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Gender is a multifaceted concept:

Evidence that specific life experiences differentially shape the concept of gender

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Abstract

Gender has been the focus of linguistic and psychological studies, but little is known about its conceptual representation. We investigate whether the conceptual structure of gender—as expressed in participants' free-listing responses—varies according to gender-related experiences in line with research on conceptual flexibility. Specifically, we tested groups that varied by gender identity, sexual orientation, and gender-normativity. We found that different people stressed distinct aspect of the concept. For example, normative individuals mainly relied on a bigenderist conception (e.g., male/female; man/woman), while non-normative individuals produced more aspects related to social context (e.g., queer, fluidity, construction). At a broader level, our results support the idea that gender is a multifaceted and flexible concept, constituted by social, biological, cultural, and linguistic components. Importantly, the meaning of gender is not exhausted by the classical dichotomy opposing sex, a biological fact, with gender as its cultural counterpart. Instead, both aspects are differentially salient depending on specific life experiences.

Keywords: gender; abstract concepts; conceptual flexibility; free-listing task; embodied and grounded cognition.

1. Introduction

Categories and concepts are what allow us to coherently make sense of the world: they constitute the "bricks" of thought (Murphy, 2002). Importantly, concepts are said to be flexible representations, re-enacting relevant information about a given category in a specific situation (Kiefer & Barsalou, 2013). A large body of evidence demonstrates that the structure of categories and concepts varies as a function of context, both if considered as the physical context in which people are asked to judge sentences, and when considering the linguistic context (or frame) in which people produce features of concepts (for a review see Yee & Thompson-Schill, 2016). Even in tasks explicitly addressing semantic access, the activation of salient semantic features generally depends on task conditions and is dynamically tied to context (Lebois, Wilson-Mendenhall & Barsalou, 2015; Borghi & Barsalou, in press). Concepts also show flexibility across individuals and within the same individual over time, and as a function of changing points of view (e.g., Barsalou & Sewell, 1984). The capacity to retrieve different information in different situations for the same concept has been robustly demonstrated with behavioral tasks (e.g., Barsalou, 1987) and through neuroimaging techniques (Hoenig et al., 2008; Wilson-Mendenhall et al., 2011).

Together with task context, linguistic and cultural context can also affect categories. As the growing number of studies concerned with linguistic and cultural relativism testifies, concepts of time (Boroditsky et al., 2011), space (Majid et al., 2004), motion (Papafragou, Hubert & Trueswell, 2008), color (Regier & Kay, 2009), odor (Majid et al., 2018), and moral concepts (Casasanto, 2009) are influenced by the linguistic, cultural, social, and experiential environment, demonstrating how variable concepts can be across groups of people in different environments (see Malt & Majid, 2013). In this paper, we examine the role of within-culture variability in conceptual representation as a function of differential life experiences.

Specifically, we explore the concept of "gender" probed through a linguistic task as a function of gender identity, sexual orientation, and gender-normativity.

In order to uncover conceptual structure, linguistic tasks such as word-associations or feature and property-generation tasks are among the most commonly employed tools (e.g., McRae et al., 2005). Asking participants to produce properties for a given concept like "truth" (i.e., property-generation task), for example, can shed light on some relevant features of abstract concepts, such as the importance of introspective and experiential relations (e.g., Barsalou & Wiemer-Hastings, 2005), and demonstrate that abstract concepts are characterized by fewer intrinsic properties and more complex situational relations (Wiemer-Hastings & Xu, 2005; Barca, Mazzuca & Borghi, 2017). Given the higher contextual dependency of abstract concepts compared to concrete concepts (Borghi & Binkofski, 2014), their representation might be more flexibly tied to the social context and personal experiences.

While traditional theories suggest that abstract and concrete concepts engage different semantic systems (e.g., Paivio, 1986; Brysbaert, Warriner & Kuperman, 2014), recent approaches have begun to reconsider the classic dichotomy between purely "abstract" and purely "concrete" concepts (Borghi et al., 2018a, 2018b, 2019; Barsalou, Dutriaux & Scheepers, 2018). Specifically, in a situated perspective (e.g., Barsalou, 2008), both concrete and abstract concepts include situational and perceptual information, and support goal-oriented actions. In this light, abstract concepts can be considered to be represented in a multidimensional semantic space with regions that partly overlap with the semantic space of concrete concepts (Troche, Crutch & Reilly, 2014; 2017; Binder et al., 2005; Harpaintner, Trumpp & Kiefer, 2018). Abstract concepts also show high intra-class variability (Ghio et al., 2013; Borghi et al., 2018b; Desai et al., 2018). For instance, Roversi, Borghi and Tummolini (2013) compared properties listed for social entities such as "choir" with properties listed for institutional artifacts such as "ownership" in a property-generation task and found that

94 although both classes of concepts could broadly be considered "social", each elicited distinct
95 properties: social entities elicited a higher proportion of contextual features (typical situations,
96 entities, or events that co-occur with the target concept, e.g., "concert" for "choir"), while
97 institutional artifacts elicited normative relations (e.g., "ownership" after one's own death is
98 legally normed by a "testament"). So, some abstract concepts are more linked to linguistic and
99 social experience, while others have a more salient affective and experiential component
100 (Prinz, 2002; 2012).

101 More generally, abstract concepts can be considered a heterogeneous class, grounded
102 in multiple systems—including perception, action, and sensori-motor information—just like
103 concrete concepts. In addition, however, abstract concepts are also grounded in language,
104 emotion, and sociality (cf. Borghi et al., 2018a; 2019; Desai, Reilly & van Dam, 2018;
105 Mellem, Jasmin, Peng & Martin, 2016). These grounding mechanisms might contribute to the
106 representation of specific abstract concepts to different extents, an idea we explore in this
107 paper.

108 *1.1. Is Gender an Abstract Concept?*

109 Gender is an interesting concept to think about in this context. It can be considered an
110 embodied social concept in which both concrete (i.e., biological factors) and abstract
111 components (related to social interpretations) are relevant. In fact, recent research has
112 proposed the hybrid label "gender/sex" pointing to a rapprochement of biological, physical
113 and perceptual factors with social and cultural factors in the constitution of gendered and
114 sexual identities (van Anders, 2015; Fausto-Sterling, 2019). This contrasts with the traditional
115 distinction between sex as the natural datum of biological sex (hormones, genes, genitalia
116 etc.), and gender as the province of social and cultural practices built upon a supposed sexual
117 dimorphism. The sex-gender distinction dates back to feminist works (e.g., Rubin, 1975) that
118 aimed at opposing the biological determinism at the basis of women's discrimination.

Separating sex from gender allowed feminists to argue that gendered traits (Bem, 1974), and more broadly genders (West & Zimmerman, 1987), are at least in part products of social practices (Haslanger, 1995; Risman, 2004). Nonetheless, scholars such as Butler (1990) have made clear that not only "abstract" notions such as gender roles, but also our sexed bodies (Fausto-Sterling, 1993; 2012), are defined by cultural practices and do not exist outside social meanings (Butler, 1993a).

Within psychology, gender is perhaps one of the most employed constructs. Psychological research has focused on gender/sex differences relying on a binary gender system that opposes men to women. Specifically, a binary gender system presupposes that "there are two discrete categories into which all individuals can be sorted […] and one's category membership is biologically determined, apparent at birth, stable over time, salient and meaningful to the self, and a host of psychological variables" (Hyde et al., 2019, p. 1). On this basis scientists have attempted to unravel traits and attitudes that distinguish the two categories. By the means of instrumental constructs, such as gender-schematicity (Bem, 1981) or gender-consistency, scholars have tried to explain the degree of gender-congruence of individuals from childhood to adulthood.

Another line of research specifically addresses gendered social stereotypes, showing how these implicitly guide people's expectations, judgements, and perception of individual men and women (for a review see Ellemers, 2018). For instance, traits such as assertiveness, competence, warmth, and nurturance are valued differently in relation to men and women; overall, women are more frequently associated with family life, whereas men are associated with career advancement (Greenwald & Banaji, 1995). Importantly, implicit stereotypical gendered knowledge is activated during language processing: comprehension of linguistic information consistent with stereotypical gender-expectations (e.g., feminine pronouns with the role descriptors "nurse") is more fluent than when it is inconsistent (e.g., masculine

pronouns with "nurse"; see e.g., Miersky, Majid & Snijders, 2019; Pesciarelli, Scorolli & Cacciari, 2019).

Other approaches focus on the influence of grammatical gender in categorization (e.g., Cubelli et al., 2011). Some of these studies suggest that speakers of gendered languages incorporate gender as a salient feature of entities, even when this is irrelevant (e.g., in the representation of inanimate entities). For example, Spanish and French adults and children tend to assign feminine and masculine voices to objects according to the grammatical gender of the objects in their native languages (Sera et al., 2002), and Spanish and German speakers remember noun-object pairings better when the noun of the object matches the grammatical gender of the object in their language (Boroditsky, Schmidt & Phillips, 2003). A recent systematic review of the literature on grammatical gender and linguistic relativity suggests that grammatical gender effects on thought are task-specific and modulated by several factors (Samuel, Cole & Eacott, 2019).

1.2. Challenges to the Binary Gender System.

While the "bigenderist assumption" dominates the scientific literature, an emerging area of research from cognitive science and biology questions the binary nature of gender (e.g., van Anders, Goldey & Kuo, 2011; Olson, Key & Eaton, 2015; Joel & Fausto-Sterling, 2016; Roughgarden, 2004; Jordan-Young & Rumiati, 2012; Joel, 2016). Notably, although most people are likely cisgender (i.e., people who perceive their assigned birth sex as congruent with their expressed and desired gender identity), individuals whose identities are not confined to the binary gender system (i.e., gender non-conforming, genderqueer, gender-diverse or transgender individuals) have been documented throughout history and across diverse cultures (Herdt, 1993; Devor, 1997). Attention to gender-nonconforming individuals in the psychological sciences is also promoted by the American Psychological Association,

which in 2015 issued guidelines for best practices with transgender and gender-nonconforming individuals (APA, 2015)

Recently some scholars have introduced in their measurements the notion of gender non-conforming or *genderqueer* (i.e., a person rejecting traditional gender categories such as man/woman), and have begun to investigate gender identity without pathologizing gender-diverse individuals (see Hegarty, Ansara & Barker, 2018 for a recent discussion). For example, Galupo, Pulice-Farrow and Ramirez (2017) asked a sample of 197 individuals who self-identified as either gender-variant or agender to describe their gender identities with the aim of investigating what non-binary individuals consider as central features of their gender identity. A thematic analysis of responses showed that fluidity, mixture, and rejection of traditional bipolar dimensions such as femininity and masculinity were key features.

Experiences of non-binary feelings were also evident among "normative" individuals in a study by Joel, Tarrasch, Berman, Mukamel and Ziv (2014) with Israeli participants. "Normative"[1] in this literature refers to people who feel their assigned birth sex is aligned with their affirmed gender identity, and that generally conform to heterosexual norms, or people who are not plurisexual (i.e., are sexually attracted by only one sex). Joel and colleagues explored identity using a questionnaire which measured gender identity, gender dysphoria, and gender performance (Multi-GIQ questionnaire, Joel et al., 2014; see also Jacobson & Joel, 2018; 2019) among people who identified as men, women, and queer. They found that among self-identified men and women, over 35% of people reported feeling the "opposite" gender, both genders, or neither. This was especially prevalent in queer individuals, but no significant differences emerged between the three groups suggesting that far from being binary, gender is fluid and multidimensional.

