, 2008). In our conceptual framework, we follow the interactionist perspectives within the person-situation debate (Schmitt & Blum, 2020), namely that differences in (the tendency to experience) state sexual pleasure (traits in the loose sense) are a function of the inter-individual differences in the capacity to experience sexual pleasure (the person; traits in the strict sense) and differences in the contextual likelihood to encounter rewarding sexual situations (the situation; e.g., qualities of stimuli).

When we accept the premise of the person x situation interaction perspective and want to operationally define all sexual pleasure aspects, we encounter the same old conundrum in the operational definition as in the conceptual definition of states and traits: self-report assessment of state and loose trait sexual pleasure only ever assesses a mixture of strict traits *and* the characteristics of situations (see Figure 5). That is, if we ask individuals “how pleasurable their (last) sexual encounter(s) has(have) been” we cannot infer whether differences between individuals in state sexual pleasure at a time or in loose trait sexual pleasure within individuals over time are due to differences in pleasure traits or differences in the quality of the assessed situations due to differences in contextual likelihoods to encounter rewarding situations. We cannot disentangle variability in state pleasure or its capacities from variability in the quality of situations.

**Figure 5**

*A Diagram of the Interrelationship between States and (Strict and Loose) Traits*



*Note.* The diagram is inspired by the work of Fleeson (2001), DeYoung (2015), and Robinaugh et al. (2019). States are represented by each individual box, loose traits are represented as the tendency for experience across several state experiences, and strict traits are represented as causal factors that determine how a state (and thereby loose trait) evolves and regulates. States are further shaped by the situations in which they occur, with situational

variability being affected by contextual likelihoods and the traits of the individual. The traits are a function of nature and nurture, with inborn propensities being shaped by experience through adaptation, which is a function of someone's (state) experiences. Psychometrically, we often infer strict traits from (self-)reports of someone's tendency for experience, i.e., loose traits. Adaptation occurs through different learning mechanisms, among which, as discussed here, conditioning and heterostasis. Regulation can occur through several mechanisms, among which, as discussed here, physiological homeostasis. Other mechanisms for adaptation and regulation exist, such as, for instance, social modeling (e.g., Bandura, 2005) and emotion regulation strategies (e.g., McRae & Gross, 2020) respectively.

On the one hand, strict sexual pleasure traits and state sexual pleasure can only be validly assessed by means of self-report assessments on actual experiences if and only if we can assume that people are interchangeable in the likelihood with which they encounter sexually competent situations or if a presented stimulus situation is equivalent in competence for the people assessed (e.g., Janssen et al., 2003; Wierzbica et al., 2015). Also, strict traits might therefore best be assessed via assessments of (cap)abilities rather than self-report, or self-report of usual experience to standardized situations (see the item structure of the SIS/SES; Janssen et al., 2002). On the other hand, a self-report state or loose trait sexual pleasure assessment would purely assess variability in the quality of the sexual situation if participants show no differences in sexual pleasure capacities. Both are usually not the case (Van Anders et al., 2021; Laan et al., 2021; Bradford & Spencer, 2020; Sakaluk et al., 2014).

In order to disentangle the variability via self-report, we would need a way to assess differences in the likelihood to encounter rewarding situations. So far, it is impossible to assess the objective reward-level of people's sexual experiences because there is no way to assess the competence of stimuli independent from the experience of the stimuli - the reward-value of a stimulus is inside the person, not outside of them, and cannot be independently



verified. We also do not have an assessment instrument, inter-subjective standard, or norm to quantify and standardize the characteristics of the sexually competent *situation* (see for a discussion of the “psychological” situation, Rauthmann & Sherman, 2020). We therefore cannot tear apart situational and strict trait-related variability and assess how their variability relates to variability in state-pleasure or loose trait-pleasure.

Nevertheless, we would still need a self-report assessment of state and loose trait sexual pleasure to assess these pleasure aspects and to relate them to a (future) stimulus database of normed sexually competent situations or an assessment of situations differing in partner/event/context-related aspects (Fava & Fortenberry, 2021). For instance, we could assess how self-report state-pleasure relates to the kind of stimulation given (for instance, absence or presence of clitoral stimulation) by whom (a fling or a steady partner) in what kind of situation (safe or unsafe) and how such variability compares to variability in the self-reported tendency to experience pleasure. Questions which are worthy to be asked, and possible to be researched by a self-report assessment of state and loose trait sexual pleasure.

Finally, we want to note that self-report is, by definition, a reflection of (recollected) introspection at the conscious level. However, affective processes are not always accessible to introspection, never mind recall of experiences during which such processes took place. Nonconscious state “liking” is assessed differently and it is to future research to see how conscious and nonconscious pleasure might differentially predict and explain sexual experience (see, for instance, recording facial reactions, approach-avoidance tasks, measuring viewing time, implicit association tasks, or measuring hedonic hotspot activation; Berridge & Robinson, 2003; Kringelbach & Berridge, 2010; van Lankveld et al., 2018). Creating a self-report assessment of consciously experienced pleasure allows us to compare it to results using other methodologies. We are working on creating such self-report assessment in future contributions.

## 2. Discussion

In this article, we have suggested that the concept of sexual pleasure can be conceptualized as covering state and (loose and strict) trait components which cover the experience of sexual pleasure and the tendency and capacity to experience sexual pleasure, respectively. These concepts can be used to conceptualize differences in sexual pleasure between people at a moment in time and within people over time, in which state and (loose) trait sexual pleasure are a function of the rewards in a stimulus situation and (strict) sexual pleasure traits. We have argued that state sexual pleasure, as the affective experience of anticipatory and consummatory liking (experience of positive affect, “feeling good”; cf. Smuts, 2011) in response to rewards in a concrete situation at a specific moment in time, should be embedded within the sexual response and its function, but should be distinguished from the other components that make up the sexual response. We have suggested that the experience of liking during sex is not only induced by liking associated with arousal and orgasm, but also liking induced by other rewards which can be served by sexual activity, allowing for a multifaceted perspective on sexual pleasure. Our conceptual synthesis resulted in a taxonomy covering the concepts in Table 2 and Figure 4 and 5. We hereby address the need for a multifaceted perspective on sexual pleasure. To the best of our knowledge, it is the first time that sexual pleasure has been broken down in this way, providing a multifaceted taxonomy and framework of the overall concept.

### 2.1 Limitations, Future Outlook, and Implications

#### 2.1.1 *WEIRDness of Theorists and Researchers*

The proposed taxonomy relies on theories and research with a western, educated, industrialized, rich, and democratic (WEIRD) background (Henrich et al., 2010). This WEIRD lens extends to our (post)positivist research assumptions, which allow us to pursue a nomological (rather than idiographic) conceptual and operational definition of sexual

pleasure, a taxonomy of rewards, and framework based on findings from positivist research methodologies (Steinmetz, 2005). Our assumptions, especially those regarding the existence of certain *universal basic* rewards that are retrieved from and experienced during sexual activity, need to be cross-validated, for instance by means of response-process research and cognitive interviews across different cultural settings in order to validate whether the framework and taxonomy do reflect peoples' lived experience (Wolf et al., 2019). Smuts (2021), Khalaf et al. (2018), and Muhanguzi (2015) suggest that sensual pleasure is universally experienced but contextually shaped and curtailed by positioning and legitimizing it within the confines of heterosexual, and often married, coupledness and demoralizing it outside these confines. Assessment and research of the sexually pleasurable situation needs to take such aspects into account. Eventually, we attempted to adhere to the GAB definition which states that "[t]he experiences of human sexual pleasure are diverse" by including an array of rewards experienced during sex, rather than equating sexual pleasure with sensual pleasure and orgasm, and by informing our framework and taxonomy by insights gained from positivist and non-positivist research methodologies.

### ***2.1.2 Aspects in Need of Clarification***

We would like to discuss eight limitations in need of clarification. First, future research needs to ascertain which of the pleasure facets represent useless and potentially misleading reifications. Second, future research needs to clarify how the domains and facets relate to each other and in what constellation they predict sexual satisfaction, health, and wellbeing in what contexts (Gianotten et al., 2021; Metz, & McCarthy, 2007; GAB, 2016; Fava & Fortenberry, 2021; Kleinplatz et al., 2009). Third, the introduced facets describe categorizations intended to provide an overview, and like any categorization, simplify their content. We simplified the microscopic subtleties of the basic affect accounts and behavioral neuroscience<sup>1, 2</sup> to serve the overall goal of a conceptual, molar-level, synthesis (de la Fuente

et al., 2019). Fourth, this limitation includes that a future sexual response framework needs to clarify the interrelationship or overlap between arousal and wanting and incorporate punishment and aversion related processes next to reward. Fifth, we could not yet further clarify the difference in category-non/specificity of genital arousal response between cis women and cis men (see for an excellent review, Chivers, 2017). Sixth, future research needs to assess whether and how the facets vary intra- *and* inter-individually – such variance is not equivalent or interchangeable. Seventh, future work needs to further specify what types of learning, regulation, and adaptation play a role in shaping the sexual (pleasure) response (Berntson & Cacioppo, 2007), a topic we could only shortly touch upon.

Finally, we are presenting a working framework and taxonomy - its content should and needs to be further developed. First, the taxonomy does not yet include “the experience of autonomy” as a reward, nor does it include “enjoyment-related autonomy” as a trait-like pleasure-related capacity or tendency. We suggest that the experience of autonomy seems to be a *contextual predisposition* for pleasure to be experienced and for pleasure to contribute to sexual wellbeing rather than an independent reward (i.e., a “key partner/context/event-specific enabling factors”; GAB, 2016; Fava & Fortenberry, 2021). Second, we did not include “the experience of engagement” as a reward within the taxonomy. We are uncertain whether it should be included as an individual reward or whether this, undeniably pleasurable, state emerges as a potential *consequence* of exhibiting several and/or intense rewards during sex in combination with several enjoyment-traits in an optimal context (i.e., sexual flow, cf. Csikszentmihalyi, 1990; APA, n.d.-f; or sexual peak experience; cf. Privette, 1983; APA, n.d.-e). Third, pleasurable sexual experiences might also have to be experienced as meaningful, as in significant or purposeful, in order to be truly pleasurable (cf. with definitions of the “good life” by e.g., Seligman, 2004 and the definition of optimal or magnificent sex; Kleinplatz et al., 2009; Kleinplatz & Ménard, 2020). We argued that the

taxonomy covers pleasurable and potentially engaging experiences, but not whether sexual experiences are experienced as meaningfully “significant”.

### ***2.1.3 The Development of Sexual Pleasure and its Relation to Sexual Ethics and Sexual Rights***

The taxonomy presented here is inspired by learning paradigms which stress the continuous adaptation of an organism to its environment and, thus, the importance of sexual *development* within a person’s learning history alongside human propensities and constraints. Sexual rights start right there; societies should represent environments in which individuals are allowed to sexually flourish by learning to enjoy and desire sex within contexts that respect and stimulate their rights: their individuality, equality and non-discrimination, psychological and bodily integrity, freedom of opinion and expression, privacy, the highest attainable standard of health, access to education and information and the protection of these rights from infringement by others (Ford et al., 2019; Gruskin et al., 2019). This allows us to envision how we might promote the capacities to experience pleasure and prevent pleasure differentials. We might want to foster sexually self-efficacious and self-loving individuals who are allowed to experience sensually pleasurable, safe and secure, validating and engaging, and reciprocal sexual experiences from the start of their sexual interaction careers, such that they develop expectancies that such experiences are attainable and that they can learn how to attain them. Psychology contributes insights that apply to the individual and how individual differences develop within a particular environment, but this is also where the vision of psychology stops. Psychology needs sociology, anthropology, politics, law, philosophy et al. to decide on how interpersonal relationships and the environment might be (re)structured to let the individual flourish, without infringing on other individuals’ flourishing.

### 3. Conclusion

In this article, we have proposed an adapted framework of the sexual response which includes sexual pleasure as a central component. We suggested that state sexual pleasure figures centrally in sexual responding as the experience of anticipatory and consummatory liking (experience of positive affect, “feeling good”; cf. Smuts, 2011) in a concrete situation at a specific moment in time in response to (the expectation of) sexual activity that offers rewards. We have further argued that trait-like concepts can be applied to the tendency to experience such state sexual pleasure which can be used to research differences between people at a moment in time and within people over time. We thereby offered a multifaceted definition of state and trait sexual pleasure and discussed how we might assess pleasure thus defined. After the taxonomy’s and a future assessment’s domains and facets are validated, it is to future research to determine how the proposed capacities and qualities of sexual situations might be fostered and whether that prevents individuals from experiencing systematic differences in pleasurable sexual experiences (see for overviews of such systematic differences, Van Anders et al., 2021; Laan et al., 2021; Bradford & Spencer, 2020).

Sex and pleasure mean many things to different people (Goldey et al., 2016; Meston & Buss, 2007) and sex can serve pleasure by serving different rewards. We aimed to cover the most relevant in the presented taxonomy and made a valuable conceptual start, worthy of extension. To research and understand sexual pleasure, we need a manner to conceptualize and assess it in all its complexity. By positioning pleasure centrally within the sexual response (system) and offering a first taxonomy and call for a multifaceted assessment of sexual pleasure, we contribute to giving sexual pleasure the center position it deserves in sex research and practice.

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**Supplemental Material**

S1: Definitions of Sexual Pleasure - Reviewed Articles

**Data Availability Statement**

Not applicable.

**Disclosure statement**

The authors report no conflict of interest. Ellen Laan contributed to the conception and writing of the first version of this article and the conception of the first revision. Earlier versions of the article can be found at <https://osf.io/3z6eq/> and are preprinted at <https://doi.org/10.31234/osf.io/9a2nk>. We pursued the revisions of this article in honor of Ellen Laan and everything we had the privilege and pleasure to learn from her.

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### Footnotes

<sup>1</sup> The cited affective neuroscience literature is not settled on whether the anticipation of a reward already induces activation of the, so-called, hedonic hotspots that are directly linked to “liking” proper (Berridge, 2018; 2019). Toates (2014, pp. 182-183) argues that pleasure can be experienced during the anticipation of reward (see also, Bindra, 1978). It remains to be seen whether such anticipatory pleasure is associated with hedonic hotspot activation (“liking” proper) or a positive affect process which should be labeled differently, and whether “liking” proper is only associated with consumption rather than anticipation of reward (Berridge, 2018; Paredes, 2014; Pfaus et al., 2012). We therefore decided to use the labels *anticipatory* and *consummatory* liking, both of which should be experienced as pleasure when reaching conscious experience (see also Rømer Thomsen et al., 2015). Eventually, in the case of sexual stimulation and response, we consider it difficult to draw a line between where consumption begins and anticipation stops (Pfaus 1999). That is, we suggest that affective processes, which are at work during anticipation, flow over into consumption; except if we use the idea of penetration or genital touch defining the line from anticipation to consumption.

<sup>2</sup> For some readers, we might gloss over the question whether there is “sexual” versus “general” arousal and/or whether there are different kinds or components of “arousals” (for instance, central, peripheral, or genital arousal; Bancroft, 1989; or wakeful, autonomic, and affective arousal; Satpute et al., 2019). This question is indeed not settled (cf. Ågmo, 2008; Janssen, 2011; Laan et al., 1995; Pfaff, 1999; Sachs, 2007). Here, we follow Ågmo (2008) and others (e.g., Pfaff, 1999) and suggest that there is general, including genital, arousal triggered by environmental changes reflecting potential threats or opportunities that require the mobilization of energy (Frijda, 2008; see also, Russell & Barrett, 1999). Such arousal can be considered “sexual” if exteroceptive or interoceptive stimuli that are associated or experienced concurrently with it, carry non/conscious sexual meanings/connnotations and



allow the embodied and contextualized experience to be constructed as sexual (Barrett, 2009, 2017; Both et al., 2007). Some readers might consider this a slide of hand and a violation of Occam's razor, and would argue that we displace the issue of defining what makes certain arousal "sexual" compared to, for instance, "anxious" to a different process – that of construction of basic affective processes. For these readers, we discuss the underlying issue of basic versus constructionist views of emotion in the discussion.

<sup>3</sup> This *emergent* state has also been called a "central motive state" (Berridge, 2018; Toates, 2009; 1986) or "presently excited gnostic organization a.k.a. pexgo" (Bindra, 1978). Note also that we are not the first to suggest that the state of experiencing sexual desire is an *emergent* property. Singer and Toates (1987) used the metaphor of a pie emerging from more basic ingredients, and the constructionist perspective on emotions by Barrett (2009) suggests that emotional states metaphorically resemble loafs of bread that emerge from more basic, and interoceptively hardly distinguishable, ingredients.

<sup>4</sup> We realize that conceptualizing a strict "trait-like difference" in arousal, wanting, or liking is still rather imprecise. It might help us to label and envision that individuals differ in certain responses amongst each other and amongst themselves across time in response to the same stimulus (situation), but it should be further specified what such differences denote: the relative latency, speed, rate, or absolute intensity with which one responds in response to the stimulus (cf. Whalen, 1966; Pfaus, 1999)? And is that a characteristic of the circuitries or the relationship between the circuitries? And should such molar-level differences between individuals be reduced to microscopic characteristics of individual circuitries at all? Future work needs to answer these questions.

<sup>5</sup> We are aware of the circularity in explaining certain stimuli or stimulus situations as rewarding because they trigger pleasure/liking and wanting, and explaining pleasure as a

response to rewarding stimuli. However, we suggest that this circularity is not logically problematic as long as we accept the assumption that there are certain stimuli and/or stimulus situations that just are rewarding, i.e., just trigger pleasure/liking and wanting, when they are anticipated, attained, or consumed. Following such a stimulus view of reward does not appear more logically problematic than proposing the existence of an (additional) endogenous “need” mechanism for sexual gratification (“libido”), which causes tension when deprived, and which requires a certain nutrient stimulus in order for the need-tension to be quenched, with quenching the tension equaling pleasure – rather than that the contact with the rewarding stimulus itself is what is pleasurable. The existence of a “need” is not necessary to explain reward, contact with rewarding stimuli and processes mediating reward are (see Hilgard and Marquis, 1961b).

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## Supplemental Material

### Definitions of Sexual Pleasure - Reviewed Articles

Some of the cited articles demarcate sexual pleasure from, for instance, orgasmic experience; however, they do not propose a definition of sexual pleasure following that demarcation. Also, some studies are qualitative studies which, by design, leave definitions to the participants of the study. We did include those qualitative studies in Table 1 in the main text if the study proposed different components of pleasure and respective labels or definitions.

Note that the articles were not retrieved via a systematic search; however, we reviewed studies included in systematic reviews (e.g., Reis et al., 2021), in addition to the articles we had read in preparation for the main article. We therefore assume that the selection includes a representative overview of the available literature on definitions and assessments of sexual pleasure.

**(1) No definition cited nor proposed:** Thirlaway et al. (1996), Slosarz (2000), Ferguson et al. (2003), Pinkerton et al., (2003), Sanchez et al. (2005), Sanchez and Kiefer (2007), Randolph et al., (2007), Higgins et al., (2008), Hull (2008), Boul et al. (2008), Maynard et al., (2009), Vannier and O'Sullivan (2010), Hinchliff et al. (2010), Schick et al. (2010), Weinberg and Williams (2010), Herbenick et al., (2011), Kaestle and Allen (2011), Backstrom et al (2012), Lorvick et al. (2012), Tambling et al., (2012), Kisa and Özdemir (2013), Stulhofer and Ajduvić (2013), Fahs (2014), Bowman (2014), Fahs and Gonzalez (2014), Fennell (2014), Herbenick et al., (2014), Opperman et al., (2014), Smith et al. (2014), Fileborn et al., (2015), Hoel (2015), Mastro and Zimmer-Gembeck (2015), John et al. (2015), Barnett and Melugin (2016), Shepardson et al., (2016), Wood et al., (2016), Thomas et al. (2017), Blunt-Vinti et al. (2018), Brown et al. (2018), Grower and Ward (2018), Herbenick et al., (2018),



Khalaf et al., (2018), Rigo and Saroglou (2018), Siegler et al., (2018), Alarie (2019), Ashton et al. (2019), Benson et al. (2019), Stahl et al., (2019), Carter et al. (2019), Chadwick et al. (2019), Guitelman et al., (2019), Herbenick et al., (2019), Katzman and Tuchman (2019), Marques (2019), Muhanguzi (2015), Thomas and Copulsky (2020), Waskul and Anklan (2020), Weitkamp et al. (2020), Pascoe (2021).

**(2) Philpott et al. (2006)/GAB (2016) definition:** Fiaveh et al. (2015), Pascoal et al., (2016), Saliates et al., (2017), De Santis et al., (2019), Ford et al. (2019), Castellanos-Usigli and Braeken-van Schaik (2019), and Gruskin et al., (2019), Boydell et al. (2021).

**(3) Abramson and Pinkerton (2002) definition:** Rye and Meaney (2007), Hargons et al. (2018), Bowling et al. (2018).

**(4) Pleasure as “physical sensation(s)”:** Zurbriggen and Yost (2004), Rowland et al., (2019).

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## **2.2 Article 2: A Psychometric Study of a Trait and State Assessment of Sexual Pleasure— The Amsterdam Sexual Pleasure Inventory (ASPI 1.0).**

This is a preprint of the manuscript that has been submitted for publication consideration at the *Journal of Sex Research*. It is currently undergoing review for the first time.

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**A Psychometric Study of  
a Trait and State Assessment of Sexual Pleasure –  
The Amsterdam Sexual Pleasure Inventory (ASPI 1.0).**

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### Abstract

We studied the Amsterdam Sexual Pleasure Inventory's (ASPI, Vol. 1.0) psychometric properties to present evidence regarding its intended interpretation and use. The ASPI is a theory-based and revised self-report battery which aims to assess different domains of state and trait sexual pleasure in survey-research in gender-diverse, sex-diverse, and relationship-diverse populations. We collected quantitative ( $n = 1371$ ) and qualitative data ( $n = 637$ ) using a cross-sectional multi-method design targeting the general (German-speaking) population. The theory-based 5-factor ESEM showed good and the PCA of the two general exploratory index-scales showed acceptable structural validity evidence. Measurement invariance of the 5-factor models was given for male and female (assigned-at-birth) participants and for sexually functional-scoring and dysfunctional-scoring people. Coefficient omega indicated that all scales, except those of one facet, showed acceptable to very good internal consistency reliability. The ASPI's convergent and discriminant associations with sexological and psychological constructs demonstrated good overall construct validity evidence and the scales showed differential utility in differentiating known-groups. Participants understood the items as intended and felt that the ASPI covers relevant facets of sexual pleasure. The ASPI might help understand how individuals differ in experiencing sexual pleasure and how different contexts enable some people to experience pleasure while disadvantaging others.

*Keywords:* sexual pleasure, sexual health, self-report measures, psychometrics, questionnaire development

## 1. Introduction

Sexual pleasure is a core component of sexual health and has gained increasing clinical and research attention in the last years (World Association for Sexual Health [WAS], 2019; World Health Organization [WHO], 2002) Sexual pleasure has been defined as “the physical and/or psychological satisfaction and enjoyment derived from solitary or shared erotic experiences, including thoughts, dreams and autoeroticism. [...]. The experiences of human sexual pleasure are diverse [...].” (Global Advisory Board for Sexual Health and Wellbeing, 2016; WAS, 2019). Since there is a growing body of sex research that focuses on sexual pleasure, it is of utmost importance to have valid instruments to assess sexual pleasure.

### 1.1 Definitions of Sexual Pleasure

Several definitions of sexual pleasure have been proposed (see for a review Werner et al., 2023). So far, none of these definitions has succeeded in defining sexual pleasure precisely enough to clearly distinguish it from other concepts such as sexual satisfaction, and comprehensively enough to encompass the diversity of sexual pleasure mentioned above. Recently, Werner et al. (2023) suggested that sexual pleasure can be defined as *the positive feeling induced by the anticipation, attainment, and consumption of rewards during sexual activities*. They proposed that (1) the tendency to experience sexual pleasure depends on (2) an individual's capacities to attain and experience rewards during sexual activities and (3) the availability of sexual activity that offers rewards. Thus, sexual pleasure defined in this manner includes (1) the positive feeling due to rewards (also called *state* components) and (2) the capacities to attain and experience rewards resulting in (3) the tendency to experience rewarding sexual activity (also called *trait* components). Since rewards retrieved from sexual activity can be diverse, Werner et al. (2023) proposed a taxonomy of rewarding aspects of sexual activity based on a review of the theoretical and empirical literature. The proposed taxonomy can be divided into the hedonic, interpersonal, and intrapersonal domains presented

in Table 1. In summary, the taxonomy of sexual pleasure by Werner et al. (2023) holistically defined sexual pleasure and provided a framework to conceptualize and assess this concept.

**Table 1.***Domains and Facets of Trait and State Sexual Pleasure and Existing Self-Report Measures*

Domain	Trait <sup>b</sup> Facets	Existing Measures	State Facets	Existing Measures
Hedonic Domain	<b>Arousal Enjoyment</b> The tendency to enjoy sensual stimulation and its psychophysiological consequences.	No existing measures	<b>Sensual Pleasure</b> Level of experienced pleasure through sexual stimulation and its psychophysiological consequences.	EMSEXpleasure <sup>e</sup> , B.E.S.T Scale <sup>f</sup> , two unnamed Pleasure Scales <sup>g,h</sup>
Interpersonal Domain	<b>Bonding Enjoyment</b> The tendency to experience and enjoy the bonding-related rewards of sexual interactions.	No existing measures	<b>Bonding Pleasure</b> Level of experienced (pleasure through) feelings of closeness, affection, safety, and security during sexual interactions.	B.E.S.T Scale, SPS <sup>i</sup>
	<b>Interaction Enjoyment</b> The tendency to enjoy pleasuring and being pleased by a sexual	No existing measures	<b>Interaction Pleasure</b> Level of pleasure experienced during sharing pleasure and from interaction with a sexual partner.	B.E.S.T Scale, SPS



partner (i.e., enjoying the sharing of pleasure).

Intrapersonal Domain	<b>Enjoyment-related Self-Efficacy</b> The tendency to be confident and competent about engaging in pleasurable sexual activities.	FSSI <sup>c</sup> ,	<b>Pleasure-related Mastery</b> Level of experienced mastery in creating pleasurable sexual activities.	No existing measures
	<b>Enjoyment-related Self-Worth</b> The tendency to evaluate oneself as sexually worthy and deserving of positive sexual experiences.	FSSI	<b>Pleasure-related Validation</b> Level of perceived worthiness to experience positive sexual experiences and experienced self-validation during sex.	No existing measures
General Domain <sup>a</sup>	<b>Sexual Experience Enjoyment</b> The tendency to enjoy various sexual activities.	Pleasuremeter <sup>d</sup>	<b>General Sexual Pleasure</b> Level of recently experienced pleasure related to different sexual activities.	EMSEXpleasure <sup>e</sup> , SPS <sup>i</sup>

*Note.* <sup>a</sup> not part of the sexual pleasure framework of Werner et al. (2023). <sup>b</sup> Note that Werner et al. (2023) further differentiate traits into loose traits (tendency) and strict traits (capacity); here, we focus on traits as tendencies since we expect self-report measures like the ASPI to assess tendencies to experience pleasure more than capacities to experience pleasure (see Werner et al., 2023, for more detail). <sup>c</sup> Female Sexual

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Subjectivity Inventory by Horne and Zimmer-Gembeck (2006). <sup>d</sup> The Pleasuremeter by Castellanos-Usigli and Braeken-van Schaik (2019). <sup>e</sup> Male Sexual Pleasure Scale by Siegler et al. (2018). <sup>f</sup> Body, Emotions, Sensations, Touch/Trust (B.E.S.T.) Scale by Beckmeyer et al. (2021). <sup>g, h</sup> unnamed scales by Jozkowski et al. (2016) and Vigil et al. (2021). <sup>i</sup> Sexual Pleasure Scale by Pascoal et al. (2016).

## 1.2 Existing Measurement Instruments of Sexual Pleasure

All currently existing measurement instruments have proven useful and informative and represent major steps in positive sexology (Rosen & Bachmann, 2008). However, since we lacked a shared holistic conceptual understanding of sexual pleasure, this lack is reflected in available measurement instruments. To our knowledge, there are six self-report measurements and one clinical interview that directly address sexual pleasure: the Female Sexual Subjectivity Inventory (FSSI) by Horne and Zimmer-Gembeck (2006), the Sexual Pleasure Scale (SPS) by Pascoal et al. (2016), the Male Sexual Pleasure Scale (EMSEXpleasure) by Siegler et al. (2018), the Body, Emotions, Sensations, Touch/Trust (B.E.S.T.) Scale by Beckmeyer et al. (2021), two unnamed scales by Jozkowski et al. (2016) and Vigil et al. (2021), and the Pleasuremeter by Castellanos-Usigli and Braeken-van Schaik (2019). In Table 1, we present which facets suggested by the taxonomy of sexual pleasure seem to be captured in currently available instruments.

In Table 2, we summarize the characteristics of the instruments. First, many of the instruments did not define what kind of pleasure concept is assessed. Second, sexual pleasure is often treated and measured as a unidimensional rather than multidimensional (i.e., diverse) construct. Third, measuring sexual pleasure associated with or derived from sensory experiences does not consider pleasure from other sources, such as intimacy and affection. Fourth, sexual pleasure is measured as a trait, but not as a momentary state - or vice versa. The latter point is also infrequently explicated in the proposed interpretations and uses of the instrument and therefore needs to be inferred from the instructions, items, and response scale. Fifth, many scales focus on partnered sexuality only which precludes insight into pleasure retrieved from solosex or other types of sexual experience. We conclude that there is no instrument yet that covers all facets of sexual pleasure and assesses the construct in a holistic and inclusive manner. Thereby, existing measurement of sexual pleasure might provide a

limited perspective on sexual pleasure which could result in suboptimal assessment and insights in research.

