

# Assessing Diversity Dimensions in Environmental Psychology: Challenges and Recommendations

Helen Landmann<sup>1</sup>, Sven Kachel<sup>2</sup>, Laura Kommerscheidt<sup>2</sup>, Florian Lange<sup>3</sup> & Isabel Richter<sup>4</sup>

1 FernUniversität in Hagen, 2 University of Kaiserslautern-Landau, 3 KU Leuven, 4 Norwegian University of Science and Technology (NTNU)

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## Abstract

Representing diversity is a ubiquitous challenge in environmental psychology: Many researchers aim to describe the diversity of their samples by collecting characteristics such as gender, age, and socioeconomic status, and the (lack of) diversity of participants is often discussed when dealing with the generalizability of environmental psychology findings (e.g., for different ethnic groups). Some standard instruments for measuring sociodemographic characteristics can be problematic because they are based on outdated concepts (e.g., a two-gender system) and are inappropriate for accurately capturing participant heterogeneity. To address this issue, we compare and extend existing approaches for the operationalization of sociodemographic characteristics and provide recommendations for capturing and documenting diversity in environmental psychology in particular. In addition, we discuss measures of specific diversity dimensions (migration/ethnicity, socioeconomic status, gender and sexual orientation) and provide recommendations for assessing them in general. Thereby, we aim to promote the use of more inclusive measures to assess sociodemographic characteristics and to stimulate an enriching discussion about representing diversity dimensions in environmental psychology.

## Keywords

Diversity, Measurement, Ethnicity, Socioeconomic Status, Gender

# 1 Non-Inclusive Measurement Practices in Environmental Psychology

Although far from being a homogeneous field, we think it is fair to consider environmental psychology a collective endeavor guided by a number of core principles. As scientists, environmental psychologists generally strive to paint an accurate picture of selected parts of the natural world (as evidenced by the immense effort they put into the development and improvement of measurement techniques and explanatory models). In addition, they tend to assume social responsibility and address societal problems (as indicated by frequent references to problems such as climate change in the introduction sections of their scientific contributions). Environmental psychologists typically work together with human research participants and they are motivated to do so in a way that is characterized by integrity, respect, and harm avoidance (as indicated by ethical guidelines and the significant role assigned to institutional review boards).

We feel that these core values are sometimes inadvertently violated when it comes to the assessment of sociodemographic characteristics or diversity dimensions. Independent of the particular research question, researchers in environmental psychology and beyond typically dedicate a part of their research reports to the characterization of the study sample. They assess a limited number of variables (e.g., gender, age, ethnicity, occupation), most often via self-report questions, and then describe how these variables are distributed in the sample. This information is relevant for many questions in environmental psychology: Environments may differentially affect people with different socio-demographic profiles (e.g., Mitchell & Popham, 2008) and different parts of the population may affect the environment in different ways (e.g., Atkinson, 2014). While sample descriptions seem a great opportunity to accurately reflect and acknowledge the diversity of human beings (even within the often rather homogenous samples in environmental psychological studies, Tam & Milfont, 2020), this opportunity is often missed. For example, frequent practices such as the use of binary gender measures ("Gender: male/female", Cameron & Stinson, 2019) may jeopardize psychologists' striving for accuracy, harm avoidance, and positive societal impact. They jeopardize accuracy when misclassifying participants who do not fall into the provided categories and when suggesting that the sample can be sufficiently described by those categories. They jeopardize harm avoidance and respect when a person who does not identify with any of the provided categories is denied their identity. They jeopardize positive societal change when perpetuating obsolete and incomplete views on human diversity or suppressing the visibility of minority groups (Muschalik et al., 2021).

We do not wish to suggest that any environmental psychologist has ever sought to deliberately produce any of these consequences, nor do we claim that we ourselves have always been able to avoid them. Instead, we believe that, despite its prevalence, the

assessment of diversity dimensions has not received the necessary attention, and that many researchers may not be aware of potential problems of assessment methods that they consider to be straightforward or self-evident.

With the present paper, we aim to encourage critical reflection and debate on how to measure and describe diversity dimensions in environmental psychology. In the following sections, we will first discuss challenges and measurement approaches for selected dimensions before then turning to the discussion of recommendations that apply to the measurement of diversity in general. Many of our considerations might already be familiar to diversity experts as we aimed to make this paper accessible and useful for environmental psychologists who have not extensively reflected on diversity assessment yet. While we try to make as many specific suggestions for improvement as possible, we do not understand any of these as silver bullets or one-size-fits-all solutions. In all likelihood, the thoughts articulated in the present paper will be insufficient to capture the complexity of the issue. Some readers will have justifiable doubts about our suggestions and others will have more effective ideas to adequately address the challenge of measuring diversity dimensions. It is our hope that the present paper can help to put such ideas and disagreements on the table and, by this means, be a starting point for a fruitful discussion within environmental psychology.

## **2 Challenges and Recommendations for Specific Diversity Dimensions**

### **2.1 Overview of Diversity Dimensions**

In the following sections, we discuss the assessment of ethnicity, migration, socio-economic status, gender, and sexual orientation. The selection of these specific diversity dimensions is mainly based on the authors' expertise. It covers aspects that are associated with biases in environmental psychology (environmental psychology often focuses on Western societies without migration experiences), aspects that are often assessed by default in environmental psychology (socio-economic status and gender), and an aspect that has been only rarely addressed by environmental psychologists so far (sexual orientation).

### **2.2 Ethnicity and Migration**

Ethnicity and Migration can be relevant for environmental psychology, for instance with regard to place attachment, societal beliefs, and cultural values. After a person migrated, an adaptation process starts that includes significant changes in attachment to the former and the new place (Boğaç, 2009). The association between environmental concern and pro-environmental behavior depends on societal beliefs (Tam & Chan, 2017) and cultural values (Chwialkowska et al., 2020). Furthermore, the topics of environmental psychology and

migration may be more and more intertwined with increasing migration due to climate change (Landmann et al., 2022).

Ethnicity can be regarded as a “sense of belonging, based on ideas of common origins, history, culture, language, experience and values” (Brown & Langer, 2010). Migration, by contrast, refers to physical movement from one region to another either across an international border or within a state (Sironi et al., 2019). The concepts of ethnicity and migration can be related. Some people may feel that they belong to a specific ethnic group because they migrated (i.e., Migration Experience) or because their parents or grandparents migrated (i.e., Migration Background without Migration Experience). However, the concepts cannot be equated. People may identify with an ethnic minority without having migrated – others may have migrated but identify with the ethnic majority. There is a tradition within and outside environmental psychology to assess either participants’ ethnicity or their migration background. Some studies, of course, assess both or other indicators of migration or ethnicity. However, as ethnicity and migration background sometimes seem to be used interchangeably, we compare different approaches of measuring these constructs as well as their strengths and weaknesses.