To summarize, gender has been investigated from three broad perspectives: (1) in relation to social stereotypes, (2) relating to the representation of grammatical gender in

language and thought, and (3) as a characteristic related to the sense of one's own identity. However, it is unclear how lay people conceptualize gender exactly. Is it conceptualized as something related to our physical and biological make-up or better characterized by social practices? Our study examines the concept of gender in Italian speaking participants. The main purpose was to explore people's conceptual representation of gender taking into account specific experiences that might contribute to the shaping of the concept, in particular different experiences associated with gender identity, sexual orientation, and gender-normativity. We ask whether the concept of gender is differentially shaped by each of these gender-related experiences, in a predominantly conservative cultural setting in terms of gender-related issues.

1.3. The Current Study: How do Italian People Conceptualize Gender?

We adopted a common methodology used to investigate conceptual knowledge. We asked a sample of Italian speaking participants to list words they freely associated with the concept of *genere* 'gender'. We conducted the study in Italy which is an interesting context to explore this question because of the specific linguistic and cultural particulars of this community. In the Italian language, *genere* 'gender', is a polysemous word covering five areas of meaning. In addition to the social interpretation of sex[2] it also includes: (1) the original Latin notion of "genus" representing what species have in common (e.g., the genus Panthera, within the family Felidae, includes species such as lions and tigers); (2) a notion similar to the English meaning of *kind* or *type*; (3) aesthetic canon—similar to English *genre*—applying to literature as well as to cinema, arts, and music; (4) the grammatical category distinguishing nouns into masculine or feminine classes, also used to differentiate individuals based on biological features. This distinction is not confined to animate entities, but also applies to inanimate entities on the basis of linguistic conventions—e.g., in Italian *philosophy* is feminine and *table* is masculine. This binary dichotomy may have ramifications

for the general concept of "gender" too. Indeed, it has been hypothesized that speaking a language that encodes gender in a binary fashion (e.g., Italian, French) may reinforce the conceptualization of gender as a binary system (see Gabriel & Gygax, 2016; Gabriel, Gygax & Kuhn, 2018; Pérez & Tavits, 2019).

The concept of gender in Italian is also interesting because of the specific cultural and social context. Italy is a predominantly catholic country, and theological accounts of gender, sexuality, and family politics are very prominent[3]. In Italian public debate, the English term *gender* is maintained in its English form as a derogatory term. It describes gender and queer studies as based on an "ideology" that undermine the structure of the traditional family (the so-called *ideology of gender*; see e.g., Garbagnoli, 2014; Bernini, 2016).

In order to investigate how Italian speakers represent the concept of gender, we used a free-listing paradigm. We were primarily interested in uncovering conceptual structure, and not in assessing participants' explicit attitudes towards gender-related issues. To avoid participants adopting social desirability strategies, we refrained from explicit measures such as questionnaires or scales measuring attitudes towards sexuality or gender-roles. Instead we focused on participants' own conceptual relations, thus opting for an approach more explicit than, for example, IAT (Greenwald, McGhee & Schwartz, 1998). Free-listing tasks, also termed *semantic fluency procedures,* are thought to make explicit the psychological proximity of concepts and words produced in sequence. The general assumption underlying this kind of task is that when a concept is activated in memory it will in turn prime words and concepts which are semantically related or similar to it. This provides an indirect measure of the psychological saliency of concepts (see Crowe & Prescott, 2003).

We conducted the free-listing task with a diverse pool of Italian participants that were divided into three subgroups according to their gender identity, sexual orientation, and classification according to normative or bigenderist benchmarks. In line with the idea that

abstract concepts are represented as multidimensional constructs (Borghi et al., 2018a; Barsalou et al., 2018), where both embodied and contextual aspects interact, we expected that across all participants we would find evidence of the duality of *genere* 'gender' in Italian, such that participants would list features relating to both the abstract and concrete sense of gender. As such, we expected early and frequent listing of features of gender as a social construct (e.g., culture, femininity, masculinity), as well as features related to the more concrete meaning (e.g., sex, body, genitalia).

In addition, we hypothesized that gender is at least in part represented differently depending on the sub-group of interest following the proposal that conceptual knowledge is flexibly modulated by different experiences (Casasanto & Lupyan, 2015). We investigated whether participants that differed in their gender identity listed different features of the concept gender. Additionally, we expected "normative" and heteronormative individuals, who typically conform to the gender-binary system (Motschenbacher, 2019), to produce more features focusing on physical, sexual, and biological aspects of gender, while "non-normative" and non-heteronormative (i.e. plurisexual, homosexual) participants would generate more features related to their personal experiences and to the social sense of gender.

2. Method

2.1. Participants

80 native Italian speakers voluntarily took part in the study. Ethical approval was provided by the Ethics Committee of the Institute of Cognitive Sciences and Technologies of the Italian National Research Center (ISTC-CNR Ethical Approval n.0000315). Participants were asked to provide their birth sex, self-identified gender identity, and sexual orientation (details of procedure below). The majority of individuals were highly educated: 67.5% had a Master Degree and 13.7% had a PhD; 17.5% completed High School, while only 1.2% had Lower High School education.

2.2. Procedure

We created an on-line questionnaire divided into three sections that participants filled in a fixed order. In the first section, participants gave basic personal information, such as age and birth sex (male; female; intersex). The second section consisted of the free-listing task. Participants were asked to provide 10 concepts they thought were related to the concept of gender (*Il tuo compito ora è quello di scrivere dieci concetti che ti vengono in mente in relazione al concetto di genere*; 'Your task is now to type ten concepts that come to your mind related to the concept of gender').

Finally, in the third section, participants provided additional information about their self-identified gender identity, sexual orientation, and level of education. Gender identity was assessed through forced-choice boxes (woman, man, queer, and transgender), in addition to a blank text box labeled "other" that participants could fill according to their preferences. Keeping birth sex separate from gender identity allowed participants to report their affirmed gender identity, thus avoiding mis-gendering practices (see Ansara & Hegarty, 2014). Indeed, inferring gender identity from biological sex has been criticized by some scholars, in that self-determined gender identity does not always match with the sex assigned at birth. However, we made this distinction explicit only in the third section of the questionnaire, to avoid potential demand effects. Sexual orientation was assessed through the Kinsey Scale (Kinsey et al., 1948), a self-report measure where participants respond on a 7-point scale, ranging from "exclusively heterosexual" to "exclusively homosexual"—hence not considering sexual behavior a strict dichotomy (although for criticism see Galupo, Mitchell & Davis, 2018, Savin-Williams, 2016).

3. Results

We sought to investigate how individuals conceptualize gender, in particular in relation to their personal experiences related to gender. As a first step, we report the characteristics of

our participants. We then focus on the free-listing data and aggregate results across all participants to illustrate which words were produced more frequently overall. We show how words produced by the full cohort of participants tested are clustered together using a measure which accounts for the psychological saliency of the produced associates (see the following sections for details). This overall analysis is followed by subsidiary analyses zooming in on the free-listing produced by different sub-groups according to gender-related experiences. All data and scripts are available at https://osf.io/3zdsm/.

3.1. Participant Characteristics

There were a total of 80 participants, with 45 female (age *M* = 29.5; *SD*=7.7), 35 male (age *M* = 32.7; *SD*=10.5), and no intersex individuals. Among these, 41 identified as women (age *M* = 29.5; *SD*=6.8), 32 identified themselves as men (age *M* = 33.3; *SD*=11.5), 7 identified as queer (age *M* = 28.1; *SD*=6.7), and none as transgender.

Sexual orientation was assessed using the Kinsey Scale (Kinsey et al., 1948; for further details, see *Procedure*). Among the total sample, 36 placed their sexual behavior at the heterosexual extreme of the Kinsey Scale (points 1 and 2), while 37 considered their sexual behavior as homosexual (points 6 and 7 of the Kinsey Scale). Seven participants fell in the middle of the scale (points 3, 4, 5) or defined their sexual orientation as bisexual or asexual. At a more fine-grained level, 50 participants reported to be attracted only by one sex (points 1 and 7), while 29 participants reported to be attracted to more than one sex to different extents (points 2, 3, 4, 5, 6), and one participant identified as asexual.

In order to explore how these differences relate to the concept of *genere* 'gender', participants were first divided into two groups according to their self-affirmed gender identity (woman and man). Individuals who identified as queer (*n*=7) were excluded from the analysis by gender identity because of the small sample size; however, their responses were collated in

317 the subsequent analyses by "normativity", thus partially avoiding the potential
318 marginalization of underrepresented gender and sexual minorities.

319 Second, participants were divided according to their sexual orientation according to
320 their ratings on the Kinsey Scale. Participants' responses followed a bimodal distribution.
321 Accordingly, participants who scored 1 or 2 in the Kinsey Scale were considered
322 heterosexual, while those who scored 6 or 7 were considered homosexual for the purposes of
323 the analyses by sexual orientation. The remaining participants who rated their sexual
324 orientation on the Kinsey Scale as 3, 4 or 5, or bisexual and asexual were excluded from this
325 analysis (n=7), but they were included in the subsequent analyses.

326 Finally, to distinguish "normative" vs. "non-normative" individuals, we took into
327 account participants' gender identity, sexual orientation, and the correspondence between
328 birth sex and affirmed gender identity. "Normative" individuals (n=43) are therefore cis-
329 gender monosexual individuals (either exclusively heterosexual or exclusively homosexual;
330 see e.g. Galupo, Lomash & Mitchell, 2017; Jacobson & Joel, 2019); "non-normative"
331 individuals (n=37) are gender-diverse individuals, individuals falling under the umbrella term
332 of transgender, and/or cis-gender individuals who did not define their sexual preferences in
333 strictly monosexual terms. We included exclusively-homosexual cis-gender individuals (point
334 7 of the Kinsey Scale) in the category of "normative" individuals (Motschenbacher, 2019). In
335 fact, non-exclusively monosexual individuals (points 2, 3, 4, 5, 6 of the Kinsey Scale) can be
336 considered as "less normative" than cis-gender exclusively homosexual individuals, in that
337 their sexual experiences challenge the assumption that sexual interests are only defined by
338 sexual biological features in a binary fashion (see also Hegarty, Ansara & Baker, 2018; van
339 Anders, 2015).

340 *3.2. Free-listing task*

341 *3.3. How is the Concept of "Gender" Represented Across all Participants?*

Overall, the total sample of 80 participants produced 300 words. There was great variation in the responses provided by participants suggesting that, as expected, *genere* 'gender' is a complex concept that incorporates a number of distinct components. Participants produced a small number of common associates: out of 300 words, 64% (*n*= 192) were produced only once by an individual. The most frequently listed word (*identity*), was produced by 24 out of a total sample of 80 participants. So, there is low overall coherence of this category in this sample. For the overall analysis presented first, we focus on associates produced by at least 5% of all participants. Among the list of terms produced by all participants, 41 were produced by at least 5% of the sample. As would be expected, the data exhibit a power law distribution with the frequency of words inversely proportional to their rank (cf. Zipf, 1935).