**Table 2.***Measurement Instruments of Sexual Pleasure*

Instrument	Authors	Content	Definition of Pleasure	Example	Characteristics
Female Sexual Subjectivity Inventory (FSSI)	Horne & Zimmer- Gembeck (2006)	Five components of female sexual subjectivity which contribute to sexual pleasure/wellbeing, rated on a 5-point endorsement scale: sexual body esteem, self-efficacy in achieving pleasure and desire, entitlement to pleasure from self, and from a partner, and sexual self-reflection.	“Sexual pleasure is defined as a sense of well-being derived from the experience of being sexual and, as such, is an essential component of sexual subjectivity” (p. 126).	It's okay for me to meet my own sexual needs through self-masturbation: Not at all true for me (1) to Very true for me (5)	1. Trait 2. Multidimensional 3. Evidence for validity in cis-women 4. Solo and partnersex

Sexual Pleasure Scale (SPS)	Pascoal et al. (2016)	Three items with a 7-point intensity scale capturing the extent to which sexual intercourse, sexual activity in general, and sexual intimacy within one's relationship are perceived as sexually pleasurable in the last four weeks.	No definition provided since the scale "allows individuals to subjectively define pleasure for themselves" (p. 1408).	I find sexual intercourse: Not pleasurable (1) to Very pleasurable (7)	<ol style="list-style-type: none"> <li>1. State (last four weeks)</li> <li>2. Unidimensional</li> <li>3. Evidence for validity in heterosexual partnered individuals</li> <li>4. Partnersex and intercourse</li> </ol>
No name specified	Jozkowski et al. (2016)	Six items leading to a relative frequency score capturing the consistency with which sexual activity was experienced in a certain way and how consistently certain sensations were experienced in the last four weeks.	No definition provided.	Of the time(s) that you had sexual activity with your partner in the past 4 weeks, how many times: was the sexual activity mainly pleasurable and enjoyable?: Number of times: _____	<ol style="list-style-type: none"> <li>1. State (last four weeks)</li> <li>2. Unidimensional</li> <li>3. Evidence for validity in bisexual and homosexual women</li> <li>4. Partnersex</li> </ol>

Male Sexual Pleasure Scale (EMSEX pleasure)	Siegler et al. (2018)	Twelve items measuring event- level sexual pleasure regarding the use of condoms for men (rating scale and response options are not reported).	No own definition provided. Refer to the following definition in the paper: Sexual pleasure has been described as “the authentic, abiding satisfaction that makes us feel complete as human beings” (p. 1745).	This sex was very pleasurable.	<ol style="list-style-type: none"> <li>1. State (not specified)</li> <li>2. Unidimensional</li> <li>3. Evidence for validity in cis-men</li> <li>4. Partnersex</li> </ol>
Body, Emotions, Sensations, Touch/Trust (B.E.S.T.)	Beckmeyer et al. (2021)	Ten items with a 5-point intensity scale measuring how pleasurable aspects of intimacy with partner, emotions, sexual behavior performed and received, and physical sensations were in the last sexual experiences.	No own definition provided. Refer among others to GAB’s working definition of sexual pleasure (p. 1).	The physical sensations you felt: Not at all pleasurable (1) to Extremely pleasurable (5)	<ol style="list-style-type: none"> <li>1. State (not specified)</li> <li>2. Unidimensional</li> <li>3. Evidence for validity in college students (men and women)</li> <li>4. Partnersex</li> </ol>

No name specified	Vigil et al. (2021)	Six non-validated items rated on a 6-point endorsement scale.	“[...] we operationalized sexual pleasure as conscious, positive evaluations of physical sensations during sex, either localized in the genitals or throughout the body” (p. 3).	I felt intense pleasure in my genitals: Not at all true (1) to Completely true (6)	<ol style="list-style-type: none"> <li>1. State (not specified)</li> <li>2. Unidimensional</li> <li>3. Evidence for validity in women who had sex with someone in the previous four weeks and report that their genitals were stimulated by their partner (i.e., penetrative sex, oral sex, etc.).</li> <li>4. Partnersex</li> </ol>
The Pleasuremeter	Castellanos-Usigli & Braeken-van Schaik (2019)	A clinical interview including rating scales to evaluate seven pleasure factors in the last 12 months on a 10-point intensity scale: Physical and psychological satisfaction/enjoyment, Self-determination, Consent, Safety, Privacy,	No own definition provided. Refer to GAB’s working definition of sexual pleasure (p. 314).	From 1 to 10, how much did you enjoy/how satisfied were you with your sexual experiences in the last 12 months?	<ol style="list-style-type: none"> <li>1. Trait and state</li> <li>2. Not applicable</li> <li>3. No evidence for validity</li> <li>4. Partnersex</li> </ol>



Confidence,  
Communication/negotiation

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*Note.* The table only includes those instruments that directly address sexual pleasure with more than one item and not as part of another scale, e.g., a desire or satisfaction scale. For instance, we excluded the Quality of Sexual Experience Scale (QSE) by Sanders et al. (2013). Single item pleasure scales are usually bipolar or unipolar rating scales (“unpleasurable/ unpleasant” to “pleasurable/pleasant”) in combination with intensity markers (“not at all” to “very”) or frequency markers (“never pleasurable” to “always pleasurable”) which either ask about sex in general or different kinds of sexual activities, and with respect to different time periods or events. We also excluded questionnaires which assess motives to have sex as these do not assess the experience of or tendency to experience pleasure but reasons to have sex.

### 1.3 Aim of the Study

In this study, we present the Amsterdam Sexual Pleasure Inventory (ASPI, Vol. 1.0) which goes beyond existing measurement tools by covering diverse facets of sexual pleasure and assessing sexual pleasure as a state and trait following the taxonomy proposed by Werner et al. (2023). We intend the ASPI's state scales to be interpreted and used such that higher scores indicate more experienced pleasure (in the last two weeks) and the ASPI's trait scales to be interpreted and used such that higher scores indicate a greater tendency to experience sexual pleasure in survey research in gender, sex, and relationship diverse populations. The latter is possible since the ASPI is constructed in an inclusive manner and allows for use in populations of diverse sex, gender, and (sexual) relationship types.

The aim of this study was to analyze the psychometric properties of the Amsterdam Sexual Pleasure Inventory (Vol. 1.0) to collect evidence regarding its intended interpretation and use following the “modern validity theory” framework (American Educational Research Association (AERA), 2014; Santos-Iglesias, 2022). Therefore, our study assesses (1) whether the ASPI can be scaled according to the structure in Table 1; (2) whether this structure holds in different groups and whether resulting scores are comparable between groups (male and female and sexual dys/function); (3) whether the resulting scores can be interpreted to assess state and trait sexual pleasure rather than other constructs, (4) which are not influenced by irrelevant background differences but are sensitive to relevant individual differences; and (5) whether the ASPI-scales encompass the relevant diverse facets of sexual pleasure and include items that are understandable to intended participants. For this purpose, we examine the factor structure, its invariance and the scores' reliability (regarding 1 and 2), as well as construct and content validity evidence (3 and 4) and present qualitative data on item comprehension and content coverage (5).

## 2. Materials and Methods

### 2.1 Development of the Amsterdam Sexual Pleasure Inventory (ASPI, Vol. 1.0)

**Step 1: Focus Group.** The original version of the ASPI (called Amsterdam Sexual Pleasure Index 0.1) was created in 2013 by sexologists and reviewed and revised by a panel of psychologists, sociologists, anthropologists, and medical doctors, all of whom were engaged in sex research. The ASPI 0.1 took the multifaceted nature of sexual pleasure into account but lacked a conceptual background. Furthermore, the phrasing of the questionnaire and items was based on a trait conception of pleasure only.

**Step 2: Validation of first ASPI 0.1 (only Trait).** The ASPI 0.1 was examined in a psychometric validation study. Results suggested that the ASPI 0.1 and its five preliminary scales showed acceptable model fit, acceptable to excellent internal consistency and test-retest reliability, and acceptable construct validity evidence. However, the authors recommended further revision of the ASPI-scales. The study information and this first version of the questionnaire are available on the OSF (Werner et al., 2023, January 25).

**Step 3: Item Generation for ASPI 1.0.** Meanwhile, Werner et al. proposed a conceptual framework of sexual pleasure (2023). The framework describes sexual pleasure in its multifaceted nature and distinguishes between the experience of sexual pleasure and the tendency and capacity to experience sexual pleasure (i.e., sexual pleasure as a state and trait). Based on this framework, new items were added to the ASPI 0.1 and items were rephrased to better cover the state and trait structure described in the framework. The ASPI 1.0 includes two separate but combinable questionnaire forms which assess state and trait sexual pleasure respectively. In the state part, the introduction and items ask about the intensity of pleasurable experiences during the last two weeks, while in the trait part, the introduction and items ask whether the respondent usually has the tendency to experience sexual experiences as pleasurable.

**Step 4: Forth and Back Translation in three languages (GE, EN, DU).** The ASPI 1.0 and its successors should be usable in cross-cultural research, which is why item generators aimed the ASPI 1.0 to be translatable into other languages. During item generation, they therefore assured that the phrasing could be forth-and-back translated into different languages and started with the languages they speak fluently (German, English, Dutch). Final forth-and-back translation was done in collaboration with native speakers of all three languages.

**Step 5: Think Aloud Groups for ASPI 1.0.** Item generators formed German-speaking Think Aloud groups with people who had no background in psychology to discuss the meaning and understanding of the items (Phillips, 2014).

**Step 6: ASPI 1.0 Pilot Study.** In 2020, we piloted the ASPI 1.0 by collecting qualitative data on item comprehension. Participants noted that items were clearly formulated and understandable. However, participants mentioned that items were redundant and repetitive.

**Step 7: The to-be-validated version of the ASPI 1.0.** Based on the qualitative data of the pilot study, 32 items were deleted for the to-be-validated version of the ASPI 1.0 to avoid redundancy. This resulted in a total of 44 state items (10 deleted) and 36 trait items (22 deleted). We intended to delete further items to make the final questionnaires better tailored to survey research.

Based on the sexual pleasure framework and taxonomy, items combine into five scales representing the different facets for state and trait pleasure respectively (Werner et al., 2023).

*State Scales:* Sensual Pleasure (9 items), Bonding Pleasure (6 items), Interaction Pleasure (6 items), Pleasure-related (PR) Mastery (8 items), Pleasure-related (PR) Validation (7 items);

*Trait Scales:* Arousal Enjoyment (5 items), Bonding Enjoyment (6 items), Interaction Enjoyment (6 items), Enjoyment-related (ER) Self-Efficacy (7 items), Enjoyment-related (ER) Self-Worth (6 items). In addition, there are two general scales that are not part of the

sexual pleasure framework: General Sexual Pleasure (state; 8 items) and Sexual Experience Enjoyment (trait; 6 items). The general scales include items that ask about (usually experienced) pleasure associated with different types of sexual activities (flirting, erotica, fantasy, masturbation, partnersex, general sexual experiences/one's sex life) rather than pleasure associated with the experience of one specific rewarding aspect of sexual activity. Since these items refer to different, partly unrelated, activities we consider the overall pleasure associated with these activities as a composite (formative) rather than latent (reflective) variable (Fried, 2020) because the respective constructs are a function of the evaluation of each activity rather than common latent causes.

## 2.2 Participants

**Sample 1.** Between May 2021 and January 2022,  $N = 2579$  people were interested in participating in a larger study concerning sexual experience. After excluding people under the age of 18 and people who had not accepted the declaration of consent,  $n = 2518$  (56.7 % female assigned-at-birth;  $M_{age} = 39.7$ ;  $SD_{age} = 13.6$ ; age range: 18 to 86 years) German-speaking participants took part in the study. We excluded those participants who failed attentive responding checks and/or time checks to ensure the quality of data ( $n = 1147$ ; of which  $n = 704$  did not start the main questionnaire and therefore did not fulfill the attentive responding check). The usable sample consisted of  $n = 1371$  participants.

**Sample 2.** Sample 2 is a subsample of sample 1, with participants who were interested in taking part in a follow-up qualitative study which inquired further into item comprehension. The follow-up study was completed by 637 participants.

## 2.3 Procedure

This study follows a cross-sectional multi-method design in which we collected quantitative and qualitative data. We collected survey data using the online questionnaire

program Qualtrics (Qualtrics, Provo, UT). Participants were first asked demographic background questions, followed by the ASPI 1.0 and other questionnaires. All questionnaires following the ASPI 1.0 were shown in random order to reduce order effects. In the ASPI, the trait and state parts as well as the items within the two parts were presented randomly. At the end of the survey, we asked participants to provide their e-mail address if they were interested in participating in the follow-up qualitative study, which took place two weeks later. The e-mail address was saved separately from the data to ensure anonymity of responses and was only used for inviting participants to the qualitative survey. The qualitative survey consisted of meta-questions about the items according to the response process evaluation method (Wolf et al., 2019). Participants were offered to attend a lottery (5 times 100 francs). The study was approved by the ethics committee of University of Bern. The analysis of this study was preregistered on the OSF (<https://osf.io/wnrxa/>).

## **2.4 Measures**

### ***2.4.1 Demographics***

We asked about age, sex assigned-at-birth, gender and gender identity, sexual orientation, relationship status and duration, marital status, number of children, year of birth, educational attainment, as well as the frequency of masturbating and having partnered sex.

### ***2.4.2 The Amsterdam Sexual Pleasure Inventory 1.0 (Original Item Version)***

*The Amsterdam Sexual Pleasure Inventory* (ASPI 1.0) is a self-report questionnaire with a trait and state section, each with 6 scales. Scales are scored and can and should be used independently from each other. The differentiation of the state and trait sections and items is created as follows: state items ask about the intensity of pleasure associated with different rewards during sexual activities of the last two weeks, are rated on a 6-point Likert-scale from not at all (1) to a great extent (6), and the introduction of the state section emphasizes that

respondents should answer items thinking about their sexual experiences in the last two weeks; trait items ask about in how far respondents consider themselves to tend to experience pleasurable sexual activity by asking about the tendency to experience rewarding sexual activity, rated on a 6-point Likert-scale from strongly disagree (1) to strongly agree (6), with the introduction of the trait section emphasizing that respondents should answer items thinking about how they generally experience sexual activities. If participants indicated that they did not engage in partnersex or masturbation in the last two weeks, state items about partnersex and/or masturbation were not presented and coded as NA. In addition, for some state items, there is a NA response category if an event or experience did not occur. Trait and state scores are calculated per scale (6 each), with higher values representing a stronger tendency for sexual pleasure (trait) and a higher level of recently experienced sexual pleasure (state), respectively. In total, the to-be-validated questionnaire contains 80 original test items (36 trait and 44 state items).

### ***2.4.3 Sexual Excitation and Inhibition***

*The Sexual Inhibition and Sexual Excitation Scales-Short Form (SIS/SES-SF)* by Carpenter et al. (2011) (for German Version see Rettenberger et al., 2019; Velten et al., 2018) distinguishes between three facets: (1) Sexual Excitation (SES), (2) Sexual Inhibition - threat due to failure in a sexual situation (SIS1), and (3) Sexual Inhibition - threat of the consequences of a sexual situation (SIS2) and consists of 14 items rated on 4-point Likert scales, with higher scores indicating a higher propensity for sexual excitation or inhibition. Reliability of SES in the current study is high with Cronbach's  $\alpha=.79$ , and rather poor for SIS with  $\alpha=.59$  for SIS1, and  $\alpha=.63$  for SIS2.

#### **2.4.4 Sexual Assertiveness**

Sexual assertiveness was assessed using the corresponding subscale of the *Multidimensional Sexuality Questionnaire* (MFS; Brenk-Franz & Strauß, 2011; Snell, 1998); items are rated on a 5-point Likert scale and higher scores indicate stronger sexual assertiveness. Reliability of this measure was acceptable in the current study,  $\alpha=.78$ .

#### **2.4.5 Sexual Function**

The German version of the *Female Sexual Function Index* (FSFI-d; Berner et al., 2004; Rosen et al., 2000) includes 19 items rated on a 5- or 6-point Likert scale, with higher scores indicating better sexual function. The cut-off value of 26.55 defined by Wiegel et al. (2005) was used to distinguish between functional and dysfunctional scoring individuals.

The *Male Sexual Function Index* (MSFI) by Kalmbach et al. (2015) consists of 16 items scored on 5- or 6-point Likert scales, with higher scores indicating better sexual function. The cut-off value of 22.35 defined by Kalmbach et al. (2015) was used to distinguish between functional and dysfunctional scoring individuals. For the correlation analyses, we excluded the satisfaction subscales from the calculation of the overall score for sexual function to avoid inflating the relationship of sexual function with the satisfaction scales (FSFI: 16 items instead of 19; MSFI: 13 items instead of 16).

The *Premature Ejaculation Profile* (PEP; Patrick et al., 2009) consists of 4 items rated on a 6-point Likert scale, with higher scores indicating more experienced control of ejaculation and a cut-off value of 10 or lower indicates sexual dysfunction (Jern et al., 2013). To cover and operationalize all aspects of sexual dysfunction in men, we combined the MSFI and PEP for our analysis.

The *Human Sexual Response Questionnaire* (HSRQ) assesses sexual function in participants who chose to be presented with a gender-neutral and sex-neutral version of a



sexual function assessment. The HSRQ was developed for this study and includes 30 items rated on 5- or 6-point scales.

For the correlational analyses, the sexual function questionnaires are merged into one scale. The reliability for all function scales was high with  $\alpha=.94$  for FSFI,  $\alpha=.93$  for MSFI,  $\alpha=.90$  for PEP, and  $\alpha=.98$  for HSQR.

#### **2.4.6 Sexual Distress**

*The Sexual Distress Scale Short Form* (SDS-SF) by Santos-Iglesias et al. (2020) contains 5 items rated on a 5-point Likert scale, with higher scores indicating more sexual distress (Derogatis et al., 2002; Santos-Iglesias et al., 2018). Reliability of this measure was also high in the current study,  $\alpha=.88$ .

#### **2.4.7 Sexual Satisfaction**

Three self-formulated items on a 6-point Likert scale captured participants' sexual satisfaction, with a higher score indicating higher sexual satisfaction (e.g., “Overall, how satisfied are you with your sexuality in general at the moment?”). Reliability of this measure was acceptable in this study,  $\alpha=.73$

#### **2.4.8 Unidimensional State Sexual Pleasure**

*The Sexual Pleasure Scale* (SPS; Pascoal et al., 2016) measures recently experienced levels of sexual pleasure in a unidimensional way and includes 3 items rated on an 7-point scale, with higher scores representing higher levels of recently experienced sexual pleasure and reaching a high reliability in the current study,  $\alpha=.88$

#### **2.4.9 Self-Esteem**

*The Rosenberg Self Esteem Scale* (Rosenberg, 1965; Von Collani & Herzberg, 2003) includes 10 items with a 4-point Likert scale, with higher scores representing higher self-esteem and a high reliability in this study  $\alpha=.90$

#### **2.4.10 Behavioral Inhibition and Behavioral Activation**

*The Behavioral Activation and Inhibition Scale* (BAS/BIS; Carver & White, 1994; Strobel et al., 2001) assesses the behavioral approach system (BAS) and the behavioral inhibition system (BIS) with three BAS scales (BAS Fun Seeking,  $\alpha=.62$ ; BAS Drive,  $\alpha=.74$ , and BAS Reward,  $\alpha=.58$  in current study) and one BIS scale ( $\alpha=.84$  in current study). Items are rated on 4-point Likert scales and higher scores represent a stronger tendency toward behavioral activation or inhibition.

#### **2.4.11 Attachment Style**

*The Experiences in Close Relationships - Revised* (ECR-RD; Ehrental et al., 2009; Fairchild & Finney, 2006) comprises 12 items and includes an attachment anxiety scale ( $\alpha=.68$  in current study) and an attachment avoidance scale ( $\alpha=.73$  in current study) rated on a 7-point Likert scale. Higher scores represent more attachment anxiety or attachment avoidance.

#### **2.4.12 Positive and Negative Affect**

*The Positive and Negative Affect Schedule* (PANAS; Breyer & Bluemke, 2016; Watson et al., 1988) measures positive (PA,  $\alpha=.89$  in current study) and negative affect (NA,  $\alpha=.86$  in current study) using 20 items on a 5-point Likert scale, with higher scores indicating higher positive or negative affect in the last two weeks.

#### **2.4.13 Social Desirability**

The *SEA Short Form* (Satow, 2012) measures socially desirable response tendencies using two items having 4 response options, with higher scores representing a stronger tendency toward socially desirable responses. Reliability of this measure was acceptable in the current study,  $\alpha=.64$ .

#### **2.4.14 Attentive Responding Checks**

We included 6 different types of items assessing inattentive responding throughout the survey (inspired by Berinsky et al., 2014; Huang et al., 2015; Meade & Craig, 2012).

### **2.5 Power Analysis**

To specify a minimum sample size which obtains sufficient power to estimate the factor models precisely, we followed the proposed test of not-close fit by MacCallum et al. (1996). The power analysis suggested a sample of  $n = 353$  per measurement invariance group for the trait-scale and  $n = 262$  per measurement invariance group for the state-scale, with an expected power of  $>.99$ . In order to perform the analyses for state and trait with the same sample, the higher  $n$  of the trait power calculation was used for the states as well, so that all main factor analyses were conducted with a minimum sample size of  $n = 706$  ( $n = 353$  per measurement invariance group). Measurement invariance groups were female/male and sexually functional/dysfunctional scoring individuals.

### **2.6 Data Management**

Participants were not excluded from analyses based on background characteristics, nor were outliers. Only for measurement invariance and known-group analysis regarding sexual dys/function, we had to exclude those who indicated to have been sexually inactive on the sexual function questionnaires ( $n = 13$ ) and those participants who opted for the gender-

neutral sexual function questionnaire ( $n = 4$ ) since we cannot calculate a validated cut-off for sexual function for these participants yet. Furthermore, and as written in the preregistration, we excluded individuals with the most missing values until we reached our minimum necessary power.

Note that missing values on the ASPI can occur due to three reasons: 1) the item was presented but not completed (missing), 2) the item was not presented because it related to masturbation or partnersex and participants indicated that they did not engage in one and/or the other in the last two weeks (not applicable missing), 3) the item was presented but participants did not have the experience the item asked about in the last two weeks and therefore selected the respective “not applicable” response option (not applicable missing).

This data management procedure was chosen to strike a balance between analyzing the psychometric properties of the ASPI in a dataset that was as complete as possible while not losing power by excluding everyone with a single missing value. Remaining missing values and “not applicable” responses of those participants who were still included in the final dataset were both treated as missing. Note that the remaining participants ( $n = 706$ ) were not different from the excluded participants ( $n = 665$ ) in terms of age, educational background, and sexual orientation; however, the final sample differed from the excluded sample in terms of sex and relationship status (more male and partnered participants in the final than the excluded sample) which resulted from stratifying on sex for the measurement invariance analysis and the fact that partnered individuals were less likely to choose “not applicable” responses.

## 2.7 Statistical Analysis

Analysis was performed using IBM SPSS Statistics (SPSS) 27.0. and R-Studio (Package ggthemes, Arnold et al., 2021; Package GPArotation, Bernaards & Jennrich, 2005; Package data.table, Dowle et al., 2021; package qgraph und bootnet, Epskamp et al., 2018;

Epskamp et al., 2012; Package semPlotEpskamp et al., 2022; Package Hmisc, Harrell & Dupont, 2022; Package Amelia, Honaker et al., 2011; Package networktools, Jones, 2022; Package semTools, Jorgensen et al., 2021; Package MVN, Korkmaz et al., 2014; psych package, Revelle & Revelle, 2015; lavaan package, Rosseel et al., 2017; Package corpor, Schafer et al., 2021; RStudio Team, 2020; R Core Team, 2017; Package corrplot, Wei et al., 2021; Package haven, Wickham, 2016; Package tidyverse, Wickham et al., 2019; Package ggplot2, Wickham & Miller, 2021; Package dplyr, Wickham et al., 2021; Package knitr, Xie, 2021; Package EFAutilities, Zhang et al., 2020).

To test the psychometric structure, we performed the following six steps: First, we ran factor analyses using exploratory structural equation modeling (ESEM) separately for the trait and state model. We used ESEM as it better accommodates complex measurement models by not imposing zero constraints on the relationship between items and factors (i.e., it allows for cross-loadings). Furthermore, ESEM offers better insight in discriminant validity as it delivers a more realistic representation of the data (Marsh et al., 2014; Marsh et al., 2009). We specified oblique semi-specified target rotation for which we could specify which loadings we expected to be 0 while leaving the remaining elements unspecified. This specification followed the conceptual background of Werner et al. (2023, see Table 1) (Lavaan Package; Fischer & Karl, 2019). For the two general scales (Sexual Experience Enjoyment for trait and General Sexual Pleasure for state), we performed principal component analyses (PCA; psych package; Revelle & Revelle, 2015) since these scales represent indices rather than factors (Fried, 2020). Since multivariate normality was not given, we used robust methods (robust maximum likelihood estimation and polychoric correlations) for both ESEM and PCA.

We wanted to shorten the questionnaire to make it more usable for survey research. After having evaluated all ASPI items in terms of content (conceptual background and qualitative data) and statistics (distribution, Cronbach's alpha, factor loading higher .3), we reduced the item number and ran ESEM and PCA again for the shortened final state and trait

model. We provide a detailed rationale for the criteria used to select each final ASPI item in the supplemental material S1. Importantly, we calculated the model fit indices for both the models including all original items before item reduction and for the models with reduced number of items. We carried out all following steps using the reduced models.

Second, we tested for measurement invariance across sex assigned-at-birth and sexual function groups to evaluate whether scale scores can be validly compared among these groups.

Third, we checked the scales' reliability using omega coefficients and expected adequate internal consistency for each validated scale.

Fourth, we examined construct validity through convergent and discriminant relationships to other relevant constructs as well as differences between known-groups (female vs. male and sexual functional vs. dysfunctional). For convergent and discriminant construct validity, we used network analysis to model correlations between ASPI-scales and relevant sexological and psychological constructs. We ran network analysis for trait and state separately. The postulated hypotheses are provided in the preregistration on the OSF (<https://osf.io/wnrxa/>; p. 2-4) and as a tabular overview in the supplemental material S2. Differences between known-groups was tested using t-tests for independent groups whereby we expected sexually dysfunctional scoring participants to report less enjoyment (ASPI trait domains) and pleasure (ASPI state domains) than sexually functional scoring participants.

Fifth, to verify whether the NA values of the ASPI could be treated as missing, we performed two sensitivity analyses. 1) we reran the factor and network analyses on the same dataset in which NA was set to 0 instead of missing 2) we reran the same factor and network analysis on the data of those participants who had no NA nor missing responses on any of the items.

Sixth, we analyzed the association of the ASPI-scales with the SEA-Short Form to see whether responses on the ASPI were systematically associated with socially desirable

responses. In order to ascertain whether this is a problem for the ASPI specifically, we compared the strength of association of the largest Spearman correlation coefficient for the trait and state facets with that of the Spearman correlation coefficients of the SES and the Sexual Satisfaction scales and the SEA-Short Form respectively and considered correlation coefficients equal to or higher than .5 as problematic.

Finally, as explorative analysis we examined sex differences on all scales of the ASPI using t-tests for independent groups.

## **2.8 Divergence with respect to the preregistration**

There are seven points of divergence with respect to the preregistration. (1) We estimated five-factor models for state and trait rather than six-factor models because we did not include the general scales for state and trait in the factor models as originally but erroneously specified. The general scales are exploratory and are not based on the conceptual framework of sexual pleasure (Werner et al., 2023). Since the scales are not theory-based and represent components rather than factors, we adjusted the statistical procedure before analyzing the data. This correction was attached to the pre-registration and can be found as an erratum document on the OSF (<https://osf.io/qv2wd>). (2) Item generators decided to call the ASPI 1.0 an inventory rather than index, since the ASPI 1.0 is a battery rather than single questionnaire and the adapted name does not suggest that the scales assess components rather than factors. (3) Also note that we have adjusted the name of one facet: Bonding Enjoyment and Pleasure were used to be called Attachment Enjoyment and Pleasure. (4) In order to combine all sexual function scales into one scale for the correlational construct validity analyses, we calculated weighted sum scores rather than average scores before combining the scales because this led to more comparable scores across the function scales. (5) We accepted a higher number of “not applicable” responses for three state scales as initially specified as we would not have reached sufficient power otherwise. Furthermore, this more representative

rate of NA responses allowed us to formulate suggestions for future use of the ASPI state questionnaire. (6) We did not have to run the factor sensitivity analyses on subparts of the questionnaire items, since the previous models fit sufficiently well and gave sufficient insight into potential misspecifications. (7) Last but not least, we had planned to sub-select groups for measurement invariance based on (cis)gender rather than sex assigned-at-birth – however, we eventually did not want to exclude specific transgender individuals from our sample, but also did not have sufficient individuals in transgender subgroups to run factor and measurement invariance analyses separately for them. We therefore decided to select measurement invariance groups based on sex assigned-at-birth rather than gender. Future studies need to approach the sampling design and measurement invariance analyses differently.

### 3. Results

#### 3.1 Participants

After preprocessing the data, we obtained a sample of  $n = 706$  participants (Sample 1). The sample includes an equal number of individuals who were assigned the sex female or male at birth ( $n = 353$ , 50%). The average age was 40.3 years ( $SD = 13.4$ ) with a range between 18 and 86 years. Out of the sample,  $n = 16$  (2.3%) individuals reported that their sex assigned-at-birth did not match their gender. Instead, they described themselves as genderfluid, bi-gender, diverse or trans. Further sociodemographic characteristics are presented in Table 3 separately for sample 1 and 2. Sample 2 is a subsample of sample 1, with participants who were interested in taking part in a follow-up qualitative study which inquired further into item comprehension ( $M_{age} = 41.1$ ;  $SD_{age} = 14.1$ ; age range: 19 to 86 years).



**Table 3.***Sociodemographic Characteristics of Participants*

Demographic Characteristics	Sample 1		Sample 2	
	<i>n</i>	%	<i>n</i>	%
Sex				
Female at birth	353	50	379	59.5
Male at birth	353	50	258	40.5
Highest educational level				
higher education or university degree	388	55.3		
apprenticeship or gymnasium	288	50.0		
secondary school	8	1.1		
primary school	1	0.1		
other	18	2.5		
Sexual orientation				
heterosexual	523	74.1	495	77.7
bisexual	106	15.0	76	11.9
homosexual	20	2.8	14	2.2
other	57	8.0	52	8.1
Relationship				
yes	556	78.8 <sup>a</sup>	454	71.3
no	150	21.2	183	28.7

*Note.* Sample 1: *n* = 706; Sample 2: *n* = 637.

<sup>a</sup> *M* = 11.7 years of relationship, *SD* = 10.9 years of relationship, range = 1-56.

### 3.2 Factor Structure

#### 3.2.1 Trait Model

The original 30-item trait version showed a good model fit<sup>1</sup> for the five-factor structure (Table 4). Except for seven items, the items had factor loadings higher than .3 on their expected factor. After item reduction, seven items were excluded, 23 items were retained (see Table 5).

The final 23-item trait model also showed a very good model fit (see Table 4). All items, except for item 18, showed factor loadings higher than the cut-off .3. Nevertheless, item 18 was not excluded due to the other reduction criteria described in the rationale (see supplemental material S1). Items 4, 10, 14-18 and 22 showed cross-loadings (i.e., >.3, see Brown, 2015, p. 115; Costello & Osborne, 2005) as can be seen in Table 5.

**Table 4.**

*Trait Fit Indices ESEM*

	CFI	TLI	RMSEA.robust	SRMR	BIC	AIC
5-Factor						
original trait model	.956	.930	.044	.029	45022.095	44155.768
5-Factor final trait model	.981	.962	.036	.021	32988.611	32313.788

*Note.* ESEM = Exploratory structural equation modelling; CFI = Comparative Fit Index;

TFI = Tucker-Lewis Index; RMSEA = root-mean-square error of approximation; SRMR =

standardized root-mean-square residual; BIC = Bayesian-Information-Criterion; AIC =

Akaike-Information-Criterion. See Footnote 1 for applied cut-off values.

**Table 5.***Trait Factor Loadings*

Domain	Item No	Item	M1	M2	M3	M4	M5
Hedonic		Arousal Enjoyment					
	trait1	I enjoy it when my body reacts to sexual stimuli.	<b>.62</b>				
	trait2	I love feeling sexual arousal.	<b>.65</b>				
	trait3	I love the sensations of my aroused genitals.	<b>.7</b>				
	trait4	I love it when my erogenous zones are being touched.	<b>.41</b>				.35
Intrapersonal	trait5	I enjoy feeling sexual sensations in my body.	<b>.58</b>				
		Enjoyment-Related Self-Efficacy					
	trait6	I know how to shape my sexlife in a way that I really enjoy.		<b>-.81</b>			
	trait7	I understand what I need in order to enjoy myself sexually.		<b>-.63</b>			
	trait8	I know how to pleasure my sexpartner.		<b>-.52</b>			
	trait9	I can engage in partnersex in a way that I really enjoy.		<b>-.73</b>			
	trait10	I can masturbate in a way that I really enjoy.	.3	<b>-.35</b>			
		Enjoyment-Related Self-Worth					
	trait11	I feel I am worthy of receiving pleasure from my sexpartner.			.3		
	trait12	During partnersex, I neglect my own pleasure. (R)			<b>.72</b>		
	trait13	My sexual pleasure is irrelevant. (R)			<b>.5</b>		

Interpersonal	Interaction Pleasure			
	trait14	I find it arousing to entice my sexpartner into having sex.	<b>.32</b>	<i>.61</i>
	trait15	I feel fulfilled when my sexpartner enjoys themselves during sex.	<b>.72</b>	<i>.92</i>
	trait16	I find it arousing to pleasure my sexpartner during sex.	<b>.74</b>	<i>.88</i>
	trait17	I enjoy stimulating my sexpartner during sex.	<b>.7</b>	<i>.85</i>
	trait18	I enjoy it when my sexpartner stimulates me during sex.	<b>.2</b>	<i>.3</i>
	Bonding Enjoyment			
	trait19	During sex, I enjoy being close to my sexpartner.		<b>.8</b>
	trait20	During sex, I feel connected to my sexpartner.		<b>.67</b>
	trait21	During sex, I enjoy the affection between me and my sexpartner.		<b>.81</b>
	trait22	During partnersex, I enjoy the feeling of security.	<b>-.3</b>	<b>.56</b>
	trait23	Sex brings me closer to my sexpartner.		<b>.57</b>

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*Note.* M1-M5 = Factors; bold = factor loadings; italics = cross loadings.