Ethnicity is typically assessed using a categorical approach. National statistical institutes in the US use the categories “American Indian or Alaska Native”, “Asian”, “Black or African American”, “Native Hawaiian or Other Pacific Islander”, “White”, and “Hispanic or Latino” (Wallman et al., 2000). In the UK, categories of “White”, “Mixed”, “Asian or Asian British”, “Black/African/Caribbean/Black British” are used (Connelly et al., 2016). Participants can usually select more than one response option or select the option “Mixed.” Still, this categorical approach has been criticized as “reifying the fictional concept of ‘race’” (Ballard, 1996), which has no foundation in clear and distinct biological markers (Lott, 2009). Blum (2010) therefore recommends to use the term “racialized groups” instead of “race” and Roberts and colleagues (2020) recommend asking participants to report their “racial/ethnic identity” using an open-response format. Furthermore, ethnic categories depend on the context, change over time, and are often not clearly defined. It is not clear to what extent they refer to appearance, country of origin, or cultural background (Burton et al., 2010). Hence, it is unclear what these categorical measures of ethnicity actually measure. Instead, using these categories may reinforce stereotypes about racialized groups (e.g., via stereotype threat, Spencer et al., 2016).

An alternative approach for measuring ethnicity is to target the components of ethnicity more directly (Burton et al., 2010; Connelly, 2016; Nandi & Platt, 2012). Scholars can directly ask for citizenship, language, and religiousness (see Table 1). This more adequately captures the multidimensionality of ethnicity and avoids stereotypic categories of “race.” In order to reduce the perception of othering, we recommend to avoid the category “other” but to give a

list of countries, languages, or religions (which can be easily implemented in online studies, see <https://www.worldometers.info/geography/alphabetical-list-of-countries/>). If this is not possible (e.g., in paper and pencil questionnaires), it is possible to ask yes/no questions complemented with an open question (e.g., Were you born in Germany? yes/no; If no, in which country were you born?) although this question may also be experienced as othering (i.e., the feeling of being excluded, Johnson et al., 2004). To cover potential marginalization, questions about discrimination experiences can be added. Discrimination experiences can, for instance, be assessed with a two-alternative forced choice question (e.g., “Do you describe yourself as a member of a group that is discriminated against in this country?”, Siddiq et al., 2023), two-dimensional scales covering lifetime and daily discrimination (e.g., Everyday Discrimination Scale, Williams et al., 1997), or with multi-dimensional scales (e.g., Multidimensional Scale of Perceived Discrimination, Molero et al., 2013). Furthermore, some scholars propose to add a set of questions about the relevance of the categories reported above for the participants’ identification (e.g., “How important is your religion to your sense of who you are?”, Connelly et al., 2016; Nandi & Platt, 2012).

The term migration background is used by national statistical institutes in Germany and Austria. In Germany, “a person has a migration background if they or at least one of their parents did not acquire the German citizenship at birth” (Statistisches Bundesamt, 2022). This concept has been used in expert discussions since 1998 and introduced as an official category in 2007; before that, the term “foreigner” was used in governmental reports (Will, 2019). However, the concept of migration background can be regarded as problematic as well. First, the reference to citizenship or place of birth varies between countries. In Germany, the definition is based on citizenship and thus partly on blood ties whereas in the Netherlands and Austria place of birth is relevant for the definition of migration background (Will, 2019). Second, the use of the concept migration background is justified by the goal to identify persons with increased “integration needs” (Will, 2020). However, research shows no increased need for integration for individuals with one parent born in Germany compared to individuals with both parents born in Germany (Will, 2018). Consequently, children with an Austrian-born parent and a parent with migration experience are counted as “without migration background” in Austria (Will, 2019). By contrast, the Statistische Bundesamt in Germany decided to count children with a German-born parent and a parent with migration experience as “with migration background” contradicting the goal to identify integration needs. Finally, the official definition of migration background does not match well to subjective self-perceptions. Among people in Germany who have a migration background according to the official statistics definition, about two thirds do not consider themselves as having a migration background (Nesterko & Glaesmer, 2019). Hence, asking about migration

background can be regarded as questioning whether a person “really” belongs to the country and therefore might carry a negative connotation.

A more inclusionary way of measuring migration is to ask for migration experience rather than migration background (Will, 2019). Migration experience (i.e., whether one has gone through the process of migration) can be assessed by asking participants in which country they were born and whether they have lived abroad (see Table 1). Forcedness of migration can be assessed in addition (e.g., “I was forced to leave my country,” Knausenberger et al., 2022). This approach makes diversity in terms of heritage and experiences visible without relying on the concepts of “race” or “blood ties”.

With increasing efforts to diversify samples and study psychological constructs across countries, the question of migration becomes even more complex because not only the definition of migration within one country (e.g., Germany) but different definitions in different countries have to be considered. In areas and countries with a strong tradition of migration and multicultural societies (e.g., Malaysia), integration needs will also differ significantly from countries where migration is still the exception rather than the rule.

(Table 1)

### **2.3 Socio-Economic Status**

Socio-economic status is highly relevant for behavior that affects the environment. One important predictor of the ecological footprint is income: People who have more money use more resources than people with lower income (Uddin et al, 2017). Education, by contrast, is positively associated with pro-environmental attitudes (Meyer, 2015). The influence of socio-economic status becomes even more apparent when considering a broader definition of pro-environmental behavior (see Barbett & Landmann, this issue).

Socio-economic status (SES) reflects absolute and relative levels of wealth and the social power closely associated with it. Typically, SES is measured with education and/or income as sole indicators. Other factors, such as accumulated economic assets, marital status, insurance coverage, or occupation would also fall into the category albeit assessed far less often (Braveman et al., 2005). We focus on the financial aspects of socio-economic status as this is most commonly assessed in environmental psychology. However, we think that an adequate assessment of multiple aspects of socio-economic status can add to this discussion in the future. Authors rarely provide a justification why certain dimensions and the corresponding ways to measure them were selected. Having “controlled for” SES can therefore indicate that the results might be largely independent of income and education (but see Westfall & Yarkoni, 2016), but still leave the question unanswered if occupation, marital status or family composition play a role (Braveman et al. 2001). Table 2 shows a comparison

of three measures of socio-economic status: Asset-based approaches, income, and subjective measures.