In order to address our first hypothesis, namely that 'gender' encompasses both abstract and concrete components, we asked an independent sample of 20 Italian participants (9 female, 10 male, 1 intersex; M_{age}= 28.1, *SD*= 6.4) to rate on a 7-point scale the most commonly produced associates in terms of abstractness, concreteness, and emotionality. In line with recent research (Villani et al., 2019; Della Rosa et al., 2010), we probed abstractness and concreteness separately. The order of presentation of the words and of the scales was randomized across participants.

All data were analyzed using R (version 3.6.2, R-Core Team, 2019) and RStudio (version 1.2.1335; RStudio Team, 2018); data processing was also carried out in part using "dplyr" (Wickham, François, Henry & Müller, 2020), "tidyverse" (Wickham et al., 2019), "broom" (Robinson & Hayes, 2020), and "emmeans" (Lenth, 2020) packages.

[PLEASE INSERT TABLE 1 HERE]

As hypothesized, participants in the free-listing task produced terms that included abstract and concrete associates (see Table 1). Overall, the ratings of the free-listing associates demonstrated a negative correlation between abstractness and concreteness ratings, $r(39) = -0.88$, $p < .001$, as would be expected. Concreteness and emotionality ratings were positively correlated, $r(39) = 0.34$, $p = .028$; but there was no significant correlation between abstractness and emotionality ratings, $r(39) = -0.08$, $p = .587$. Generally, the terms produced varied widely in ratings for all three dimensions considered: abstractness ratings ranged from scores of 1.60–5.15 ($M = 3.83$, $SD = 0.92$); concreteness ratings ranged from 2.50–5.75 ($M = 3.93$, $SD = 0.70$); and emotionality ratings ranged from 1.90–5.60 ($M = 3.71$, $SD = 0.90$). One could wonder whether terms produced early in the free-listing differed from those produced later. Perhaps early associates are more likely to be abstract, or conversely more likely to be concrete. We found no significant difference among the first 20 terms produced and the last 20 produced in abstractness, $t(39) = -0.52$, $p = .600$; concreteness, $t(39) = 0.45$, $p = .649$; or emotionality, $t(39) = 1.04$, $p = .300$. This suggests abstract and concrete associates are equally distributed across the free-listing exemplar production of 'gender'.

To facilitate further qualitative interpretation, we computed an abstractness–concreteness difference score by subtracting the mean abstractness rating for each item from the mean concreteness rating. Terms with a resulting positive value can be considered abstract words, and those with negative values concrete words (see Table 1). Among the 41 most frequently produced terms, 23 were abstract and 18 were concrete.

The free-listing data revealed associates with concrete physical and perceptual connotations, (e.g., *body, woman, female, man, male, sex*), as well as abstract social and cultural experiences (e.g., *construct, freedom, category, fluidity*). Additional terms included experiential and personal features (e.g., *education, identity, discrimination, identification*), as

well as linguistic associations connected to the term *genere* in Italian (e.g., *music, literature, grammar, type*).

3.3.1. Measure of psychological proximity. To analyze the free-listing data in more depth, we used a measure developed by Crowe and Prescott (2003). According to this measure, similarity between pairs of items in a free-listing task can be calculated by considering both the distance of two items produced in a single list (from an individual participant), and the distance of the same two items produced across lists (across participants). The measure is given by two component measures, namely α and β_w, one based on within-list proximity (α), and the other on across-list item co-occurrence (β_w). These two metrics are combined to form the overall inter-item similarity metric ($\alpha\beta_w$). Matrices of inter-item dissimilarity were computed initially for all the participants, and then for all the groups of interest (for further details see Crowe & Prescott, 2003). Once the most frequently produced words were identified, both for the total sample of participants and for the sub-groups of interest, associate words were subjected to cluster analyses based on inter-item dissimilarity matrices described above. Hopkins' statistic test has been performed using the package "factoextra" (Kassambara & Mundt, 2017). Clustering indices were calculated with the "NbClust" package (Charrad, Ghazzali, Boiteau & Niknafs, 2014), and dendrograms produced using "dendextend" package (Galili, 2015).

3.3.2. Clustering methods and analyses. Before applying specific clustering methods, we assessed whether our data could be clustered using Hopkins' statistic test (Lawson and Jurs, 1990), which measures the probability that a given data set is generated by a uniform data distribution. The results indicated our data approach a good tendency (H= 0.53). Hierarchical cluster analysis was performed based on the dissimilarity matrix using Ward's method, based on a sum-of-squares criterion (Murtagh & Legendre, 2014) which minimizes within group dispersion (see also Harpaintner et al., 2018). In order to determine the number

of clusters and assess cluster validity, we relied on indices that are most frequently used in the literature. We thus computed Silhouette Index, C-Index, McClain Index and Dunn Index. Two of the aforementioned indices provided a six-cluster solution (SI= 0.3; CI= 0.3), while the remaining two suggested a two-cluster solution (McClain= 0.3; Dunn=0.06). We opted for the six-cluster solution (Figure 1), which better illustrates the fine-grained structure of *genere* 'gender'. The outcome is represented in the dendrogram as visual proximity of words; namely, words that appear clustered together by short branch lengths are words that were most frequently produced in succession.

We found there was no difference across clusters in abstractness ratings, $F(5, 35)= 1.78$, $p=0.142$, or concreteness ratings, $F(5, 35)= 2.13$, $p=.084$, but there was a significant difference in emotionality rating $F(5, 35)= 3.43$, $p=.012$. Pairwise comparisons showed Cluster 1 was rated as more emotional than Cluster 2, $t(35)= 3.92$, $p= .004$, but there were no other significant differences.

[PLEASE INSERT FIGURE 1 HERE]

We refer to the clusters in Figure 1 from top to bottom. In the top cluster—Cluster 1 (violet)—and the next Cluster 2 (blue) the terms are consistent with the conceptualization of gender as a social construct. These two clusters represent the most abstract part of the dendrogram, and point to the idea of gender as a social construction (Butler, 1990), entrenched in social structures (e.g., *power, discrimination*; Foucault, 1978). Cluster 1 had a large number of words that were rated as highly emotional (*expression, freedom, power, and discrimination*).

In Cluster 2 all the words were rated as abstract (*construct* is the most abstract term in the list, see Table 1). This cluster includes concepts generally used in philosophical and

political discourses on gender, and it reveals aspects of the conceptualization of gender derived from shared knowledge and mediated by cultural and social factors (see Shea, 2018).

In Cluster 3 (green) features related to the physical, perceptual, and interoceptive characteristics of gender are evident. Words in this set refer to the physical display of gender attitudes (*masculinity* and *femininity*), clustered together with *sex*; *body* and *belonging* are linked together. In this cluster abstract terms (*belonging*, *femininity*, and *masculinity*) are combined with the most concrete term listed (*body*; see Table 1), suggesting that this cluster is a mix of interoceptive features and physical and perceptual ones.

Cluster 4 (yellow) points to gender as a specifically cultural and social discourse. This is suggested by the presence of *sexuality*, *politics*, *feminism* and *queer* (e.g., Foucault, 1978, Motschenbacher, 2019; Butler, 1993b), and by the strong associations of the words *rights* and *lgbtq*.

Cluster 5 (orange) is the most heterogeneous cluster. Here, terms relating and challenging the normative facet of gender (*transgender*, *fluidity*) appear as closely linked to social and cultural terms (*culture*, *education*, *difference*, *society*, and *behavior*) and terms indicating identity-related characteristics (*feminine*, *masculine* and *identity*). This is likely to reflect the relation that exists in people's minds between education and the development of a gendered identity (for a review, see e.g., Fausto-Sterling, 2012), and it is in line with the notion of *socialization* (e.g., Witt, 1997), according to which parents and peers play a fundamental role in the development of gender-stereotyped self-concepts in children, by reproducing and projecting culturally derived behaviors and norms.

In Cluster 6 (red) a different meaning of the Italian word *genere* appears. We find words referring to the meaning of 'genre' (*music*), as well as 'kind', 'species' (*animal*, *human*) and *grammar*. In addition, this cluster includes *male* and *female*, likely linguistic associations given that they are clustered closely together with the words *human* and *music*.

This cluster is the most concrete according to the ratings: of a total of 8 words, only two can be considered abstract (*identification* and *stereotype*); all the other words were rated as concrete.

Overall, our results suggest the concept of gender cannot be considered either a purely abstract or a purely concrete concept. Rather, it encompasses aspects traditionally considered to be both abstract and concrete. Linguistic associations (e.g., Paivio, 1986) such as *literature* and *animal*, experiential and situational features like *identification* and *behavior* (e.g., Barsalou & Wiemer-Hastings, 2005), social and contextual features like *binarism* and *queer* (Roversi et al., 2013), culturally mediated aspects like *politics* and *feminism* (Shea, 2018), and bodily or biological properties (e.g., *body*, *female* and *male*) appear. This result is in line with recent accounts of abstract conceptual knowledge (e.g., Barsalou, Dutriaux & Scheepers, 2018; Borghi et al., 2018a) and with contemporary debates reconsidering the distinction between sex and gender (e.g., van Anders, 2015).

3.4. Does the Concept of "Gender" Vary Across Sub-Groups?

In the analysis presented so far, we did not distinguish people by gender identity, sexual orientation, or according to gender and sexual norms. However, these aspects are likely to influence the conceptualization of gender. To assess this, participants were divided into three subgroups according to their gender identity (woman, man), sexual orientation (heterosexual, homosexual), and "normativity" ("normative", "non-normative") (see section *3.1. Participant Characteristics*). For each of these sub-groups, we examined how people conceptualized *genere* 'gender'. Relevant words that entered the cluster analysis were items produced at least by 10% of participants in each sub-group. In the sub-groups analyses, we raised the threshold for inclusion from 5% to 10% so as to avoid having items produced by only one participant which would have arisen due to the subsetting of the data. Inclusion of unique items would

have merely led to more idiosyncratic responses being considered in the analyses, whereas we hope to capture general trends.

3.4.1. The concept of gender as a function of gender identity. Overall, there was no significant difference in the total number of items listed by women (M = 8.90; SD = 2.71) and men (M = 7.84; SD =2.86), $t(71) = -1.61$, p =.111, although women showed higher agreement in the terms they mentioned, with 29 commonly listed words compared to 12 common words produced by the men. Among the terms produced by women, 17 were abstract and 12 concrete. Men produced 8 concrete and 4 abstract terms. Chi-squared tests revealed no difference between the two groups in the number of tokens of abstract and concrete terms, χ^2 (1) = 1.27, p= .258. Comparing all relevant terms produced by women and men, also revealed no significant difference in abstractness, $t(39)= 1.85$, p=.071; concreteness, $t(39)=-1.82$, p=.076; or emotionality, $t(39)= -0.17$, p=.863. The most frequently produced words by women (Panel A) were *identity* (39% of the sample) and *sex* (27%). For men (Panel B) *masculine* was the most frequently produced word (22%), followed by *identity* (19%). Figure 2 shows the dendrograms resulting from Hierarchical Cluster Analysis (HCA) for each group.

