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## GENDER IS A MULTIFACETED CONCEPT

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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.

44

45 **1. Introduction**

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

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

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

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

81 While traditional theories suggest that abstract and concrete concepts engage different  
82 semantic systems (e.g., Paivio, 1986; Brysbaert, Warriner & Kuperman, 2014), recent  
83 approaches have begun to reconsider the classic dichotomy between purely “abstract” and  
84 purely “concrete” concepts (Borghi et al., 2018a, 2018b, 2019; Barsalou, Dutriaux &  
85 Scheepers, 2018). Specifically, in a situated perspective (e.g., Barsalou, 2008), both concrete  
86 and abstract concepts include situational and perceptual information, and support goal-oriented  
87 actions. In this light, abstract concepts can be considered to be represented in a  
88 multidimensional semantic space with regions that partly overlap with the semantic space of  
89 concrete concepts (Troche, Crutch & Reilly, 2014; 2017; Binder et al., 2005; Harpaintner,  
90 Trumpp & Kiefer, 2018). Abstract concepts also show high intra-class variability (Ghio et al.,  
91 2013; Borghi et al., 2018b; Desai et al., 2018). For instance, Roversi, Borghi and Tummolini  
92 (2013) compared properties listed for social entities such as “choir” with properties listed for  
93 institutional artifacts such as “ownership” in a property-generation task and found that although

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

101 More generally, abstract concepts can be considered a heterogeneous class, grounded in  
102 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; Mellem,  
105 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 paper.

107

### 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 proposed  
112 the hybrid label “gender/sex” pointing to a rapprochement of biological, physical and  
113 perceptual factors with social and cultural factors in the constitution of gendered and sexual  
114 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 etc.),  
116 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.

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

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

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

143 role descriptors “nurse”) is more fluent than when it is inconsistent (e.g., masculine pronouns  
144 with “nurse”; see e.g., Miersky, Majid & Snijders, 2019; Pesciarelli, Scorolli & Cacciari, 2019).

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

### 156 *1.2. Challenges to the Binary Gender System.*

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



167 2015 issued guidelines for best practices with transgender and gender-nonconforming  
168 individuals (APA, 2015)

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

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

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

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

### 201 *1.3. The Current Study: How do Italian People Conceptualize Gender?*

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

217 a binary fashion (e.g., Italian, French) may reinforce the conceptualization of gender as a binary  
218 system (see Gabriel & Gygax, 2016; Gabriel, Gygax & Kuhn, 2018; Pérez & Tavits, 2019).

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

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

237 We conducted the free-listing task with a diverse pool of Italian participants that were  
238 divided into three subgroups according to their gender identity, sexual orientation, and  
239 classification according to normative or bigenderist benchmarks. In line with the idea that  
240 abstract concepts are represented as multidimensional constructs (Borghi et al., 2018a; Barsalou  
241 et al., 2018), where both embodied and contextual aspects interact, we expected that across all

242 participants we would find evidence of the duality of *genere* ‘gender’ in Italian, such that  
243 participants would list features relating to both the abstract and concrete sense of gender. As  
244 such, we expected early and frequent listing of features of gender as a social construct (e.g.,  
245 culture, femininity, masculinity), as well as features related to the more concrete meaning (e.g.,  
246 sex, body, genitalia).

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

## 256 **2. Method**

### 257 *2.1. Participants*

258 80 native Italian speakers voluntarily took part in the study. Ethical approval was provided by  
259 the Ethics Committee of the Institute of Cognitive Sciences and Technologies of the Italian  
260 National Research Center (ISTC-CNR Ethical Approval n.0000315). Participants were asked  
261 to provide their birth sex, self-identified gender identity, and sexual orientation (details of  
262 procedure below). The majority of individuals were highly educated: 67.5% had a Master  
263 Degree and 13.7% had a PhD; 17.5% completed High School, while only 1.2% had Lower High  
264 School education.

### 265 *2.2. Procedure*

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

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

### 286 **3. Results**

287 We sought to investigate how individuals conceptualize gender, in particular in relation to their  
288 personal experiences related to gender. As a first step, we report the characteristics of our  
289 participants. We then focus on the free-listing data and aggregate results across all participants  
290 to illustrate which words were produced more frequently overall. We show how words

291 produced by the full cohort of participants tested are clustered together using a measure which  
292 accounts for the psychological saliency of the produced associates (see the following sections  
293 for details). This overall analysis is followed by subsidiary analyses zooming in on the free-  
294 listing produced by different sub-groups according to gender-related experiences. All data and  
295 scripts are available at <https://osf.io/3zdsm/>.

### 296 *3.1. Participant Characteristics*

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

301 Sexual orientation was assessed using the Kinsey Scale (Kinsey et al., 1948; for further  
302 details, see *Procedure*). Among the total sample, 36 placed their sexual behavior at the  
303 heterosexual extreme of the Kinsey Scale (points 1 and 2), while 37 considered their sexual  
304 behavior as homosexual (points 6 and 7 of the Kinsey Scale). Seven participants fell in the  
305 middle of the scale (points 3, 4, 5) or defined their sexual orientation as bisexual or asexual. At  
306 a more fine-grained level, 50 participants reported to be attracted only by one sex (points 1 and  
307 7), while 29 participants reported to be attracted to more than one sex to different extents (points  
308 2, 3, 4, 5, 6), and one participant identified as asexual.