### 3.2.2 State Model

The original 36-item state version showed a good model fit<sup>1</sup> for the five-factor structure (see Table 6; Hu & Bentler, 1998; MacCallum et al., 1996). Except for 11 items, the items had factor loadings higher than .3 on their expected factors. After item reduction, 12 items were excluded and 24 items were retained (see Table 7).

**Table 6.**

*State Fit Indices ESEM*

	CFI	TLI	RMSEA.robust	SRMR	BIC	AIC
5-Factor						
original state model	.944	.920	.051	.030	46402.370	45429.565
5-Factor final state model	.968	.939	.054	.023	34377.314	32699.930

*Note.* ESEM = Exploratory structural equation modelling; CFI = Comparative Fit

Index; TFI = Tucker-Lewis Index; RMSEA = root-mean-square error of

approximation; SRMR = standardized root-mean-square residual; BIC = Bayesian-

Information-Criterion; AIC = Akaike-Information-Criterion. See Footnote 1.

The final 24-item state model also showed a very good model fit (see Table 6). Most factor loadings were above the cut-off  $> .3$ , six items were below (Brown, 2015; Costello & Osborne, 2005). Nevertheless, these items were retained due to the other reduction criteria described in the rationale (see supplemental material S1). Items 5-7, 9, 11, 15-17, and 19 showed cross-loadings  $> .3$  (see Table 7). For a detailed summary of all ASPI items, the EFA factor-loadings, and the final decisions regarding item selection, see the Excel® file on the OSF (<https://osf.io/fq29c/>).

**Table 7.***State Factor Loadings*

Domain	Item No	Item	M1	M2	M3	M4	M5
Hedonic		Sensual Pleasure					
	state1	Feeling sexually aroused was amazing.	<b>.72</b>				
	state2	Touching my erogenous zones was pleasurable.	<b>.49</b>				
	state3	Feeling sexual sensations in my body was pleasurable.	<b>.75</b>				
	state4	During partnersex, my genitals glowed with excitement.	<b>.52</b>				
Intrapersonal	state5	During masturbation, my genitals glowed with excitement.	<b>.3</b>	<b>.55</b>			
		Pleasure-Related Mastery					
	state6	I could shape my sexlife in a way that I really enjoyed.		<b>.23</b>	<b>.32</b>	<b>-.43</b>	
	state7	During partnersex, I was able to get what I needed to enjoy myself.		<b>.14</b>	<b>.42</b>		
	state8	During masturbation, I was able to give myself what I needed to enjoy myself.		<b>.88</b>			
	state9	During partnersex, I felt 'good at sex'.	<b>.3</b>	<b>.14</b>		<b>-.37</b>	
	state10	During masturbation, I was good at pleasuring myself.		<b>.69</b>			
	state11	During sex, I had the feeling that I was able to pleasure my sexpartner.		<b>.12</b>		<b>-.41</b>	
		Pleasure-Related Validation					
	state12	I thought it was important to live out my sexual needs.			<b>.23</b>		
	state13	During partnersex, I neglected my own pleasure. (R)			<b>.63</b>		
	state14	During partnersex, my own sexual pleasure did not feature. (R)			<b>.49</b>		

Interpersonal	Interaction Pleasure		
	state15	Seducing my sexpartner was pleasurable.	<i>.46</i> <b>-.32</b>
	state16	Stimulating my sexpartner was pleasurable.	<i>.41</i> <b>-.38</b>
	state17	Being stimulated by my sexpartner was pleasurable.	<i>.41</i> <b>-.23</b>
	state18	During partnersex, we were both completely absorbed in pleasure.	<b>-.45</b>
	state19	During partnersex, we whipped each other into ecstasy.	<i>.32</i> <b>-.47</b>
	Bonding Pleasure		
	state20	Feeling the closeness of my sexpartner during sex was pleasurable.	<b>-.68</b>
	state21	During sex, I felt connected to my sexpartner.	<b>-.79</b>
	state22	Feeling affection between me and my sexpartner during sex was pleasurable.	<b>-.75</b>
	state23	The feeling of security during partnersex was pleasurable.	<b>-.71</b>
	state24	Sex brought me closer to my sexpartner.	<b>-.68</b>

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*Note.* M1-M5 = Factors; bold = final factor loadings; italics = cross loadings.

### 3.3 Principal Component Analysis (PCA) for General Scales (Sexual Experience Enjoyment and General Sexual Pleasure)

Examination of Kaiser's criteria and the scree-plot yielded empirical justification for retaining one component with eigenvalues  $> 1$  for the trait-scale. Due to the component loadings, we decided to exclude trait I and trait II. For the trait-scale, 45% of the total variance was captured by one component (see Table 8).

**Table 8.**

*PCA for Sexual Experience Enjoyment*

Item No	Item	Original model		Final model	
		Component loadings	$h^2$	Component loadings	$h^2$
trait24	I experience sexual pleasure in my life.	.63	.40	.76	.57
<i>trait I</i>	I enjoy using sexually stimulating media (stories, audio books, magazines, porn, etc.).	.52	.27		
trait25	I enjoy partnersex.	.57	.33	.70	.49
trait26	I enjoy fantasizing about sex.	.70	.48	.62	.38
trait27	I enjoy masturbating.	.60	.36	.59	.35
<i>trait II</i>	I enjoy flirting.	.51	.26		

*Note.* Items in italics are those that were excluded after item reduction. Proportion of variance of the original model = .35; Proportion of variance of the final model = .45.

Examination of Kaiser's criteria and the scree-plot yielded empirical justification for retaining one component with eigenvalues exceeding 1 for the state-scale. Due to the



component loadings, we decided to exclude state I and state II. For the state-scale, 49% of the total variance was captured by one component (see Table 9).

**Table 9.**

*PCA for General Sexual Pleasure*

Item No	Item	Original model		Final model	
		Component loadings	$h^2$	Component loadings	$h^2$
state25	My sexual experiences were pleasurable.	.78	.51	.82	.68
<i>state I</i>	Using sexually stimulating media was pleasurable (stories, audio books, magazines, porn, etc.).	.39	.15		
state26	Partnersex was pleasurable.	.73	.53	.79	.63
state27	Fantasizing about sex was pleasurable.	.60	.36	.54	.29
state28	Masturbation was pleasurable.	.63	.40	.59	.35
state29	After partnersex I felt amazing.	.76	.57	.81	.65
state30	After masturbation, I felt amazing.	.60	.36	.58	.34
<i>state II</i>	Flirting was pleasurable.	.53	.28		

*Note.* Items in italics are those that were excluded after item reduction. Proportion of variance of the original model = .41; proportion of variance of the final model = .49.

### 3.4 Measurements Invariance for Sex and Sexual Function

Measurement invariance for trait and state model was given between females and males assigned-at-birth (see Table 10).

**Table 10.**

*Measurement Invariance Between Sexes*

	$\chi^2$	$df$	$p$	RMSEA robust	CFI robust	TLI robust	Model Comparison	$\Delta df$	$\Delta$ RMSEA robust	$\Delta$ CFI robust	$\Delta$ TLI robust
Configural (trait)	401.7256	<.001		.045	.972	.944		-	-	-	-
Metric (trait)	516.3366	<.001		.038	.971	.959	2 vs. 1	110	-.006	-.001	.015
Scalar (trait)	577.6384	<.001		.042	.963	.951	3 vs. 2	18	.004	-.008	-.009
Configural (state)	564.9292	<.001		.058	.962	.929		-	-	-	-
Metric (state)	703.5407	<.001		.053	.956	.941	2 vs. 1	115	-.005	-.006	.012
Scalar (state)	765.7426	<.001		.056	.949	.934	3 vs. 2	19	.003	-.007	-.006

*Note.* n = 353 per group. See Footnote 2 and 3.

According to the large majority of our model fit criteria<sup>3</sup>, measurement invariance held at all levels between sexes. In fact, the fit for the ASPI (trait and state) scales was good at the configural level indicating that the same factor structure (which factor is measured by what item) held across groups (Hu & Bentler, 1998; MacCallum et al., 1996). Furthermore, metric and scalar invariance held, as the difference in goodness-of-fit when constraining loadings (metric model) and intercepts (scalar model) was not above commonly used cut-off values for the differences in CFI, RMSEA, and TLI (Chen, 2007; Cheung & Rensvold, 2002). In other words, loadings and intercepts were equivalent across groups, the latter which was actually against our expectations.

**Table 11.***Measurement Invariance Between Sexually Functional and Dysfunctional Scoring Groups*

	$\chi^2$	$df$	$p$	RMSEA robust	CFI robust	TLI robust	Model Comparison	$\Delta df$	$\Delta RMSEA$ robust	$\Delta CFI$ robust	$\Delta TLI$ robust
Configural (trait)	371.8256	<.001		.040	.975	.951		-	-	-	-
Metric (trait)	499.6366	<.001		.035	.972	.962	2 vs. 1	110	-.005	-.003	.011
Scalar (trait)	524.8384	<.001		.035	.971	.962	3 vs. 2	18	.000	-.001	.000
Configural (state)	659.7292	<.001		.061	.955	.916		-	-	-	-
Metric (state)	792.7407	<.001		.054	.951	.934	2 vs. 1	115	-.007	-.004	.018
Scalar (state)	821.7426	<.001		.054	.950	.936	3 vs. 2	19	.001	-.001	.002

*Note.*  $n = 583$  in the sexually functional scoring group;  $n = 110$  in the sexually dysfunctional scoring group. See Footnote 2 and 3.

Measurement invariance held at all levels for sexually functional and dysfunctional scoring groups according to the large majority of fit criteria (see Footnote 3). The fit for the ASPI trait and state scales was good at the configural level indicating that the same factor structure held across groups (Hu & Bentler, 1998; MacCallum et al., 1996). Furthermore, metric and scalar invariance held, as the difference in goodness-of-fit when constraining loadings (metric model) and intercepts (scalar model) was not above commonly used cut-off values for the CFI, RMSEA and TLI (Chen, 2007; Cheung & Rensvold, 2002). In other words, loadings and intercepts were equivalent across sexual function groups.

### 3.5 Reliability: Internal Consistency

Most scales showed acceptable to excellent values in Standardized Cronbach's Alpha and McDonald's Omega, except ER Self-Worth of the trait scales and PR Validation of the state scales which showed questionable values (Table 12).

**Table 12.**

*Standardized Cronbach's Alpha and McDonalds Omega*

	Standardized Cronbachs's $\alpha$	McDonald's Omega
TRAIT		
Arousal Enjoyment	.825	.825
Enjoyment-Related Self-Efficacy	.785	.801
Enjoyment-Related Self-Worth	.640	.637
Interaction Enjoyment	.777	.763
Bonding Enjoyment	.855	.85
STATE		
Sensual Pleasure	.789	.76
Pleasure-Related Mastery	.769	.768
Pleasure-Related Validation	.611	.652
Interaction Pleasure	.869	.873
Bonding Pleasure	.906	.906

*Note.* Values around .9 indicate excellent, around .8 indicate good, around .7 indicate acceptable, around .6 indicate questionable, and values of .5 or less indicate poor (Crutzen & Peters, 2017).

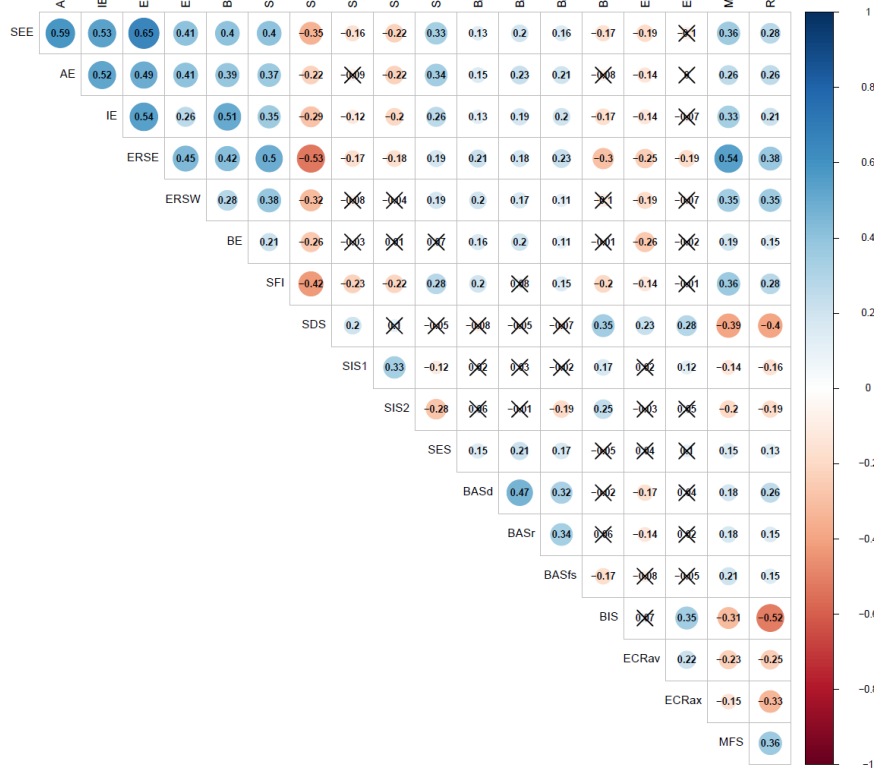
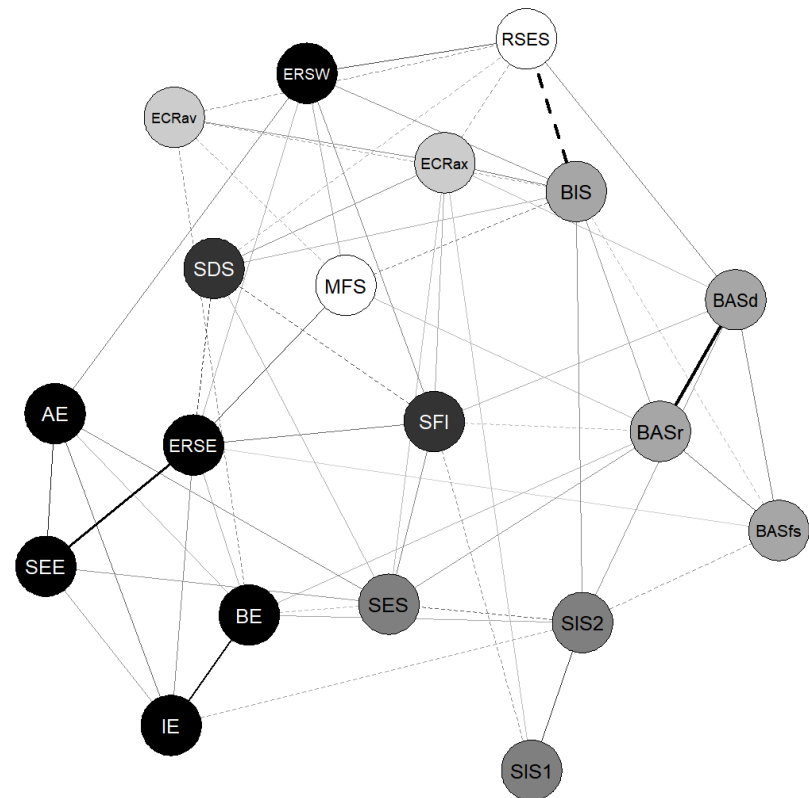
### 3.6 Construct Validity I: Convergent and Discriminant Associations

In Figure 1 and 2, Panels A and B, we present the zero-order and model-selected associations between all ASPI trait and state scales respectively and the respective convergent

and discriminant construct scales. We ran the recommended stability analyses for the network estimation which showed that the overall correlation structure and individual edge estimation was sufficiently stable to allow substantive interpretation<sup>4</sup>. Table 13 reports all descriptive statistics of convergent and discriminant construct scales. The ASPI's descriptive statistics can be found in Table 14.

**Figure 1 (Panel A and B).**

*Relationships with other constructs of the ASPI trait scales. Zero-order correlations on the left and model-selected correlations on the right. Zero-order correlations which did not reach statistical significance are crossed out ( $\alpha < .001$ ).*

**(A)****(B)**

Contrary to our expectations, the two general ASPI-scales did not correlate equally with all other ASPI-scales. Sexual Experience Enjoyment correlated most strongly with ER Self-Efficacy, followed by Arousal and Interaction Enjoyment (see Figure 1). General Sexual Pleasure correlated most strongly with Sensual Pleasure and Mastery, followed by Interaction Pleasure (see Figure 2 Panel A) and Bonding Pleasure (see Figure 2 Panel B) for the zero-order and model-selected correlations respectively.

**Table 13.**

*Descriptive statistics of Sexological and Psychological Scales (N = 706)*

Scale	<i>M</i>	<i>SD</i>	Possible Range
Sexual Excitation (SES)	16.87	2.78	6-24
Sexual Inhibition (SISs)			
Performance Failure (SIS1)	8.96	2.00	4-16
Performance Consequences (SIS2)	9.73	2.33	4-16
Sexual Assertiveness (MFS)	14.94	3.76	0-20
Sexual Distress (SDS)	9.12	3.84	5-25
Female Sexual Function Index <sup>a</sup>	30.41	3.67	2-36
Male Sexual Function Index <sup>b</sup>	26.53	2.37	2-30
Premature Ejaculation <sup>c</sup>	14.95	3.70	0-20
Human Sexual Function Index <sup>d</sup>	4.34	0.32	4-4.7
Sexual Function Index <sup>e</sup> (SFI)	25.55	2.80	2-32
Sexual Satisfaction (SS)	4.82	.92	1-6
Sexual Pleasure Scale (SPS)	18.76	3.04	0-21
Behavioral Activation (BAS)			
BA Reward Responsiveness (BASr)	16.21	2.05	5-20
BA Drive (BASd)	11.92	2.02	4-16
BA Fun Seeking (BASs)	11.98	1.95	4-16
Behavioral Inhibition (BIS)	20.00	4.00	7-28
Attachment Anxiety (ECRax)	3.40	1.09	1-7
Attachment Avoidance (ECRav)	2.33	.93	1-7

Self-Esteem (RSES)	32.91	5.20	10-40
Positive Affect (PANASp)	3.48	.66	1-5
Negative Affect (PANASn)	1.89	.61	1-5

*Note.* <sup>a</sup>  $n = 345$ , <sup>b</sup>  $n = 349$ , <sup>c</sup>  $n = 347$ , <sup>d</sup>  $n = 4$ , <sup>e</sup> excluding satisfaction subscales and the PEP and MSFI were combined for men.

Overall, the ASPI-scales correlated more strongly and robustly with sexological constructs compared to psychological constructs. However, many direct and indirect relationships between the ASPI-scales and psychological constructs were observed, indicating that psychological individual differences play a role in sexual functioning, health, and wellbeing.

### **3.6.1 Trait Scales**

Following our expectations, Arousal Enjoyment and Sexual Experience Enjoyment correlated moderately positively with Sexual Excitation (SES) while they correlated positively yet less strongly, or not at all, with Behavioral Activation (BASd, BASr, BASs) for both zero-order and model-selected correlations (see Figure 1). Regarding Sexual Inhibition (SIS1 and SIS2) and Behavioral Inhibition (BIS), our expectations were partially dis/confirmed. As expected, both Sexual Inhibition and Behavioral Inhibition showed negative zero-order correlations with the ASPI scales (see Figure 1 Panel A). However, these correlations were similar in strength rather than stronger for Sexual compared to Behavioral Inhibition. Also against our expectations, not all ASPI scales correlated with Sexual Inhibition in the model-selected correlation network. Only SIS2 correlated negatively with Interaction Enjoyment and positively with Bonding Enjoyment, the latter which might be a suppression effect, as there was no zero-order correlation between Bonding Enjoyment and SIS2 in the zero-order correlations (see Figure 1).



Regarding the associations of Bonding Enjoyment, Interaction Enjoyment, and ER Self-Worth with Attachment Anxiety (ECRax), the pattern of correlations turned out different than expected. Attachment Anxiety did not correlate strongly nor moderately (positively) with Bonding Enjoyment nor Interaction Enjoyment and ER Self-Worth, but did show a small zero-order negative correlation with ER Self-Efficacy instead (see Figure 1). Importantly, Attachment Anxiety acted unexpectedly in the model-selected correlation network overall in that it also correlated positively, rather than negatively, with Sexual Function and Sexual Excitation, both of which was not the case for the zero-order relationships (see Figure 1). Partially following expectations, Attachment Avoidance (ECRav) showed small to moderate negative zero-order correlations with all ASPI facets (with Bonding Enjoyment being the strongest, followed by ER Self-Efficacy), and correlated negatively with Bonding but not Interaction Enjoyment in the model-selected network (see Figure 1).

Regarding the associations of ER Self-Efficacy and ER Self-Worth with Sexual Assertiveness (MFS), all expectations were confirmed. Sexual Assertiveness correlated positively (moderate to high strength) with ER Self-Efficacy and ER Self-Worth, with the association between Sexual Assertiveness and ER Self-Efficacy being stronger than the association between Sexual Assertiveness and ER Self-Worth, even in the model-selected network (see Figure 1). Regarding the associations of ER Self-Efficacy and ER Self-Worth with general Self-Esteem (RSES), the expectations were partially dis/confirmed. Self-Esteem correlated moderately positively with both ER Self-Worth and ER Self-Efficacy, but the relationship was not stronger for ER Self-Worth than for ER Self-Efficacy for the zero-order correlations (see Figure 1 Panel A). However, the relationship with ER Self-Worth was more robust since Self-Esteem only related with ER Self-Worth in the model-selected network, and not with ER Self-Efficacy (see Figure 1 Panel B).

Regarding the associations of all ASPI trait scales and Sexual Function (SFI), all correlations followed the expected direction (positive) but the zero-order correlations turned

out stronger than expected (moderate-strong rather than moderate; see Figure 1 Panel A). As expected, Sexual Function correlated most strongly with ER Self-Efficacy in the zero-order correlations and only showed direct relationships with ER Self-Efficacy and ER Self-Worth in the model-selected networks (see Figure 1). Regarding the associations of all ASPI trait facets and Sexual Distress (SDS), all correlations followed the expected direction (negative) but the zero-order correlations turned out stronger than expected (moderate-strong rather than moderate; see Figure 1 Panel A). Only ER Self-Efficacy correlated with Sexual Distress in the model-selected network (see Figure 1 Panel B).

### ***3.6.2 State Scales***

As expected and shown in Figure 2, Panel A, all ASPI state scales showed positive zero-order correlations with Sexual Function (SFI) and negative zero-order correlations with Sexual Distress (SDS), which turned out higher than expected for Sexual Function (strong rather than moderate). The model-selected correlations only partially followed our expectations. Sexual Function correlated positively with Validation, Sensual Pleasure, and General Sexual Pleasure but not with Mastery, Bonding Pleasure, nor Interaction Pleasure. Sexual Distress only correlated negatively with Mastery and positively with Sensual Pleasure (see Figure 2 Panel B) rather than all scales, the latter of which might again be a suppression effect since Sexual Distress and Sensual Pleasure did not associate positively, but negatively, within the zero-order correlations (see Figure 2 Panel A).

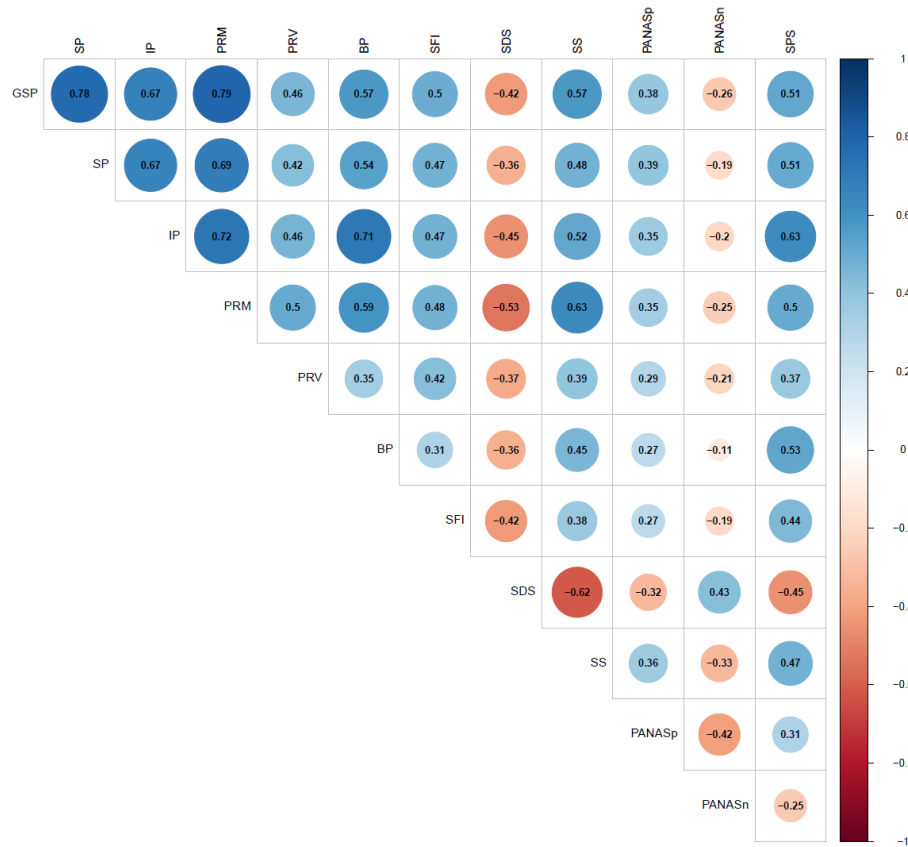
As expected, all ASPI state scales correlated positively with Sexual Satisfaction (SS), and did so less strongly overall than compared with the strength of the negative correlation between Sexual Satisfaction and Sexual Distress, specifically in the model-selected network (SDS; see Figure 2). Mastery did correlate as strongly with Sexual Satisfaction in the zero-order correlations but correlated less strongly in the model-selected networks. Sexual Satisfaction did correlate more strongly with the ASPI state scales than we expected (strong

rather than moderate), but the zero-order correlations between the ASPI state scales and Sexual Satisfaction were all below .8, indicating that they likely assess different constructs (see Figure 2 Panel A). Following our expectations, the correlations between the ASPI state scales and Sexual Function, Sexual Distress and Sexual Satisfaction were generally stronger than the zero-order and model-selected correlations between the ASPI state scales and Positive Affect (PANASp) and Negative Affect (PANASn; see Figure 2).

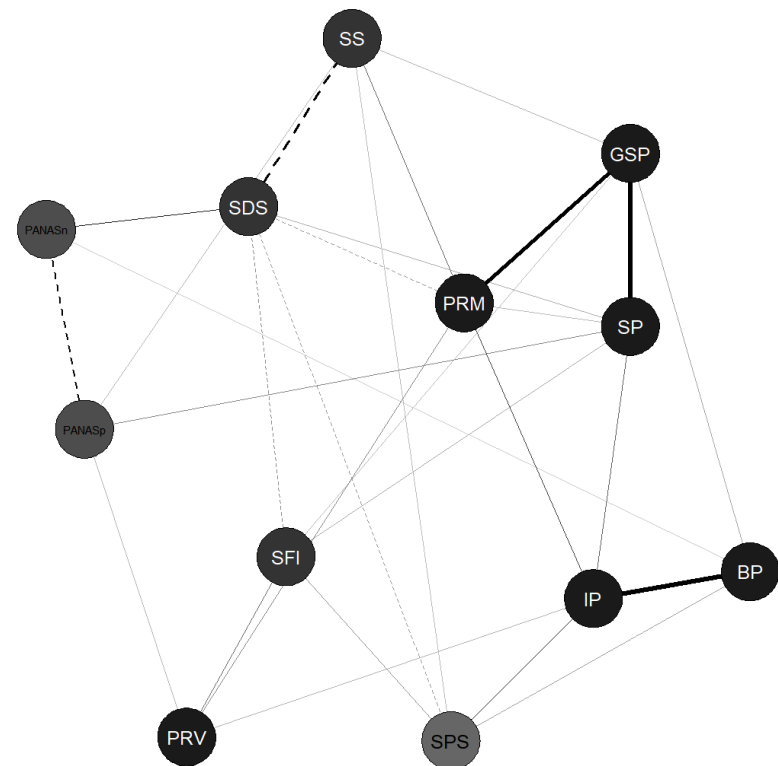
**Figure 2 (Panel A and B).**

*Relationships with other constructs of the ASPI state scales. Zero-order correlations on the left and model-selected correlations on the right. Zero-order correlations which did not reach statistical significance are crossed out ( $\alpha < .001$ )*

(A)



(B)



**Table 14.**

*Descriptive Statistics of ASPI-scales Overall, and for Known-Groups and Explorative Analyses*

Scale	Overall		female		male						functional		dysfunctional					
	<i>N = 706</i>		<i>n = 353</i>		<i>n = 353</i>						<i>n = 583</i>		<i>n = 110</i>					
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>t</i>	<i>df</i>	<i>p</i>	<i>d</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>t</i>	<i>df</i>	<i>p</i>	<i>d</i>
TRAIT																		
Arousal	5.57	.5	5.56	.56	5.59	.46	-	704	.284		5.61	.45	5.36	.65	-	129.838	<	-
Enjoyment							1.073								4.002		.001	0.52
Enjoyment-Related Self-Efficacy	5.04	.67	4.99	.74	5.08	.6	-	674.608	.099		5.15	.59	4.49	.79	-	132.921	<	-
							1.654								8.143		.001	1.06
Enjoyment-Related Self-Worth	5.03	.72	5.14	.74	4.91	.69	4.133	704	<.001	-	5.12	.66	4.54	.82	-	137.455	<	-
										0.32					6.954		.001	0.84
Interaction Enjoyment	5.48	.54	5.37	.6	5.59	.45	-	655.544	.000	0.42	5.54	.48	5.17	.71	-	128.928	<	-
							5.451								5.139		.001	0.71
Bonding Enjoyment	5.26	.66	5.25	.65	5.27	.67	-.526	704	.599		5.31	.62	5.03	.77	-	137.100	<	-
															3.590		.001	0.43
Sexual Experience Enjoyment	5.29	.56	5.25	.58	5.33	.53	-	704	.073		5.36	.5	4.94	.70	-	130.578	<	-
							1.798								6.004		.001	0.78

## STATE

Sensual Pleasure	4.94	.77	4.94	.82	4.95	.72	-.235	704	.814		5.06	.69	4.39	.89	- 7.431	134.817	< .001	- 0.92
Pleasure- Related	4.95	.77	4.82	.81	4.80	.73	.325	704	.746		4.94	.67	4.10	.87	- 9.537	134.288	< .001	- 1.19
Mastery Pleasure- Related	4.81	.93	4.95	.99	4.74	.87	3.083	691.871	.002	- 0.26	4.98	.83	4.14	.06	- 7.886	135.404	< .001	- 1.10
Validation Interaction	5.23	.94	4.87	1.0	5.02	.87	- 2.052	690.871	.040		5.1	.83	4.17	.09	- 8.442	133.547	< .001	- 1.22
Pleasure Bonding	5.04	.94	5.0	.96	5.08	.96	- 1.202	704	.230		5.15	.84	4.48	.20	- 5.537	129.993	< .001	- 0.87
Pleasure General Sexual	4.90	.74	4.9	.79	4.89	.69	.090	690.678	.928		5.01	.65	4.29	.85	- 8.465	134.363	< .001	- 1.05

*Note.* Due to unequal variances between the groups (significant Levene test), different df may occur due to the robust test applied.

Contrary to our expectations, the alternative Sexual Pleasure Scale (SPS) did not correlate most strongly with General, Sensual, Bonding and Interaction Pleasure compared to Mastery and Validation but correlated most strongly and robustly with Bonding and Interaction Pleasure only (see Figure 2).