[PLEASE INSERT FIGURE 2 HERE]

The data from both groups supported a good clustering tendency (women's H= 0.58; men's H= 0.69). Even though some words overlapped between the two groups (n=9), the cluster analyses revealed differences between men and women too. For instance, *identity*—one of the most frequently produced terms by both groups—was mentioned by men together with *feminine*, *masculine* and *sex*, suggesting a relation between perceptual and physical properties and gender identities. For women, however, *identity* appeared closely related to

social terms (*construct*, *role*, *freedom*) and subsequently connected with *fluidity*, *sex*, *behavior* and *society*, suggesting a non-deterministic perspective on gender identity.

It is also noteworthy that although traditional bigender terms were mentioned by both groups, they are differently positioned in the dendrograms. On the one hand, *male* and *female* are represented in a small biological cluster, in the women's dendrogram, which in turn is connected to words that seem to challenge a traditional binary conception of gender (*transgender*). In the men's dendrogram, however, the clustering of *male* and *female* appears as a linguistic association to the grammatical category of gender, as indicated by the link between the two terms and the word *grammar*. *Masculine* and *feminine* are part of a small linguistic cluster for women (indicated by the presence of the word *music*); for men they are part of a cluster marking the identity-laden value of gender, possibly delimited by sexual differences (*sex*). *Woman* co-occurred with *man* in the men's responses, while in the women's dendrogram the word *woman* was coupled with *feminism* along with *difference* and *queer*, whereas *man* does not appear. *Difference* and *culture* are both part of a socio-cultural cluster in both groups. While women generally associated *culture* with *sexuality* in a cluster including *masculinity* and *femininity*, men often mentioned them together with *rights* and subsequently *man* and *woman*.

In sum, there are notable qualitative differences between the two groups. Although the conceptualization of gender by men included social and cultural features (e.g., *rights* was mentioned by men, but not women), terms explicitly challenging a binary and heteropatriarchal system were not highly salient: most words referred to the perceptual, biological and physical sphere; for women, social, cultural and experiential features played a more central role. Women mentioned words with social and political value (e.g., *queer*, *feminism*, *construct*, *stereotype*, *fluidity* and *binarism*) consistent perhaps with their social experience of historically being considered a subaltern identity. This relates to the notion of

"androcentrism", that implies "the privileging of male experience and the "otherizing" of female experience, such that males and male experience are treated as a neutral standard or norm ... and females and female experience are treated as a sex-specific deviation from that allegedly universal standard" (Bem, 1993; p. 41; for a recent review see Bailey, LaFrance & Dovidio, 2019).

3.4.2. The concept of gender as a function of sexual orientation. There was no significant difference in the total number of items listed by heterosexual participants (*M*= 8.64; *SD*=2.83) and homosexual participants (*M*= 8.30; *SD*=2.81), $t(71) = 0.51$, $p=.607$, although heterosexual participants showed higher agreement in the terms they mentioned, producing 22 words in common versus 12 words in the homosexual group. There was no significant difference between the two groups in the number of abstract and concrete terms listed, $\chi^2(1) = 0.75$, $p= .383$, with heterosexual participants listing 8 abstract and 14 concrete terms, and homosexual participants listing 7 abstract and 5 concrete terms. Similarly, comparing all relevant terms, there was no significant difference in abstractness $t(32)= -1.10$, $p=.279$, concreteness $t(32)= 1.10$, $p=.276$, or emotionality ratings $t(32)= -1.16$, $p=.251$, of the terms listed by heterosexual and homosexual participants. *Sex* was the most frequently produced word by the heterosexual group (Panel C) (31% of the sample), followed by *culture* (19%). The homosexual group (Panel D) produced *identity* (41%) and *masculine* (30%) most frequently. Figure 3 shows the dendrograms resulting from HCA performed on target concepts for each group.

[PLEASE INSERT FIGURE 3 HERE]

The data from both groups supported a good clustering tendency (heterosexuals' *H*= 0.70; homosexuals' *H*= 0.60). Even though some words overlapped between the two groups

(*n*=9), the cluster analyses showed interesting qualitative differences. *Sexuality* forms a separate cluster in both groups, but in the heterosexual group is paired with gendered terms (*man* and *woman*), while in the homosexual group it forms a separate and distinct cluster together with *rights* and *society*; *culture* is instead in a separate cluster connected with *fluidity* and *freedom. Masculine* and *feminine* form a separate small cluster in both groups but are associated with linguistic features such as *human* and *music* by the heterosexual group, but with *sex* by the homosexual group. *Sex* was instead frequently produced together with *masculinity* and *femininity* by the heterosexual group, indicating a connection between biological sex and physical appearance.

The clusters in the heterosexual group's dendrogram shows a high prevalence of linguistic associations, along with attention to the bipolar structure of the term gender (with the addition of *transgender*). This suggests that one crucial dimension for this group is the biological one that includes the female/male distinction, and the social roles that this distinction carries. The most abstract cluster in this group can be considered a socio-cultural cluster, centered on *culture* and *society,* and encompassing *difference* and *role.* In contrast, for the homosexual group the two most abstract clusters specifically address the political and social value of the term gender: we find here terms such as *rights*, *fluidity* and *freedom*. Interestingly, these are important instances for the LGBTQI community. The fact that they were mainly mentioned by this sub-group suggests that personal experiences and different contexts shape our conceptual system.

3.4.3. The concept of gender as a function of "normativity". There was no significant difference in the total number of items listed by "normative" participants (M = 8.77; SD = 2.49) and "non-normative" participants (M = 8.16; SD=3.10), $t(78)$ =0 .96, p =.337. There was also no significant difference between the two groups in the number of abstract and concrete terms listed, $\chi^2(1) = 0.11$, p= .731, with "normative" participants listing 7 abstract

and 10 concrete terms, and "non-normative" participants listing 9 abstract and 8 concrete terms. Similarly, comparing all relevant terms there was no significant difference in ratings of abstractness $t(32)= -1.24$, $p=.222$, concreteness $t(32)= 1.42$, $p=.165$, or emotionality $t(32)= -0.08$, $p=.934$, listed by "normative" and "non-normative" participants.

The first two most frequently listed words by the "normative" (Panel E) group were *identity* (30%), and *sex* (26%). In the "non-normative" group (Panel F), the most frequently produced words were *identity* (30%) and *culture* (24%). Figure 4 shows the dendrograms resulting from HCA performed on target words for each group.

[PLEASE INSERT FIGURE 4 HERE]

The data from both groups supported a good clustering tendency ("normative" $H= 0.55$; "non-normative" $H= 0.60$). Even though some words overlapped between the two groups ($n=10$), the cluster analyses indicated qualitative differences too. *Masculine* and *feminine* formed a separate cluster in the "normative" group, suggesting the two terms represent a crucial axis along which the concept of gender is organized; in the "non-normative" group they were instead grouped together with the word *expression* and subsequently *sex* and *fluidity*, in a cluster evoking the idea of traditional gendered roles as social and cultural constructions, and suggesting the idea of femininity and masculinity as performative acts (Butler, 1990). *Society* was mentioned mainly with the word *sexuality* and *education*, and then the word *identity* in the "normative" group, in a cluster that can be labeled as socio-cultural. In the "non-normative" group, *society* was also included in a heterogeneous cluster that represents the concept of gender as a social construct. Specifically, the term *society* was frequently mentioned together with *discrimination*. *Sex* was produced in

association with *role* and *difference* in the "normative" group, while it was paired with the word *fluidity* in the "non-normative" group.

The words listed by both groups reveal differences in the conceptual representation of gender. The "normative" group frequently mentioned words referring to gender in a binary perspective (e.g., *male/female*, *woman/man*). In the "non-normative" group, the experiential and personal domain together with social and cultural aspects emerge more sharply (e.g., *discrimination*, *expression*, *construct*, *fluidity*, and *queer*). At the broadest level, two main clusters emerged in the "normative" group: one explicitly referring to a binary perspective on gender which can be considered a more "concrete" cluster, composed of the words that were rated as more concrete (*woman*, *man*, *male, female*) with the addition of the word *transgender*. The second cluster is a more abstract cluster including words such as *sexuality, education, society, stereotype* and *culture*. In the "non-normative" group, on the other hand, the concrete grounding relies mainly on the experiential corporeity of gender (*masculinity* and *femininity* connected to *expression*), but it is connected with *sex* and *fluidity*. Overall, the "normative" group emphasized a bigenderist perspective of gender, while the "non-normative" group referred to contextually-dependent and social phenomena challenging traditional bigenderist assumptions.

4. General Discussion

Our results demonstrate that the concept of gender is multilayered. According to participants' responses, biological, perceptual and social aspects converge in the conceptual representation of *genere*. When people were asked to produce free associations of the term, both abstract (i.e., social, cultural, and linguistic) and concrete (i.e., physical, biological, and sexual) associations were elicited. Our findings also suggest that the concept of gender is malleable: depending on the characteristics of the individuals, some features of the concept appear more salient than others.

The results do not align well with the traditional view that assumes abstract and concrete concepts are represented distinctly (e.g., Paivio, 1986, Brysbaert et al., 2014), but are more compatible with the idea of a fuzzy boundary between abstract and concrete concepts (e.g., Barsalou, Dutriaux & Scheepers, 2018). We believe the concept of gender is particularly illustrative of this haziness, although future research could specifically address whether and to what extent other abstract concepts are differently represented as a function of personal and cultural experiences. Specifically, in the case of gender, we found experiential, bodily, biological, and perceptual features (e.g., *female*, *male*, *body*, *sex*) were combined with social, cultural, introspective, and linguistic features (e.g., *queer*, *binarism*, *construct*, *feminism*, *rights*, *fluidity*, *discrimination*). In this light, the boundaries of the concept gender seem to also be delineated by "social metacognition" (Shea, 2018; Borghi et al., 2018c), incorporating terms conveyed by specific cultural and social contexts such as academic discussions and public debates.

Our findings shed light on the debate concerning the distinction between sex and gender. Specifically, the results support the claim that sex and gender are entrenched in social context. People's conceptual knowledge of gender seems to incorporate sexual and biological factors related to gender (e.g., *sex, female, male, body*), as well as aspects related to the performativity of gender (e.g., *femininity, masculinity, role, difference, expression*) which are inevitably embedded in social and cultural norms. As Butler (1993a) has argued the very distinction between sex as the corporeal fact of our existence, and gender as the social conventions shaping traditional femininity and masculinity is questionable, in that the perception of physical-sexual differences is affected by social conventions. Indeed, the adequacy of a two-sex system has been questioned as it does not include the full spectrum of human sexual configurations, which might be better characterized as lying on a continuum (see e.g., Fausto-Sterling, 1993). More recently, van Anders (2015) proposed the notion of

gender/sex as "an umbrella term for both gender (socialization) and sex (biology, evolution) […] reflects social locations or identities where gender and sex cannot be easily or at all disentangled." (p.1181). Whatever the underlying "reality", we show that gender/sex is conceptualized by Italian people as a multidimensional, dynamic and complex construct, reflecting the fact that sex and socio-cultural gender are entwined, and therefore making explicit the "being" and the "doing" of gender at the same time.