Asset-based measures assess ownership of durable assets (e.g., whether a person possesses a car, refrigerator, or television), housing characteristics (e.g., which material the floor and roof have and which cooking fuel is used), and access to basic services (e.g., electricity supply, source of drinking water, and sanitation facilities) (Howe, 2012). This approach does not rely on currency, which makes it easier to compare the answers between different countries. However, there is not one standard asset measure. Many different asset and wealth indices have been developed with different foci on either durable assets and thus property or on access to basic services (e.g., water, heating, electricity) which are related to basic needs. Furthermore, researchers are confronted with considerable degrees of freedom when calculating the indices (Howe, 2012). They have to decide whether all questions are weighted equally or whether some are more important than others and should thus weigh more heavily.

Assessing socio-economic status via income comes with the advantage of objectivity. It can be assessed for individuals or households, either continuously with an open question (see Table 2) or with categories representing, for example, quartiles of income in the country the study takes place (Braveman et al., 2005). When household income is assessed, its value can be analyzed relatively to the number of people living in the household. However, income is very difficult to compare between countries due to different currencies and different costs of living. Furthermore, while most people in high-income countries have a stable income, salaries in low-income countries often depend on self-employment and seasonal activity (Howe, 2012). This variation in income makes it difficult to reliably answer questions about monthly or annual income.

Regardless of the objective SES, the subjective perception of it (subjective SES, for example in comparison to neighbors) might influence potential pro-environmental behavior (e.g., experiences of economic hardship). Wordings and response options might also have different meanings for different people answering the survey. If participants are asked to indicate their position on the socio-economic ladder (Adler et al., 2000), the interpretation of this ladder might differ between people and thereby have different implications (Gilthorpe & Wilson, 2003). Alternatively, researchers can ask participants to select a statement that best describes their financial situation (see Table 2). Measures such as the ladder-based instrument or the statements about the own financial situation presented in Table 2 allow capturing subjective perceptions of SES. Given the complementary advantages of asset-based, income-based, and subjective measures of SES and the complex relationships between them, combining multiple SES indicators might be an interesting option for many research projects in environmental psychology. Given the high relevance of socio-economic

status for pro-environmental behavior (Meyer, 2015; Uddin, 2017), this may help improve the prediction of behavior relevant for climate change and environmental protection.

(Table 2)

## **2.4 Gender**

### **2.4.1 Beyond Two Genders**

Gender is a complex, multidimensional, and dynamic characteristic – despite all simplifying attempts to maintain a binary gender system that divides the social world exclusively into women and men. Gender binarity is promoted by any study that only offers two gender options (Morgenroth & Ryan, 2018). According to our impression, the environmental psychology literature is mainly limited to a dichotomous understanding of gender when addressing gender-related questions (in addition to collect gender information for sample description; for an exception see Pakin-Albayrakoğlu, 2022). Using a binary gender measure contradicts an adequate (and long-time available) psychological understanding of gender (Cameron & Stinson, 2019), causes an inaccurate and invalid measurement of gender (Lindqvist et al., 2021), and motivates gender minority people to drop out of studies using such measures (Diethold et al., 2023). Even more central than the question of how many genders can, must, and should be distinguished is how gender can be defined. Researchers who want to include gender in their study should first consider which gender component and level they want to examine and, more importantly, why.

### **2.4.2 Biological Gender**

An approach established in the late 1960s differentiates between the biological and the social component of gender (Stoller, 1968). Biological gender can be distinguished on four levels: a) primary (genital) gender characteristics (e.g., clitoris, glans), b) endocrine (hormonal) gender (estrogen, progesterone, and testosterone), c) genetic (chromosomal) gender (e.g., XX, XY, XXY), and d) secondary gender characteristics (e.g., breast, facial hair, size of larynx, voice). Since the gendered body as a biological entity can only be referred to by language, it makes it an object of societal negotiation and social co-construction (Butler, 1990). Therefore, we refrain from using the term “sex”.

The prototypicality of phenotypic characteristics for biological gender is a product of social construction. In Western cultures, doctors assign the gender of individuals based on ultrasound examinations of the fetus or observations of primary gender characteristics at birth. Social construction becomes especially apparent when different levels of biological gender do not correspond in their expression to the socio-medical expectations. For example, in Complete Androgen Insensitivity Syndrome, a fetus with an XY chromosome set will have female-appearing genitalia (Hughes et al., 2012). According to a medical understanding, people whose various biological gender characteristics do not correspond to



each other are referred to as inter\*. Connectedly, children whose sex organs are not smaller than 1cm (clitoris) and not larger than 2.5cm (penis) are called inter\* as well. These criteria represent an arbitrary selection from a size continuum of sex organs (Prader & Gurtner, 1955). Finally, the social construction of biological gender becomes apparent by its transfer to and entrenchment in legal gender. Legal gender is determined by selecting a gender entry in the birth certificate in terms of the Personal Status Act (Fausto-Sterling et al., 2012). In Germany, for example, there are four possibilities available since 2018 (Bundesgesetzblatt, 2018): female, male, diverse, and none.

Environmental psychology rarely addresses biological gender although this might be relevant for environmental perceptions, experiences, and behaviors. For instance, it was shown that higher levels of testosterone and facial as well as vocal masculinization were accompanied by lower pro-environmental attitudes (Landry et al., 2019). Similarly, testosterone concentrations predicted differences between women and men in pointing accuracy, necessary for navigating the environment (Bell & Saucier, 2004). Accounting for variations during the menstrual cycle could be a valuable methodological expansion, e.g., for explaining the effectiveness of coping with environmental stress caused by odor annoyance (e.g., Cavalini et al., 1991).

When investigating endocrine or genetic gender, researchers should apply a direct measurement like saliva or blood tests to increase accuracy. For assessing phenotypic gender, verbal self-reports are a valid and harm-avoiding method when potential confounds with the social gender component can be excluded. When assessing gender, it is important for researchers to reduce confusion among participants by explicitly mentioning the specific component and level when introducing the gender item (Bauer et al., 2017), for example, "My biological gender corresponds to...". Please see Table 3, for an overview of different options for assessing gender (including potential pitfalls). It is worth noting that a cross-national and trans-cultural application of these should be done with caution since gender categories vary between countries and cultures (e.g., two-spirit for indigenous people in North America; Wilson, 1996).

### **2.4.3 Social Gender**

The social component of gender encompasses two levels: a) gender identity and b) gender-role self-concept. The social gender component has been suggested to be relevant for individuals' environmental experiences and behaviors (Bloodhart & Swim, 2020). For example, the acceptability of reduced lighting (as one measure to reduce energy consumption) depends on perceived safety with women feeling less safe than men in the same lighting situations (Boomsma & Steg, 2012). Similarly, women reported more fear than men in public parks, especially when people recreating were absent (Jorgensen et al., 2013). Moreover, it has been found that women worry more about global climate change threats

than men, which comes along with stress, anxiety, and depression (Boluda-Verdú et al., 2022).