### **3.7 Construct Validity II: Differences between Known-Groups**

T-tests for independent groups per scale confirmed the expected differences between the sexually functional and the sexually dysfunctional scoring group. The sexually dysfunctional scoring group had significantly lower mean ASPI scores than the sexually functional scoring group on all scales ( $p < .001$ ; see Table 13), with ER Self-Efficacy differentiating most among the trait facets, and differences being more pronounced on the state compared to the trait scales. In other words, the ASPI-scales discriminated between sexual function groups and the state and trait scales showed differential utility.

### **3.8 Sensitivity Analysis regarding Handling of “Not Applicable” Responses**

Factor analysis for the state model still resulted in similar, i.e. good, model fit compared to the original models (in which “not applicable” was handled as missing) when participants with “not applicable” responses were included but “not applicable” was set to 0, and when participants with “not applicable” responses were excluded (see Table 15).

**Table 15.***Model Fit Indices (ESEM) for the Sensitivity Analysis for the State Model*

	CFI	TLI	RMSEA.robust	SRMR	BIC	AIC
NA set to 0	.960	.957	.046	.076	44382.214	44204.445
NA excluded	.992	.992	.020	.050	19089.846	18938.833
5-Factor final state model	.968	.939	.054	.023	34377.314	32699.930

*Note.* ESEM = Exploratory structural equation modelling; CFI = Comparative Fit Index;

TLI = Tucker-Lewis Index; RMSEA = root-mean-square error of approximation; SRMR =

standardized root-mean-square residual; BIC = Bayesian-Information-Criterion; AIC =

Akaike-Information-Criterion.

We also ran sensitivity analyses with the two additional samples for the network analysis. For both cases (“not applicable” set to 0 and NA excluded), all networks were highly similar to the original networks with all newly estimated correlation matrices correlating above .9 with the original correlation matrices.

### **3.9 Response Bias for ASPI-scales**

ASPI-scales were not systematically associated with socially desirable responses since correlation coefficients were not equal or higher than the cut-off of  $r > .5$  (the highest zero-order correlation between SEA and Interaction Pleasure was  $r = .18$ ). In addition, the correlations between the ASPI-scales and the SEA-Short Form were comparable to the correlation of the SES and the Sexual Satisfaction scales with the SEA-Short Form.



### 3.10 Explorative Analysis: Sex Differences on ASPI-scales

Most scales showed no significant sex difference using t-tests for independent groups (see Table 14). Only the trait scales Interaction Enjoyment and ER Self-Worth and the state pendant scale PR Validation showed a significant sex difference, with males showing higher mean scores for the Interaction scale and females showing higher mean scores for the Self-Worth and Validation scales (see Table 14). The effect sizes according to Cohen (1988) were small (Cohen's  $d$  for Interaction Enjoyment = - 0.43, Cohen's  $d$  for ER Self-Worth = 0.31, Cohen's  $d$  for PR Validation = 0.23).

### 3.11 Response Process Evaluation: Item Comprehension and Content Validity

We asked participants of sample 1 whether they thought the ASPI covered (trait) enjoyment and (state) pleasure sufficiently or whether they felt that any pleasurable aspects of sexual experiences were missing. Respondents noted that playing with, exploring, and learning about personal and interpersonal boundaries and the resulting novelty, psychological “mindfuck” and spiritual and transcendent experiences were not yet sufficiently included. We also specifically targeted those people who indicated that they had not experienced any of the sexual experiences covered in the ASPI to ask them whether they had experienced anything as sexually pleasurable which was not covered in the ASPI ( $n = 10$  of 1371). None of these participants suggested any additional activity or experience; all indicated that no potential experience was missing.

In the qualitative survey (sample 2), we focused on whether participants understood the content of the items. For the most part, the items were understandable. Only for nine items more than three participants indicated that they did not fully understand them. Seven of these items were excluded based on the quantitative analysis. For the two retained items (state4: "During partnersex, my genitals glowed with excitement." and state5: "During masturbation, my genitals glowed with excitement.") we examined the qualitative responses in more detail

and saw that people had difficulty understanding the word "glowed". We checked what the two statements meant to respondents in their own words and noted that they described the statement as intended (e.g., hot, wet, blood flowing, swelling, maximum arousal). We therefore held on to retain these two items.

Participants were also asked whether the items adequately covered the scales. Those participants who indicated issues, mainly had difficulties with the names of the scales. This difficulty could be due to failed scale-label translation into German on our part or the fact that the scale labels are technical and potentially not intuitively familiar. The German labelling and definition of the scales could be reworded in future ASPI versions and research, which would allow for better insight in item-scale coverage in future response process evaluations.

#### **4. Discussion**

In this study, we presented the Amsterdam Sexual Pleasure Inventory (ASPI Vol. 1.0) and analyzed its psychometric properties to gather validity evidence regarding the intended interpretation and uses of the ASPI. The ASPI is a multidimensional instrument which aims to assess the different facets of sexual pleasure from a trait and state perspective and can be used in diverse groups of people to compare respective scores between male and female respondents with and without sexual dysfunction.

Our analyses suggested that the 5-facet structure for trait and state pleasure proposed by Werner et al. (2023) showed good structural validity evidence and that the explorative general ASPI-scales showed acceptable evidence of structural validity as indices. The majority of the scales showed acceptable internal consistency and the factor structure was invariant among intended comparison groups. Sexual pleasure as assessed by the ASPI differed from similar and related constructs such as sexual satisfaction and associated theoretically sensibly with other sexological and psychological constructs, suggesting that the ASPI-scales showed overall good validity evidence regarding relations with other constructs.

Differences between known-groups suggested that the state scales have differential utility compared to the trait scales in differentiating sexual dys/function and that the different facets have utility in researching differences between males and females (assigned-at-birth). Furthermore, we confirmed that the ASPI did not appear to be particularly sensitive to socially desirable responding. Based on the qualitative data, participants understood the items as intended and thought that the ASPI covers relevant facets of sexual pleasure. Therefore, we argue that the ASPI can be used in survey research among respondents with different sex, gender, and relationship types to assess the tendency to experience and levels of experienced sexual pleasure and can be used to compare scores on the respective scales between males and females, and potentially between groups with and without sexual dysfunction.

## **4.1 Factor Structure and Internal Consistency Reliability**

### **4.1.1 Trait Scales**

The model fit for the trait model was very good. Except for Interaction Enjoyment, all facets showed clearly demarcated factor loading patterns. We decided to keep the weakly loading item in Interaction Enjoyment as otherwise the scale would mostly reflect giving rather than exchanging pleasure which we considered crucial for interaction. We accepted the strongly cross-loading items since they cross-loaded on Bonding Enjoyment only, which also belongs to the interpersonal domain, and should therefore not be as theoretically problematic. All scales, with the exception of the ER Self-Worth scale, showed at least acceptable internal consistency, probably due to the fact that it is shorter with only three items, two of which are reverse scored.

### **4.1.2 State Scales**

The state structure showed good model fit. However, the factor loading patterns were not as consistent as for the trait model, and only Sensual Pleasure, PR Validation, and

Bonding Pleasure showed clear demarcation in terms of their factor loadings. Interaction Pleasure showed four cross-loadings on Sensual Pleasure, probably because Interaction items also ask about pleasure received from *stimulation*, but with a focus on stimulation in a *partnered* rather than *general* context (Item 15, 16, 17, 19). We decided to retain this distinction in order to distinguish the more general and partnered sexual contexts, especially for those who did not engage in partnered sex.

PR Mastery included four items which loaded weakly on PR Mastery while cross-loading strongly on other factors (Item 6, 7, 9, 11). Three of these cross-loading items refer to partnersex and loaded strongly on Interaction Pleasure and Bonding Pleasure, probably because these factors share the context of partnered sex. Since the PR Mastery scale is not about the activity and its context but about the mastery experienced during the activity, we decided to keep the scale separate even though PR Mastery shares aspects with the interpersonal domain.

All scales except PR Validation showed at least acceptable internal consistency. PR Validation probably showed questionable consistency since it is shorter with only three items two of which are reverse scored.

#### **4.1.3 Trait vs. State Scales**

Overall, the structure of the trait model was more robust than that of state model with the state scales showing lower loadings overall and more cross loadings than the trait scales. We can speculate about three potential reasons. First, state scales might be affected more by measurement error than trait scales since experiences reflected in state items might be affected more by unsystematic extraneous time-varying aspects (Hamaker et al., 2007) than those of trait items, resulting in lower factor-loadings due to more residual variation. Second, in the state model more than in the trait model, items clustered alongside the activity and/or context, suggesting that state-evaluations are more sensitive to situational aspects which

might lead respondents to answer those items more similarly even though the items refer to different aspects of those situations. Future work could address this by modelling factor models including three method factors for general sexual experiences, partnersex, and solosex. Third, the ASPI state scales are newer in development than the trait scales, since the trait scales were partially based and therefore able to learn from the original version of the ASPI 0.1.

#### ***4.1.4 Factors vs. Components – Latent Variables vs. Indices***

We also demonstrated acceptable model fit for the component models for the general scales, with component loadings generally surpassing acceptable strength. However, the fact that the components only captured about 50% of the variance suggests that one should look critically at an average score of this scale. Experience across the different activities seem to vary unsystematically across individuals - i.e., not everyone who experiences masturbation as pleasurable also experiences partnersex as pleasurable – which implies that overall pleasure and enjoyment across different activities cannot be easily reduced unidimensionally.

## **4.2 Measurement Invariance and Known-Group Differences**

We showed that the ASPI can be used to compare scores across sex and probably sexual function groups since measurement invariance was given for both male and female participants and for sexually functional and dysfunctionally scoring people. Thereby, the ASPI is the first pleasure scale with validity evidence regarding uses and comparability in such different groups of people.

Furthermore, we showed that all ASPI-scale scores significantly differentiated between dysfunctionally scoring and functionally scoring participants, with ER Self-Efficacy showing the biggest difference among the trait scales and the state scales showing bigger differences than the trait scales. These results confirm that the ASPI is able to discriminate

sexual function groups and that sexually dysfunctional scoring individuals report less pleasure and a lower tendency to experience pleasure than functional scoring individuals, which is in line with previous research (Pascoal et al., 2016; Stephenson & Meston, 2012). Furthermore, these results suggest that it is useful to differentiate between state and trait sexual pleasure.

Somewhat contrary to the previous literature (Klein et al., 2022; Laan et al., 2021), sex differences occurred only on ER Self-Worth and Interaction Enjoyment and the state pendant PR Validation, with females scoring higher on ER Self-Worth and PR Validation and lower on Interaction Enjoyment than males. Our finding highlights the utility of the ASPI in that it is possible to study how specifically groups differ in various aspects of pleasure and enjoyment. Earlier findings of sex differences in pleasure, with women reporting less pleasure than men, potentially resulted from the fact that those instruments assessed pleasure and enjoyment associated with the sexual interaction rather than other (aspects of) sexual activities.

#### **4.3 Construct and Content Validity: Convergent and Discriminant Associations and Response Process Evaluation**

Overall, each ASPI-scale showed sufficiently differential interrelationships with the other constructs which suggests that each scale represents a unique construct worthwhile to interpret and use separately. This further supports our decision to not collapse factors into one scale. Furthermore, participants provided qualitative responses which showed good evidence of validity regarding the content of the ASPI-scales. Items were considered comprehensive, understandable, and relevant.

Our construct validity analyses offered evidence of good validity of the ASPI-scales in terms of relations with other variables, apart from some important exceptions regarding Sexual Inhibition and Attachment Anxiety. In line with our predictions, the ASPI-scales correlated more strongly with sexological compared to psychological scales, with the trait

scales correlating more strongly with Sexual Excitation compared to Behavioral Activation, and the state scales correlating more strongly with Sexual Function, Distress and Satisfaction compared to General Positive and Negative Affect. Furthermore, the ASPI Self-Efficacy & Mastery and Self-Worth & Validation scales showed differential patterns of relationships with Sexual Assertiveness and Self-Esteem, supporting their intended interpretation (Mastro & Zimmer-Gembeck, 2015; Rowland et al., 2015).

As expected, the ASPI-scales correlated with Sexual Satisfaction, but overall less strongly and consistently so than Sexual Satisfaction and Sexual Distress correlated with each other, offering further evidence to interpreting the ASPI to measure another construct than satisfaction, which is consistent with the literature (Bois et al., 2013; McClelland, 2010, 2014; Pascoal et al., 2014; Stephenson & Meston, 2012).

Contrary to our expectations, the ASPI trait scales did not correlate as expected with Attachment Anxiety and Sexual Inhibition, whereas the relationships between the ASPI trait scales and Attachment Avoidance and Sexual Excitation did follow our expectations overall (Davis et al., 2004; Impett et al., 2008; Nelson-Coffey et al., 2017). We speculate that these deviations are due to the fact that, at the time we formulated our hypotheses, we had limited understanding of the differential roles Attachment Anxiety and Sexual Inhibition play in pleasure and enjoyment. That is, we think that we specified faulty conceptual hypotheses rather than that we report on problems of the ASPI. Future research should disentangle the differential role Attachment Avoidance and Attachment Anxiety appear to play in sexual pleasure and function, and focus on the differential role Sexual Inhibition and Sexual Excitation seem to be playing in different domains of sexual pleasure and enjoyment.

Regarding the general scales (Sexual Enjoyment and Sexual Pleasure), we noted that they correlated most strongly and robustly with Arousal Enjoyment and Sensual Pleasure and Self-Efficacy and Mastery, and somewhat less strongly and consistently with the Bonding and Interaction facets, and very weakly to not at all with Validation and Self-Worth. This might

imply that general sexual pleasure and enjoyment do not encompass the Self-Worth and Validation facets. Also, the alternative general Sexual Pleasure Scale (SPS; Pascoal et al., 2016) correlated consistently with the Bonding and Interaction scales, suggesting that this alternative general scale measures the interpersonal domain of sexual pleasure. Since the general scales correlated with at least one of the scales of each domain, these results suggest that the general ASPI-scales can be interpreted and used to assess the general tendency to and experience of sexual pleasure.

#### **4.4 Limitations and Future Improvements**

There are several limitations and potential future improvements regarding the study and questionnaire.

##### **4.4.1 Study**

First, the study did not include repeated measurements which are needed to investigate differentiation into state and trait variability on the scales over time (Hamaker et al., 2007) as well as reliability in terms of temporal stability. Second, in this study we did not further discuss and differentiate between traits as tendencies and traits as capacities which we shortly referred to in the introduction. We expect that a self-report assessment that is structured like the ASPI mostly assesses the tendency but not capacity to experience pleasure (see for a discussion Werner et al., 2023), an assumption which should be further researched in the future. Third, we studied the ASPI in a sample of German-speaking individuals.

Investigations of cross-cultural measurement invariance are necessary in order to use the ASPI in other languages and cultural contexts. Fourth, examining the factor structure of the ASPI for sexually inactive people separately was beyond the scope of the study. We did assess different procedures for scoring the “not applicable” responses indicating that in our sample the scoring of “not applicable” responses did not have a strong influence on the



conclusions drawn regarding validity evidence. Future studies should assure the valid use and interpretation of the scores in samples with more “not applicable” and missing responses and explore the scaling and scoring in different groups in more detail using Item Response Theory. Fifth, measurement invariance in people with sexual dysfunction, people whose assigned sex does not correspond to their gender, and partnered versus non-partnered respondents needs to be assessed in a larger sample to pursue the goal of using the ASPI scores to compare these groups of individuals validly. Last but not least, we focused on reporting validity evidence for the state and trait scales separately. Future research should investigate how the state and trait facets relate to each other.

#### ***4.4.2 Questionnaire***

First, the ASPI is a self-report questionnaire leaving the results subject to measurement limitations specific to self-report assessments. Future work using different instruments such as physiological measures of pleasure and instruments assessing standardized situations can gather additional evidence regarding the interpretation of the ASPI state scales as a state measure and the interpretation of the ASPI trait scales as a trait measure. Second, the validity evidence suggested that the Interaction scales and the Self-Worth/Validation scales require another round of improvements. Third, the current version does not yet cover all rewarding aspects of sexual experiences and participants suggested to add facets that dovetail with additional facets suggested in previous research (playing with, learning about, and expanding boundaries as well as novelty and the transcendence or spirituality of sex; see also Goldey et al. (2016); Kleinplatz et al. (2009); Werner et al. (2023)). Fourth, as for previous versions of the ASPI (i.e. 0.1) and other sexual pleasure scales, the items and scores of the ASPI 1.0 were left skewed and non-normally distributed; however, rather than seeing this as a limitation of the instrument it appears to be how pleasure is distributed in samples from the general population (Beckmeyer et al., 2021). Fifth, as the

combination of state and trait scale is still lengthy (> 50 items), future studies could aim to develop even shorter versions.

#### ***4.4.3 Strengths and Conceptual Implications***

The ASPI is the first questionnaire to assess sexual pleasure from a conceptual and holistic perspective, capturing trait and state aspects of multiple facets of sexual pleasure, considering aspects of partner and solo sexuality, while being inclusive as it does not assume gender, sex, or relationship types. We investigated the questionnaire using a large sample representing the general (German speaking) population. Nevertheless, the ASPI might also be used in clinical groups. The results suggest that the ASPI includes constructs which have not been covered sufficiently yet in other conceptual frameworks and questionnaires and which could be useful for future research on sexual dys/function and differences between groups. For ease of use, we provide information on the use and scoring of the ASPI within R and SPSS on the OSF (<https://osf.io/9hkde/>).

By drawing on the conceptual framework of Werner et al. (2023), the study simultaneously offers evidence for the uses and interpretations of the questionnaire as well as evidence for this recently proposed framework. Contrary to expectations, Attachment Anxiety and Sexual Inhibition did not figure as important correlates of any of the facets, which will need to be incorporated into the framework. Also, the Interpersonal Domain and Validation and Self-Worth facets did not associate as consistently with General Sexual Pleasure and Enjoyment compared to the Hedonic Domain and the Mastery and Self-Efficacy facets. However, overall Werner et al.'s suggestion that sexual pleasure encompasses the (tendency for the) experience of *different* rewards was supported in that the general scales did correlate consistently with at least one scale of each of the three reward domains (hedonic, interpersonal and intrapersonal; Manuscript submitted for publication). The latter suggestion is in line with voices that suggest that sexual pleasure encompasses more than the experience

of sensual pleasure and orgasm and that it is crucial to incorporate other rewarding aspects of sexuality in order to study sexually pleasurable experiences (Fileborn et al., 2017; Goldey et al., 2016; Kleinplatz et al., 2009; Opperman et al., 2014).

Reflecting and addressing these conceptual facets of sexual pleasure in a measurement is crucial for further research and practice. Planning and designing an intervention will turn out differently if people differ in their general tendency to experience sexual pleasure or whether they differ in pleasure experienced recently and depending on which pleasure facet is experienced less intensely or consistently. Differentiating between different aspects of sexual pleasure, and general tendencies versus context-dependent experience, allows us to assess how general tendencies differ from experienced realities, and how situational differences rather than inter-individual differences in intra-individual tendencies predict differences in experienced pleasure. Depending on the source, interventions to increase sexual pleasure would need to focus on changing the capacities or the context. Future studies need to establish in what kind of constellation the rewards and the tendency to experience them contribute to an optimal pleasure balance and how the different rewards contribute to sexual health and wellbeing.

## **5. Conclusion**

Sexual pleasure is central to sexual health and has received increasing clinical and research attention in recent years (WAS, 2019; WHO, 2002). However, there was no measurement instrument yet that covered the diversity of sexual pleasure in a holistic and inclusive manner. In this article, we introduced the ASPI 1.0 and presented evidence for its intended interpretation and use. We showed that the ASPI is the first questionnaire that captures trait and state aspects of sexual pleasure and considers sexual pleasure as a multifaceted concept as suggested in the conceptual framework of Werner et al. (2023). Sexually pleasurable experiences can be more than “merely” sensually pleasurable

experiences, they can also encompass the experience of feeling validated, feeling confident and competent, feeling intimate and connected, and sharing pleasure joyfully. We hope the ASPI helps us to find out why some people find it easier than others to create pleasurable sexual experiences, and how different contextual factors enable some people to experience sexual pleasure while disadvantaging others.

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## **Supplemental Material**

S1: Rationale regarding selection of final ASPI items; Table S2: Associations between relevant sexological and psychological constructs with ASPI trait domains to test hypotheses of construct validity (convergent and discriminant validity); Table S3: Associations between relevant sexological and psychological constructs with ASPI state domains to test hypotheses of construct validity (convergent and discriminant validity); Figure S4: Stability Plots for Traits; Figure S5: Stability Plots for States. Further information about the project can be found at <https://doi.org/10.17605/OSF.IO/FQ29C> and available questionnaire materials at <https://doi.org/10.17605/OSF.IO/9HKDE>.

## **Disclosure statement**

The authors report no conflict of interest.

## **Funding Details**

No funding to disclose.

### Footnotes

<sup>1</sup> We used the following criteria for model fit: root mean square error of approximation (RMSEA) with values less than .06 indicating excellent fit, values between .08 and .10 indicating mediocre fit and values above .10 indicating poor model fit (Hu & Bentler, 1998); the standardized root mean square residual (SRMR) with values smaller than .09 suggesting good fit (Hu & Bentler, 1998); the comparative fit index (CFI) and Tucker–Lewis Index (TLI) with values above .90 indicating acceptable fit and values above .95 indicating good model fit (Hu & Bentler, 1998; MacCallum et al., 1996).

<sup>2</sup> Differences in fit smaller than .01 (for  $\Delta$ RMSEA) and larger than -.01 (for  $\Delta$ CFI and  $\Delta$ TLI) suggest invariance across groups (Chen, 2007; Cheung & Rensvold, 2002).

<sup>3</sup> For configural we used the following criteria for model fit: root mean square error of approximation (RMSEA) with values less than .06 indicating excellent fit, values between .08 and .10 indicating mediocre fit and values above .10 indicating poor model fit (Hu & Bentler, 1998); the comparative fit index (CFI) and Tucker–Lewis Index (TLI) with values above .90 indicating acceptable fit and values above .95 indicating good model fit (MacCallum, Browne, & Sugawara, 1996; Hu & Bentler, 1998). For metric and scalar: differences in fit larger than .01 (for RMSEA) and smaller than -.01 (for CFI and TLI) suggest invariance across groups (Chen, 2007; Cheung & Rensvold, 2002).

<sup>4</sup> Edge stability (retaining a correlation of .7 in at least 95% of the samples) for the trait and the state network was 0.751 (0.673-1) and the bootstrap-based variance around the edge estimates seemed acceptable. Stability plots can be found in the supplemental material S3.

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## Supplemental Material

### S1: Rationale regarding selection of final ASPI items

*Leading Questions: How did we proceed with the selection or deletion of items? What were the criteria we looked at?*

#### General criteria

- The items were evaluated both in terms of content (theoretical) and statistics (psychometric).
- In **terms of content** means:
  - According to theoretical background
  - According to qualitative data (sample 2): were used to ensure in advance (as an assumption for further analysis) that the item was not misunderstood or too complicated *and* when statistical uncertainty about whether to delete or keep an item during item reduction occurred.
- **Statistically** means:
  - Based on Cronbach's alpha (accepting a worse alpha if theoretically/content wise relevant to the construct; in principle, no lower than  $\alpha = .6$ )
  - Factor loadings: cut-off of .3 (i.e.,  $> .3$ , see Brown, 2015 p. 115; Costello & Osborne, 2005)
  - Distribution: to determine that sufficient variance was captured
- further it is necessary to note:
  - Some items were deleted even though they were statistically satisfactory, but to
    - a) shorten the scale (in this case, the worst item among the good ones was selected for deletion) and

b) for masturbation-partner sex equivalents (since either both or neither is kept) or explained the pleasure/experience variance relevant to the subscale.

- In other words, factor loadings lower than .3 but highly relevant to the construct could still be retained if the item either served as the masturbation/partner sex equivalent within a subscale or explained either the pleasure or experience variance relevant to the subscale.
- the state and trait items have been made as comparable as possible.

In the end, it was always about the best combination of all criteria for each item.

In summary, all items that are included in the final ASPI:

- Are theoretically grounded
- Are meaningful in terms of content
- Have psychometrically acceptable values

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**Table S2.**

*Associations between relevant sexological and psychological constructs with ASPI trait domains to test hypotheses of construct validity (convergent and discriminant validity)*

	Sexual Experience Enjoyment	Arousal Enjoy- ment	Enjoyment- related Self- Efficacy	Enjoyment- related Self-Worth	Inter- action Enjoy- ment	Bonding Enjoy- ment	Hypothesis in words incl. references
Sexual Function	+/++	+/++	+/++	+/++	+/++	+/++	We expect a low to moderate positive association between all ASPI trait-domains and sexual function (Pascoal et al., 2016; Stephenson & Meston, 2012; Werner et al., 2021b).
Sexual Distress	--	--	--	--	--	--	We expect a moderate negative association between the ASPI trait-domains and sexual distress (Pascoal et al., 2016; Stephenson & Meston, 2012; Werner et al., 2021b).
Sexual Assertiveness			+++	++/+++			Among all ASPI trait-domains, we expect Sexual Assertiveness to associate most positively (moderate to high strength) with Enjoyment-related Self-Efficacy and Enjoyment-related Self-Worth, with the association between Sexual Assertiveness and Enjoyment-related

							Self-Efficacy being stronger than the association between Sexual Assertiveness and Enjoyment-related Self-Worth (Mastro & Zimmer-Gembeck, 2015).
Sexual Excitation	++/+++	++/+++	+/++	+/++	+/++	+/++	Among all ASPI trait-domains, we expect Sexual Excitation to associate most positively (moderate to high strength) with the ASPI-domains Arousal Enjoyment and Sexual Experience Enjoyment (Bancroft et al., 2005; Janssen & Bancroft, 2007; Werner et al., 2021b). Comparatively, we expect Behavioral Activation to show relatively lower positive associations (low to moderate strength) with the ASPI-domains Arousal Enjoyment and Sexual Experience Enjoyment. Similarly, we expect Sexual Inhibition to show relatively higher negative associations with the ASPI-domains compared to Behavioral Inhibition with the ASPI-domains.
Sexual Inhibition	-/--	-/--	-/--	-/--	-/--	-/--	
Behavioral Activation	+	+	+	+	+	+	
Behavioral Inhibition	-	-	-	-	-	-	
Attachment Anxiety				--/---	++/+++	++/+++	We expect Attachment Anxiety to associate positively (moderate to high strength) with the ASPI-domain Attachment Enjoyment (with Interaction Enjoyment following in strength) but negatively (moderate to high strength) with the ASPI-domain Enjoyment-related Self-Worth. We expect these three associations to be the
Attachment Avoidance					--/---	--/---	

						<p>strongest associations among all ASPI trait-domains with Attachment Anxiety (Davis et al., 2004; Impett et al., 2008; Nelson-Coffey et al., 2017; Picardi et al., 2005). We expect Attachment Avoidance to associate negatively (moderate to high strength) with the ASPI-domain Attachment Enjoyment (with Interaction Enjoyment following in strength); however, in contrast to Attachment Anxiety, Attachment Avoidance does not, or only weakly, associate with Enjoyment-related Self-Worth. We expect these two expected associations to be the strongest associations among all ASPI trait-domains with Attachment Avoidance (Davis et al., 2004; Impett et al., 2008; Nelson-Coffey et al., 2017; Picardi et al., 2005).</p>
Self-Esteem			++	++/+++		<p>Among all ASPI trait-domains, we expect Self-Esteem to associate most positively (moderate to high strength) with Enjoyment-related Self-Worth and Enjoyment-related Self-Efficacy, with the association between Self-Esteem and Enjoyment-related Self-Worth being stronger than the association between Self-Esteem and</p>

							Enjoyment-related Self-Efficacy (Mastro & Zimmer-Gembeck, 2015; Rowland et al., Steinke et al., 2008).
--	--	--	--	--	--	--	--

Note: high positive association = +++; moderate positive association = ++ ; low positive association = +; high negative association = ---; moderate negative association = --; low negative association = -



**Table S3.**

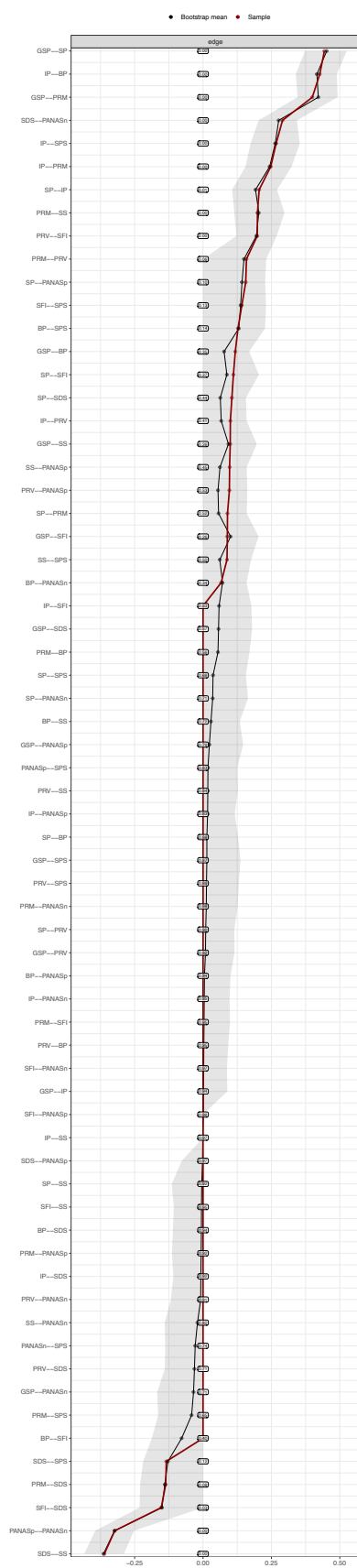
*Associations between relevant sexological and psychological constructs with ASPI state domains to test hypotheses of construct validity (convergent and discriminant validity)*

	General Pleasure	Sensual Pleasure	Validation	Mastery	Interaction Pleasure	Bonding Pleasure	Hypothesis in words incl. references
Sexual Pleasure	+++	+++	++	++	+++	+++	We expect Sexual Pleasure to associate strongly positively with General Pleasure, Sensual Pleasure, Attachment Pleasure and Interaction Pleasure, but less strongly positively with the ASPI state domains Mastery and Validation (Werner et al., 2021a; 2021b).
Sexual Function	++	++	++	++	++	++	We expect a moderate positive association between all ASPI state-domains and sexual function (Pascoal et al., 2016; Stephenson & Meston, 2012; Werner et al., 2021b).
Sexual Distress	--/---	--/---	--/---	--/---	--/---	--/---	We expect a moderate to high negative association between all ASPI state-domains and sexual distress (Pascoal et al., 2016; Stephenson & Meston, 2012; Werner et al., 2021b).
Sexual Satisfaction	++	++	++	++	++	++	We expect sexual satisfaction to associate moderately positively with the ASPI-state-domains (Bois et al., 2013; McClelland, 2010, 2014; Stephenson & Meston, 2012)..

Positive Affect	+	+	+	+	+	+	We expect a relatively lower positive association between the ASPI-state-domains and Positive Affect and a relatively lower negative association between the ASPI-state-domains and Negative Affect compared to the sexual state constructs (sexual satisfaction, sexual function, sexual pleasure) (Bancroft et al., 2003; Kalmbach & Pillai, 2014; Oliveira & Nobre, 2013; Peixoto & Nobre, 2012; Werner et al., 2021b).
Negative Affect	-	-	-	-	-	-	

Note: high positive association = +++; moderate positive association = ++ ; low positive association = +; high negative association = ---; moderate negative association = --; low negative association = -



**Figure S5.***Stability Plots for States*

### **2.3 Article 3: Effectiveness of an Unguided Online Intervention for Sexual Pleasure in Women: A Randomized Controlled Pilot Study**

This is a preprint of the manuscript that has been submitted for publication consideration at *Sexes*. It is currently undergoing review for the second time.