According to some proposals conceptual knowledge is affected by cultural, social, and linguistic factors (e.g. Boroditsky et al., 2011; Majid et al., 2004; Casasanto, 2009), and different populations may categorize things differently depending on the language spoken, and on the experiential (Casasanto & Lupyan, 2015) and cultural environment (Majid et al., 2018) they live in. In this vein, we hypothesized that individuals conforming to a "normative" conception of gender would produce more words related to a bigenderist conception, while "non-normative" individuals would rely more on socio-cultural aspects of gender and on their personal experiences. A comprehensive categorization of gender experiences combining instrumental constructs such as the Kinsey Scale and tick-boxes with pre-given answers arguably rely on a cis-genderist and normative approach. We attempted to overcome this limitation by allowing participants to produce their own label for each variable (assigned birth sex, affirmed gender identity, and sexual orientation), using a blank text box. In spite of this, we are aware that our operationalization of "normative" and "non-normative" individuals is possibly problematic, in that it is not always an explicit assessment of participants' of themselves, but an experimenter's inference from participants' answers. Nonetheless, in line with recent language and sexuality research (e.g., Motschenbacher, 2019), we aimed at exploring how normativity plays a role in the discursive construction of gender and sexuality. To avoid misconceptions and misgendering phenomena, and to fully account for gender in its full complexity, further research could make different choices for categorizing gender and

sexuality experiences (e.g., see new instruments such as TMF Scale, Kachel et al., 2016; Multi-GIQ questionnaire, Joel et al., 2014, or Sexual-Romantic and Gender-Inclusive Scales, Galupo et al., 2017b).

Despite these caveats, we found some interesting differences in how people conceptualize gender. "Normative" individuals were more likely to mention dichotomous terms, while "non-normative" individuals mentioned words related to the social dimension of gender, such as *fluidity*, *construct*, and *queer*, along with terms such as *expression* and *discrimination*—pointing at specific personal experiences. Recent findings investigating gender identity among non-binary transgender individuals (Galupo et al., 2017a) showed that one central theme in self-descriptions was the notion of *fluidity*, suggesting that gender identity can fluctuate across time. Our results are in line with these findings, showing that the majority of "non-normative" individuals, in contrast to "normative" individuals, mentioned the term *fluidity* in their associations with the term gender, along with terms such as *construct* and *queer*. In this regard, the inclusion of the term *queer* in the conceptualization of gender of "non-normative" individuals supports the importance of the social context in the embodiment of specific experiences. Indeed, over history, the term *queer* acquired the power to give visibility and legitimization to a community of individuals not conforming to bigenderist and heteronormative assumptions. In Butler's words (1993b, p. 19) the term *queer* is "a site of collective contestation", hence a term with a high social and political valence but rooted in personal experiences.

It is also worth noting that, our sample of "non-normative" individuals mentioned binary gendered terms such as *feminine* and *masculine* like our "normative" sample. This is in line with findings from Lederer (2019) who analyzed the speech and gesture of transgender individuals. Lederer (2019) found that although one person identified as a-gender, the gestures accompanying the elucidation of the term *a-gender* matched with the conceptual

metaphor of gender as two bounded regions delimiting the boundaries between females and males. This suggest that the binary model of gender is so culturally entrenched that even in individuals questioning, rejecting, or moving across a bigendered schema it is still lurking.

This experiential relativism emerged also in our data from the other groups of interest. For example, homosexual individuals mentioned the word *rights* near *society* and *sexuality*, while for the heterosexual group the word *rights* was not a salient feature of the concept of gender. This could be because in Italy LGBTQI rights are still a matter of debate, and these kinds of issues are strictly related to gender expression and/or gender identity. On the other hand, cis-gender heterosexual individuals are usually less likely to see their rights compromised based on their sexual preferences or gender identity/expression.

To conclude, gender is a complex and multifaceted concept, whose intricacy is not exhausted by simplistic dichotomies between biological qualities of the human body and cultural or social aspects of sex expressions. These features interact at different levels and to different extents, depending also on specific experiences so as to form the representation of the concept of gender.

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References

American Psychological Association (APA). (2015). Guidelines for psychological practice with transgender and gender nonconforming people. *American Psychologist*, 70, 832-864. http://dx.doi.org/10.1037/a0039906.

Ansara, Y. G., & Hegarty, P. (2014). Methodologies of misgendering: Recommendations for reducing cisgenderism in psychological research. *Feminism & Psychology*, *24*(2), 259-270.

Auguie, B. (2017). gridExtra: Miscellaneous Functions for "Grid" Graphics. R package version 2.3. https://CRAN.R-project.org/package=gridExtra

Bailey, A. H., LaFrance, M., & Dovidio, J. F. (2019). Is man the measure of all things? A social cognitive account of androcentrism. *Personality and Social Psychology Review*, *23*(4), 307-331.

Barca, L., Mazzuca, C., & Borghi, A. M. (2017). Pacifier overuse and conceptual relations of abstract and emotional concepts. *Frontiers in psychology*, *8*, 2014.

Barsalou, L.W., & Sewell, D.R. (1984). Constructing representations of categories from different points of view. *Emory Cognition Project Technical Report #2*, Emory University.

Barsalou, L. W. (1987). The instability of graded structure: Implications for the nature of concepts. *Concepts and conceptual development: Ecological and intellectual factors in categorization*, *10139*.

Barsalou, L. W., & Wiemer-Hastings, K. (2005). Situating abstract concepts. *Grounding cognition: The role of perception and action in memory, language, and thought*, 129-163.

Barsalou, L. W. (2008). Grounded cognition. *Annual Review of Psychology*, *59*, 617-645.

761 Barsalou, L. W., Dutriaux, L., & Scheepers, C. (2018). Moving beyond the distinction
762 between concrete and abstract concepts. *Philosophical Transactions of the Royal*
763 *Society B: Biological Sciences*, *373*(1752), 20170144.
764 Bates, D.,Maechler, M., Bolker, B., Walker, S. (2015). Fitting Linear Mixed Effects Models
765 Using lme4. Journal of Statistical Software, 67(1), 1-48. doi:10.18637/jss.v067.i01.
766 Bem, S. L. (1974). The measurement of psychological androgyny. *Journal of Consulting and*
767 *Clinical Psychology*, *42*(2), 155.
768 Bem, S. L. (1981). Gender schema theory: A cognitive account of sex typing. *Psychological*
769 *Review*, *88*(4), 354.
770 Bem, S. L. (1993). *The lenses of gender: Transforming the debate on sexual inequality*. New
771 Haven, CT: Yale University Press.

772 Bernini, L. (2016). La "teoria del gender", i "negazionisti" e la "fine della differenza
773 sessuale". *AG About Gender-Rivista internazionale di studi di genere*, *5*(10).

774 Binder, J. R., Westbury, C. F., McKiernan, K. A., Possing, E. T., & Medler, D. A. (2005).
775 Distinct brain systems for processing concrete and abstract concepts. *Journal of*
776 *Cognitive Neuroscience*, *17*(6), 905-917.
777 Borghi, A. M., & Binkofski, F. (2014). *Words as social tools: An embodied view on abstract*
778 *concepts*. New York, NY: Springer.
779 Borghi, A. M., Barca, L., Binkofski, F., & Tummolini, L. (2018a). Abstract concepts,
780 language and sociality: from acquisition to inner speech. *Philosophical Transactions*
781 *of the Royal Society B: Biological Sciences*, *373*(1752), 20170134.
782 Borghi, A. M., Barca, L., Binkofski, F., & Tummolini, L. (2018b). Varieties of abstract
783 concepts: development, use and representation in the brain. *Philosophical*
784 *Transactions of the Royal Society B: Biological Sciences*, *373*(1752), 20170121.

785 Borghi, A. M., Barca, L., Binkofski, F., Castelfranchi, C., Pezzulo, G., & Tummolini, L.
786 (2019). Words as social tools: language, sociality and inner grounding in abstract
787 concepts. *Physics of Life Reviews, 29,* 120-153. *doi:*
788 *https://doi.org/10.1016/j.plrev.2018.12.001*
789 Borghi, A. M., & Barsalou, L. (in press). Perspectives in the conceptualization of categories.
790 *Psychological Research.*
791 Boroditsky, L., Schmidt, L. A., & Phillips, W. (2003). Sex, syntax, and semantics. In D.
792 Gentner & S. Goldin-Meadow (Eds.), *Language in mind: Advances in the study of*
793 *language and thought* (pp. 61–79). The MIT Press.
794 Boroditsky, L., Fuhrman, O., & McCormick, K. (2011). Do English and Mandarin speakers
795 think about time differently? *Cognition*, *118*(1), 123-129.
796 Brysbaert, M., Warriner, A. B., & Kuperman, V. (2014). Concreteness ratings for 40 thousand
797 generally known English word lemmas. *Behavior Research Methods*, *46*(3), 904-911.
798 Butler, J. (1990) *Gender Trouble: Feminism and the Subversion of Identity*. New York:
799 Routledge.

800 Butler, J. (1993a). *Bodies that matter: On the discursive limits of "sex"*. New York:
801 Routledge.

802 Butler, J. (1993b). Critically queer. *GLQ: A journal of Lesbian and Gay Studies*, *1*(1), 17-32.

803 Casasanto, D. (2009). Embodiment of abstract concepts: good and bad in right-and left-
804 handers. *Journal of Experimental Psychology: General*, *138*(3), 351.
805 Casasanto, D. & Lupyan, G. (2015). All concepts are ad hoc concepts. In E. Margolis and S.
806 Laurence (eds) *The Conceptual Mind: New Directions in the Study of Concepts*, 543-
807 566.

808 Charrad, M., Ghazzali, N., Boiteau, V., Niknafs, A. (2014). NbClust: An R Package for
809 Determining the Relevant Number of Clusters in a Data Set. *Journal of Statistical*
810 *Software*, *61*(6), 1-36. URL http://www.jstatsoft.org/v61/i06/.

811 Crowe, S., & Prescott, T. (2003). Continuity and change in the development of category
812 structure: Insights from the semantic fluency task. *International Journal of Behavioral*
813 *Development*, *27*(5), 467-479.

814 Cubelli, R., Paolieri, D., Lotto, L., & Job, R. (2011). The effect of grammatical gender on
815 object categorization. *Journal of Experimental Psychology: Learning, Memory, and*
816 *Cognition*, *37*(2), 449.

817 Della Rosa, P. A., Catricalà, E., Vigliocco, G., & Cappa, S. F. (2010). Beyond the abstract—
818 concrete dichotomy: mode of acquisition, concreteness, imageability, familiarity, age
819 of acquisition, context availability, and abstractness norms for a set of 417 Italian
820 words. *Behavior Research Methods*, *42*(4), 1042-1048.

821 Desai, R. H., Reilly, M., & van Dam, W. (2018). The multifaceted abstract brain.
822 *Philosophical Transactions of the Royal Society B: Biological Sciences*, *373*(1752),
823 20170122.