309 In order to explore how these differences relate to the concept of *genere* ‘gender’,  
310 participants were first divided into two groups according to their self-affirmed gender identity  
311 (woman and man). Individuals who identified as queer ( $n=7$ ) were excluded from the analysis  
312 by gender identity because of the small sample size; however, their responses were collated in  
313 the subsequent analyses by “normativity”, thus partially avoiding the potential marginalization  
314 of underrepresented gender and sexual minorities.

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

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

### 335 3.2. Free-listing task

### 336 3.3. How is the Concept of "Gender" Represented Across all Participants?

337           Overall, the total sample of 80 participants produced 300 words. There was great  
338 variation in the responses provided by participants suggesting that, as expected, *genere* 'gender'  
339 is a complex concept that incorporates a number of distinct components. Participants produced

340 a small number of common associates: out of 300 words, 64% ( $n= 192$ ) were produced only  
341 once by an individual. The most frequently listed word (*identity*), was produced by 24 out of a  
342 total sample of 80 participants. So, there is low overall coherence of this category in this sample.  
343 For the overall analysis presented first, we focus on associates produced by at least 5% of all  
344 participants. Among the list of terms produced by all participants, 41 were produced by at least  
345 5% of the sample. As would be expected, the data exhibit a power law distribution with the  
346 frequency of words inversely proportional to their rank (cf. Zipf, 1935).

347 In order to address our first hypothesis, namely that ‘gender’ encompasses both abstract  
348 and concrete components, we asked an independent sample of 20 Italian participants (9 female,  
349 10 male, 1 intersex;  $M_{age}= 28.1$ ,  $SD= 6.4$ ) to rate on a 7-point scale the most commonly  
350 produced associates in terms of abstractness, concreteness, and emotionality. In line with recent  
351 research (Villani et al., 2019; Della Rosa et al., 2010), we probed abstractness and concreteness  
352 separately. The order of presentation of the words and of the scales was randomized across  
353 participants.

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

358

359 [PLEASE INSERT TABLE 1 HERE]

360

361 As hypothesized, participants in the free-listing task produced terms that included  
362 abstract and concrete associates (see Table 1). Overall, the ratings of the free-listing associates  
363 demonstrated a negative correlation between abstractness and concreteness ratings,  $r(39)= -$   
364  $0.88$ ,  $p<.001$ , as would be expected. Concreteness and emotionality ratings were positively



365 correlated,  $r(39) = 0.34, p = .028$ ; but there was no significant correlation between abstractness  
366 and emotionality ratings,  $r(39) = -0.08, p = .587$ . Generally, the terms produced varied widely in  
367 ratings for all three dimensions considered: abstractness ratings ranged from scores of 1.60–  
368 5.15 ( $M = 3.83, SD = 0.92$ ); concreteness ratings ranged from 2.50–5.75 ( $M = 3.93, SD = 0.70$ );  
369 and emotionality ratings ranged from 1.90–5.60 ( $M = 3.71, SD = 0.90$ ). One could wonder  
370 whether terms produced early in the free-listing differed from those produced later. Perhaps  
371 early associates are more likely to be abstract, or conversely more likely to be concrete. We  
372 found no significant difference among the first 20 terms produced and the last 20 produced in  
373 abstractness,  $t(39) = -0.52, p = .600$ ; concreteness,  $t(39) = 0.45, p = .649$ ; or emotionality,  $t(39) =$   
374  $1.04, p = .300$ . This suggests abstract and concrete associates are equally distributed across the  
375 free-listing exemplar production of ‘gender’.

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

381

382 The free-listing data revealed associates with concrete physical and perceptual  
383 connotations, (e.g., *body, woman, female, man, male, sex*), as well as abstract social and cultural  
384 experiences (e.g., *construct, freedom, category, fluidity*). Additional terms included experiential  
385 and personal features (e.g., *education, identity, discrimination, identification*), as well as  
386 linguistic associations connected to the term *genere* in Italian (e.g., *music, literature, grammar,*  
387 *type*).