Gender identity represents a person's experience of belonging to a certain gender group (Egan & Perry, 2001; American Psychiatric Association, 2013) and the corresponding gender self-definition. Gender identities are diverse and have undergone significant expansion in recent years, going well beyond woman-man distinctions and can be understood in the context of queer-feminist movements (Jagose, 1996). These include gender self-references to situate oneself outside the two-gender system (e.g., gender non-binary), to refer to changes in experienced gender (e.g., genderfluid, genderflux), or to simply express avoidance of any gender-related categorizations (e.g., agender).

Gender identities can correspond to phenotypic gender, gender assigned at birth, or birth-certificate gender entry (called cis\*) but do not need to (called trans\*). The distinction between cis\* and trans\* was negotiated particularly within the framework of the two-gender system. For example, a person who was assigned a male gender at birth and experienced themselves as female was considered a "trans\* woman". It is important to note that this designation (as well as "trans\* man") is not necessarily used by trans\* persons themselves. They tend to self-define according to the gender they experience and hence most likely refer to themselves as "woman" or "man" (e.g., Cahill & Makadon, 2014; Lindqvist et al., 2021). In recent years, continuous (women and men as poles) or multiple gender systems (a variety of different genders) have been established in Western societies. Referring to these gender systems, trans\* people identify also as "non-binary", "agender", or "genderqueer". When researchers wish to capture whether participants' gender identities transgress gender assigned at birth or not (Fraser, 2018), they should think of collecting both characteristics using a two-step measurement (Tate et al., 2013). Fraser (2018) provides a handy guide on which measures to choose when a transgression is to be represented.

A single-item open-ended gender question in which the respondents are asked to enter their gender in a fill-in-the-blank field seems to offer many advantages at first sight. Therefore, some scholars recommend its use (e.g., Ansara & Hegarty, 2014). First of all, there is the simplicity of collecting the data. In addition, people who belong to the queer community feel invited by this form coming along with a low tendency to drop out (Diethold et al, 2023). Difficulties arise, however, in coding the data: Which responses should be grouped together? Do individuals who indicated "feminine" mean the same as individuals who indicated "woman"? The risk of misgendering by applying labels to people who have not selected them for themselves (Anslinger, 2021) and the workload are thus shifted to the data analysis phase (Bauer et al., 2017).

If researchers aim to target a representative or highly heterogeneous sample (e.g., recruitment via crowd-sourcing platforms), six gender-identity options can be seen as a minimal variant. These include “woman”, “man”, “neither woman nor man”, “I prefer not to categorize my gender at all.”, “I prefer to self-describe using my own label...”, and “I prefer not to respond to this item”. The third-to-last and last response options are not the same: “I prefer not to categorize my gender at all” provides a way for people to express who do not want to classify their gender (e.g., agender), while the last option can be selected by participants who do not want to make a statement about the question at all. The open text field shall offer a comprehensive representation of all possible gender self-definitions within the sample. It is likely that not being offered the own gender definition as an option to select from but having to add the preferred term leads to discomfort in the respondent. Even when researchers attempt to provide a complete list of gender identities, they risk neglecting options among the multiverse of possible gender identities (e.g., Frohard-Dourlent et al., 2017; Magliozzi et al., 2016). Correspondingly, the discomfort of gender (and sexual) minorities can be addressed and reduced but not be avoided. The measure we propose seems also suitable for researchers involving right-wing conservative samples (e.g., to investigate attitudes towards climate change and protection; McCright & Dunlap, 2011). Although gender items with more than two response options might potentially be perceived as an offense to traditional norms and morality (e.g., right-wing authoritarianism goes along with a rejection of trans\* people’s civil rights; Tee & Hegarty, 2006), which could result in reluctance and dropout, a valid gender measure (such as the one suggested) is necessary for collecting diversity also within this sample.

Response options can be adapted, depending on the targeted sample. When the research question directly refers to gender (and sexual) minorities or when recruitment of participants relies on the infrastructure of the LGBTIQA\* (lesbian, gay, bisexual, trans\*, inter\*, queer, asexual) community, the measure should include in particular “non-binary”, “agender”, “trans\*”, and “inter\*” among others.

In general, the greatest possible comprehensibility for the participants needs to be ensured (Fowler, 2009; Watson et al., 2020) – this is also important for people belonging to the queer community who are not familiar with specific labels and who should not feel uncomfortable about this. Hence, for example, it may be useful to mention different labels that can be regarded as synonymous (e.g., “transgender”, “trans\* woman”, “trans\* man”, “transsexual” for trans\*) or to add explanations for the individual options, e.g., “trans\* (e.g., gender assigned at birth does not match gender self-experience).”

We like to emphasize that our aim in proposing such more inclusive gender items is clearly to measure and map the gender identity of participants instead of socio-politically educating them. Moreover, we also highlight that gender identity is a highly individual matter since it

reflects how each person defines their gender (instead of being defined by others). That said, participants with a female or male gender experience that is in line with the gender assigned at birth are referring to themselves as “woman” and “man” in the general population but tend to prefer “cis\* woman” and “cis\* man” when having a queer-feminist background. Similarly, although the term “transsexual” is outdated, some people still use it to describe themselves (American Psychological Association, 2020). Psychologists must prioritize doing good and avoiding harm (American Psychological Association, 2017) but this can be challenging when different groups have conflicting interests. It needs to be debated whether “transsexual” should be avoided in gender identity measures since it may be considered derogatory by some members of the trans\* community, even though this denies others a label for self-identification.

Gender-role self-concept describes the extent of a person's self-assessed femininity and masculinity and is the result of various sources, such as gendered aspects of the external appearance, personality traits, interests, behaviors, attitudes, and beliefs, etc. (Athenstaedt & Alfermann, 2011; Kachel et al., 2016). Femininity and masculinity do not necessarily form two poles on one continuum but rather different dimensions (Constantinople, 1973): The first axis refers to traits that are associated with interpersonal closeness and are more socially desirable for women (communion/ warmth/ expressivity), the second axis refers to task-related traits that are more desirable for men (agency/ competence/ instrumentality) (Spence et al., 1975; Spence & Helmreich, 1978; Abele & Wojciszke, 2014; Fiske et al., 2002). According to the concept of psychological androgyny (Bem, 1974), high degrees on both axes are possible and occur frequently for women and men. Gender-role self-concept has often been represented by applying the Bem Sex Role Inventory (Bem, 1981) or the Personal Attributes Questionnaire (Spence et al., 1975). More up-to-date measures (especially for German samples) would be the Positive-Negative Sex-Role Inventory (Berger & Krahe, 2013) and the Traditional Masculinity-Femininity scale (Kachel et al., 2016).