824 Devor, H. (1997). *FTM: Female-to-male transsexuals in society*. Bloomington, IN: Indiana
825 University Press.

826 Ellemers, N. (2018). Gender Stereotypes. *Annual Review of Psychology*, 69, 275-298.

827 Fausto-Sterling, A. (1993). The five sexes. *The Sciences*, *33*(2), 20-24.

828 Fausto-Sterling, A. (2019). Gender/sex, sexual orientation, and identity are in the body: How
829 did they get there?. *The Journal of Sex Research*, *56*(4-5), 529-555.

830 Fausto-Sterling, A. (2012). *Sex/gender: Biology in a social world*. New York: Routledge.

831 Foucault, M. (1978). *The History of Sexuality*. *Volume 1: An Introduction*. New York:
832 Penguin.
833 Gabriel, U., and Gygax, P. (2016). Gender and linguistic sexism. In H. Giles and A. Maas
834 (Eds), *Advances in intergroup Communication*. Bern: Peter Lang Publishers.
835 Gabriel, U., Gygax, P. M., and Kuhn, E. A. (2018). Neutralising linguistic sexism: promising
836 but cumbersome? *Group Processes & Intergroup Relations*, *21*, 844–858. doi:
837 10.1177/1368430218771742

838 Galili, T. (2015). dendextend: an R package for visualizing, adjusting, and comparing trees of
839 hierarchical clustering. *Bioinformatics*. doi:10.1093/bioinformatics/btv428

840 Galupo, M. P., Pulice-Farrow, L., & Ramirez, J. L. (2017a). "Like a constantly flowing
841 river": Gender identity flexibility among nonbinary transgender individuals.
842 In *Identity flexibility during adulthood* (pp. 163-177). Springer, Cham.

843 Galupo, M. P., Lomash, E., & Mitchell, R. C. (2017b). "All of my lovers fit into this scale":
844 Sexual minority individuals' responses to two novel measures of sexual orientation.
845 *Journal of Homosexuality*, *64*(2), 145-165.

846 Galupo, M. P., Mitchell, R. C., & Davis, K. S. (2018). Face validity ratings of sexual
847 orientation scales by sexual minority adults: Effects of sexual orientation and gender
848 identity. *Archives of Sexual Behavior*, 47(4), 1241-1250.

849 Garbagnoli, S. (2014). 'L'ideologia del genere': l'irresistibile ascesa di un'invenzione retorica
850 vaticana contro la denaturalizzazione dell'ordine sessuale. *About Gender*, *3*(6), 250-
851 263.

852 Ghio, M., Vaghi, M. M. S., & Tettamanti, M. (2013). Fine-grained semantic categorization
853 across the abstract and concrete domains. *PloS One*, *8*(6), e67090.

854 Greenwald, A. G., & Banaji, M. R. (1995). Implicit social cognition: attitudes, self-esteem,
855 and stereotypes. *Psychological Review*, *102*(1), 4.

856 Greenwald, A. G., McGhee, D. E., & Schwartz, J. L. (1998). Measuring individual
857 differences in implicit cognition: the implicit association test. *Journal of Personality*
858 *and Social Psychology*, *74*(6), 1464.

859 Harpaintner, M., Trumpp, N. M., & Kiefer, M. (2018). The Semantic Content of Abstract
860 Concepts: A Property Listing Study of 296 Abstract Words. *Frontiers in*
861 *Psychology*, *9*, 1748. doi:10.3389/fpsyg.2018.01748

862 Haslanger, S. (1995). Ontology and social construction. *Philosophical Topics*, *23*(2), 95-125.

863 Hegarty, P., Ansara, Y. G., & Barker, M. J. (2018). Nonbinary gender identities. In N. K.
864 Dess, J. Marecek, & L. C. Bell (Eds.), *Gender, sex, and sexualities: Psychological*
865 *perspectives*. Oxford: Oxford University Press, pp. 53-76.

866 Herdt, G. (Ed.). (1993). *Third sex, third gender: Beyond sexual dimorphism in culture and*
867 *history*. New York, NY: Zone Books.

868 Hoenig, K., Sim, E. J., Bochev, V., Herrnberger, B., & Kiefer, M. (2008). Conceptual
869 flexibility in the human brain: dynamic recruitment of semantic maps from visual,
870 motor, and motion-related areas. *Journal of Cognitive Neuroscience*, *20*(10), 1799-
871 1814.

872 Hyde, J. S., Bigler, R. S., Joel, D., Tate, C. C., & van Anders, S. M. (2019). The future of sex
873 and gender in psychology: Five challenges to the gender binary. *American*
874 *Psychologist*, *74*(2), 171.

875 Jacobson, R., & Joel, D. (2018). An exploration of the relations between self-reported gender
876 identity and sexual orientation in an online sample of cisgender individuals. *Archives*
877 *of Sexual Behavior*, *47*(8), 2407-2426.
878 Jacobson, R., & Joel, D. (2019). Self-reported gender identity and sexuality in an online
879 sample of cisgender, transgender, and gender-diverse individuals: an exploratory
880 study. *The Journal of Sex Research*, *56*(2), 249-263.
881 Joel, D. (2016). Captured in terminology: Sex, sex categories, and sex differences. *Feminism*
882 *& Psychology*, *26*(3), 335-345.
883 Joel, D., & Fausto-Sterling, A. (2016). Beyond sex differences: new approaches for thinking
884 about variation in brain structure and function. *Philosophical Transactions of the*
885 *Royal Society B: Biological Sciences*, *371*(1688), 20150451.

886 Joel, D., Tarrasch, R., Berman, Z., Mukamel, M., & Ziv, E. (2014). Queering gender:
887 studying gender identity in 'normative'individuals. *Psychology & Sexuality*, *5*(4), 291-
888 321.

889 Jordan-Young, R., & Rumiati, R. I. (2012). Hardwired for sexism? Approaches to sex/gender
890 in neuroscience. *Neuroethics*, *5*(3), 305-315.

891 Kachel, S., Steffens, M. C., & Niedlich, C. (2016). Traditional masculinity and femininity:
892 Validation of a new scale assessing gender roles. *Frontiers in Psychology*, *7*, 956.

893 Kassambara, A. & Mundt, F. (2017). factoextra: extract and visualize the results of
894 multivariate data analyses. R package version 1.0.5. https://CRAN.R-
895 project.org/package=factoextra

896 Kiefer, M., & Barsalou, L.W. (2013). Grounding the human conceptual system in perception,
897 action, and internal states. In W. Prinz, Miriam Beisert, & Arvid Herwig

(Eds.), *Action science: Foundations of an emerging discipline* (pp. 381-407). Cambridge, MA: MIT Press.

Kinsey, A. C., Pomeroy, W. B., & Martin, C. E. (1948). *Sexual behavior in the human male*. Oxford, England: Saunders.

Lawson, R. G., & Jurs, P. C. (1990). New index for clustering tendency and its application to chemical problems. *Journal of Chemical Information and Computer Sciences*, *30*(1), 36-41.

Lebois, L. A., Wilson-Mendenhall, C. D., & Barsalou, L. W. (2015). Putting everything in context. *Cognitive Science*, *39*(8), 1987-1995.

Lederer, J. (2019). Gesturing the source domain: The role of co-speech gesture in the metaphorical models of gender transition. *Metaphor and the Social World*, *9*(1), 32-58.

Lenth, R. (2020). emmeans: Estimated Marginal Means, aka Least-Squares Means. R package version 1.4.4. https://CRAN.R-project.org/package=emmeans

Majid, A., Bowerman, M., Kita, S., Haun, D. B., & Levinson, S. C. (2004). Can language restructure cognition? The case for space. *Trends in Cognitive Sciences*, *8*(3), 108-114.

Majid, A., Burenhult, N., Stensmyr, M., De Valk, J., & Hansson, B. S. (2018). Olfactory language and abstraction across cultures. *Philosophical Transactions of the Royal Society B: Biological Sciences*, *373*(1752), 20170139.

Malt, B. C., & Majid, A. (2013). How thought is mapped into words. *Wiley Interdisciplinary Reviews: Cognitive Science*, *4*(6), 583-597.

McRae, K., Cree, G. S., Seidenberg, M. S., & McNorgan, C. (2005). Semantic feature production norms for a large set of living and nonliving things. *Behavior Research Methods*, *37*(4), 547-559.

922 Mellem, M. S., Jasmin, K. M., Peng, C., & Martin, A. (2016). Sentence processing in anterior
923 superior temporal cortex shows a social-emotional bias. *Neuropsychologia*, 89, 217-
924 224.

925 Misersky, J., Majid, A., & Snijders, T. M. (2019) Grammatical gender in German influences
926 how role-nouns are interpreted: evidence from ERPs. *Discourse Processes*, 56(8),
927 643-654, DOI: 10.1080/0163853X.2018.1541382

928 Murphy, G. L. (2002). *The big book of concepts*. Cambridge, MA: MIT Press.

929 Motschenbacher, H. (2019). Language and sexual normativity. In: R. Barrett & K. Hall
930 (Eds.), *Oxford Handbook of Language and Sexuality*. Oxford: Oxford University
931 Press, in press.

932 Murtagh, F. and Legendre, P. (2014). Ward's hierarchical agglomerative clustering method:
933 which algorithms implement Ward's criterion? *Journal of Classification*, 31, 274–295.
934 doi: 10.1007/s00357-014-9161-z.

935 Olson, K. R., Key, A. C., & Eaton, N. R. (2015). Gender cognition in transgender
936 children. *Psychological Science*, *26*(4), 467-474.

937 Paivio, A. (1986). *Mental Representations: A Dual Coding Approach*. New York, NY:
938 Oxford University Press.

939 Papafragou, A., Hulbert, J., & Trueswell, J. (2008). Does language guide event perception?
940 Evidence from eye movements. *Cognition*, *108*(1), 155-84.

941 Pérez, E. O., & Tavits, M. (2019). Language influences public attitudes toward gender
942 equality. *The Journal of Politics*, *81*(1), 81-93.

943 Pesciarelli, F., Scorolli, C., & Cacciari, C. (2019). Neural correlates of the implicit processing
944 of grammatical and stereotypical gender violations: a masked and unmasked priming
945 study. *Biological Psychology*, *146*.
946 Prinz, J. (2002). *Furnishing the mind: concepts and their perceptual basis*. Cambridge, MA:
947 MIT Press.
948 Prinz, J. (2012). *Beyond human nature*. London: Penguin/New York: Norton.
949 R Core Team (2019). R: A language and environment for statistical computing. R Foundation
950 for Statistical Computing, Vienna, Austria. URL https://www.R-project.org/.
951 Regier, T., & Kay, P. (2009). Language, thought, and color: Whorf was half right. *Trends in*
952 *Cognitive Sciences*, *13*(10), 439-446.
953 Risman, B. J. (2004). Gender as a social structure: Theory wrestling with activism. *Gender &*
954 *Society*, *18*(4), 429-450.
955 Robinson, D. & Hayes, A. (2020). broom: convert statistical analysis objects into tidy tibbles.
956 R package version 0.5.4. https://CRAN.R-project.org/package=broom
957 Roughgarden, J. (2004). *Evolution's rainbow: Diversity, gender, and sexuality in nature and*
958 *people*. Berkeley: University of California Press.
959 Roversi, C., Borghi, A. M., & Tummolini, L. (2013). A marriage is an artefact and not a walk
960 that we take together: an experimental study on the categorization of artefacts. *Review*
961 *of Philosophy and Psychology*, *4*(3), 527-542.
962 RStudio Team (2018). RStudio: Integrated Development for R. RStudio, Inc., Boston, MA
963 URL http://www.rstudio.com/.
964 Rubin, G. (1975). The traffic in Women: Notes on The" Political Economy" of Sex. In R.
965 Reiter (Ed.), *Toward an Anthropology of Women*, pp. 157-210. New York: Monthly
966 Review Press.