The preprint of the article can be found at <https://doi.org/10.31234/osf.io/s5cxt>.

## **Effectiveness of an Unguided Online Intervention for Sexual Pleasure in Women: A Randomized Controlled Pilot Study**

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### Abstract

The importance of sexual pleasure as a factor promoting sexual and public health is increasingly recognized. Nevertheless, hardly any theory-based and empirically tested interventions exist for fostering sexual pleasure. Consequently, we developed an unguided online intervention called PleaSure to promote sexual pleasure in women. In a randomized controlled pilot trial with a mixed-method design, we evaluated the effectiveness of PleaSure by comparing the intervention group to a waitlist control group in pre–post measurements over 4 weeks. With 657 participants ( $M_{age} = 31.46$ ,  $SD_{age} = 8.78$ ), we evaluated an index of sexual pleasure and five facets: sensual pleasure, pleasure-related mastery, pleasure-related validation, interaction pleasure, and bonding pleasure. The results show that the online intervention primarily strengthened the intrapersonal domain of sexual pleasure by increasing pleasure-related mastery. Neither the other facets nor the index were significantly influenced by the intervention. Although the effects of the quantitative data are small, the qualitative data support overall positive effects on participants' sexual experience. We discuss the content of the intervention and the methods used. Our pilot study suggests that sexual pleasure can be promoted, but that major improvements are needed to the intervention's content and design to do so effectively. Therefore, future studies are encouraged to further develop and implement such resource-efficient interventions in clinical and nonclinical samples to better understand the importance of sexual pleasure to sexual health.

*Keywords:* Sexual pleasure; sexual health; online intervention; randomized controlled trial

## 1. Introduction

Sexual pleasure can be defined as “physical and/or psychological satisfaction and enjoyment derived from solitary or shared erotic experiences, including thoughts, dreams and autoeroticism” (Global Advisory Board for Sexual Health and Wellbeing, 2016), and it constitutes one of the main reasons for engaging in sexual situations and becoming sexually active (Abramson & Pinkerton, 2002; Hull, 2008; Meston & Buss, 2007; Van Lunsen et al., 2013). Sexual pleasure describes the positive feeling that occurs when rewards are expected, attained, and enjoyed during sexual activities (Werner et al., 2023). Because the rewards achieved through sexual activity can be diverse, sexual pleasure is seen as a multidimensional construct (Goldey et al., 2016) and can be divided into three domains: hedonic, intrapersonal, and interpersonal. These domains in turn comprise facets: sensual pleasure in the hedonic domain, pleasure-related mastery and validation in the intrapersonal, and interaction and bonding pleasure in the interpersonal. Each facet is related to a possible reward that can be derived from sexual activity (Werner et al., 2023).

Sexual pleasure has been considered an essential component of sexual health and sexual rights for several years (Ford et al., 2019; Gruskin & Kismödi, 2020; Kismödi et al., 2017; Landers & Kapadia, 2020; Mitchell et al., 2021). This is supported by a growing body of evidence showing positive associations between sexual pleasure, sexual health, and health-related outcomes (Whipple et al., 2003). A review found that sexual satisfaction, pleasure, and positive self-esteem have a positive impact on sexual health as well as mental and physical health (Anderson, 2013). The latter can also be supported by an older study showing that enjoyment of sexual activity is associated with longevity in women (Palmore, 1982). However, results from research on sexual pleasure are also promising in terms of psychological and behavioral outcomes (Laan et al., 2021). On the one hand, studies have shown that sexual pleasure is positively correlated with autonomy, self-esteem, and empathy (Galinsky & Sonenstein, 2011; Sanchez et al., 2006). On the other hand, a recent study on



sexual behaviors has shown that sexual pleasure is related to several health indicators, such as communication about sexually transmitted infections (STIs), condom use, and the absence of sexual problems (Klein et al., 2022). Recently, sexual pleasure was even declared one of four pillars of a comprehensive public health approach to sexuality (Mitchell et al., 2021).

These findings highlight the importance of sexual pleasure to overall well-being and the need for interventions focused on increasing sexual pleasure. Therefore, the World Association of Sexual Health (WAS, 2019) highlights in the Declaration on Sexual Health that sexual pleasure should be accepted and supported by acknowledging “sexual pleasure as a component of holistic health and well-being: . . . The right to sexual pleasure should be universally recognized and promoted.”

### **1.1. Sexual Pleasure in Sexual Health Interventions**

Many sex-positive interventions and projects have been initiated and evaluated over the past two decades, resulting in increased recognition of and focus on positive sexual health constructs such as sexual pleasure. Research indicates that interventions that incorporate sexual pleasure can lead to improvements in sexual health knowledge and attitudes and behaviors such as learning how to communicate with partners and practicing safer sex (Becasen et al., 2015; Hogben et al., 2015; Philpott et al., 2006; Scott-Sheldon & Johnson, 2006). This last was confirmed by a recent systematic review that examined 33 studies targeting HIV/STI risk reduction through a pleasure-based approach. The authors found that promoting sexual pleasure leads to a reduction in risk behaviors associated with sexual health (Zaneva et al., 2022). Other reviews and meta-analyses show congruent findings in which pleasure-based interventions reduce sexual risk-taking and improve sexual health (Becasen et al., 2015; Hogben et al., 2015; Philpott et al., 2021; Scott-Sheldon & Johnson, 2006). The repeated demonstration of the importance of sexual pleasure to public and sexual health has provided a foundation for a pleasure-based approach to sexual health and sexual rights.

However, in previous studies, sexual pleasure was studied as a predictor of sexual health rather than an outcome (Becasen et al., 2015; Hogben et al., 2015; Philpott et al., 2006; Scott-Sheldon & Johnson, 2006; Zaneva et al., 2022). Hardly any studies have examined the effectiveness of interventions for increasing sexual pleasure in the general population.

## **1.2. Online Sexual Health Interventions**

In recent decades, a promising trend in sexual health interventions has emerged in which interventions are increasingly delivered online. The effectiveness of online interventions for sexual health has already been confirmed several times. For example, online interventions have focused on (1) various sexual problems and dysfunctions (Chisari et al., 2022; Jones & McCabe, 2011; Stephenson et al., 2021; van Lankveld, 2016; Van Lankveld et al., 2009; Weitkamp et al., 2021; Zarski et al., 2018; Zarski et al., 2017), (2) STIs (Carswell et al., 2012; Williamson et al., 2021), and (3) sex education (Martin et al., 2020; Mustanski et al., 2015; van Clief & Anemaat, 2020; Wadham et al., 2019). Online interventions offer many advantages: they allow easy access, are flexibly available, can be conducted anonymously, save time and travel, and are very cost-effective (Berger & Krieger, 2018; Buntrock et al., 2014; Ebert et al., 2018). Indeed the European Society of Sexual Medicine has recently clarified that online sexual health interventions can offer fundamental opportunities to improve sexual health in the general population (Kirana et al., 2020).

However, online interventions conducted so far and the interventions involving sexual pleasure mentioned above have focused primarily on at-risk or clinical subgroups. To the best of our knowledge, only one observational study has tested the effectiveness of a website (OMGyes.com) that presents masturbation strategies as a resource for empowering women to enhance their understanding, support, and enjoyment of sexual pleasure (Hensel et al., 2022). Participants were asked to explore OMGyes.com over a 4-week period. No further instructions were provided on frequency or approach to resource use. Using the OMGyes.com

website for 4 weeks had a positive impact on how women thought and felt about their sexual pleasure and how they understood and communicated their own preferences to their partners (Hensel et al., 2022). By targeting the general population, defining sexual pleasure as an outcome, and using the online setting, the study summarizes what has been lacking so far. The study provides important evidence that sexual pleasure can be targeted, but it has three main limitations: First, the study included no control group; second, it was not conducted as a randomized controlled pilot trial (RCT); and third, the intervention is not theory based.

### **1.3. Sexual Pleasure and Sexocorporel**

The Sexocorporel approach can provide a theoretical background for interventions for promoting sexual pleasure because this is the central goal of Sexocorporel sexual therapy (Bischof, 2012). Sexocorporel is a comprehensive view of human sexuality that considers the physiological, emotional, cognitive, and relational components involved in a sexual experience. (Bischof, 2012; Desjardins, 1996; Desjardins et al., 2010). According to Sexocorporel, sexual pleasure depends on individual knowledge and learning processes; thus, psychoeducational elements and self-experience elements are central to promoting sexual pleasure. Such practical elements of Sexocorporel include exercises and reflections that provide resources to experience a positive body image and genital self-image. To achieve this, they focus primarily on self-stimulation and individuals' new experiences with their own bodies through conscious changes following the three dimensions of body movement, rhythm, and muscle tone during sexual activity (Desjardins, 1996; Desjardins et al., 2010). Movement of the pelvis and alternating phases of contraction and relaxation of the pelvic floor are associated with greater pleasure and orgasms during sex (Bischof-Campbell et al., 2018). By learning and mastering a variety of arousal modes through mindfulness, body self-exploration, and concrete exercises to increase and intensify arousal, individuals can expand the spectrum of their sexual pleasure (Bischof-Campbell et al., 2018; Desjardins, 1996;

Desjardins et al., 2010). Therefore, Sexocorporel may provide a theoretical framework for an intervention for promoting sexual pleasure.

One study has already empirically tested the Sexocorporel approach in a face-to-face therapy for men with premature ejaculation and shown promising results for sexual function and sexual satisfaction (de Carufel & Trudel, 2006). In addition, three German-language manuals written by sex therapists discuss the basics, methods, and use of Sexocorporel (Schiftan, 2018; Sparmann, 2015; Sztenc, 2020).

#### **1.4. The Current Paper**

We drew on the theoretical background of the Sexocorporel approach to develop a 4-week unguided online intervention called PleaSure. PleaSure is the first online intervention based on Sexocorporel and incorporates psychoeducational elements and specific exercises for promoting women's sexual pleasure. Our decision to prioritize research on women's sexual pleasure before men's was motivated by the historical imbalance in which women's pleasure has been given less attention and importance compared to men's (Hall, 2019; Laumann et al., 2006; Mahar et al., 2020; Van Lunsen et al., 2013). By focusing on women's pleasure, our study aims to contribute to the growing efforts to promote sexual agency and pleasure for all women. The intervention targets the general female population and uses sexual pleasure as a preventative factor that promotes sexual and public health. Thus, the intervention addresses the core of sexual health policy suggested by the European Society of Sexual Medicine (Kirana et al., 2020).

The aim of this pilot study was to test the effectiveness of the online intervention PleaSure using a mixed-method design in an RCT comparing an intervention group (IG) with a waitlist control group (WCG).

Our research questions were as follows:

Research question 1 (RQ1): How do the facets of sexual pleasure change among the IG before and after the online intervention compared to the WCG? We expect that women's facets of sexual pleasure in the IG will be significantly higher in the postintervention measurement than in the preintervention measurement compared to women in WCG.

Research question 2 (RQ2): How do the sexual pleasure facets change in the IG from pre to post to follow-up as a result of the online intervention? We expected the positive outcomes to persist at 4-week follow-up among women in the IG.

## **2. Materials and Methods**

### **2.1. Description of the Online Intervention PleaSure**

PleaSure is an unguided online intervention for women from the general population to promote sexual pleasure using psychoeducational elements and specific exercises derived from Sexocorporel. Thus, the intervention aims to promote sexual pleasure among a wide range of women, rather than just a specific subgroup (e.g., women with sexual dysfunctions). The content of the intervention was developed from the theories of Sexocorporel (Bischof, 2012; Chatton et al., 2005; Desjardins, 1996; Desjardins et al., 2010), the German-language Sexocorporel manuals (Schiftan, 2018; Sparmann, 2015; Sztenc, 2020), and an exercise manual with hands-on Sexocorporel exercises (Sparmann, 2018). The online intervention was conducted in German and was divided into four steps, which were completed by the participants over a period of 4 weeks. Each week covered a thematic focus and specific learning outcomes that were always presented at the beginning of a new week (see Table 1). The website ([www.pleasure-studie.ch](http://www.pleasure-studie.ch)) begins with some basics, providing participants with important terms and theories relevant to the Sexocorporel approach and an anatomical summary about the female reproductive organs, so that all participants have the same prior knowledge. After this, the four steps follow:

1. The first week focuses on mindful awareness of the body. The knowledge section includes information on mindfulness, the parasympathetic and sympathetic nervous systems, and Jacobsen's progressive muscle relaxation (PMR); the link between body and mind is a key theme in Sexocorporel (Desjardins et al., 2010; Sztenc, 2020). The exercises for this week are a mindful-based body scan and a PMR exercise (Sparmann, 2018) that treats the whole body including the genitals and can be listened to as audio or read as text.
2. The second week focuses on exploring the vulva, as Sexocorporel assumes that the better the genital self-image is, the better the sexual experience will be (Sparmann, 2015). Thus, general knowledge is provided about the vulva, and a summary of the OMGyes study describes various forms of genital stimulation (Herbenick et al., 2018). The exercise is on genital self-image (Sparmann, 2018). In the first part of the exercise, the vulva is explored with a hand mirror. In the second part of the exercise, the vulva is explored with the fingers.
3. The third week focuses on the habitual arousal patterns and the variation of tension and relaxation of body regions that is integral to Sexocorporel practice (Bischof, 2012; Desjardins, 1996). Information was provided on arousal patterns, and on the relation between tension and relaxation. As an exercise, participants were asked to masturbate while varying habitual arousal patterns (Schifftan, 2018). At the end of this step, the participants are encouraged to perform the exercise in couple sex as well. The participants receive input on the topic of consensus and communication in couple sex because it is known that experiences and skills acquired in solosex can be transferred to couple sexuality (Bischof-Campbell et al., 2018).
4. The fourth week focuses on the element movement and the body parts the pelvic floor and the inner vaginal space as these are central body regions for Sexocorporel (Bischof, 2012; Sztenc, 2020). The arousal modes were repeated, and reflection

questions were asked about muscle tension during masturbation. The psychoeducative element relates to the pelvic floor, excessive muscle tension, and associated pain. An exercise on tensing and relaxing the pelvic floor provides a practical demonstration for the participant. In addition, the Sexocorporel double swing exercise (Bischof, 2012) is introduced with a text and two videos. The double swing combines a movement of the pelvic swing with a movement of the chest, neck, and head (Sparmann, 2018) and is associated with greater physical and emotional intensity in sexual arousal (Bischof-Campbell et al., 2018). Another exercise is the bullet fantasy journey exercise (Sparmann, 2018), which uses an audio to help the participant imagine a ball making its way through her vagina.

At the end of each step, central references are summarized, contact information is provided, and participants are encouraged to repeat the exercises several times during the week. At the end of the online intervention, the participants were asked some reflection questions. In addition, they were taught how to implement the contents learned in their everyday lives. Excerpts from the website can be found in the supplemental material S1-S7. PleaSure offers various advantages associated with this unguided online format. These include comparatively easy access, flexible availability, anonymity, and cost-effectiveness (Buntrock et al., 2014). The online setting proved to be a particularly useful and practical tool because the RCT was conducted during the Covid-19 pandemic, when face-to-face contact was especially difficult.

**Table 1***Procedure and content of the study*

	Topic	Psychoeducative elements	Exercises	Learning Outcomes (in this week you ...)
Start	Basics	Important theories (embodiment, mindfulness, and Sexocorporel) and terms (gender, sexuality) Refresh anatomy knowledge (vulva, vagina, clitoris, pelvic floor)	Reflect actual state of the own sexuality Set personal goals	Reflect your current state in sexuality and set personal goals for yourself, how intensively you want to deal with the course and what you want to achieve in the further development of your sexuality. Refresh your knowledge of the anatomy of sex and perhaps learn something new about it.
1 <sup>st</sup> week	Perception of one's own genitals	Exploration on Mindfulness and Progressive muscle relaxation (PMR)	Opening exercise: Exploration of the hand Mindful bodyscan including the genitals	Refresh your knowledge about mindfulness. Perceive your body in its present state. Explore and observe your body in a mindful, non- judgmental and curious way.
2 <sup>nd</sup> week	Discovery of one's own genitals	Description of the vulva and different forms of genital stimulation	Mindful exploration of the vulva with hand mirror Mindful exploration of the vulva with fingers	Recognize the diversity of different vulvas. Establish acceptance and a sense of pride towards your genital. Learn about different aspects of genital touch and stimulation.



3 <sup>rd</sup> week	Arousal tension and relaxation	Description of sexual response cycle, orgasm, and arousal modes	Masturbation exercise Getting to know the own arousal modes	Learn theoretical background knowledge about the sexual response cycle and ways of increasing arousal.
				Get to know and expand your own arousal patterns through pleasant touches on the genitals and the whole body.
4 <sup>th</sup> week	Movement	Explanation of pelvic floor, movement, and vagina	Tightening the pelvic floor Double swing Imagination to the inside of the vagina	Learn about the relevance and modulation of the pelvic floor.
				Learn that the increase in perception and arousal can be regulated by tension, relaxation, and movement of the pelvic floor. Feel the spread of sensory perception in the genitals with the help of movements of the pelvis and a fantasy journey.
Closing	Review	encouraging further practice (also in couple sex) Further inspiration (links to info pages)	Review and reflection	

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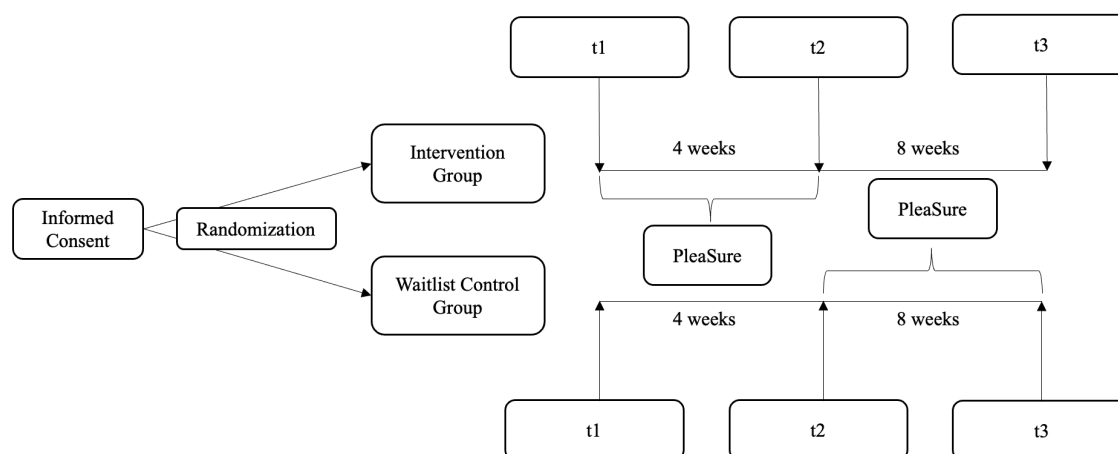
## 2.2. Procedure and Study Design

A two-arm RCT with three repeated measures was conducted to compare participants who used the internet-based unguided intervention PleaSure and thus constituted the IG to those assigned to a WCG. Between May and December 2021, participants were recruited in Switzerland through an online and offline channel. On the one hand, we posted the advertisement for the study on our private and our research group's Instagram profile (unibe\_sexuellegesundheit), on the other hand, we distributed flyers at the University of Bern and in public places in the city of Bern. This recruitment method was chosen to reach a diverse group of women from the general population, rather than just women with sexual difficulties. Data were collected using the Qualtrics online questionnaire program (Qualtrics, Provo, UT). Participants were required to indicate their agreement to participate voluntarily, confirm that they were at least 18 years old and agree that their responses would be used for research purposes on the first page of the questionnaire. If they did not agree to any of these points, they were immediately excluded from the study. After the participants had given their written informed consent, an algorithm function of the Qualtrics online questionnaire program assigned them to one of the two study conditions in a 1:1 ratio. This procedure meant that the investigators were completely blinded during the randomization and data collection. Inclusion criteria were that participants had to be identified as (1) female, (2) over 18 years old, and (3) German speakers. All participants attended voluntarily. After completing the baseline questionnaire (t1), participants were informed whether they were assigned to the IG or the WCG, with participants in the IG receiving direct access to the online intervention and participants in the WCG being informed that the intervention would start in 4 weeks. Four weeks later, all participants were asked to fill out the same questionnaire again (t2), and participants in the WCG who did so were given access to the online intervention. During the four-week intervention period, all participants were reminded to continue with the intervention through weekly automatic e-mails. These e-mails were sent to all participants

regardless of whether they had used the intervention or not. The final measurement (t3) took place after another 4 weeks, following completion of the online intervention by the WCG and as a follow-up for the IG (see Figure 1 for study design). To match each participant's responses across the three measurement points, participants were asked to create a pseudonym, which they were asked to provide in all three questionnaires. Participants who completed all three questionnaires had the opportunity to take part in a raffle with prizes such as a book about sexual pleasure. The study was approved by the Ethics Committee of the University of Bern on May 7, 2021 (No. 2021-04-00005) and is registered on the Open Science Framework (OSF; [osf.io/bhkh2](https://osf.io/bhkh2)).

**Figure 1**

*Participant Flow. T1 = baseline for IG, pre-baseline for WCG; t2 = post-measurement for IG, baseline for WCG; t3 = follow-up-measurement for IG, post-measurement for WCG*



## 2.3. Measures

The following is a description of the measurement tools and variables used for this RCT. The data collection was part of a larger project that included more measurement

instruments and variables than those listed below. All information about the measures not specified here can be found in the preregistration on the OSF ([osf.io/xbhk2](https://osf.io/xbhk2)).

### ***2.3.1. Demographic Data and Frequency of Sexual Behavior***

Demographic data included information on age, gender, level of education, sexual orientation, and partnership status and were obtained in the baseline questionnaire (t1). To assess the frequency of partner sex and masturbation, two items formulated by the authors, “how often do you have partner sex on average?” and “how often do you masturbate on average?”, were included in the questionnaire. Response options for each question were as follows: “I have never had partner sex or masturbated”, “less than 1 × a month”, “more than 1 × a month to 1 × a week”, “more than 1 × a week to daily”, “several times a day”.

### ***2.3.2. Outcome Measure: Sexual Pleasure***

The Amsterdam Sexual Pleasure Inventory (ASPI Vol. 1.0) is a self-report questionnaire comprising two parts, Trait Sexual Pleasure and State Sexual Pleasure with good psychometric properties (Borgmann et al., 2023). To identify changes arising from the intervention, we assessed only the state part, which includes 30 items in six subscales. The following is a list of the ASPI’s state subscales with their definitions and a sample item of each (Borgmann et al., 2023):

- *Sensual Pleasure*: Level of pleasure experienced through sensual stimulation and its psychophysiological consequences (e.g., item 2: “Touching my erogenous zones was pleasurable.”). The reliability of the five-item scale was high ( $\alpha = .80$ ).
- *Pleasure-Related Mastery*: Level of experienced mastery in creating pleasurable sexual activities (e.g., item 6: “shape my sex life in a way that I really enjoyed.”). The reliability of the six-item scale was high ( $\alpha = .85$ ).

- *Pleasure-Related Validation*: Level of perceived worthiness to experience positive sexual experiences and experienced self-validation during sex (e.g., item 12: “I thought it was important to live out my sexual needs.”). The reliability of the three-item scale was questionable ( $\alpha = .66$ ).
- *Interaction Pleasure*: Level of pleasure experienced during sharing pleasure and from interaction with a sexual partner (e.g., item 18: “During partner sex, we were both completely absorbed in pleasure.”). The reliability of the five-item scale was excellent ( $\alpha = .90$ ).
- *Bonding Pleasure*: Level of experienced (pleasure through) feelings of closeness, affection, safety, and security during sexual interactions (e.g., item 24: “Sex brought me closer to my sex partner.”). The reliability of the five-item scale was excellent  $\alpha = .93$ .
- *General Sexual Pleasure*: Level of recently experienced pleasure related to different sexual activities (i.e., items 26 and 28: “Partner sex was pleasurable.” and “Masturbation was pleasurable.”). The reliability of the six-item scale was high ( $\alpha = .84$ ).

The subscales are calculated from the mean value and may not be added together to form a total scale. The items are rated on a 6-point Likert scale from “not at all” to “to a great extent” and refer to the experience of sexual pleasure over the previous 2 weeks. For some items, an additional response option refers to the absence of a specific event or experience and is coded “NA”. Higher scores indicate higher levels of recently experienced sexual pleasure. All ASPI state items can be found in the supplemental material S8.

We chose this measurement instrument because it is the first questionnaire that tries to capture sexual pleasure holistically by covering the proposed facets of the theoretical framework for sexual pleasure (Werner et al., 2023). Previous questionnaires capture sexual

pleasure rather unidimensionally, focusing on either sensory pleasure (Jozkowski et al., 2016; Vigil et al., 2021) or pleasure during intercourse (Pascoal et al., 2016). Thus, by assessing five facets of sexual pleasure (sensual pleasure, pleasure-related mastery and validation, interaction pleasure and bonding pleasure), the ASPI goes beyond these questionnaires. Therefore, the ASPI enables us to gain precise insights into which facets of sexual pleasure can be improved by the intervention. Moreover, the ASPI is formulated inclusively to address all individuals including those in a relationship, singles, and sexually inactive individuals.

### ***2.3.3. Compliance with and Evaluation of the Online Intervention PleaSure***

The level of compliance was established with two self-formulated items assessed in the post measurement. The items related to the use of the online intervention: “in which week did you invest the most or least time in the program?” and “how often did you do the exercises on average?” The evaluation regarding the exercises was also captured after the online intervention in the postintervention measurement and assessed with following two author-formulated questions: “which exercise did you like? (multiple answers possible)” and “what could you benefit from the most?”. Last but not least, the evaluation regarding the program in general and potential changes due to the program were assessed with the following three author-formulated open-ended questions: “was there a key moment in your engagement with the online program and if so, what was it?”; “in the last month, what do you think was the most significant change for you that took place as a result of participating in the online program?”; and “why was this change important to you?” The last two questions were used to obtain qualitative data about the online intervention.

## **2.4. Power Analysis**

In order to ensure that our study had adequate statistical power to detect meaningful differences in our research questions (RQ1 and RQ2), we conducted two separate power

analyses using G\*Power (Faul et al., 2007). For our power analysis, we used a probability level of 0.05, meaning that we wanted to minimize the chance of a type I error (i.e., rejecting the null hypothesis when it is actually true) to 5%. A power of 0.8 was chosen, meaning that we wanted to have an 80% chance of detecting a true difference in the population if one existed. The effect size used in our power analysis was set to  $f = 0.2$ , which is considered a small-to-moderate effect size. This choice was based on the previous research in this field, which showed that the effect sizes reported in the literature are heterogeneous and can vary from small to moderate (Bailey et al., 2010; Becasen et al., 2015; Spijkerman et al., 2016; Swanton et al., 2015).

A power analysis, based on the chosen probability level, power, and effect size, determined that a sample size of  $n = 52$  was needed for RQ1 and  $n = 42$  was needed for RQ2. Both RQs used a repeated-measures ANOVA, with RQ1 having an additional within-between-interaction factor, requiring a larger sample size due to its complexity.

## 2.5. Statistical Analysis

Data were analyzed with IBM SPSS Statistics (SPSS) 27.0. Preliminary analyses comprised a randomization check and a dropout analysis to ensure that there were no systematic differences between the groups at baseline. For the randomization check, we compared the IG to the WCG; and for the dropout analysis, the study dropouts were compared to the study remainders using independent-sample  $t$  tests at baseline for the demographic and descriptive variables and outcome variables. Additionally, we evaluated the comparability of the intervention and WCG in the frequency of use of the online intervention. As a prerequisite for the main ANOVAs, the outliers were identified and treated according to Tabachnick et al. (2007).

To evaluate the effectiveness of the online intervention, we computed six  $2 \times 2$  mixed ANOVAs with repeated measures with the sexual pleasure subscales as dependent variables

and time (t1 and t2) and condition (IG and WCG) as independent variables to analyze RQ1, and six one-way repeated measures ANOVAs with the sexual pleasure subscales as dependent variables and time (t1, t2, t3) as independent variable to analyze RQ2. We verified the assumption of normal distribution as a prerequisite for the use of these planned ANOVAs. For smaller sample sizes, where normality was not met, we used the non-parametric Friedman test. ANOVA was still used for larger sample sizes as it is known to be relatively robust to non-normality in such cases (Blanca Mena et al., 2017; Schmider et al., 2010). In addition, the effect sizes eta squared ( $\eta^2$ ) were calculated for significant effects. Given the number of tests being run, it was important to control for the inflation of the Type I error rate due to multiple testing. To address this issue, we applied the Bonferroni correction procedure to adjust the significance level for each individual test. The Bonferroni correction involves dividing the desired overall significance level ( $\alpha$  set at 0.05) by the number of tests being conducted (six ANOVAs per RQ). This resulted in a adjusted significance level of 0.0083 for each individual test, ensuring that any significant results were robust and controlling for the inflation of the Type I error rate (Andrade, 2019).

### 3. Results

#### 3.1. Participants

In total,  $N = 963$  people were interested in participating in the study. Of this sample,  $n = 661$  entered a pseudonym, which was used as the key code for merging the participants' data over all three measurement points. Four participants who indicated that they were not female (inter = 1, male = 3) had to be excluded. Finally, 657 participants completed the baseline questionnaire fully. The mean age of the 657 participants in the final sample was  $M = 31.46$  ( $SD\ 8.78$ ), and they were highly educated: higher education or university: 68.9% ( $n = 453$ ), college: 18.7% ( $n = 123$ ), apprenticeship: 10.8% ( $n = 71$ ), secondary school: 0.5% ( $n = 3$ ), others: 1.1% ( $n = 7$ ). In total, 74.6% ( $n = 490$ ) of the participants were heterosexual,



18.3% ( $n = 120$ ) bisexual, and 2.3% ( $n = 15$ ) homosexual. The other 4.9% ( $n = 32$ ) of participants preferred to describe their sexual orientation differently (e.g., pansexual or heteroflex). Most participants were in a romantic relationship (65.5%,  $n = 431$ ). Demographic and descriptive information for the IG and WCG is presented separately in Table 2.