Assessing gender-role self-concept is beneficial because it allows capturing gender-related variability with only one gender group. For example, studies investigated whether men need to adjust their beliefs about masculinity when eating vegan (Greenebaum & Dexter, 2018) or showed how the green-feminine stereotype prevents men from engaging in pro-environmental behavior (Brough et al., 2016). Other examples demonstrating the value of gender-role self-concept are studies on housing preferences (Devlin, 1994) or constructions of home life (Smith, 1994).

(Table 3)

## 2.5 Sexual Orientation

Similarly multifaceted as gender is the concept of sexual orientation. Although in its essence it usually refers to a person's gender-related sexual preference, several components can be distinguished. There is a common consensus that the three most important components are sexual behavior, sexual attraction, and sexual self-identification (e.g., van Anders, 2015; Laumann et al., 1994). Other than for health-related issues (e.g., prevalence of sexually transmittable infections; Bao et al., 2021), the behavioral component of sexual orientation seems to be of minor relevance for environmental psychological questions. Although environmental attitudes and behavior can be thought to be better predicted by people's self-definition (e.g., gay men) than by sexual behavior (e.g., men who have sex with men), we were not able to identify a single article in the *Journal of Environmental Psychology* or *Environment and Behavior* dealing with connections of individual's sexual orientation (no matter which component) and its environmentally related cognitions, emotions, or behaviors<sup>1</sup>.

One could argue that the measurement of sexual orientation is irrelevant to environmental psychology. However, it has been shown that individuals process, for example, their social environment (e.g., Steffens et al., 2013 for faces) differently depending on their sexual orientation. In answering environmental psychological questions related to interpersonal attraction (e.g., Guéguen, 2012; Palomo-Vélez et al., 2021), the value of including participants' sexual orientation becomes particularly evident. But also apart from mating behavior, sexual orientation appears to be a fruitful topic for environmental psychology. For instance, when actors engaged in pro-environmental behaviors that were inconsistent with their gender, uncertainty about their heterosexual identity arose (Swim et al., 2020) and the fear of being perceived as non-heterosexual was shown to regulate interpersonal distances in social environments (e.g., inhibiting same-gender touch; Floyd, 2000).

Label-based identity measures typically provide only two or three categories for sexual orientation (heterosexual, lesbian/gay, and bisexual, e.g., Worthington & Reynolds, 2009), but more fine-grained instruments exist. The Kinsey scale provides a 7-point continuum of sexual orientation based on sexual behavior and experiences (Kinsey et al., 1948) ranging from "exclusively heterosexual" to "exclusively lesbian/gay" (Kachel et al., 2017, 2018)<sup>2</sup>. The Klein Sexual Orientation Grid (Klein et al., 1985) expands the scaling by measuring seven components of sexual orientation across time.

Conventional labels are bound to the two-gender system. For instance, "bisexual" designates a sexual preference for two specific genders (women and men, Galupo et al., 2014).

Recently, a multiple-gender system for sexual counterparts is about to establish:

"Polysexual" refers to a sexual preference for multiple genders (Galupo, Ramirez, et al., 2017), "pansexual" denotes a sexual preference independent of gender (Thöni et al., 2022;

Ochs & Rowley, 2009), and “asexual” designates that individuals are not sexually interested in others – regardless of their gender (Bogaert, 2006; Storms, 1980). However, terms for describing specific sexual attractions beyond women and men are still missing (e.g., there is no term describing a sexual orientation directed to non-binary people only, Galupo, Lomash et al., 2017). Even more difficult to solve: Conventional labels create a relationship between an individual and their sexual counterparts (cf., Galupo, Lomash et al., 2017). For instance, a person labelling as “lesbian” is a woman. In short: Non-gender inclusive sexual orientation scales run the risk of an invalid measurement (especially, when considering gender minorities).

Suggestions for measuring sexual orientation can be found in Table 4. We provided one recommendation for assessing sexual self-identification and attraction each. While the first component also refers to established concepts of lesbianism/gayness, bisexuality, and heterosexuality, the second one provides a more gender-inclusive approach: Sexual attraction can be rated for each gender separately (cf., Ho & Mussap, 2019). Therefore, this measure is not referring to a person’s own gender at all and could be regarded as gender-inclusive on this side. To be gender-inclusive on the side of the sexual counterpart as well, we included the opportunity to add target genders that the participant likes to rate with respect to sexual attraction.

(Table 4)

### 3 General Recommendations

In the following, we discuss some general recommendations for fellow (environmental) psychologists of what to consider when preparing the next data collection and diversifying demographic measurements. These general recommendations apply to the specific diversity dimensions targeted in Section 2 as well as to other diversity dimensions such as age, occupational status, or health status. By no means these diversity dimensions are supposed to be an exhaustive list but merely inspirations and food for more thought.

A first recommendation is a general switch towards more comprehensive assessments of sample characteristics. Focusing exclusively on the assessment and description of gender percentages and age distributions will likely be insufficient if we want to ultimately account for the heterogeneity of psychological effects (Bryan et al., 2021). Many environmental psychologists may be reluctant to obtain richer information on sample diversity because this information seems to be of little direct relevance for their research question or does not allow for the powerful testing of hypotheses about the role of sample characteristics. Yet, the assessment of sample characteristics does not have to result in such study-level analyses to make a meaningful scientific contribution. If the assessment and comprehensive reporting of such information becomes a standard practice, future meta-analyses will be able to use it for

high-powered analyses on the relationship between psychological phenomena and diversity dimensions (see also Lange, 2020). This recommendation to, essentially, assess more personal information may conflict with recommendations or demands from ethical review boards that may discourage the assessment of personal information that is not directly relevant for the research question at hand. While we do not want to discount privacy-related concerns (and recommend to mitigate them by, e.g., making responding to socio-demographic questions optional), we think that a more accurate picture of the samples participating in our studies is vital for the long-term success of our field. We would thus like to encourage environmental psychologists to obtain more detailed information about socio-demographic diversity within their samples wherever this information can be obtained in a way that does not harm respondents (cf. stereotype threat, Spencer et al., 2016) or scientific validity. Where this practice can lead to privacy violations (e.g., when a person provides a specific combination of sociodemographic data that may render them identifiable), researchers may need to take countermeasures (e.g., removing the data in question, aggregating data, limiting access, or use of the data) to strike a balance between open science and privacy protection.