967 Samuel, S., Cole, G., & Eacott, M. J. (2019). Grammatical gender and linguistic relativity: A
968 systematic review. *Psychonomic Bulletin & Review*. https://doi.org/10.3758/s13423-
969 019-01652-3
970 Savin-Williams, R. C. (2016). Sexual orientation: Categories or continuum? Commentary on
971 Bailey et al.(2016). *Psychological Science in the Public Interest*, *17*(2), 37-44.
972 Sera, M. D., Elieff, C., Forbes, J., Burch, M. C., Rodríguez, W., & Dubois, D. P. (2002).
973 When language affects cognition and when it does not: An analysis of grammatical
974 gender and classification. *Journal of Experimental Psychology*: *General*, *131*(3), 377.
975 Shea, N. (2018). Metacognition and abstract concepts. *Philosophical Transactions of the*
976 *Royal Society B: Biological Sciences*, *373*(1752), 20170133.
977 Yee, E., & Thompson-Schill, S. L. (2016). Putting concepts into context. *Psychonomic*
978 *Bulletin & Review*, *23*(4), 1015-1027.
979 Troche, J., Crutch, S., & Reilly, J. (2014). Clustering, hierarchical organization, and the
980 topography of abstract and concrete nouns. *Frontiers in Psychology*, *5*, 360.
981 Troche, J., Crutch, S. J., & Reilly, J. (2017). Defining a conceptual topography of word
982 concreteness: clustering properties of emotion, sensation, and magnitude among 750
983 English words. *Frontiers in Psychology*, *8*, 1787.
984 van Anders, S. M., Goldey, K. L., & Kuo, P. X. (2011). The steroid/peptide theory of social
985 bonds: integrating testosterone and peptide responses for classifying social behavioral
986 contexts. *Psychoneuroendocrinology*, *36*(9), 1265-1275.
987 van Anders, S. M. (2015). Beyond sexual orientation: Integrating gender/sex and diverse
988 sexualities via sexual configurations theory. *Archives of Sexual Behavior*, *44*(5), 1177-
989 1213.
990 Villani, C., Lugli, L., Liuzza, M. T., & Borghi, A. M. (2019). Varieties of abstract concepts
991 and their multiple dimensions. *Language and Cognition*, *11*(3), 403-430.

West, C., & Zimmerman, D. H. (1987). Doing gender. *Gender & Society*, 1(2), 125-151.

Wickham, H. (2016). ggplot2: Elegant Graphics for Data Analysis. Springer-Verlag New York.

Wickham, H., Averick, M., Bryan, J., Chang, W., McGowan, L., François, R., Grolemund, G., Hayes, A., Henry, L., Hester, J. and Kuhn, M. (2019). Welcome to the Tidyverse. *Journal of Open Source Software*, *4*(43), 1686.

Wickham, H., François, R., Henry, L. and Müller, K. (2020). dplyr: A Grammar of Data Manipulation. R package version 0.8.4. https://CRAN.R-project.org/package=dplyr

Wiemer-Hastings, K. & Xu, X. (2005). Content differences for abstract and concrete concepts. *Cognitive Science*, *29*(5), 719-736.

Wilson-Mendenhall, C. D., Barrett, L. F., Simmons, W. K., & Barsalou, L. W. (2011). Grounding emotion in situated conceptualization. *Neuropsychologia*, *49*(5), 1105-1127.

Witt, S. D. (1997). Parental influence on children's socialization to gender roles. *Adolescence*, *32*(126), 253-260.

Zipf, G. K. (1935). *The psycho-biology of language. An introduction to dynamic philology*. M.I.T. Press.

1010

1011 **Table 1**

1012

1013 *Terms produced by at least 5% of participants (N= 80) ordered according to their frequency, and*
1014 *associated rating scores on emotionality, abstractness, and concreteness. On the difference score, a*
1015 *positive score indicates an abstract concept; negative score indicates a concrete concept.*

1016

Word produced by participants in Italian	Translation in English	Percentage of participants producing response (raw frequency)	Emotionality mean rating (standard deviation)	Abstractness mean rating (standard deviation)	Concreteness mean rating (standard deviation)	Difference score abstractness-concreteness
identità	identity	30 (24)	4.6 (1.5)	5.1 (2.0)	4.0 (1.5)	1.1
sesso	sex	22 (18)	4.7 (1.8)	2.8 (1.2)	4.7 (1.7)	-2.0
cultura	culture	19 (15)	4.6 (1.8)	4.5 (1.7)	3.6 (1.5)	0.9
maschile	masculine	19 (15)	2.8 (1.5)	3.5 (1.4)	3.7 (1.1)	-0.2
ruolo	role	16 (13)	3.2 (2.2)	4.1 (1.5)	3.4 (1.8)	0.7
femminile	feminine	16 (13)	3.6 (2.0)	3.4 (1.7)	4.1 (1.4)	-0.7
società	society	15 (12)	3.7 (1.9)	4.2 (2.0)	3.9 (1.7)	0.3
fluidità	fluidity	14 (11)	3.1 (1.8)	4.8 (2.0)	2.5 (1.5)	2.3
transgender	transgender	14 (11)	3.4 (1.7)	2.9 (1.6)	4.3 (1.5)	-1.4
differenza	difference	12 (10)	3.6 (1.9)	4.5 (1.8)	3.6 (1.6)	0.9
femmina	female	12 (10)	3.5 (2.0)	2.5 (1.6)	4.8 (1.9)	-2.3
libertà	freedom	11 (9)	5.6 (1.5)	5.0 (2.0)	3.7 (2.1)	1.3
letteratura	literature	11 (9)	4.3 (1.6)	4.1 (2.0)	4.4 (1.7)	-0.3
sessualità	sexuality	11 (9)	4.4 (1.5)	3.4(1.5)	4.4 (1.3)	-1.0
maschio	male	11 (9)	3.2 (1.8)	2.2 (1.3)	4.7 (1.7)	-2.5
donna	woman	10 (8)	3.8 (1.9)	2.2 (1.4)	5.1 (1.8)	-3.0
tipo	type	9 (7)	2.2 (1.9)	4.9 (1.9)	2.9 (1.9)	2.0
stereotipo	stereotype	9 (7)	4.1 (1.8)	4.6 (1.9)	3.7 (1.9)	0.9
educazione	education	9 (7)	4.0 (1.8)	3.8 (1.6)	3.9 (1.7)	-0.1
musica	music	9 (7)	5.6 (1.3)	3.1 (1.7)	4.7 (1.7)	-1.6
costrutto	construct	8 (6)	2.2 (1.6)	5.2 (2.2)	2.8 (1.7)	2.4
categoria	category	8 (6)	2.1 (1.7)	4.9 (1.9)	3.2 (1.9)	1.8
mascolinità	masculinity	8 (6)	3.7 (1.6)	4.7 (1.6)	3.4 (1.5)	1.3
femminilità	femininity	8 (6)	4.1 (2.2)	4.2 (1.9)	3.9 (1.6)	0.4
femminismo	feminism	8 (6)	4.4 (1.9)	4.2 (1.7)	3.9 (1.7)	0.3
diritti	rights	8 (6)	5.2 (1.3)	4.1 (2.0)	3.9 (1.8)	0.2
queer	queer	8 (6)	3.1 (1.6)	3.9 (1.9)	3.5 (1.5)	0.5
discriminazione	discrimination	8 (6)	5.5 (1.6)	3.8 (1.9)	4.3 (1.5)	-0.5
grammatica	grammar	8 (6)	1.9 (1.3)	3.7 (2.2)	3.9 (2.0)	-0.2
uomo	man	8 (6)	3.3 (1.9)	2.2 (1.2)	4.8 (2.0)	-2.6
identificazione	identification	6 (5)	4.2 (1.6)	4.6 (2.0)	2.9 (1.7)	1.7
espressione	expression	6 (5)	4.1 (2.4)	3.9 (1.9)	3.8 (1.6)	0.1
comportamento	behavior	6 (5)	2.9 (2.1)	3.7 (1.8)	4.3 (1.9)	-0.6

animale	animal	6 (5)	3.5 (1.9)	2.1 (1.4)	5.5 (1.8)	-3.4
appartenenza	belonging	5 (4)	4.1 (1.9)	4.7 (1.9)	3.6 (1.8)	1.2
binarismo	binarism	5 (4)	2.6 (1.9)	4.6 (1.8)	3.2 (2.0)	1.4
politica	politics	5 (4)	3.2 (2.0)	4.5 (2.0)	3.5 (2.0)	1.0
potere	power	5 (4)	3.7 (2.1)	4.4 (1.7)	3.8 (1.6)	0.7
lgbtq	lgbtq	5 (4)	3.6 (2.1)	4.2 (2.2)	3.7 (1.9)	0.5
umano	human	5 (4)	3.8 (2.1)	3.3 (2.0)	4.5 (1.7)	-1.2
corpo	body	5 (4)	4.3 (1.8)	1.6 (1.1)	5.8 (1.7)	-4.2