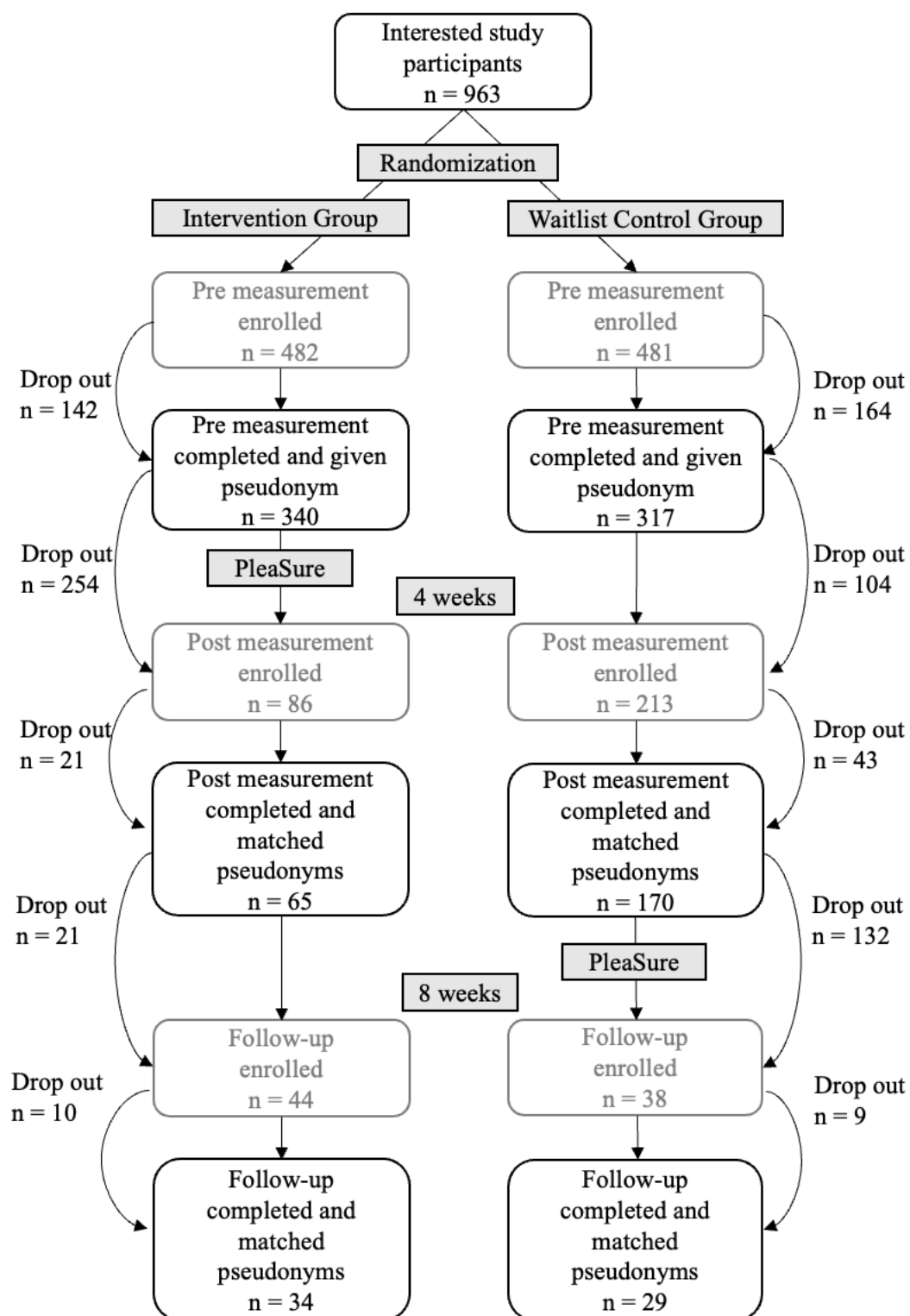
**Table 2.** Demographic and Pleasure-related Characteristics of Participants at Baseline.

Demographic characteristic	IG			WCG			Significance Test		
	n	M / %	SD	n	M / %	SD	t	df	p
Age	340	31.20	8.79	317	31.75	8.77	0.80	655	.425
Education Level	340			317			.1.64	655	.101
higher education or university	229	67.4		224	70.7				
college	64	18.8		59	18.6				
apprenticeship	43	12.6		28	8.8				
secondary school	0	0.0		3	0.9				
other	4	1.2		3	0.9				
Sexual Orientation	340			317			-0.18	655	.857
heterosexual	251	73.8		239	75.4				
bisexual	64	18.8		56	17.7				
homosexual	9	2.6		6	1.9				
other	16	4.7		16	5.0				
Relationship Status	340			317			0.32	655	.748
yes	225	66.2		206	65.0				
no	115	22.8		111	35.0				
Frequency of Masturbation <sup>a</sup>	340	3.05	0.74	317	2.98	0.75	-1.14	655	.257
Frequency of Partnersex <sup>a</sup>	340	3.24	0.72	317	3.21	0.71	-0.48	655	.632
Pleasure-related Variables									
General Sexual Pleasure <sup>b</sup>	336	4.68	0.90	314	4.59	1.01	-1.19	648	.235
Sensual Pleasure <sup>b</sup>	337	4.69	0.93	312	4.57	1.07	-1.50	620	.134
Pleasure-related Mastery <sup>b</sup>	331	4.45	1.01	300	4.45	1.09	0.05	629	.960

Pleasure-related Validation <sup>b</sup>	332	4.39	1.20	311	4.32	1.28	-0.72	641	.471
Interaction Pleasure <sup>b</sup>	237	4.61	1.10	206	4.48	1.13	-1.21	441	.225
Bonding Pleasure <sup>b</sup>	237	4.97	1.03	206	4.91	1.18	-0.54	441	.589

*Note.* IG = Intervention Group; WCG = Waitlist Control Group. <sup>a</sup> range = 1-5 (1 = “I have never had couple sex/masturbated”, 2 = “less than 1x a month”, 3 = “more than 1x a month to 1x a week”, 4 = “more than 1x a week to daily”, 5 = “several times a day”). <sup>b</sup> range = 1-6.

A high dropout rate was observed between each measurement point, which was partly due to the fact that the participants' self-chosen pseudonyms could not be matched. The participant flow, which shows the dropouts between the measurement points, is displayed in Figure 2. As shown in the participant flow, most participants dropped out at the very beginning, i.e., by not completing the initial questionnaire or by not providing a pseudonym, which was a prerequisite for the data analysis and after the end of the intervention phase. Dropouts were either due to participants did not start the questionnaire, not completing the questionnaire to the end, or not providing a pseudonym or an appropriate pseudonym. Unfortunately, it is not possible to disaggregate the ratio of reasons because we do not have other variables to relate the cases of the different time points due to data protection. To test the effectiveness of our intervention, we only retained participants who completed the questionnaires at preintervention and postintervention measurements for RQ1 ( $n = 235$ ) or all three time points for RQ2 ( $n = 34$ ).

**Figure 2.***Study design and measurement time points*

### 3.2. Randomization Check

The groups do not differ significantly regarding their age, sexual orientation, educational level, partnership status, frequency of masturbation or partner sex, or the other outcome variables at baseline. Additionally, the groups' frequency of use of the online intervention is compared. These results confirm that randomization was successful. Values for each independent sample  $t$  test are shown in Table 2.

### 3.3. Dropout Analysis

No significant difference in age, sexual orientation, educational level, partnership status, frequency of masturbation or partner sex, or the sexual pleasure outcome variables were found between the participants who remained in the study until the postintervention measurement compared to those who dropped out after the preintervention measurement. The same applies to those participants who completed all three questionnaires, with one exception: participants who remained until the follow-up measurement masturbated less at baseline ( $n = 57$ ,  $M = 3.00$ ,  $SD = 0.73$ ) than those who dropped out ( $n = 600$ ,  $M = 3.25$ ,  $SD = 0.71$ ;  $t(655) = 2.54$ ,  $p = .010$ ,  $d = 0.2$ ).

### 3.4. Effects at Postintervention: Mixed ANOVA with Repeated Measures

After treating the outliers, all assumptions were met for conducting mixed ANOVAs with repeated measures. An increase was observed in the mean values of all subscales. The means and standard deviations of all subscales per group are shown in Table 3.

**Table 3**

*Mean and Standard Deviation for IG and WCG at Preintervention and Postintervention*

*Measurement*

	IG			WCG						
	pre			post		pre			post	
	<i>n</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Sensual Pleasure	57	4.55	1.03	4.75	0.88	148	4.59	1.03	4.60	1.04
Pleasure-related Mastery	54	4.26	1.23	4.60	1.08	140	4.50	1.05	4.44	1.05
Pleasure-related Validation	55	4.28	1.25	4.61	1.16	144	4.35	1.31	4.34	1.31
Interaction Pleasure	35	4.51	1.11	4.75	1.00	88	4.52	1.15	4.61	1.12
Bonding Pleasure	35	5.13	1.01	5.22	1.05	88	5.01	1.15	4.94	1.16
General Sexual Pleasure	56	4.70	1.01	4.85	0.82	148	4.66	0.93	4.65	0.97

*Note.* IG = Intervention Group; WCG = Waitlist Control Group.

The mixed ANOVA for Pleasure-Related Mastery shows a statistically significant interaction between time and group ( $F(1,192) = 10.77, p = .001, \eta^2 = 0.053$ ). The effects for the other subscales were not significant. The statistical values for the six 2×2 mixed ANOVAs are shown in Table 4.

**Table 4***Results for the six 2×2 mixed ANOVAs*

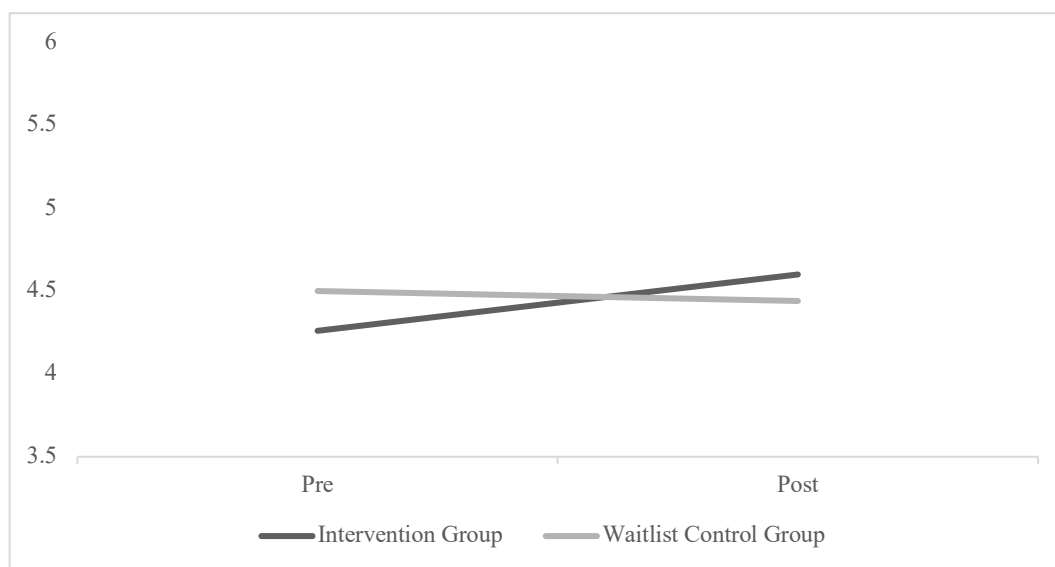
		<i>SS</i>	<i>F</i>	<i>df</i>	$\eta^2$	<i>p</i>
Sensual Pleasure	time	0.99	3.02	1, 203	0.015	.084
	time × condition	0.73	2.23	1, 203	0.011	.137
Pleasure-related Mastery	time	1.60	5.22	1, 192	0.026	.023
	time × condition	3.30	10.77	1, 192	0.053	.001
Pleasure-related Validation	time	2.06	3.32	1, 197	0.017	.070
	time × condition	2.37	3.81	1, 197	0.019	.052
Interaction Pleasure	time	1.32	4.80	1, 121	0.038	.030
	time × condition	0.26	0.93	1, 121	0.008	.336
Bonding Pleasure	time	0.01	0.02	1, 121	0.000	.888
	time × condition	0.30	0.10	1, 121	0.008	.320
General Sexual Pleasure	time	0.42	1.39	1, 202	0.007	.241
	time × condition	0.46	1.51	1, 202	0.007	.220

*Note.* SS = sum of square numerator.

The graph in Figure 3 shows the interaction of the significant effect of Pleasure-Related Mastery.

**Figure 3**

*Interaction effect of Pleasure-related Mastery. Axis values only range from 3.5 to 6 for better visualization, but the real range is 1 to 6*



### 3.5. Stability of effects: One-way ANOVAs with Repeated Measures

Six one-way repeated measures ANOVAs were performed to compare the IG's responses to the pleasure subscales before, directly after, and 4 weeks after the online intervention. The mean and standard deviation for the IG at all three measurement points are shown in Table 5.

**Table 5**

*Mean and Standard Deviation for IG at Preintervention, Postintervention, and Follow-Up Measurement*

	<i>n</i>	pre		post		follow-up	
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Sensual Pleasure	30	4.39	1.13	4.68	1.03	4.66	1.00
Pleasure-related Mastery	29	4.18	1.24	4.52	1.20	4.63	1.03
Pleasure-related Validation	29	4.37	1.23	4.63	1.09	4.67	1.21
Interaction Pleasure	19	4.45	1.08	4.63	1.00	4.59	1.07
Bonding Pleasure	19	5.06	0.96	5.07	1.16	5.00	0.95
General Sexual Pleasure	29	4.67	0.99	4.86	0.93	4.70	0.92

As can be seen in Table 6, when taking into account the correction for multiple testing, none of the six one-way repeated measures ANOVAs yielded significant effects. This suggests that the online intervention did not have a notable impact on pleasure-related outcomes in the IG across the three measurement time points.

**Table 6**

*Results for Six One-way Repeated Measures ANOVA with the IG*

	<i>SS</i>	<i>F</i>	<i>df</i>	$\eta^2$	<i>p</i>
Sensual Pleasure	1.54	2.66	2, 58	.084	.079
Pleasure-Related Mastery	3.14	4.04	2, 56	.126	.033 <sup>a</sup>
Pleasure-Related Validation	1.55	1.41	2, 56	.048	.252
Interaction Pleasure	0.33	0.65	2, 36	.035	.527
Bonding Pleasure	0.06	0.10	2, 36	.006	.905
General Sexual Pleasure	0.60	1.12	2, 56	.038	.334

Note. SS = sum of square numerator. a Huynh-Feldt correction since the sphericity assumption is not given for this subscale.



Because the normal distribution is not given for General Sexual Pleasure, Pleasure-Related Mastery, Pleasure-Related Validation, or Bonding Pleasure and  $n$  is too small ( $n < 30$ ) for these four subscales, we additionally calculated a nonparametric test for them (Friedman test). The results did not differ from that of the ANOVAs.

### **3.6. Compliance with and Evaluation of the Online Intervention**

Half of the participants (51.2%) followed our recommendations and performed the exercises at least 2–3 times a week< the others did the exercises less often. The majority (73.8%) stated that the combination of exercises and knowledge acquisition due to the psychoeducational elements was very helpful and better than only the exercises (9.5%), only the psychoeducational elements (14.3%), or something different (2.4%).

Among the exercises, participants favored the mindful exploration of the vulva (week 2), masturbation (week 3) and double swing (week 4) exercises. The mindful-based body scan including the genitals (week 1) and imagination of the inside of the vagina (week 4) exercises were liked by slightly fewer participants.

From the qualitative data evaluating the online intervention, we see that the participants' focus was on conscious exploration of the topic and conscious awareness of the whole body. Getting to know the body better and explicitly exploring the vulva, both in a positive way, were found helpful by many participants: “emphasizing the importance of mindfulness and positivity towards one’s own body”; “the body must learn to be touched as well.” Experiencing the effects of consciously controlling breathing was also cited by some participants as a key moment: “breathing deeply in and out helps for a more intense orgasm.” In addition, the double swing exercise was often mentioned as a key moment that combines all the aspects mentioned above.

The first question about the online program in general (whether there was a key moment during engagement with the online program) was answered yes by about half of the participants (48%). In response to the two other questions about what changed for participants as a result of the online intervention and why this change was important, a total of 66 responses were given per question. Of the 132 written answers, 20 were classified as neutral, or it was not possible to evaluate whether they indicated a positive or negative impact on the participants (for example, "more conscious perception of one's own sexuality" or "coming to terms with one's own body"). Only one response revealed that the online program was not completed ("Unfortunately, I didn't have the energy and desire to do the program in the past weeks. But it sounded very exciting."). The remaining 111 responses, representing 86.4% of the statements, were positive, as exemplified by 18 quotes in Table 7. The participants stated that their attitude towards masturbation and the appearance of their vulva had changed for the better. In addition, some reported more self-confidence, empowerment, and that they had learned to stand up more for their own needs and become more active. There were also some participants who made the link to general life, in the sense that it improved through improved sexuality (see Table 7, quotations 15 and 16).

**Table 7**

*Some answers to the questions: "In the last month, what do you think has been the most significant change for you that has taken place as a result of participating in the online program?" and "Why was this change important to you?"*

quote 1	"I have a totally new view of my sexuality. Before, it all scared me and today I know exercises and steps to approach it. I have sex very differently than before this month."
quote 2	"At the beginning of the month, I perceived the lack of a (sexual) partner as something negative [...], now I still wish for someone with whom I could try

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	out what I have learned here, but at the same time I am much more in tune with myself and I am satisfied in and with my sexuality.”
quote 3	“That I found my way back to more pleasurable masturbation and was ready to explore myself in a new way.”
quote 4	“The relationship with my sexuality has strengthened in a positive way just by dealing with myself and the gained knowledge through the program.”
quote 5	“Recognizing one's own sexual needs and seeing them as normal. Learning to control arousal and feeling that you can actively influence it during couple sex and have it in your own hands.”
quote 6	“I found it easier to talk about it [sexuality]. I am more open. I use my toy differently. I try to stimulate myself in a more varied way. I try to be more aware of my body, to breathe more and to use my body differently. I would say that I have more confidence to express my needs and fears to my partner.”
quote 7	“I feel much more comfortable with my genitals than before the program.”
quote 8	“I experienced an orgasm for the first time.”
quote 9	“I was never dissatisfied with my vulva, but I didn't pay any more attention to it than I did during masturbation. Now I'm proud of it, I know exactly how it looks when I'm not aroused, when I'm aroused, and even when I have an orgasm.”
quote 10	“Knowing what my vulva really looks like and finding her beautiful has had a positive effect on masturbation and couple sexuality. I have become more confident in this regard and can generally enjoy my sexuality more.”
quote 11	“Realization that i am fully functional after all.”
quote 12	“A new area is opening up in my sexuality!”
quote 13	“The change has been significant for me because now instead of a feeling of lack dominating my thoughts, I feel complete and good about the way my life is right now.”
quote 14	“It has brought us once again after 16 years of relationship even closer to each other and we enjoy our sexuality more than ever.”
quote 15	“Now i can finally live and feel myself. (put harshly - but true).”
quote 16	“I found it frightening how little i had dealt with it before and what a big positive difference the confrontation with the vulva makes in my sexual life, but also in my normal life.”

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quote 17	“Because I feel more and more that I can perceive and acknowledge my needs and feelings better and better, and it is becoming easier and easier for me to show and communicate what is good for me, what I want, and where my limits are.”
quote 18	“Sexuality was previously very shameful. I felt somewhat exposed and passive with regard to the speed and sequence of the build-up of arousal. I can now actively control this better.”

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#### 4. Discussion

This RCT is the first to empirically examine the effectiveness of an unguided online intervention for promoting sexual pleasure. The intervention, called PleaSure, uses exercises from the Sexocorporel approach to train participants to vary breathing, tension, movement, and rhythm and to provide knowledge to promote women's sexual pleasure. The main finding is that the online intervention only enhanced pleasure-related mastery; all other facets of sexual pleasure were not affected by the intervention. That the result pleasure-related mastery was promoted is not surprising, as the content of the online intervention was specifically intended to strengthen the individual skills and abilities that lead to sexual pleasure and to expand the repertoire of ways of doing so. Moreover, a focus on empowering individuals to experience more pleasure and supporting them in exploring themselves physically and genitally directly affects pleasure-related mastery.

However, the fact that all other facets of sexual pleasure remained unaffected was surprising. The interpersonal component (consisting of bonding pleasure and interaction pleasure) may not be promoted because the online intervention did not focus on partner sexuality per se and did not include the partners. For example, the online intervention did not focus on how participants stimulate partners or how partners stimulate participants; however, these are items intended to measure interaction pleasure: items 16 and 17 of the ASPI are “stimulating my sex partner was pleasurable,” and “being stimulated by my sex partner was

pleasurable.” Furthermore, it is worth noting that only half of the participants in the study were partnered, which may have affected the results of the study. People in stable partnerships generally have more opportunities to practice and consolidate their newly learned knowledge and experience of sexuality, as they have a larger learning environment through regular sexual activity with their partners (Kislev, 2020). However, it remains uncertain whether the partnered participants implemented the exercises within the context of their relationships, as this was not specifically assessed. Apart from that, transferring the practices to couple sex might require more routine and time that were not available in this brief intervention, even if they implemented the practices during sex with their partner. Therefore, a future version of the online intervention could put additional focus on the interpersonal domain of sexual pleasure by including partners and explicitly investigating their influence. A longer follow-up could also help to show the intended effects, because it is likely that the transfer to couple sexuality requires more time and routine. Finally, contrary to our expectations as well, no effect was found on sensual pleasure. Because some of the exercises were specifically related to self-stimulation, we expected that sensual pleasure would increase as a result of the online intervention. The qualitative data confirm an assumption of a mediating effect, as many participants cited engagement with their own vulvas as a key moment (quotes: 7, 9, 10, 16). This indirect effect on sensual pleasure via genital self-image should be investigated further. Furthermore, we would like to emphasize here that focusing on sexual doing and experiencing may also be temporarily inhibitory to sexual pleasure because one becomes aware of one’s limitations or lack of learning in sexuality.

In summary, the quantitative data of the study shows small and sobering effects on sexual pleasure. In contrast, the qualitative statements from the participants indicate that the intervention had a positive effect on overall sexual experience. Given the qualitative data, it is suggested that future studies include additional measures such as knowledge assessment, sexual satisfaction, or self-esteem to provide a more holistic understanding of the effect of the

intervention. Moreover, it is important to note that the qualitative statements must be considered in the context of social desirability bias and the possibility of this influencing the results cannot be ruled out.

However, the contradictory findings of the quantitative and qualitative data raise the question of how this can come about. There are at least four possible reasons for this: First, it is possible that the psychoeducational elements and exercises of the online intervention based on Sexocorporel were not specific enough to target facets of sexual pleasure, but comprehensive enough to yield positive change in the overall sexual experience. Second, it is to consider that the intervention may not have resulted in changes in behavior, which could explain the lack of changes in sexual pleasure (Ritterband et al., 2009; Smith et al., 2011). It is indeed a limitation that behavior (e.g., if the physical exercises were internalized and applied) was not included in the study. Examining changes in behavior as an intermediate step between the intervention and changes in sexual pleasure could provide valuable insight into the mechanisms underlying any observed effects. Without this information, it is difficult to understand the relationship between the intervention and (non-)changes in sexual pleasure. Third, it is possible that other variables that were not covered in the study and therefore could not be controlled for contributed to the lack of changes in sexual pleasure, such as menstrual cycle, stress, or conflicts (Bodenmann et al., 2010; Haning et al., 2007; Nowosielski et al., 2010). Having multiple measurement points and controlling for these variables would have provided more insight into the relationship between the intervention and changes in sexual pleasure. Fourth, it is possible that the participants did not actually perform the exercises as recommended, as compliance data indicated that only half of the participants adhered to the recommendation to perform the exercises at least 2-3 times per week. Since these are self-reported data, they may also not be entirely accurate, and it's possible that many participants did not follow the program as recommended. We assume that the effects could have been stronger and more evident if all participants had performed the exercises more consistently.

To overcome this, future versions of such an online intervention should include more guidance, implement more motivational and reminder emails or at least weekly surveys to ensure better control of the participants (Andersson & Titov, 2014). Another point to address and control this limitation is the inclusion of objective measures such as web analytics. Using web analytics would provide valuable objective data on participants' usage and engagement with the intervention. This could include tracking the number of times specific modules and exercises were accessed, as well as the duration of time spent on each module. By analyzing this data, researchers would have a better understanding of which exercises were most popular and effective, as well as which participants were more likely to stick to the program. Additionally, this would allow researchers to identify any patterns or trends in participants' engagement, which could inform the design and implementation of future interventions.

#### **4.1. Limitations and Strengths**

Our pilot study has several limitations that should be considered. First and probably the most significant limitation of this study is the high dropout rate, which is why we would like to examine it in more detail here as the first point of our interest. This limitation can be attributed to several factors. One of the main reasons is the unguided nature of the online intervention. Studies have shown that unguided online self-help interventions typically have small effects and high dropout rates, and our study was no exception (Berger & Krieger, 2018; Musiat & Tarrier, 2014). This is because unguided interventions rely on the participant's motivation and self-discipline to complete the program, and many participants may lose interest or become disengaged before completing the program. Another reason for the high dropout rate could be the participants' inability to reproduce their pseudonyms, which may have led to confusion and frustration for some participants, resulting in them dropping out of the study. Such dropouts must be avoided in future studies. Additionally, it is worth noting that this is a common problem in many online interventions and not specific to our

pilot study. It has been reported in various studies that dropout rates can be as high as 80% in online interventions (Melville et al., 2010). This raises the question to what extent we can trust such studies with such a dropout rate. Therefore, it is of utmost importance in future studies consider strategies to address this issue, such as providing more structure and support to increase engagement and retention or respond more to individual needs (Cavanagh, 2010). Second, the significant effect was not stable over time, which could be attributed both to the limited intervention fidelity and to the power not achieved for these analyses. Third, future studies should definitely include a follow-up for the WCG to make group comparisons and thus reach more powerful conclusions. Fourth, the sample may not be representative of the general population: participants were highly educated (68.9% have a higher education or university degree) and showed high pleasure scores at baseline, the latter being consistent with the distribution of pleasure in samples of the general population (Beckmeyer et al., 2021). This might be explained by the fact that the people who are most likely to participate in such a study are already interested in sex and sensitized to the topic. However, this sampling bias arguably strengthens our finding on pleasure-related mastery, because the effect was even evident in such a sample. Future studies are necessary to investigate such brief interventions in a more heterogeneous sample, especially among people in clinical and nonclinical settings who report limited sexual pleasure or function.

Overall, in addition to these limitations and potential for improvement, this pilot study shows essential strengths. First, PleaSure is the first theory-based online intervention that tests the content of the Sexocorporel approach. Moreover, it is worth noting that while there are already other programs and apps that aim to promote sexual pleasure, our intervention is unique in that it is the first to be empirically tested. This allows for a better understanding of the intervention's effectiveness and provides a foundation for future research in this area. Since PleaSure is addressed to the general population, our intervention considers sexual pleasure as a preventative factor for sexual and public health (Mitchell et al., 2021). Such



interventions are currently still rare, most online interventions conducted so far involving sexual pleasure have focused primarily on at-risk or clinical subgroups (Chisari et al., 2022; Stephenson et al., 2021; Williamson et al., 2021; Zarski et al., 2017). The research group is also currently adapting the online intervention to men and will investigate its effectiveness in a further study. Finally, if the intervention shows a small effect in the general population, it likely has great potential to be more effective for clinical subgroups, for example, people with sexual dysfunction. People with sexual dysfunction may have more room for improvement and thus a larger potential for change than the general population. Furthermore, the lack of effects found in the general population may be due to ceiling effects, where the majority of participants already have a high level of sexual pleasure and thus may not have as much room for improvement. Targeting a population with lower baseline levels of sexual pleasure may yield more significant results. Lastly, the online setting is in line with the current trend. In recent decades, a promising trend in sexual health interventions has emerged in which interventions are increasingly available online (Bailey et al., 2015; Bailey et al., 2010; Carswell et al., 2012; Guse et al., 2012; Hobbs, 2016; Swanton et al., 2015; Twist & McArthur, 2020). Furthermore, as already shown in a study on the promotion of genital self-image by Gonin-Spahn (2023), the combination of knowledge acquisition and exercises were crucial for the success of the intervention. The online intervention therefore benefits from many advantages and might also be applied in combination with counseling or therapy (Berger & Krieger, 2018; Ebert et al., 2018).

## 5. Conclusions

In conclusion, this RCT is the first to empirically investigate the effectiveness of an unguided online intervention, PleaSure, for promoting sexual pleasure in women. The results of the study indicate that while the intervention was effective in increasing pleasure-related mastery, there were no significant effects on other facets of sexual pleasure. Qualitative data

from the participants suggests that the intervention had a positive impact on overall sexual experience. However, the high dropout rate is a significant limitation of the study and warrants further investigation. The study provides initial evidence for the potential usefulness of the PleaSure intervention, but further improvements to the intervention's content and design are needed to better target the intervention for sexual pleasure and reduce dropout rates. Additionally, it highlights the need for more effective ways to engage participants in unguided online self-help interventions. Therefore, while the study presents some promise, more research is needed to fully understand the efficacy of the PleaSure intervention and to improve its design and engagement strategies. It should be noted that despite limitations, the intervention may be useful for people who are motivated to engage with it and that it is a low-cost option for many.

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## **Supplemental Material**

Figure S1: Screenshot of the Online Intervention: Introduction Page; Figure S2: Screenshot of the Online Intervention: Part of Basic Information Page; Figure S3: Screenshot of the Online Intervention: Part of First Week Page; Figure S4: Screenshot of the Online Intervention: Part of Second Week Page; Figure S5: Screenshot of the Online Intervention: Part of Third Week Page; Figure S6: Screenshot of the Online Intervention: Part of Fourth Week Page; Figure S7: Screenshot of the Online Intervention: Part of Closing Page; Table S8: ASPI State Items

## **Data Availability Statement**

The data that support the findings of this study are available from the corresponding author, [M.B.], upon reasonable request.

## **Conflicts of Interest**

The authors declare no conflict of interest.

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## Supplemental Material

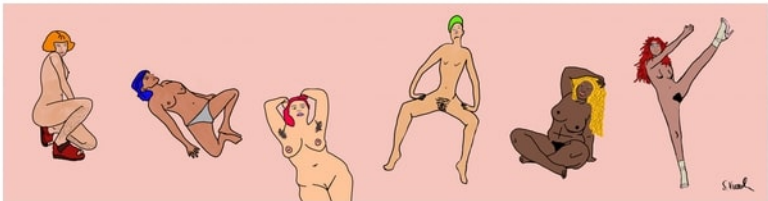
**Figure S1.**

### *Screenshot of the Online Intervention: Introduction Page*

**PLEASURE**  
Online Programm zur Erkundung des sexuellen Vergnügens

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Ein körperorientierter und achtsamkeitsbasierter Kurs mit Wissensvermittlung und verschiedenen Übungen zur selbstständigen Bearbeitung.

Wenn du dich bereits angemeldet hast und eine Mail von uns erhalten hast, kannst du direkt mit dem nächsten Menüpunkt, den **Grundlagen**, beginnen. Dort wirst du einiges an Basiswissen vorfinden und eine kleine Auffrischung zur Anatomie erhalten.

Falls du ohne Anmeldung den Weg zu unserer Website gefunden hast, **kannst du dich mit dem untenstehenden Link zur Teilnahme an unserer Studie anmelden**. Dort erhältst du die Informationen zum Programm und den Fragebogen. Das Ausfüllen des Fragebogens am Anfang und am Ende des Kurses ist für uns sehr wichtig und Voraussetzung für eine Teilnahme. So können wir sehen, ob sich eine Veränderung hinsichtlich deines sexuellen Erlebens nach dem Kurs zeigt. Die Teilnahme ist anonym. Welche Vorkehrungen genau getroffen werden, um deine persönlichen Daten zu schützen, erklären wir dir vorab genau. Alle weiteren Informationen zum Programm erhältst du per Mail.

Wir sind eine Projektgruppe des Instituts für Psychologie der Universität Bern und bieten dir mit dieser Studie ein vierwöchiges Programm an zur Erkundung des sexuellen Vergnügens für Menschen mit Vulva\*. Das Programm beinhaltet aktuelles Wissen zum Thema und verschiedene Übungen. Der Kurs kann alleine und bequem von zu Hause aus durchgeführt werden.

**Eine Anmeldung zur Studie ist nicht mehr möglich!**

**Grundlagen**

- Reflexion des Ist-Zustandes
- Begriffe klären
- Anatomie Auffrischung

**1. Woche Wahrnehmung**

- Wissenswertes zu Achtsamkeit und PMs
- Achtsame Körperreise

**2. Woche Entdeckung des eigenen Genitals**

- Wissenswertes zur Vulva und zur genitalen Stimulation
- Achtsame Erkundung der Vulva

**3. Woche Anspannung und Entspannung in Erregung**

- Orgasmus und Erregungsmodi
- Kenntlernen der eigenen Erregungsmuster

**4. Woche Bewegung**

- Beckenboden und Bewegung
- Doppelte Schaukel
- Wahrnehmung der Vagina


**Abschluss**

- Rückblick und Reflexion
- Und jetzt, wie weiter?
- Fragebogen und Verlosung
- Weitere Links

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**Figure S2.***Screenshot of the Online Intervention: Part of Basic Information Page*

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Online Programm zur Erkundung des sexuellen Vergnügens

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Grundlagen



Starten wir also mit den Grundlagen!

Nun geht es erstmals darum, dass du dir deiner eigenen Sexualität im Allgemeinen bewusster wirst und Grundlagenwissen, welches zur Bearbeitung der kommenden Wochen praktisch ist, (re)aktivierst.