Second, we believe that for many diversity dimensions, finding an exhaustive and inclusive set of choice options can be a difficult task. In many cases, adding an open-response option (“prefer to self-describe: \_\_\_\_”) can offer an inclusive and easy solution. For example, a question regarding occupational status might force respondents to categorize as either employed, student, retired, or unemployed. Adding an open-response option allows people who might do a lot of unpaid work to self-describe as “homemaker”, “carer”, or “stay-at-home parent” instead of being forced to choose “unemployed”. This solution also gives room to participants to potentially raise criticism or make suggestions for missing categories. Of course, we recognize that this option is challenging to analyze (but see our previous recommendation).

While we do not think that the role of diversity dimensions needs to be analyzed for every research question, we do wish to recommend that diversity information should be reported as comprehensively and inclusively as possible. Numbers or percentages for all response options and open responses should be listed in the sample description without collapsing infrequent responses into an “other” category. Careful aggregation of similar open responses (e.g., of the responses “neither/nor” and “non-binary”) is of course an option to keep space demands limited and where word limits are very tight, comprehensive sample descriptions can be added to the supplementary materials.

We also wish to emphasize that, in many cases, measurements of demographic characteristics will need to be adapted to the research question at hand. Where demographic characteristics are assessed to address a particular question or hypothesis about their role, a

researcher's conceptualization of that role will necessarily affect the choice of measure. As an example, researchers interested in how wealthy people feel in comparison to their peers may favor a different SES measure than researchers who want to analyze the amount of resources that people have available for non-essential consumption (see also Section 2.3).

Moreover, we recommend drawing more population-specific conclusions. All too often, results are being generalized far beyond the population from which the sample has been drawn, which poses a considerable problem in terms of external validity (Tindle, 2021). Considering that around 96% of studies published in the top journals within social psychology refer to samples from the Global North, but at the same time, the Global North only represents approximately 12% of the world's population (Henrich et al., 2010), we should be hesitant to generalize psychological findings to the global population. Studies examining differences between cultures, countries, and ethnicities, often find considerable variation in the results (Tiokhin et al., 2019). We therefore strongly recommend, for every study, to clearly specify to which population the sample results are assumed to generalize and on which grounds.

Our final recommendation is actually a set of recommendations that concerns publishers and editors of academic journals. Academic journals have the responsibility and the power to facilitate diversity and inclusive diversity assessments in academic research and publishing. One active measure journals can take is to embrace diversity within the journal's editorial team (i.e., to include editors from outside the northwestern Europe and British descent societies that dominate many editorial boards, Trepte & Loths, 2020). This provides a variety of perspectives and critical voices to foster diversity and inclusion on an internal level of the journal. Journals can further encourage authors to go the extra mile and, for example, collect inconvenient samples, use diverse gender measurements, and follow some of the other recommendations listed above. Authorship is another area with room for improvement when it comes to diversity. Journals can encourage the inclusion of authors from the location where the research was conducted, the support of early career researchers, and researchers self-identifying as belonging to a minority in their field of science (and potentially assess these dimensions at submission). Pointing out the dimensions in which articles are diverse in a transparent way (for example with a standardized diversity statement describing diversity of samples, authors, and references) and visually marking articles as diverse on publication (for example with a diversity badge) are easy-to-implement measures journals can do to encourage diversity and make the topic more salient. One journal that is currently implementing and continuously evaluating all of these options is the recently launched journal of Global Environmental Psychology (<https://gеп.psychopen.eu/>). In combination with scientific discussions on diversity and diversity assessments (as included in the present



paper and other contributions to this special issue), we believe that such journal-based initiatives can play an important part in improving environmental psychology.

## **4 Conclusion**

With the general and dimension-specific suggestions above, we hope to contribute to a more accurate, inclusive, and respectful assessment of diversity in environmental psychology. We particularly aimed to suggest assessment solutions that minimize harm to participants but in the long run provide the basis for a better understanding of the generalizability of environmental psychological research. It is not yet clear whether the solutions we recommend are actually less harmful in all situations. Evaluation studies are necessary to test which type of assessment is preferred by majority and minority groups with regard to the respective dimensions. We also strongly encourage the evaluation of different kinds of measurement options and their effects on stereotype threat. In addition, we would like to stress that the current set of recommendations was compiled by a group of white academics working in Western, educated, industrialized, rich, and democratic societies. We are therefore eager to engage in a conversation with academics from different backgrounds regarding the suitability of our recommendations. Further, we would like to stress that the set of dimensions to diversify is by far not complete or sufficient. We encourage our readers to think deeper about the diversification of other dimensions of which we merely scratched the surface such as family structure, educational level, or religion. Taken together, the present article leaves many questions concerning diversity measurement open. However, we hope that the thoughts articulated in the present paper can inspire critical reflections and discussions about how to measure diversity in environmental psychology.

## Transparency Statement

Florian Lange wrote the first draft of the introduction. Helen Landmann wrote the first draft on migration and ethnicity, the abstract and conclusion, Helen Landmann and Isabel Richter wrote the first draft on socio-economic status. Sven Kachel wrote the first draft of the sections on gender and sexual orientation with support by Laura Kommerscheidt. Isabel Richter and Florian Lange wrote the first draft of the general recommendations. All authors reviewed and revised the manuscript. Helen Landmann and Sven Kachel contributed equally to this manuscript. The first version of the manuscript was submitted May 17<sup>th</sup>, 2022.

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## Endnotes

1 An abstract search on PsyArticles and PsycInfo was conducted on April 17<sup>th</sup>, 2023 with the following terms: sexual orientation OR sexual minority OR lgb OR gay OR lesbian OR bisexual OR pansexual OR polysexual OR monosexual OR sexual behavior OR sexual attraction OR sexual self-identification OR sexual identity

2 In the original Kinsey scale, the second pole is designated with “exclusively homosexual”. Since this term is considered pathologizing and pejorative in most Western societies (American Psychological Association, 2010), we aimed to avoid it.

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## 5 Endnotes

1 An abstract search on PsyArticles and PsycInfo was conducted on April 17<sup>th</sup>, 2023 with the following terms: sexual orientation OR sexual minority OR lgb OR gay OR lesbian OR bisexual OR pansexual OR polysexual OR monosexual OR sexual behavior OR sexual attraction OR sexual self-identification OR sexual identity

2 In the original Kinsey scale, the second pole is designated with “exclusively homosexual”. Since this term is considered pathologizing and pejorative in most Western societies (American Psychological Association, 2010), we aimed to avoid it.