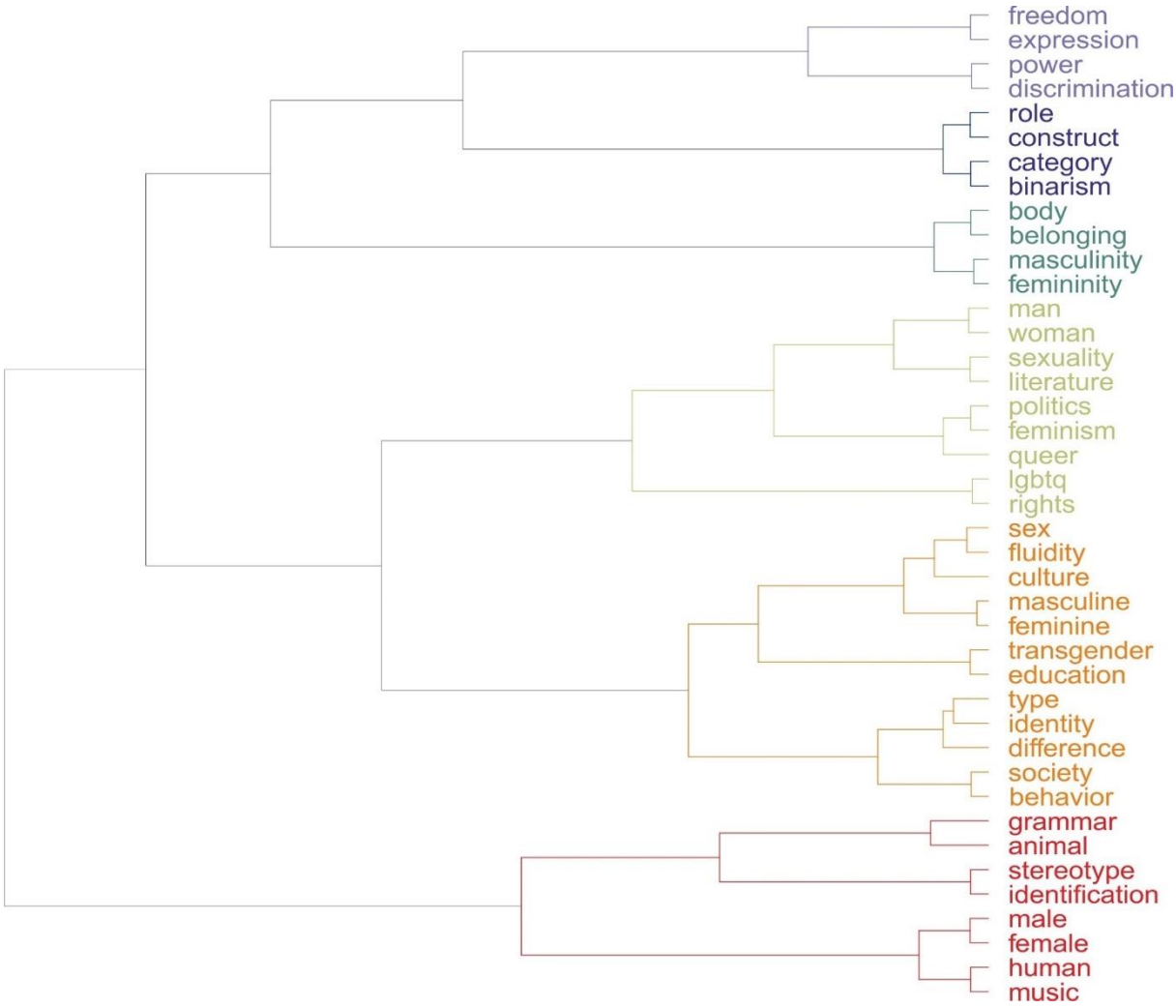

Figure 1. Dendrogram representing the six-clusters solution for words produced by at least 5% of participants.

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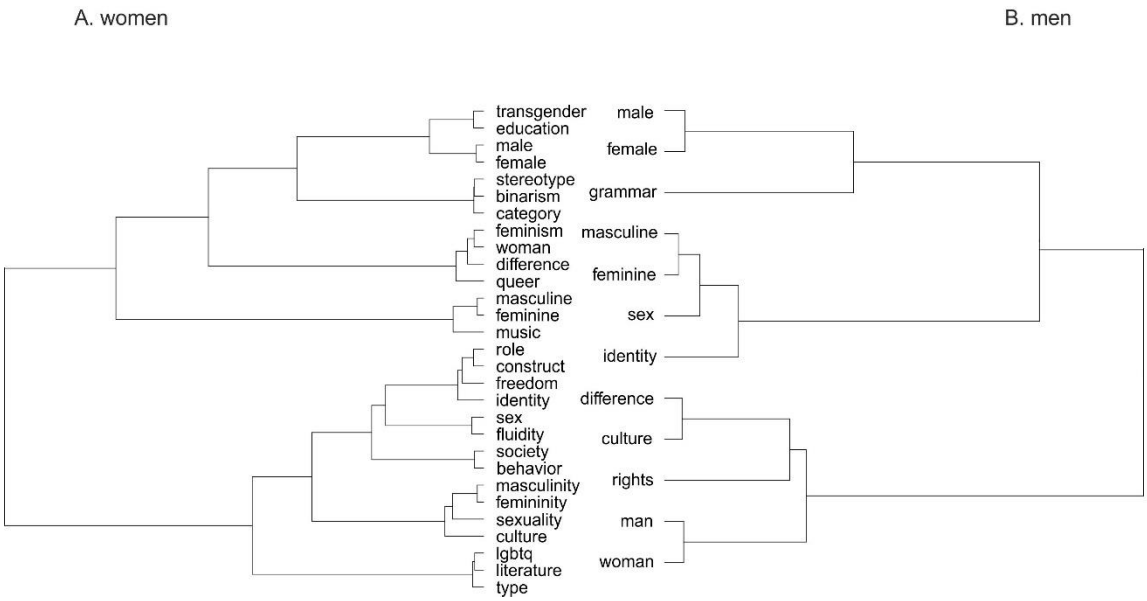

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1026 *Figure 2*. Dendrograms of words produced by at least 10% of (A) women and (B) men.

1027

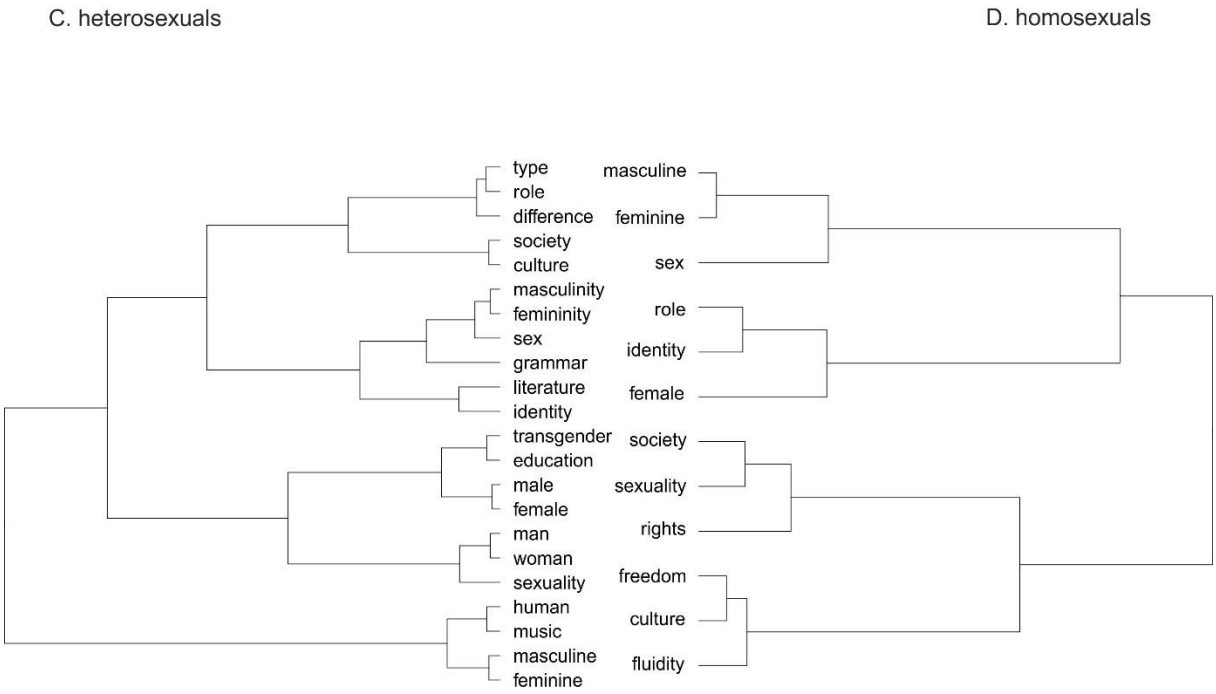

Figure 3. Dendrograms of words produced by at least 10% of (C) heterosexuals and (D) homosexuals.

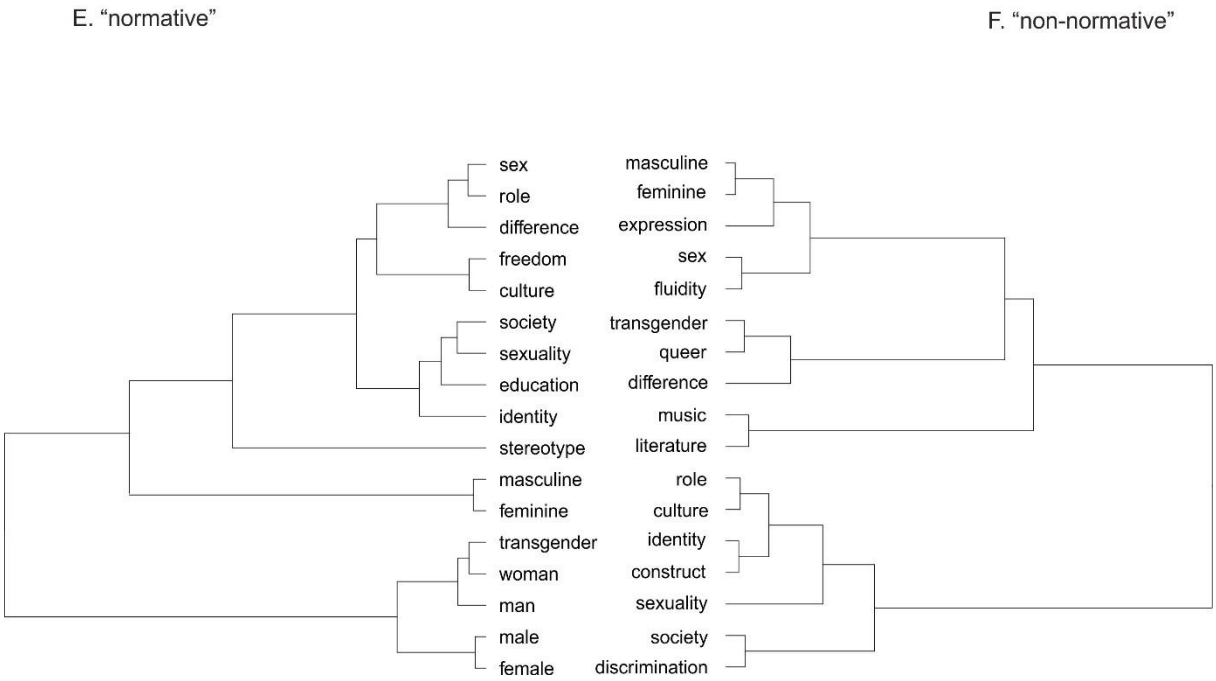

Figure 4. Dendrograms of words produced by at least 10% of (E) “normative” and (F) “non-normative” participants.

[1]Note that the term "normative" is in quotation marks, indicating that the term is applied in a strictly statistical sense, and not as a value-judgement (see Joel et al., 2014).

[2] In Italian the terms sex and gender are frequently used interchangeably. However, there is a growing awareness of the necessity to separate the two in order to account for social phenomena such as gender gaps in salary, gender-based violence, and to bring attention to specific gender non-conforming experiences. This growing awareness is due mostly to the efforts of academic and political discourses (LGBTQI+ and feminist activism).

[3] An illustrative example is provided by some of the statements of Bergoglio on the family, which according to him is composed solely of a union between man and woman. This perspective is shared by the former Family and Disabilities Minister Lorenzo Fontana, who in his first public statement declared that "rainbow families [families headed by gay couples] don't exist" (https://www.dailymail.co.uk/wires/ap/article-5800563/Italy-Right-wing-leader-says-new-govt-wont-undo-gay-unions.html). Indeed, in Italy same-sex marriages are not legal: civil unions between same sex partners are regulated by a law enacted in 2016 as a special social formation.