Diesen Kurs wirst du in den nächsten vier Wochen für dich alleine bearbeiten. Studien zeigen, dass es besser klappt bewusst Zeit für sich zu nehmen, wenn du klare Zeitfenster dafür reservierst. Es kann auch hilfreich sein, wenn du das Vorgenommene an eine andere Handlung knüpfst, beispielsweise immer nach dem Aufstehen oder vor dem Zu-Bett-Gehen. Wie viel Zeit du dafür einplanen möchtest, ist dir überlassen. Wir empfehlen jeweils ca. 20-30 Minuten. Trage dir doch in deine Agenda ein, wann du diese Woche die erste Einheit bearbeiten möchtest.


In diesem ersten Teil kannst du ...

- deinen Ist-Zustand in der Sexualität reflektieren und dir persönliche Ziele setzen, wie intensiv du dich mit dem Kurs auseinandersetzen willst und was du in der Weiterentwicklung deiner Sexualität erreichen möchtest.
- dein Wissen um die Anatomie des Geschlechts auffrischen und vielleicht auch etwas Neues dazu lernen.

Deine Sexualität verändert sich dein ganzes Leben lang. Es gibt Lebensphasen, in welchen Sex bedeutsamer ist und womöglich häufiger stattfindet und solche, in welchen Sex weniger interessant ist und seltener vorkommt. Körperliche Sexualität – alleine, sowie mit anderen Menschen – kann als **Spektrum** verstanden werden, auf welchem sich auf der einen Seite **Prosexualität** (Sexualität ist dir sehr wichtig, es gibt ein starkes Bedürfnis nach häufigem Ausleben) und auf der anderen Seite **Asexualität** (mit Sexualität kannst du wenig anfangen, ist weder interessant noch attraktiv, es zieht dich sexuell nicht zu anderen Menschen hin, wobei Selbstbefriedigung und romantische Beziehungen dennoch gelebt werden können) befindet. Du alleine, kannst darüber entscheiden, wo auf diesem Spektrum du momentan stehst und wie wichtig dir Sex heute ist und in Zukunft sein soll.

asexuell

prosexuell



Wo stehst du gerade?

Um herauszufinden, wie dein eigenes sexuelles Profil gerade aussieht, helfen Fragen zur Selbstreflexion. Während dem Kurs werden dich immer wieder Fragen und Beobachtungsübungen antreffen. Wenn du möchtest, kannst du dir dazu Notizen machen. Du kannst dafür auch extra ein Heft oder ein Dokument auf dem Computer anlegen.

Nimm dir einige Minuten Zeit und schau, dass du dich ungestört fühlst. Wir empfehlen dir, kurz in dich hineinzuhorchen und für dich zu notieren, was du mit diesem Kurs und mit deiner Sexualität im Allgemeinen erreichen möchtest. Wir haben einige Fragen zusammengestellt, die dich bei diesen Gedanken unterstützen können:

- Was an meiner Sexualität fühlt sich gerade stimmig und gut an und möchte ich so beibehalten?
- Was passt nicht mehr zu mir und möchte ich gerne hinter mir lassen?
- Was gibt es für Themen in meiner Sexualität, an denen ich gerne arbeiten möchte?
- Wo wünsche ich mir eine Veränderung?
- Was war früher einmal gut und könnte allenfalls eine Chance erhalten, wiederbelebt zu werden?
- Was möchte ich Neues ausprobieren?
- Wo will ich hin?




Figure S3.

*Screenshot of the Online Intervention: Part of First Week Page*

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Online Programm zur Erkundung des sexuellen Vergnügens

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1. Woche



In dieser ersten Woche geht es um die achtsame Erkundung des Körpers. Achtsamkeit bedeutet im Hier und Jetzt zu sein – nicht nur körperlich, sondern auch mental. Achtsam sein bedeutet, die Bewertungen sein zu lassen und sich auf das zu konzentrieren, was abseits der Gedanken gerade ist.

In dieser Woche kannst du...

- dein Wissen über Achtsamkeit auffrischen.
- deinen Körper so wahrnehmen wie er gerade ist.
- deinen Körper achtsam, wertfrei, neugierig erkunden und beobachten.

**Einstiegsübung: Erkundung der Hand**

Du kannst entscheiden, ob du die folgende Übung als Audio hören oder selbst lesen möchtest.

Als Einstieg möchten wir dir zuerst eine kleine Übung vorstellen, bei der das genaue Spüren und Wahrnehmen des Körpers im Fokus steht. Forme deine linke oder rechte Hand zu einer Faust. Mit dem Zeigefinger deiner anderen Hand kannst du nun langsam über die geballte Hand "spazieren". Dabei kannst du, wenn du magst, auch die Augen schliessen, sodass du weniger von anderen Reizen abgelenkt wirst. Der Fokus während des Abtastens liegt darauf, was deine Fingerspitzen spüren: Wo sind Einbuchtungen/Erhebungen, faltige/glatte Stellen, rauere/weichere Stellen, kältere/wärmere Stellen? Gibt es Stellen, die interessanter sind für die Finger? Gibt es Stellen, an denen die Faust mehr/weniger empfindet durch die Berührung der Finger? Gibt es Stellen, an denen die Faust lieber berührt wird als andere? Wenn die Finger wollen, können sie auch in die Höhle der Faust gehen. Wie fühlt es sich dort an? Wie ist dies für die Finger? Versuche auch, den Blickwinkel zu wechseln, wie fühlt es sich dabei für die Fausthöhle an? Währenddessen können nicht nur die Fingerspitzen auf Erkundungstour gehen, sondern auch die Faust selbst kann sich bewegen und steuern, wo sie gerne von den Fingern berührt werden möchte. Wie eine Katze, die sich mit ihren Bewegungen das Streicheln der Menschen holt.

Diese Übung funktioniert auch mit all deinen anderen Körperteilen. Versuche immer, beide Blickwinkel einzunehmen: Was spüren meine Fingerspitzen dabei? Was spürt mein Körperteil? Und wie können die beiden in einen Dialog treten, wobei sie abwechselnd die Führung übernehmen und sich mitteilen, wie sich die unterschiedlichen Stellen anfühlen?

**Wissenswertes zum Thema Achtsamkeit und PMR**

Achtsamkeit wird häufig mit folgender, von Kabat-Zinn (1990) vorgebrachten, Definition beschrieben: Achtsamkeit ist ein nicht-wertender Zustand der empfänglichen und offenen Erfahrung des gegenwärtigen Momentes. Ein wertvolles Werkzeug, um im Moment zu sein und sich nicht von abschweifenden Gedanken abzulenken, ist die achtsame Fokussierung auf unsere Körperempfindungen. Sich auf die eigenen Körperempfindungen zu konzentrieren und ins Spüren zu kommen, hilft uns präsent zu bleiben. Vielleicht hast du das vorher bereits bei der Einstiegsübung erfahren.

Durch Achtsamkeit im Alltag, beispielsweise mithilfe regelmäßiger Meditationen, kann eine hohe Schutzwirkung gegen Stress erreicht werden. Dabei spielt der Parasympathikus, der Erholungsnerv, eine grosse Rolle. Im vegetativen Nervensystem, das automatisch ablaufende Körpervorgänge wie die Atmung steuert, wird zwischen dem **Parasympathikus** und dem **Sympathikus** unterschieden. Der Parasympathikus ist für die Ruhe im Körper zuständig. Der Sympathikus löst eine gegenteilige Funktion aus und kann den Körper in erhöhte Leistungsbereitschaft versetzen. Bei Stress ist somit der Sympathikus aktiv.

Figure S4.


### Screenshot of the Online Intervention: Part of Second Week Page

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2. Woche



Diese Woche steht die Vulva im Zentrum. Es geht unter anderem darum, die Vielfalt der Vulven aufzuzeigen, den Aufbau unserer Vulva kennenzulernen, zu erkennen, wie viel Aufmerksamkeit wir unseren Vulven schenken und die eigene Vulva zu betrachten und zu berühren.

In dieser Woche kannst du...

- die Vielfalt unterschiedlicher Vulven erkennen.
- Akzeptanz und Stolz deinem Genital gegenüber aufbauen.
- verschiedene Aspekte der genitalen Berührung und Stimulation kennenlernen.

**Wissenswertes zum Thema Vulva**

Das Bild vom eigenen Genital als ein Teil des Körperbildes bezieht sich darauf, wie sich eine Person in Bezug auf ihre Genitalien fühlt oder verhält. Bei Menschen mit Vulva\* kann sich dies beispielsweise auf das Aussehen, den Duft oder die Funktionsfähigkeit des Genitals beziehen. Menschen mit Vulva\* sind ihrem Genital gegenüber häufig sehr kritisch eingestellt. Es wird davon ausgegangen, dass jede zehnte Person mit Vulva\* unzufrieden mit ihrem Genital ist. Vor allem jüngere Personen berichten häufiger von einer Unzufriedenheit gegenüber ihrem Genital. Dies kann sich in negativen Gedanken und Gefühlen wie Ablehnung, Scham und Ekel in Bezug auf das Genital zeigen. Dieses Bild von sich selbst beeinflusst die Zufriedenheit mit dem Körper und unsere Sexualität.

Aus der Forschung weiss man, dass Personen mit einer positiveren Wahrnehmung des Geschlechts mehr sexuelle Aktivität zeigen und – viel wichtiger – mehr Genuss dabei empfinden. Es besteht ein Zusammenhang zwischen der Einstellung gegenüber dem eigenen Genital und der sexuellen Funktionsfähigkeit. Das heisst, ein positives Bild des Genitals geht mit mehr sexueller Erregung, vaginaler Flüssigkeit, Orgasmen und sexueller Zufriedenheit einher.

Wie wohl wir uns in unserem Körpern fühlen, machen wir oftmals im Vergleich zu anderen fest. Bestimmte Vorstellungen, die in der Gesellschaft als normal oder schön gelten, beeinflussen unser Selbstbild. So können uns beispielsweise die vermittelten Ideale von Mainstream-Pornos prägen, in welchen uns ein Bild von gleichförmigen Brüsten, kräftigen Penis, straffen Hoden und symmetrischen, hellen, jugendlichen Vulven mit kleinen inneren Vulvalippen vermittelt wird. Die äusseren Vulvalippen sind meist ganz rasiert und die inneren verdeckt. In der Realität entsprechen aber viele, nicht minder gesunde Vulven nicht dieser künstlich hergestellten Norm. Keine Vulva ist gleich wie eine andere und daher gibt es **keine Norm**, wenn es um Vulvaformen geht. Das hast du ja bereits im Menüpunkt **Grundlagen** gesehen.




Figure S5.

### Screenshot of the Online Intervention: Part of Third Week Page

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3. Woche



Wie wir in den letzten Wochen gelernt haben, kann es sehr wertvoll sein, sich und seinem Körper Zeit zu lassen und eigene Körperteile neu zu erkunden. Wir wollen den Fokus auf der Entspannung beibehalten. Auch in der Übung für diese Woche ist eine wohlwollende, bewusste Wahrnehmung unseres Körpers wichtig. Und zur Erinnerung: unsere allzeit verfügbare Hilfe für solche achtsame Momente ist der Atem. In dieser Woche gehen wir noch einen Schritt weiter und beziehen die sexuelle Lust und Erregung mit ein. Es geht also auch um körperliche Reaktionen in den verschiedenen Phasen der sexuellen Erregung.

In dieser Woche kannst du...

- theoretisches Hintergrundwissen über den sexuellen Reaktionszyklus und die Arten der Erregungssteigerung lernen.
- deine eigenen Erregungsmuster durch angenehme Berührungen am Genital und am ganzen Körper kennenlernen und erweitern.

**Wissenswertes zum Thema Orgasmus und Erregungsmodi**

Die Sexualwissenschaftler:innen Masters und Johnsons beschrieben in den 60er-Jahren vier verschiedene Phasen der sexuellen Reaktion. Zuerst beginnt die *Erregungsphase*, die durch Vorstellungen oder Berührungen am Körper ausgelöst wird. Diese Phase löst verschiedene Körperreaktionen aus wie schnellere Atmung und Herzschlag, die Brüste werden grösser und empfindlicher, die Brustwarzen härter und die Vulvalippen und die Klitoris schwellen an. Durch die angeregte Durchblutung wird die Vagina feucht. Die Gebärmutter schwillt an und dadurch wird der hintere Bereich der Vagina grösser.

Danach folgt die *Plateauphase*, bei welcher der gesamte Genitalbereich weiter anschwillt und die Wahrnehmung dadurch verstärkt wird. Der vordere Drittel des Gewebes der Vagina füllt sich mit Blut.

Anschließend wird die *Orgasmusphase* eingeleitet. Der Orgasmus wird als Reflex beschrieben, der ausgelöst wird, wenn eine bestimmte Schwelle der Erregung überschritten wird. Er zeigt sich, indem sich die Muskeln im Genitalbereich zusammenziehen.

Darauf folgt die *Rückbildungsphase*, in der sich die Muskeln wieder entspannen.

Die Erkenntnis dieser **vierteiligen Phasenabfolge** wurde seinerzeit in der Wissenschaft als bahnbrechend angesehen und gewann viel Anerkennung. Die klare Abfolge der Phasen ist auch heute oft noch in unseren Köpfen gespeichert, entspricht allerdings nicht mehr dem aktuellen Wissensstand. Heute wissen wir, dass die Phasen der Erregung **nicht in dieser Starrheit voneinander getrennt werden können**, zeitlich nicht in dieser Reihenfolge ablaufen müssen und sicherlich auch nicht unter allen Umständen ein Orgasmus folgt. Die Phasen beschreiben lediglich die physiologische Perspektive und lassen ausser Acht, ob der Sex überhaupt als lust- und genussvoll erlebt wird. Zudem impliziert eine solche Sichtweise, einen stark biologischen Sexualtrieb, der scheinbar aus dem Nichts kommt. Heute wissen wir jedoch, dass es auf die Interaktion zwischen den inneren Zuständen eines Menschen und den sexuellen Reizen aus der Umgebung (oder im Kopf entstehend) ankommt. Diese Reize können bewusst oder unbewusst sein. Sexuelle Lust entsteht demnach nicht aus dem Nichts, sondern dann, wenn unser sexuelles System durch einen adäquaten sexuellen Reiz aktiviert wird. Was ein solcher adäquater sexueller Reiz ist, kann von Person zu Person unterschiedlich sein. Es spielen also sowohl der Mensch als auch die Reize eine Rolle, was als sexuelle Situation gesehen und wie diese erlebt wird. So ist es auch möglich, dass man nicht deshalb Sex hat, weil man sexuelles Begehren verspürt, sondern dass man sexuelles Begehren verspürt, weil man Sex hat. Der Appetit kann sozusagen auch während des Essens kommen und muss keiner klaren Abfolge folgen.

Figure S6.

*Screenshot of the Online Intervention: Part of Fourth Week Page*

**PLEASURE**  
Online Programm zur Erkundung des sexuellen Vergnügens

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4. Woche



Diese Woche möchten wir die Anspannung und Entspannung mit verschiedenen Körperbewegungen verbinden. Ebenso befasst du dich mit deinem Beckenboden und deiner Vagina.

Letzte Woche wurden dir in der Vorbereitung zur Selbstbefriedigung verschiedene Erregungsmodi vorgestellt. Kurz zur Wiederholung, es wurde unterschieden zwischen:

- Druckinduzierter Modus: schnelle orgasmische Entladung durch Pressen und Anspannung von Körperteilen
- Reibungsinduzierter Modus: schneller Rhythmus und angespannte Muskeln
- Ondulierender Modus: entspannte Muskeln, Rhythmus und Bewegung sind abwechslungsreich und frei
- Wellenförmiger Modus: Bewegung in der Körperachse begleitet von wechselnder An- und Entspannung

Reflexion: Denke nun an die Übung von letzter Woche zurück:

- Hast du bei dir während der Selbstbefriedigung eine erhöhte Muskelspannung wahrgenommen oder warst du entspannt?
- Waren die Beine angespannt oder entspannt? Dein Po? Dein Bauch? Dein Beckenboden?
- Wie hast du dich dabei bewegt?
- War deine Atmung oberflächlich oder tief in den Bauch? Oder hast du den Atem angehalten?
- Wie fühlten sich die Berührungen an, wenn der Körper angespannt war oder bewusst die Anspannung nachgelassen hat?

In dieser Woche kannst du...

- die Relevanz und Modulierung des Beckenbodens kennenlernen.
- lernen, dass die Wahrnehmungs- und Erregungssteigerung durch Anspannung, Entspannung und Bewegung des Beckenbodens reguliert werden kann.
- mithilfe von Bewegungen des Beckens und einer Fantasiereise die Ausbreitung der Sinneswahrnehmung im Genital spüren.

**Wissenswertes zum Thema Beckenboden und Bewegung**

Viele Personen mit Vulva\* bauen für eine schnelle Erregung eine **hohe Muskelspannung** im Körper auf. Diese ist allerdings für den sexuellen Genuss nicht nur förderlich. Durch die Anspannung wird vorwiegend das sympathische Nervensystem aktiviert, das Stressreaktionen auslöst. Wir befinden uns dann im "Kampf-oder-Flucht-Modus". Der ganze Körper ist in einer Alarmbereitschaft und schüttet Adrenalin aus. Durch diesen Stressmodus kann ein Gedankenkreisen ausgelöst werden und die Emotionen sind eher negativ, beispielsweise ängstlich, wütend oder beschämt. Du kommst dabei schneller ins Grübeln und siehst dich und das Gegenüber mit kritischeren Augen. Dadurch ist die Ablenkung grösser und bereits kleine Veränderungen können die Lust am Sex verringern oder ganz verschwinden lassen. Beispielsweise kann dir in diesem Modus die Veränderung des Tempos, ein Aussengeräusch oder eine Veränderung der Stellung die Erregung schnell nehmen. Störende Gedanken können dich schneller ablenken und die Erregung verschwinden lassen. Diese Anspannung zeigt auch körperlich einige Reaktionen. Das Zwerchfell wird gehemmt und die Atmung wird schneller und verflacht. Der Beckenboden und die Vagina werden weniger durchblutet. Dadurch wird die Vagina weniger oder gar nicht feucht. Durch den Sauerstoffmangel wird eine schnelle Erregungsentladung ausgelöst.


## Figure S7.

### *Screenshot of the Online Intervention: Part of Closing Page*

**PLEASURE**  
Online Programm zur Erkundung des sexuellen Vergnügens

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Abschluss



DANKE, dass du Teil von unserem Projekt bist und dir die Zeit für diesen Kurs genommen hast!

**Rückblick auf die letzten Wochen**

Wow, was du alles geleistet hast während den letzten Wochen! Du kannst stolz auf dich sein!

Du hast dich in Achtsamkeit geübt, dein Genital erkundet, dich in Erregung erlebt, durch Bewegung deine Anspannung und Entspannung kontrolliert und deine Sensibilität für das Spüren gestärkt.

Schau dir deine notierten Ziele vom Anfang nochmals an und mach dir Gedanken dazu:

- Was hat sich verändert?
- Wo stehst du jetzt?
- An welchen Zielen möchtest du noch arbeiten?
- Welche Übungen wirst du auch weiterhin für dich durchführen?

**Und jetzt, wie weiter?**

Wie schon erwähnt, brauchen neue Gewohnheiten und die Entwicklung von Sensibilität Zeit, Geduld und viele Wiederholungen. Nach diesen vier Wochen weisst du nun, wo du bereits viel wahrnehmen und geniessen und wo du noch weiter üben kannst. Nimm dir doch weiterhin einmal in der Woche für dich Zeit, wo du eine Übung durchführst. Entweder kannst du die Übungen genau wie vorgegeben durchführen oder du fokussierst dich auf einen bestimmten Bereich oder auf ein Thema, das du weiter vertiefen möchtest. Denn je mehr Stellen im Genitalbereich sensibilisiert sind (Klitoris, Vagina, G-Zone, Vaginalwände, Gebärmutterhals), desto mehr empfindest du beim Sex und desto weniger bist du davon abhängig, dass die andere Person genau die richtige Stelle bei dir erwischt.

Du kannst gerne weiterhin auf unsere Website zurückgreifen und dir die Wissensseinheiten und Übungen noch einmal anschauen und durchführen.

**Table S8.***ASPI State Items*

Item No.	Item (Origin in German)	Item (Translated into English)	Origin Subscale
state1	Sexuelle Erregung zu spüren, war fantastisch.	Feeling sexually aroused was amazing.	Sensual Pleasure
state2	Das Berühren meiner erogenen Zonen war lustvoll.	Touching my erogenous zones was pleasurable.	Sensual Pleasure
state3	Sexuelle Empfindungen in meinem Körper zu spüren, war lustvoll.	Feeling sexual sensations in my body was pleasurable.	Sensual Pleasure
state4	Beim Partnersex glühten meine Geschlechtsteile vor Erregung.	During partnersex, my genitals glowed with excitement.	Sensual Pleasure
state5	Während der Masturbation glühten meine Geschlechtsteile vor Erregung.	During masturbation, my genitals glowed with excitement.	Sensual Pleasure
state6	Ich konnte mein Sexleben so gestalten, dass ich es wirklich genoss.	I could shape my sexlife in a way that I really enjoyed.	Pleasure- Related Mastery
state7	Beim Partnersex konnte ich bekommen, was ich brauchte, um zu geniessen.	During partnersex, I was able to get what I needed to enjoy myself.	Pleasure- Related Mastery
state8	Während der Masturbation konnte ich mir geben, was ich brauchte, um zu geniessen.	During masturbation, I was able to give myself what I needed to enjoy myself.	Pleasure- Related Mastery
state9	Beim Partnersex hatte ich das Gefühl, dass ich gut im Bett war.	During partnersex, I felt 'good at sex'.	Pleasure- Related Mastery

state10	Während der Masturbation war ich gut darin, mich zu befriedigen.	During masturbation, I was good at pleasuring myself.	Pleasure-Related Mastery
state11	Beim Sex hatte ich das Gefühl, dass ich meine*n Sexualpartner*in geniessen lassen konnte.	During sex, I had the feeling that I was able to pleasure my sexpartner.	Pleasure-Related Mastery
state12	Ich legte Wert darauf, meine sexuellen Bedürfnisse auszuleben	I thought it was important to live out my sexual needs.	Pleasure-Related Validation
state13	Beim Partnersex vernachlässigte ich mein eigenes Vergnügen.	During partnersex, I neglected my own pleasure.	Pleasure-Related Validation
state14	Beim Partnersex war mein sexuelles Vergnügen unbedeutend.	During partnersex, my own sexual pleasure did not feature.	Pleasure-Related Validation
state15	Meine*n Sexualpartner*in zu verführen, war lustvoll.	Seducing my sexpartner was pleasurable.	Interaction Pleasure
state16	Meine*n Sexualpartner*in zu stimulieren, war lustvoll.	Stimulating my sexpartner was pleasurable.	Interaction Pleasure
state17	Durch meine*n Sexualpartner*in stimuliert zu werden, war lustvoll.	Being stimulated by my sexpartner was pleasurable.	Interaction Pleasure
state18	Beim Partnersex waren wir beide völlig in Genuss versunken.	During partnersex, we were both completely absorbed in pleasure.	Interaction Pleasure
state19	Beim Partnersex versetzen wir uns gegenseitig in Ekstase.	During partnersex, we whipped each other into ecstasy.	Interaction Pleasure
state20	Das Spüren der Nähe meines Sexualpartners bzw. meiner Sexualpartnerin beim Sex, war fantastisch.	Feeling the closeness of my sexpartner during sex was pleasurable.	Bonding Pleasure

state21	Beim Sex fühlte ich mich mit meinem*meiner Sexualpartner*in verbunden.	During sex, I felt connected to my sexpartner.	Bonding Pleasure
state22	Das Spüren von Zuneigung zwischen mir und meinem*meiner Sexualpartner*in beim Sex war fantastisch.	Feeling affection between me and my sexpartner during sex was pleasurable.	Bonding Pleasure
state23	Mich beim Partnersex geborgen zu fühlen, war fantastisch.	The feeling of security during partnersex was pleasurable.	Bonding Pleasure
state24	Sex brachte mich meinem*meiner Sexualpartner*in näher.	Sex brought me closer to my sexpartner.	Bonding Pleasure
state25	Meine sexuellen Erfahrungen waren lustvoll.	My sexual experiences were pleasurable.	General Sexual Pleasure
state26	Partnersex war lustvoll.	Partnersex was pleasurable.	General Sexual Pleasure
state27	Über Sex zu fantasieren, war lustvoll.	Fantasizing about sex was pleasurable.	General Sexual Pleasure
state28	Masturbation war lustvoll.	Masturbation was pleasurable.	General Sexual Pleasure
state29	Nach dem Partnersex fühlte ich mich grossartig	After partnersex I felt amazing.	General Sexual Pleasure
state30	Nach der Masturbation fühlte ich mich grossartig.	After masturbation I felt amazing.	General Sexual Pleasure



### 3. General Discussion

Sexual pleasure contributes to sexual health and thus to health in general (Ford et al., 2019; Gruskin & Kismödi, 2020; Kismödi et al., 2017; Mitchell et al., 2021). Despite the considerable attention paid to sexual pleasure, our understanding of it has remained limited due to the lack of a coherent conceptualization to date. Because sexual pleasure is a complex and multifaceted construct, it has been challenging for researchers to develop a comprehensive and universal understanding of sexual pleasure (Hull, 2008). This dissertation sought to address this challenge by more closely examining the construct of sexual pleasure. Three research questions were formulated addressing the conceptualization and definition of sexual pleasure, the operationalization and measurement of sexual pleasure, and the promotion of sexual pleasure. These research questions were addressed in an article presenting a theoretical framework for and definition of sexual pleasure, another article testing the Amsterdam Sexual Pleasure Inventory (ASPI) questionnaire, and a third evaluating the effectiveness of an online intervention in promoting sexual pleasure in women. This general discussion analyzes whether the steps for construct development described in the introduction (p. 10-13) were followed effectively and applied in the articles. Following the discussion of the research questions, the potential avenues for future research are explored and the implications of the findings discussed. Finally, the limitations and strengths of this dissertation are acknowledged and considered.

#### 3.1 First Research Question: How can Sexual Pleasure be Conceptualized and Defined?

To address the first research question, we developed an adapted sexual response framework that includes sexual pleasure as a central component. This framework provides a theoretical foundation for our investigation into the construct of sexual pleasure.

We found that sexual pleasure manifests in the form of liking and occurs when a trait-sensitive system, an organism, interacts with a sexually relevant and competent, rewarding

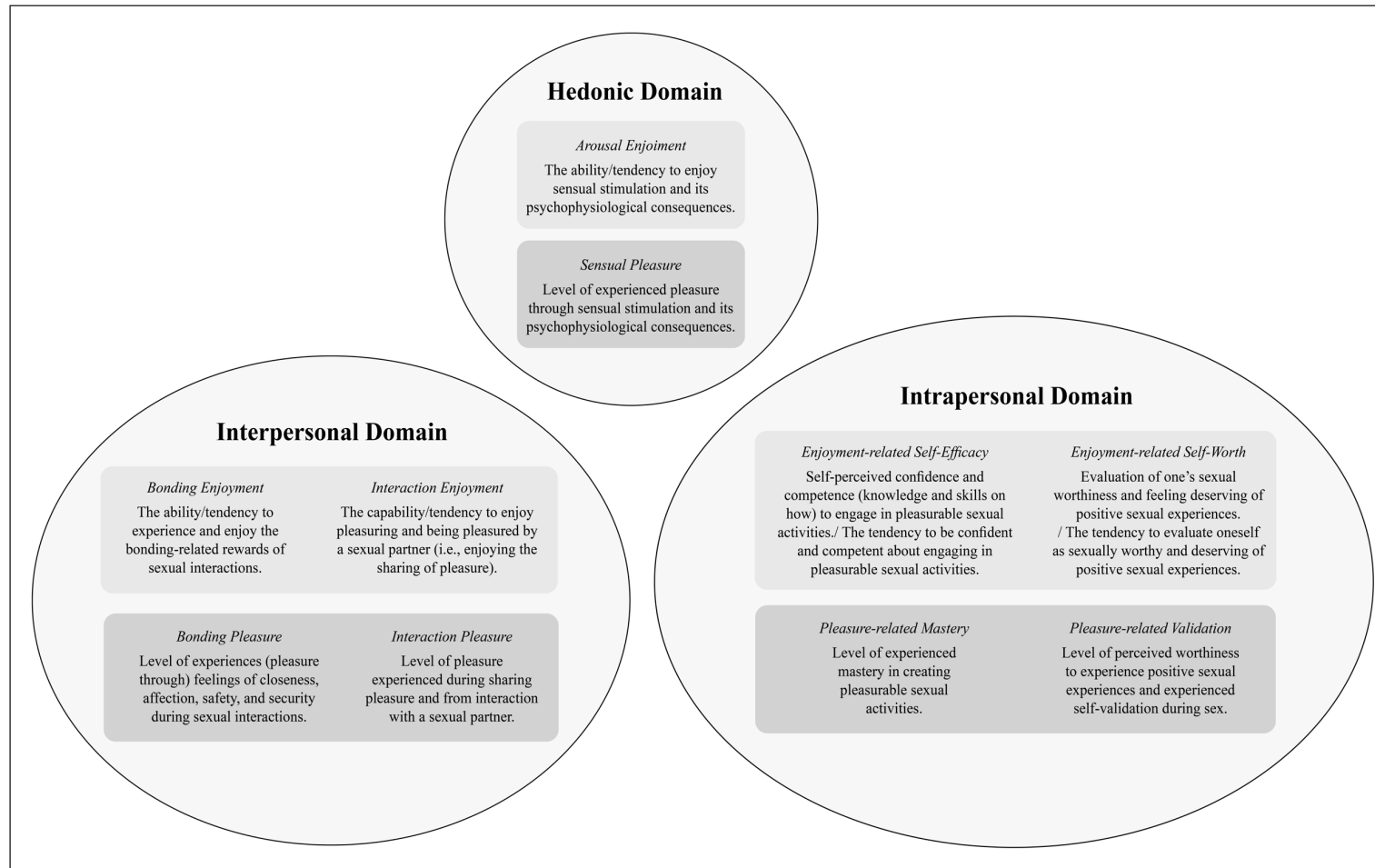
stimulus. In other words, sexual pleasure is a positive feeling that is induced by the interaction of a sensitive sexual response system with a sexual stimulus and involves need gratification. Thus, sexual pleasure can be understood as a construct that encompasses both state-like and trait-like experiences. As a state, sexual pleasure provides the positive feelings that are induced by the anticipation, attainment, and consumption of rewards during sexual activities. As a trait, sexual pleasure is an individual's capacity to respond pleasurable to sexual stimuli and enjoy sexual activities, which is influenced by their propensities and abilities to experience and attain rewards and by their learning history. Sexual pleasure can vary both within individuals over time in intraindividual differences and between individuals in interindividual differences due to differences in sexually arousing and rewarding stimuli and trait-like differences in sexual responsiveness (Werner et al., 2023).

Since many different rewards, and not only the orgasm as often incorrectly assumed (Braun, 2005; Kleinplatz et al., 2009), can be derived from sexual activity, it follows that different states of sexual pleasure may be achieved as well. To identify the heterogeneous rewards that may be obtained through sexual activity, we drew upon literature and research on basic sexual and psychological rewards and needs. The sexual and basic rewards that emerged were captured in a taxonomy that encompassed five facets of state sexual pleasure, which can be found in the dark grey boxes in Figure 4. It is important to note that these facets do not combine in a cumulative way to create a more satisfying or healthy sexual experience. Different people may prioritize different rewards in their sexual experiences, and these preferences may vary depending on the situation or relationship (Werner et al., 2023).

The experience of pleasure during sexual activity is therefore influenced by the availability of different rewards as well as the individual's prepared and adapted trait-like capacities that enable them to anticipate, attain, and consume these rewards. The trait facets of sexual pleasure are presented in the light grey boxes in Figure 4. Note that while these traits may be more stable than temporary experiences or states, they can still be influenced by

experiences (Werner et al., 2023). Furthermore, we concluded that the state and trait facets of sexual pleasure can be divided into hedonic, intrapersonal, and interpersonal domains. The classification into these domains and the definitions of each facet can be found in Figure 4 (Werner et al., 2023).