## 6 Tables

Table 1: Approaches for assessing ethnicity and migration

	Ethnicity	Migration Background	Migration Experience	
Definition	Ethnicity refers to a “sense of belonging, based on ideas of common origins, history, culture, language, experience and values” (Brown & Langer, 2010)	A person has a migration background if they or at least one of their parents did not acquire citizenship at birth (Statistisches Bundesamt, 2022).	Migration refers to physical movement from one region to another either across an international border or within a State (Sironi et al., 2019).	
Example	<p>Please indicate your ethnicity</p> <ul style="list-style-type: none"> <li>○ American Indian or Alaska Native</li> <li>○ Asian</li> <li>○ Black or African American</li> <li>○ Native Hawaiian or Other Pacific Islander</li> <li>○ White</li> <li>○ Hispanic or Latino (Wallman et al., 2000)</li> </ul>	<p>Do you have the [Country of Study] citizenship? yes/no</p> <p>If you have another citizenship (in addition), please indicate: _____</p> <p>Which is the dominant language in your household? [List of Languages]</p> <p>Which religious group do you belong to? [List of Religions]</p>	<p>Was your mother (or stepmother or female legal guardian) born in the United States? (“United States” includes the 50 states, its territories, the District of Columbia, and U.S. military bases abroad.)</p> <p>Yes/No/I don’t know</p> <p>Was your father (or stepfather or male legal guardian) born in the United States? Fill one circle only.</p> <p>Yes/No/I don’t know</p> <p>Were you born in the United States?</p> <p>Yes/No/I don’t know</p> <p>(Mullis &amp; Martin, 2015)</p>	<p>In which country were you born? [list of countries]</p> <p>Have you been living abroad for more than three months?</p> <ul style="list-style-type: none"> <li>○ Yes</li> <li>○ No</li> </ul> <p>If yes, in which country? _____</p> <p>(SOEP-Core, Goebel et al., 2018)</p>

Strength	Visibility of diversity	Captures the multidimensionality of diversity	Does not rely on the concept of "race"	Does not rely on the concept of "race" or "blood ties"
Pitfalls	Reifies the concept of "race" Clear definitions of each category are missing Categories differ between countries and change over time Ethnicity is treated as unidimensional	Physical appearance and associated discrimination experiences are not covered.	Definition of migration background differs between countries May create feelings of social exclusion (e.g., in people with two same-gender parents)	Maybe experienced as othering.
Recommendation	Allow for choosing multiple categories.	Preferred option for assessing ethnicity. Discrimination experiences can be assessed in addition.	Avoid this approach or at least ask for own migration experience in addition.	Preferred option for assessing migration. Forcedness of migration and indicators of ethnicity can be assessed in addition.

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Note. If not indicated differently, the examples are self-constructed.



Table 2: Approaches for assessing socio-economic status

	Asset-Based Measures	Income	Subjective Measures	
Definition	Assessing information on ownership of durable assets, housing characteristics, and access to basic services (Howe, 2012)	Assessing individual or household income per month or capita (Howe, 2012)	Assessing participants' perception of their socio-economic status (Howe, 2012)	
Example	<p>International Wealth Index (Smits &amp; Steendijk, 2015; globaldatalab.org):</p> <p>Does the household own or have a... (yes/no)</p> <p>TV</p> <p>Refrigerator</p> <p>Phone</p> <p>Bike</p> <p>Car</p> <p>Cheap utensils (&lt;\$50)</p> <p>Expensive utensil (&gt;\$300)</p> <p>Electricity</p> <p>What is the quality of the... (low/middle/high)</p> <p>Main source drinking water?</p> <p>Toilet facility usually used?</p> <p>Main floor material?</p> <p>Nr. of rooms used for sleeping (one/two/three+)</p>	<p>What was your income from work last month?</p> <p>If possible, please provide both:</p> <ul style="list-style-type: none"> <li>• Gross earnings, i.e., wages or salaries before deduction of taxes and social security</li> <li>• and the net earnings, i.e., the amount after taxes and contributions have been deducted for pension, unemployment and health insurance.</li> </ul> <p>brutto ____ EURO</p> <p>netto ____ EURO</p> <p>(SOEP-Core, Goebel et al., 2018)</p>	<p>Socio-economic Ladder (Adler et al., 2000)</p> <p>Think of this ladder as representing where people stand in our society. At the top of the ladder are the people who are the best off – those who have the most money, the most education, and the most respected jobs. At the bottom are the people who are the worst off – those who have the least money, least education, the least respected jobs, or no job. The higher up you are on this ladder, the closer you are to the people at the very top; the lower you are, the closer you are to the people at the very bottom.</p> <p>Where would you place yourself on this ladder?</p> <p>Please place a large “X” on the rung where you think you stand at this time in your life relative to other people in the United States.</p>	<p>Statements about the own financial situation (Prakash et al., 2016)</p> <p>How would you describe your economic situation? (please select one response)</p> <p>I don't have to limit myself in any way.</p> <p>I am well taken care of and can afford a lot.</p> <p>On the whole, I'm coping.</p> <p>I'm just making ends meet.</p> <p>It is not enough front and back.</p>

Strengths	Independent of currency Objectivity	Objectivity	Independent of currency Covers different aspects of socio-economic status	Independent of currency Easy to understand
Pitfalls	No consent for calculating the index (Howe, 2012) Whether it is a relative or an absolute measure of SES depends on the specific assessment and calculation (Howe, 2012) Not much variance within high-income countries	Depends on currency Difficult to measure in low income countries where salary depends on self-employment and seasonal activity (Howe, 2012) Assesses one dimension of socio-economic status only.	Biased to the middle in high-income countries and to the lower end of the ladder in low- and middle-income countries (Howe et al., 2012) Socio-economic status is not unidimensional: Though standard measures of education and income are usually correlated, these correlations are not strong enough to be equated (Braveman et al., 2005).	The scale may not be interval scaled (it is not clear whether the differences between the options are the same).
Recommendation	Recommended for assessing objective differences between countries	Recommended for assessing objective differences within a country. Questions about education and occupation may be added to cover more dimensions of socio-economic status.	Recommended for assessing subjective status	

Note. If not indicated differently, the examples are self-constructed.

Table 3: Approaches for measuring gender using verbal statements

	Biological gender	Legal gender	Gender identity	
Definition	Biological gender can be differentiated on four levels (genital, hormonal, genetic, secondary gender characteristics, e.g., Diethold et al., 2023) but is prototypically equated with the phenotypic manifestation of the genitalia.	Refers to the entry in the birth certificate in line with the Personal Status Act. It is mostly equivalent to the gender assigned at birth by medical staff (cf. Suen et al., 2022).	Refers to a person's belonging to and identification with (or rejection of) a particular gender and is strongly connected to a person's gender experience (Perry et al., 2019).	
Example	<p>My biological gender corresponds to...</p> <ul style="list-style-type: none"> <li>○ Female</li> <li>○ Male</li> <li>○ Inter* (incl. intergender/intersex)</li> <li>○ I prefer not to respond to this item.</li> </ul>	<p>In my birth certificate the following entry is made for gender...</p> <ul style="list-style-type: none"> <li>○ Female</li> <li>○ Male</li> <li>○ Diverse</li> <li>○ None</li> <li>○ I prefer not to respond to this item.</li> </ul>	<p>I would describe my gender most conveniently as...</p> <ul style="list-style-type: none"> <li>○ Woman</li> <li>○ Man</li> <li>○ Neither woman nor man</li> <li>○ I prefer not to categorize my gender at all.</li> <li>○ I prefer to self-describe using my own label... (Please enter)</li> <li>○ I prefer not to respond to this item.</li> </ul>	<p>I would describe my gender most conveniently as...</p> <ul style="list-style-type: none"> <li>○ Woman</li> <li>○ Man</li> <li>○ Non-binary</li> <li>○ Trans* (incl. transgender/transsexual)</li> <li>○ Inter* (incl. intergender/intersex)</li> <li>○ Agender</li> <li>○ I prefer to self-describe using my own label... (Please enter)</li> <li>○ I prefer not to respond to this item.</li> </ul>

Strengths	<p>Visibility of inter* persons          Seeks to capture the body-related foundation of gender becoming socially powerful          Indirect measurement of primary gender characteristics (avoiding ethical problems due to intimate proximity between experimenter and participant)          Option not to answer the question</p>	<p>Exhaustive measurement of legal gender options for Germany          Differentiates between a gender entry which is left blank and not wanting to answer the question</p>	<p>Option provided not to categorize own gender (especially relevant for agender people)          Use of own label available for reasons of non-offensiveness and comprehensive measurement          Comprehensible for a broad majority of people</p>	<p>Option provided not to categorize own gender          Use of own label available for reasons of non-offensiveness and comprehensive measurement          Contains self-references of the queer community          Number of options still manageable, so overload is unlikely to occur (Diethold et al., 2023)</p>
Pitfalls	<p>Primary gender characteristics represent only one level of biological gender          Classification corresponds to trichotomization of a potentially continuous extent of sex organs          May lead to negative feelings for individuals who have been/are devalued based on their phenotypic gender characteristics</p>	<p>May cause discomfort for individuals who are about to align their legal gender with their gender identity or have been challenged in this regard          If gender transition is of interest, it is better to ask about the gender assigned to participants at birth          High cross-national variability of legal gender options</p>	<p>Potential discomfort due to reduced selection of possible gender identities and open text entry</p>	<p>“Agender” has the quality of an identity category which contradicts the original intention not wanting to indicate a certain gender identity</p>
Recommendation	<p>Avoid this approach if possible; only use it when biological gender is relevant for the research question.</p>	<p>Avoid this approach if possible; only use it when legal gender is relevant for the research question.</p>	<p>Preferred option when addressing representative or convenience samples.</p>	<p>Preferred option when addressing LGBTIQA* samples, highly educated samples, or non-right-wing samples. Options can be added and/or replaced. Choosing multiple options can be allowed.</p>

Note. If not indicated differently, the examples are self-constructed.

Table 4: Approaches for measuring sexual orientation

	Sexual Self-Identification	Sexual Attraction
Definition	Refers to the belonging to a certain gender-related sexual orientation group (cf. Klein et al., 1985).	Refers to being physically and/or emotionally attracted to people of a certain gender (cf. Klein et al., 1985).
Example	<p>Please indicate how you describe your gender-related sexual orientation...</p> <ul style="list-style-type: none"> <li>○ Asexual</li> <li>○ Heterosexual</li> <li>○ Lesbian</li> <li>○ Gay</li> <li>○ Bisexual</li> <li>○ Polysexual</li> <li>○ Pansexual</li> <li>○ I prefer to self-describe using my own label... (Please enter)</li> <li>○ I prefer not to respond to this item.</li> </ul>	<p>Please indicate the degree you feel sexually attracted to the following genders. (You may also add further options to indicate attraction to genders that are not listed.)</p> <ul style="list-style-type: none"> <li>○ Women</li> <li>○ Men</li> <li>○ People not identifying as women or men</li> <li>○ People prefer not to categorize their gender</li> <li>○ I like to add at least one more gender and rate my corresponding sexual attraction: ... (Please enter)</li> <li>○ I prefer not to respond to this item.</li> </ul> <p>Scale from 1 (“not at all”) to 7 (“very”) for each response option</p>
Strength	<p>Identity is captured directly</p> <p>Gender-related sexual orientation is explicitly mentioned to avoid confusion with other characteristics of the sexual counterpart one could be attracted to (e.g., “sapiosexual” – sexual attraction to intelligence or a way of thinking)</p> <p>More than three established categories (lesbian/gay, bisexual, heterosexual) gain visibility</p> <p>Fill-in-the-blank option for people whose sexual orientation is not listed</p>	<p>Measurement captures gender variations of the sexual counterpart</p> <p>Gender inclusivity is given on the side of the participants (since no references are made to participants' own gender) and on the side of the sexual counterpart (because participants can add further genders for which they want to rate sexual attraction)</p>

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Pitfalls	<p>Partially assumes the validity of the two-gender system on the side of the participant and operates with relative terms (“heterosexual”, “lesbian”, “gay”)</p> <p>Partially assumes the validity of the two-gender system on the side of the sexual counterpart (“bisexual”)</p> <p>Participants who are unfamiliar with some of the categories or hold negative views about sexual minorities possibly experience discomfort</p> <p>People who do not wish to label their sexual orientation (Eliason et al., 2016) or who question it can feel uncomfortable by being forced to do so</p> <p>Sexual orientation seems to be treated as an invariant construct</p> <p>In countries in which non-heterosexual behavior is illegal, people will tend not to indicate corresponding behavior and possibly feel stressed not doing so</p>	<p>Challenging for people with a strong heterosexual identity who are forced to rate their sexual attraction toward same-gender individuals (cf., Mescher &amp; Rudman, 2014)</p> <p>Possibly challenging with people holding strong gender binary ideologies (Tee &amp; Hegarty, 2006)</p> <p>Not all possible genders are listed which can be experienced as othering</p> <p>In countries in which non-heterosexual behavior is illegal, people will tend not to indicate corresponding behavior and possibly feel stressed not doing so</p>
Recommendation	<p>Preferred when identity-related aspects of sexual orientation shall be measured or sample should be described.</p>	<p>Preferred when gender-related sexual attraction is the focus of the research question. Researchers can add options if they are of interest.</p>

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Note. If not indicated differently, the examples are self-constructed.