In summary, the new framework and taxonomy for understanding sexual pleasure recognizes that sexual pleasure is a multifaceted construct that can be experienced differently by different people. By aiming to capture the most important aspects of sexual pleasure, while not claiming to be exhaustive, this definitional work provides a valuable foundation for further exploration in this field and is worthy of expansion.

**Figure 4***Facets of Sexual Pleasure*

*Note.* The light gray boxes contain the trait facets and the dark gray boxes the state facets of sexual pleasure. The size of the circles does not represent a weighting of the domains.

The first article in this dissertation provided a means of answering the first research question: how sexual pleasure can be conceptualized and defined (Werner et al., 2023). Therefore, we engaged in a thorough process of construct development to clearly define the construct of sexual pleasure: First, we defined the construct of sexual pleasure precisely by identifying its key characteristics and how it differs from other related constructs. Second, we conducted a comprehensive review of the literature on sexual pleasure to understand how it had previously been defined and operationalized, as well as its limitations. Third, we developed a conceptual framework that outlines the key features and dimensions of sexual pleasure. Fourth, we clearly defined the domains and facets of sexual pleasure and operationalized these in a multifaceted way. Through this process, we effectively addressed the first four steps of construct development, as outlined in Figure 3 presented in the introduction, p. 13.

### **3.2 Second Research Question: How can Sexual Pleasure be Operationalized and Measured?**

A few instruments for measuring sexual pleasure are already available, but they have several limitations, including no underlying definition of sexual pleasure, unidimensional measurements of the construct, and a focus on sensual pleasure. The existing measurement instruments and detailed elaboration of the limitations are described in article 2 of this dissertation (Borgmann et al., 2023). To operationalize and measure sexual pleasure beyond these limitations and thus address this second research question holistically, we drew on the definitional work presented in article 1 of this dissertation (Werner et al., 2023). We developed a self-report questionnaire called the Amsterdam Sexual Pleasure Inventory (ASPI) to measure sexual pleasure in its holistic and multifaceted nature. The ASPI captures sexual pleasure as both a state-like experience and a trait-like tendency, as well as the various associated facets mentioned in the previous subchapter. The scale names correspond to the

names of the facets, which can be found in Figure 4. In addition, we drew up a general scale for state and trait. Therefore, a total of six independent scales are provided for state and another six for trait. In total, the ASPI includes 30 state and 27 trait items (Borgmann et al., 2023).

To measure sexual pleasure as a state, participants were asked to rate their experience of pleasure over the previous two weeks. To measure sexual pleasure as a trait, they were asked to rate their capacities for experiencing pleasure across different situations and over time. By considering both state and trait sexual pleasure, the research captures the full range of variation and variance in sexual pleasure. Asking about experiences over a specific time period, such as the past two weeks, allows an examination of how these experiences may vary across situations or time. Conversely, asking about a person's general enjoyment of sex may provide insight into their more stable traits or tendencies that hold across a range of situations. This is a great advantage as it allows a more accurate and holistic understanding of sexual pleasure.

The validation study of the ASPI presented in article 2 indicated that the psychometric quality of the ASPI is good overall. The results of the exploratory structural equation modelling ( $n = 706$ ) showed that the five-facet structure for trait and state sexual pleasure proposed in article 1 demonstrated good structural validity. The general ASPI scales provided acceptable evidence of structural validity as demonstrated in the principal component analysis. However, the component loadings only captured about 50% of the variance, indicating that individuals' experiences of pleasure and enjoyment may vary irregularly across activities, suggesting that overall sexual pleasure cannot be reduced to one dimension. Therefore, an average score of these general scales should be viewed cautiously and critically. All scales except one demonstrated acceptable to very good internal consistency, and the factor structure was consistent across male and female and across sexually functional-scoring and dysfunctional-scoring people. In the zero-order correlations and the model-selected

correlations of the network analysis, the ASPI scales showed good construct validity in their relationships with other constructs. As discussed in the article, sexual pleasure measured by the ASPI differed from related constructs such as sexual satisfaction and was associated plausibly with other psychological and sexological constructs (Borgmann et al., 2023).

Thus, the ASPI confirms our assumption that sexual pleasure is a multidimensional construct and encompasses more than sensually pleasurable experiences by including experiences of feeling validated, confident, competent, intimate, and connected and sharing pleasure. The ASPI operationalizes and captures the various facets of sexual pleasure from both trait and state perspectives and therefore goes beyond previous instruments for measuring sexual pleasure. Even though the initial findings of our validation study provide first indications of validity, the ASPI is still in the early stages of development and further refinement is needed. Some limitations should be acknowledged. For example, there is currently no data on test–retest reliability for the ASPI, and no item response theory analysis has been conducted, although these are important steps in scale development (e.g., Ambühl & Inauen, 2022; Boateng et al., 2018). Additionally, the state and trait scales of the ASPI cannot currently be compared directly because the analyses were conducted separately. This approach was taken initially to examine the scales individually, and future research needs to compare state and trait facets. Moreover, the validity tests suggest that further refinement is necessary for the interaction scales and the self-worth/validation scales in particular to strengthen the evidence they provide (Borgmann et al., 2023). To conclude, although the ASPI is a good starting point, it requires continued critical evaluation and refinement.

We developed the ASPI and tested it for validity and reliability with exploratory structural equation modeling, measurement invariance testing, and omega coefficients calculation, and we related it to more or less closely related constructs with network analysis. This enabled us to undertake steps 5 and 6 of the construct development process described in

the introduction (p. 10-13) and begin step 7 by evaluating the construct. However, these steps can still be further supported by the additional methods discussed above, and the construct has not yet been fully established and validated by this initial empirical examination. Therefore, even though the empirical testing of the full range of sexual pleasure facets has provided initial support for our theory-based definition of the construct, more research is needed to further establish its validity.

### **3.3 Third Research Question: How can Sexual Pleasure be Promoted?**

In previous intervention studies, sexual pleasure was mainly studied as a predictor rather than an outcome. Thus, various intervention studies in sex research have shown that when sexual pleasure was included in the intervention, the outcome investigated improved (Becasen et al., 2015; Hogben et al., 2015; Philpott et al., 2006; Scott-Sheldon & Johnson, 2006; Zaneva et al., 2022).

To investigate how sexual pleasure can be promoted and thus address the third research question, we drew on both the definition, operationalization, and measurement of sexual pleasure presented in the previous chapters and on the current trend in sex research to implement the intervention online. Indeed, this format has already been shown to be successful in sexual health several times (Chisari et al., 2022; Jones & McCabe, 2011; Stephenson et al., 2021; van Lankveld, 2016; Van Lankveld et al., 2009; Weitkamp et al., 2021; Zarski et al., 2018; Zarski et al., 2017). The online intervention drew on the Sexocorporel approach as this follows the main goal of promoting sexual pleasure (Bischof, 2012, cf. section 1.2.2 Sexocorporel by Désjardins). This resulted in an unguided 4-week online intervention, called *PleaSure*, for women that included psychoeducational elements and specific exercises drawn from the Sexocorporel approach. The effectiveness of this online intervention was tested in a randomized controlled pilot trial (RCT) that compared a wait-list control group and intervention group. The six state subscales of the ASPI were defined as



outcome variables. We did not include the trait subscales because we assumed that they were not sensitive to change and therefore not useful for answering this research question.

Overall, the effects on sexual pleasure in the RCT described in article 3 were lower than expected (Borgmann, 2023). The online intervention primarily strengthened the intrapersonal domain of sexual pleasure by showing a small positive effect on participants' pleasure-related mastery. The intervention did not have a significant effect on other facets of sexual pleasure or on the general sexual pleasure scale. While these quantitative data showed only limited effects, the qualitative data indicated overall positive effects on sexual experience for participants. Therefore, the intervention appears to have had an impact on the participants' sexual experience overall but did not necessarily address specific facets of sexual pleasure. The reasons for the lack of impact on specific facets of sexual pleasure and the limitations of the study are discussed in further detail in article 3 (Borgmann, 2023).

However, two general limitations related to the establishment and development of the construct of sexual pleasure should be addressed here: First, it is a notable limitation of this study that the trait subscales of the ASPI were not included in the intervention study. The inclusion of these subscales would have allowed an examination of how the trait and state scales changed over time and in response to the intervention. This could have provided further insights into the assumed stability of the trait scales compared to the assumed change-sensitive state scales. Additionally, the ability to differentiate between the trait and state scales could have confirmed our definition of state and trait sexual pleasure provided in the first article included in this dissertation. Second, the study focuses only on the promotion of women's sexual pleasure, so the results are not generalizable to all genders. However, we chose to focus on women's sexual pleasure before developing an intervention for men (which is currently under development at the Department of Health Psychology and Behavioral Medicine at the University of Bern). In many societies, women's sexual pleasure has historically been overshadowed or minimized in favor of men's sexual pleasure (Hall, 2019;

Laumann et al., 2006; Mahar et al., 2020; Van Lunsen et al., 2013). However, recent years have seen a growing recognition of the importance of women's sexual pleasure and the right to pleasure. This shift has been driven by a variety of factors, including increased awareness of gender inequality and a greater focus on sexual health (Laan et al., 2021; Reis et al., 2021). This has led to a growing focus on the importance of women's sexual pleasure and the need for women to have agency over their own bodies and sexual experiences. By focusing on women's sexual pleasure, our study contributes to the growing body of research on this topic and the efforts to ensure that all women have the opportunity to experience sexual pleasure and agency in their sexual experiences. Therefore, the generalizability issue is both a limitation and a strength.

Nevertheless, and apart from these limitations, it seems that sexual pleasure can be promoted: we succeeded in promoting at least one facet. However, the intervention described in article 3 should be developed and refined to include psychoeducational elements and exercises targeted at each facet of sexual pleasure in order to give all facets an opportunity to improve. Even though the intervention has substantial potential for improvement and its effects were rather modest, the findings are crucial because they imply that sexual pleasure is a construct that can be improved. Thus, these are first hints that sexual pleasure is changeable and thus promotable.

In summary, this intervention enabled us to establish the multidimensional construct of sexual pleasure. Attempting to promote specific facets of sexual pleasure tested the construct's usefulness and practicality in applied research and therefore could be further evaluated. This corresponds to step 7 of the process of construct development described in the introduction (p. 10-13). However, this intervention did not allow the construct to be used to predict other relevant outcomes such as sexually transmitted diseases or sexual dysfunctions, which would also be part of step 7. This point needs to be addressed in future research.

Additionally, while the three articles included in this dissertation have provided initial evidence that the theory established and the empirical data collected are consistent, indicating that the construct has some validity, this process is not yet complete. However, the findings indicate that the construct should not be discarded but further refined and explored in future research, as step 8 of the process of construct development suggests.

### **3.4 Future Research**

By gaining a deeper understanding of sexual pleasure, we can pave the way for future research that aims to improve our overall understanding of sexual health and well-being. Therefore, I would like to suggest two directions for future research: First, future research could further investigate the structure of the construct, and second, future research could improve the understanding of sexual pleasure by contextualizing it within a broader framework.

#### *3.4.1 Structure of the Construct*

In order to further understand the structure of sexual pleasure, it will be important for future research to further investigate the state and trait components of sexual pleasure. Previous research and the theoretical framework of sexual pleasure presented here have suggested that stable, trait-like factors and more transitory, state-like factors both contribute to sexual pleasure (Castellanos-Usigli & Braeken-van Schaik, 2019; Pascoal et al., 2016; Werner et al., 2023). However, direct comparison and contrast between the state and trait subscales has not been empirically possible, because they have been studied separately in previous research (Borgmann, 2023; Borgmann et al., 2023). Therefore, future research needs to examine these two components in a more integrated way to determine whether traits are really more stable and states are actually more sensitive to change and to determine the extent to which they overlap or interact.

Furthermore, examining the proposed hedonic, intrapersonal, and interpersonal domains in more detail would be valuable to better understanding the structure and organization of sexual pleasure. These domains have been suggested in the theoretical framework for sexual pleasure in article 1 as ways of organizing the various facets of sexual pleasure, but they have not yet been explored empirically. Examining these domains could help to determine whether they emerge as overarching factors in the structure of sexual pleasure and could provide a more nuanced understanding of the relationships between the facets of sexual pleasure.

Finally, examining the roles that context and activity play in shaping sexual pleasure experiences may be useful in investigating the structure of sexual pleasure. The ASPI includes items that refer to both partner sex and masturbation. The factor structure of the state items in the ASPI suggests that the items related to masturbation cluster more closely than others. This suggests that whether the pleasure is experienced in a partnered sexual encounter or through masturbation may be an important factor. A future version of the ASPI could carefully balance items related to partner sex and those related to masturbation. Moreover, future research could examine whether these contexts provide overarching factors that influence sexual pleasure experiences in distinct ways. This could provide insight into how sexual pleasure is structured and how it may be influenced by contexts and activities.

#### *3.4.2 The Broader Context of Sexual Pleasure*

Placing our understanding of sexual pleasure in a broader context requires a range of related topics to be considered. Some potential areas for investigation include identifying and examining the physical, psychological, and social factors that influence sexual pleasure and exploring how these factors interact. Additionally, research could compare and contrast sexual pleasure among various groups, such as people with different genders, sexual orientations, cultural backgrounds, and life stages. Overall, both interindividual and

intraindividual variations need to be considered in the study of sexual pleasure. Another important area for future research to explore is the potential of sexual pleasure to predict other important sexual health outcomes. Pleasure-based approaches have already shown considerable promise (Becasen et al., 2015; Hogben et al., 2015; Philpott et al., 2006; Scott-Sheldon & Johnson, 2006; Zaneva et al., 2022). A multidimensional and comprehensive definition and corresponding measurement instrument such as the ASPI may enable identification of which specific facets of sexual pleasure are particularly predictive of certain outcomes and which less so. This could help us to better understand how sexual pleasure is related to overall sexual health and well-being.

Exploring these areas of inquiry can also inform the development of interventions and resources that promote sexual pleasure. Such research will likely play an important role in providing an effective and cost-efficient approach to promoting sexual health. By focusing on enhancing sexual pleasure, researchers can take a preventative approach, addressing potential issues before they develop into more serious sexual dysfunction. This approach not only improves sexual health but also helps to avoid high costs in the health care system. The pilot study on the promotion of sexual pleasure presented here could and should be revised, for instance by revising its content to address all facets of sexual pleasure and taking a more guided approach. What further interventions might look like and what should be considered when developing such interventions are discussed in more detail in the following chapter as practical implications.

### **3.5 Practical Implications**

The findings of this dissertation may have important implications for research, health care, sex education, and society, and these findings are discussed in more detail below.

### *3.5.1 Implications for Research*

Objective methods for operationalizing and measuring a construct are crucial to the reproducibility of findings and a better understanding of the underlying concept (Fried & Flake, 2018). However, such objectivity is often lacking, as these methods have not undergone proper evaluations for quality. This results in a lack of specific and stable phenomena and corresponding theories (Fried, 2021; van Rooij & Baggio, 2021). Agreement is also needed on which definitions should be used for research purposes to ensure that research findings are comparable and can be integrated coherently and comprehensively. Future research in this field needs to address these issues to promote a more standardized and scientifically rigorous approach to studying sexual pleasure.

The definition of sexual pleasure and the validated measurement instrument, the ASPI, both developed in this dissertation, provide a solid foundation for future studies on sexual pleasure and sexual health. This means that future research can use this definition and measurement instrument to accurately and appropriately capture sexual pleasure in a holistic and multifaceted way. They enable researchers to study the construct more precisely and meaningfully and thus help provide a better understanding of the complex and nuanced nature of sexual pleasure. Additionally, such a validated measurement instrument can facilitate comparisons across studies.

### *3.5.2 Implications for Healthcare Professionals*

The body of evidence shows positive associations between sexual pleasure and a variety of health outcomes, including cardiovascular, perinatal, general, and mental health (Anderson, 2013; Gianotten et al., 2021; Klein, Laan, et al., 2022; Laan et al., 2021; Reis et al., 2021). Furthermore, research has shown that sexual pleasure is related to important psychological factors such as autonomy, self-esteem, and empathy, particularly in young women (Galinsky & Sonenstein, 2011). These findings clearly indicate that sexual pleasure is

a crucial aspect of overall well-being and should be considered in public health policy and advocacy. Healthcare professionals benefit from adopting a comprehensive and holistic approach that goes beyond a solely functional view of sexuality, and an accurate and nuanced definition and operationalization of sexual pleasure can facilitate the development of more effective interventions for promoting and enhancing sexual pleasure. By differentiating between the various facets of sexual pleasure and between general tendencies and context-dependent experience, healthcare professionals can gain a deeper understanding of how to design and plan interventions to increase sexual pleasure. This means that healthcare professionals gain the ability to assess whether people differ in their general tendency to experience sexual pleasure or whether they differ in pleasure experienced recently, and, accordingly, be able to design interventions that focus on changing either the capacities or the context. This allows a more targeted and effective approach to addressing sexual pleasure issues, because interventions can be tailored to address the specific needs and challenges of individuals rather than relying on a one-size-fits-all approach.

Currently, limited research specifically addresses a pleasure-based approach in therapy and counseling settings. However, two projects are worth mentioning: the Pleasuremeter (Castellanos-Usigli & Braeken-van Schaik, 2019) and the Pleasure & Pregnancy Program (Dancet et al., 2019). The Pleasuremeter is a new tool that assists healthcare professionals in exploring the link between sexual health, sexual rights, and sexual pleasure during consultations (Castellanos-Usigli & Braeken-van Schaik, 2019). The Pleasure & Pregnancy Program is an online program for couples experiencing fertility difficulties and aims to address their needs with a pleasure-based approach that improves sexual function and increases the chance of natural pregnancy (Dancet et al., 2019). Although these projects are promising, empirical research is currently lacking on their effectiveness. However, the growing understanding of sexual pleasure may lead to the development of further

interventions that focus on sexual pleasure and the empirical testing of existing ones, such as those mentioned above.

Moreover, future intervention efforts should consider targeting both at-risk groups and individuals with lower levels of sexual dysfunction and not only people from the general population as we studied in our PleaSure intervention. In our validation study (article 2), we showed that individuals with lower levels of sexual function scored significantly lower on measures of sexual pleasure than those with higher levels of sexual function (Borgmann et al., 2023). Therefore, future interventions targeting individuals who have lower sexual function may be more effective and thus yield greater therapeutic outcomes.

The growing trend of using online settings for sexual health interventions also offers a potential avenue for health care concerning sexual pleasure. Indeed, research has shown that online interventions for sexual health are effective (Carswell et al., 2012; Chisari et al., 2022; Jones & McCabe, 2011; Stephenson et al., 2021; van Lankveld, 2016; Van Lankveld et al., 2009; Weitkamp et al., 2021; Williamson et al., 2021; Zarski et al., 2018; Zarski et al., 2017) and have many advantages, including high accessibility, flexibility, anonymity, and cost-effectiveness (Buntrock et al., 2014). Online interventions can also be used parallel to face-to-face counseling or therapy to increase their effectiveness (Berger & Krieger, 2018; Ebert et al., 2018). Given the benefits and potential impact, it is crucial to actively develop and implement future interventions in health care utilizing the online setting.

### *3.5.3 Implications for Sex Education*

In recent decades, various articles and studies have called for the inclusion of sexual pleasure in sex education (Allen & Carmody, 2012; Fine, 1988; Fine & McClelland, 2006b; Ingham, 2005). They have shown that incorporating sexual pleasure in sex education has the potential to positively impact such aspects of sexual health and well-being as sexual self-esteem, body image, communication skills, and the safe use of sexual practices (Hirst, 2013;



Koepsel, 2016; Mark et al., 2021; Mark & Wu, 2022). Michelle Fine first brought attention to this issue in 1988 in her article “Sexuality, Schooling, and Adolescent Females: The Missing Discourse of Desire,” in which she criticized how sexual pleasure, particularly that of females, was omitted from discussions of sexual experiences in sex education. Instead, either abstinence was promoted, or emphasis was placed on negative aspects of sexuality, such as the link between sexuality and violence (Fine, 1988). Although this missing discourse of sexual pleasure was acknowledged subsequently by various authors (Allen & Carmody, 2012; deFur, 2012; Lamb et al., 2013; Sundaram & Sauntson, 2016), a follow-up study 20 years after Fine’s article found that little progress had been made in including sexual pleasure in sex education in the United States of America (Fine & McClelland, 2006b). However, other countries have made more progress in this field. For example, sex education is taught with an emphasis on a sex-positive and pleasure-based approach in France, Australia, and the Netherlands (Weaver et al., 2005). Furthermore, pioneering efforts in sex education now incorporate a pleasure-based approach, as is the case with Love Matters, an initiative by RNW Media (van Clief & Anemaat, 2020). This program targets young people online and offers a wide range of content that focuses on pleasure-based information and education on diverse topics (Sladden et al., 2021). This program also runs online, demonstrating that an online format is as appropriate for sex education as it is for interventions. Studies have already shown promising results for online settings in sex education (Martin et al., 2020; Mustanski et al., 2015; van Clief & Anemaat, 2020; Wadham et al., 2019).

This dissertation makes a significant contribution to sex education by providing a deeper understanding of the construct of sexual pleasure. By understanding the diverse facets of sexual pleasure, such as physical pleasure and pleasure derived from intimacy and closeness, individuals can develop a better understanding of themselves and their bodies and of how to interpret and understand their reactions and feelings. Furthermore, this dissertation challenges the limited and narrow view that orgasm is the only form of pleasure in sexuality

and can help to provide a more holistic and inclusive approach to sex education. Emphasizing that sexual pleasure is more than merely orgasm but instead multifaceted and can be individually tailored, can help individuals, particularly children, understand that sex is complex and can be experienced in various ways. This can have positive impacts on their sexual health and well-being.

In conclusion, the scientific establishment of the construct of sexual pleasure achieved in this dissertation can make a valuable contribution to integrating and emphasizing sexual pleasure and its multifaceted nature in sex education.

#### *4.5.4 Implications for Society*

The establishment of the construct of sexual pleasure and better understanding of it may lead to more open and honest discussions about sex in general and promote a more open and accepting societal attitude towards sexual pleasure. This can help to reduce stigma and shame around this important aspect of life and to debunk myths and misinformation about this complex construct, which may in turn lead to improved sexual health outcomes (Anderson, 2013; Giami, 2002). Additionally, a greater awareness of sexual pleasure can potentially promote a more sex-positive culture in which individuals are encouraged to explore and embrace their sexuality in a pleasurable, healthy, and consensual way. Society needs to create an inclusive and diverse environment that respects and values individuals' different expressions of sexual pleasure.

In conclusion, the scientific establishment of the construct of sexual pleasure can play a crucial role in promoting a more open, accepting, and sex-positive society. Thus, the construct contributes to moving society further from a negative, functional-focused understanding towards a more positive and holistic view of sexuality.

### 3.6 Limitations and Strengths

While this dissertation's limitations must be considered, its strengths also warrant acknowledgement. Both aspects will be addressed in this section.

#### 3.6.1 *State and Trait Sexual Pleasure*

This dissertation included an effort to distinguish between the concepts of state and trait in relation to sexual pleasure. This distinction is important because it allows a more comprehensive understanding of the complexity and diversity of sexual pleasure experiences. However, distinguishing between state and trait in the analysis of sexual pleasure can be a complex task, as these concepts are not always mutually exclusive and can interact. For example, an individual's trait may influence their experiences in a specific situation, and their state can also affect their traits over time (Schmitt & Blum, 2020; Steyer et al., 1992).

While this dissertation acknowledges and incorporates the distinction between state and trait in relation to sexual pleasure in the theoretical framework provided in the first article included in this dissertation (Werner et al., 2023), the empirical work in this dissertation does not fully explore the distinction between state and trait and is limited to separate analyses of state and trait scales (Borgmann et al., 2023). While the acknowledgement of state and trait distinction in the theoretical framework is a strength, the separate analyses of state and trait scales in the empirical work are a limitation of the dissertation, as the interplay between state and trait remains underexplored in this research. Therefore, further research is needed to gain a more comprehensive understanding of the complexity of sexual pleasure, including how state and trait interact.

#### 3.6.2 *The WEIRD Perspective on Sexual Pleasure*

One potential limitation of the dissertation is that it may have limited generalizability, as the population studied may not be representative of nor the measurement instrument used

appropriate for all individuals and contexts. This is because research on sexual pleasure has been primarily conducted in Western, educated, industrialized, rich, and democratic (WEIRD) societies, which tend to be more open and accepting of discussions about sexuality and sexual pleasure (Fazli Khalaf et al., 2018; Klein, Savaş, et al., 2022; Muhanguzi, 2015; Smuts, 2021). These societies may have different cultural norms and expectations of sexuality, which can influence individuals' experiences and expressions of sexual pleasure. As a result, research on sexual pleasure conducted in WEIRD societies may not represent the experiences of individuals in other cultural contexts (Jones, 2019).

This limitation demands consideration of the cultural context in which research on sexual pleasure is conducted and awareness of potential cultural biases that may influence the findings. Moreover, cultural, religious, societal, and geographic differences can influence an individual's early experiences and states of sexual pleasure, which may shape their abilities or traits and result in persistent differences in sexual pleasure. These differences can create inequalities in access to and enjoyment of sexual pleasure (Hall, 2019). It is precisely when such differences between cultures emerge that sexual rights are central, as these should ensure that everyone has equal conditions in which to express their sexuality, access accurate information, and enjoy their sexual pleasure (Gruskin et al., 2019; Lottes, 2013).

The fact that the author of this dissertation and the authors of the three articles presented in this dissertation are also from WEIRD societies may further contribute to the potential limitation of the generalizability of the findings to non-WEIRD cultures. This is because the authors' cultural backgrounds and experiences may influence the way they approach and understand the topic of sexual pleasure, potentially leading to a narrow or culturally biased view of the subject. However, the authors were aware of this limitation and made a conscious effort to approach the topic inclusively, considering the potential cultural biases and differences that might influence their findings. Moreover, a conscious effort was undertaken to adhere to the Global Advisory Board for Sexual Health and Wellbeing's (GAB,

2016) definition of sexual pleasure as a diverse experience. This was done by including a variety of rewards that can be experienced during sexual activity, rather than limiting our understanding of sexual pleasure to sensual pleasure and orgasm. Additionally, we incorporated insights from both positivist and nonpositivist research methodologies in the development of our framework and taxonomy (Werner et al., 2023). This helped to increase the likelihood that our understanding of sexual pleasure was inclusive and not limited to a particular culture or demographic.

Nonetheless, this alone cannot replace the need for further research in other cultures to gain a more comprehensive understanding of the complexity and diversity of sexual pleasure experiences. Therefore, it is important to acknowledge this limitation, and to emphasize the need for research on sexual pleasure to be conducted across different cultural contexts, and to include diverse perspectives.

### *3.6.3 The Pleasure Imperative*

The dissertation may be criticized for promoting a pleasure imperative which posits that sexual pleasure should be the primary goal of sexual activity for everyone. The concept of a pleasure imperative was first introduced by Louisa Allen (2005), who highlighted the potential limitations of including a discourse on erotics in sex education and the risk of creating a space in which students feel compelled to achieve sexual pleasure. An imperative would convey the experience of sexual pleasure as a duty and its absence as wrong or lacking. However, sexual pleasure should not be presented as evidence of empowerment or even of healthy sexuality (Allen, 2005; Wood et al., 2019). Therefore, it is crucial to view sexual pleasure as an opportunity rather than a duty. It is of utmost importance to avoid creating such a pleasure imperative; such a far-reaching limitation would directly contradict the actual intention of the dissertation.

### 3.6.4 *The Sexocorporel Approach*

The Sexocorporel approach is a holistic and comprehensive approach to understanding and addressing sexual health. It recognizes the importance of physical, emotional, cognitive, and relational components of sexuality and the promotion of sexual pleasure as a key goal (Bischof, 2012; Desjardins, 1996; Desjardins et al., 2010). Its holistic approach to understanding and addressing sexual health is a key strength of the approach.

The Sexocorporel approach encompasses a vast array of methods such as psychoeducational elements and mindfulness-based physical exercises. This quality poses challenges to isolating the specific effects that can be attributed solely to the Sexocorporel approach, as these elements and exercises are also present in other interventions (Brotto et al., 2008; Carvalheira & Leal, 2013; Gurney et al., 2020; Mize, 2015; Velten et al., 2020; Velten et al., 2018). However, the goal of the intervention study or this dissertation was not to test the approach as a whole but to test an intervention developed from the Sexocorporel approach to assess the intervention's potential to enhance sexual pleasure. Testing the Sexocorporel approach itself would require a different design and should be conducted in future research, because it is beyond the scope and purpose of this dissertation.

Furthermore, the Sexocorporel approach has its origins in practice and is primarily known within German-speaking countries. Consequently, the empirical literature pertaining to this approach is currently limited (de Carufel & Trudel, 2006) and more research is needed to confirm its effectiveness.

Moreover, use of the Sexocorporel approach might inadvertently generate a pleasure imperative, since the approach itself clearly dictates how sexual pleasure can and should be achieved. This can be a potential limitation of the approach, and it is crucial to consider this point when developing further intervention studies.

### *3.6.5 A Theory-based Integrative and Comprehensive Approach*

One strength of this dissertation is its highly integrative and comprehensive approach, which builds on and confirms previous findings in the field. A thorough literature review was conducted to provide a comprehensive understanding of the current state of the art on sexual pleasure. The breadth and depth of the literature review ensures that connections were made between studies, and it provides a solid foundation for the research. By working on the topic from the ground up, the dissertation is able to adopt a broad perspective on the construct of sexual pleasure and identify areas for further investigation. Another strength of this dissertation lies in its thorough and comprehensive examination of the construct of sexual pleasure, from its definition and conceptualization to its operationalization and measurement. Adherence to the eight steps of construct development outlined in the introduction of this dissertation (p. 10-13) ensures comprehensive definition and operationalization of the construct. The definition, which was derived from previous research and literature, informed the operationalization, whose results in turn informed the intervention. Thus, a strong foundation of evidence was created that supports the validity and reliability of the construct and its operational definitions.

While the dissertation's comprehensive and integrative approach is a strength, one potential limitation is that the process of construct development outlined in the introduction may not have been sufficiently detailed in its description of the individual steps. However, the process outlined in the dissertation serves as a general framework, and each step includes various methodologies and approaches that can be employed to further refine the understanding of the construct. Enumerating and describing all of the methodologies within this dissertation would exceed its scope; the process outlined serves as a framework for the dissertation rather than a comprehensive examination of all possible methodologies.

Despite these limitations, this dissertation advances the understanding and promotion of sexual pleasure and provides a solid foundation of evidence that future research can build upon. It also lays the foundation for the development of interventions and policies for promoting sexual pleasure to improve sexual health and well-being.



#### **4. Conclusion**

This dissertation represents a significant contribution to the field of sexual health by providing a theory-based definition of sexual pleasure and developing a measurement instrument to capture it. The development and validation of this measurement instrument and examination of an approach to promoting sexual pleasure pave the way for future research and interventions in this field. Through this dissertation, I have taken a step towards developing a more comprehensive and inclusive understanding of sexual pleasure, and in doing so, I hope to have laid the foundation for further research and interventions in this important field. Therefore, I wish this dissertation to serve as a starting point for further exploration and discussion and to inspire new conversations and directions for research on sexual pleasure and its role in sexual health and overall well-being.

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## **Erklärung zur Dissertation**

Hiermit bestätige ich, dass ich die Dissertation

### **Sexual Pleasure Matters**

### **Defining, Operationalizing, and Promoting Sexual Pleasure**

im Fach Gesundheitspsychologie und Verhaltensmedizin

unter der Leitung von Prof. Dr. Hansjörg Znoj

ohne unerlaubte Hilfe ausgeführt und an keiner anderen Universität zur Erlangung eines akademischen Grades eingereicht habe.

Datum: 30. Januar 2023

Unterschrift