388 *3.3.1. Measure of psychological proximity.* To analyze the free-listing data in more  
389 depth, we used a measure developed by Crowe and Prescott (2003). According to this measure,

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

403       3.3.2. *Clustering methods and analyses.* Before applying specific clustering methods,  
404 we assessed whether our data could be clustered using Hopkins' statistic test (Lawson and Jurs,  
405 1990), which measures the probability that a given data set is generated by a uniform data  
406 distribution. The results indicated our data approach a good tendency ( $H= 0.53$ ). Hierarchical  
407 cluster analysis was performed based on the dissimilarity matrix using Ward's method, based  
408 on a sum-of-squares criterion (Murtagh & Legendre, 2014) which minimizes within group  
409 dispersion (see also Harpaintner et al., 2018). In order to determine the number of clusters and  
410 assess cluster validity, we relied on indices that are most frequently used in the literature. We  
411 thus computed Silhouette Index, C-Index, McClain Index and Dunn Index. Two of the  
412 aforementioned indices provided a six-cluster solution (SI= 0.3; CI= 0.3), while the remaining  
413 two suggested a two-cluster solution (McClain= 0.3; Dunn=0.06). We opted for the six-cluster  
414 solution (Figure 1), which better illustrates the fine-grained structure of *genere* 'gender'. The

415 outcome is represented in the dendrogram as visual proximity of words; namely, words that  
416 appear clustered together by short branch lengths are words that were most frequently produced  
417 in succession.

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

423

424 [PLEASE INSERT FIGURE 1 HERE]

425

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

432 In Cluster 2 all the words were rated as abstract (*construct* is the most abstract term in  
433 the list, see Table 1). This cluster includes concepts generally used in philosophical and political  
434 discourses on gender, and it reveals aspects of the conceptualization of gender derived from  
435 shared knowledge and mediated by cultural and social factors (see Shea, 2018).

436 In Cluster 3 (green) features related to the physical, perceptual, and interoceptive  
437 characteristics of gender are evident. Words in this set refer to the physical display of gender  
438 attitudes (*masculinity and femininity*), clustered together with *sex; body and belonging* are  
439 linked together. In this cluster abstract terms (*belonging, femininity, and masculinity*) are

440 combined with the most concrete term listed (*body*; see Table 1), suggesting that this cluster is  
441 a mix of interoceptive features and physical and perceptual ones.

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

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

455 In Cluster 6 (red) a different meaning of the Italian word *genere* appears. We find words  
456 referring to the meaning of 'genre' (*music*), as well as 'kind', 'species' (*animal*, *human*) and  
457 *grammar*. In addition, this cluster includes *male* and *female*, likely linguistic associations given  
458 that they are clustered closely together with the words *human* and *music*. This cluster is the  
459 most concrete according to the ratings: of a total of 8 words, only two can be considered abstract  
460 (*identification* and *stereotype*); all the other words were rated as concrete.

461 Overall, our results suggest the concept of gender cannot be considered either a purely  
462 abstract or a purely concrete concept. Rather, it encompasses aspects traditionally considered  
463 to be both abstract and concrete. Linguistic associations (e.g., Paivio, 1986) such as *literature*  
464 and *animal*, experiential and situational features like *identification* and *behavior* (e.g., Barsalou

465 & Wiemer-Hastings, 2005), social and contextual features like *binarism* and *queer* (Roversi et  
466 al., 2013), culturally mediated aspects like *politics* and *feminism* (Shea, 2018), and bodily or  
467 biological properties (e.g., *body*, *female* and *male*) appear. This result is in line with recent  
468 accounts of abstract conceptual knowledge (e.g., Barsalou, Dutriaux & Scheepers, 2018; Borghi  
469 et al., 2018a) and with contemporary debates reconsidering the distinction between sex and  
470 gender (e.g., van Anders, 2015).

#### 471 3.4. Does the Concept of “Gender” Vary Across Sub-Groups?

472 In the analysis presented so far, we did not distinguish people by gender identity, sexual  
473 orientation, or according to gender and sexual norms. However, these aspects are likely to  
474 influence the conceptualization of gender. To assess this, participants were divided into three  
475 subgroups according to their gender identity (woman, man), sexual orientation (heterosexual,  
476 homosexual), and “normativity” (“normative”, “non-normative”) (see section 3.1. *Participant*  
477 *Characteristics*). For each of these sub-groups, we examined how people conceptualized  
478 *genere* ‘gender’. Relevant words that entered the cluster analysis were items produced at least  
479 by 10% of participants in each sub-group. In the sub-groups analyses, we raised the threshold  
480 for inclusion from 5% to 10% so as to avoid having items produced by only one participant  
481 which would have arisen due to the subsetting of the data. Inclusion of unique items would  
482 have merely led to more idiosyncratic responses being considered in the analyses, whereas we  
483 hope to capture general trends.

484 3.4.1. *The concept of gender as a function of gender identity.* Overall, there was no  
485 significant difference in the total number of items listed by women ( $M = 8.90$ ;  $SD = 2.71$ ) and  
486 men ( $M = 7.84$ ;  $SD = 2.86$ ),  $t(71) = -1.61$ ,  $p = .111$ , although women showed higher agreement  
487 in the terms they mentioned, with 29 commonly listed words compared to 12 common words  
488 produced by the men. Among the terms produced by women, 17 were abstract and 12 concrete.  
489 Men produced 8 concrete and 4 abstract terms. Chi-squared tests revealed no difference

490 between the two groups in the number of tokens of abstract and concrete terms,  $\chi^2(1) = 1.27$ ,  
491  $p = .258$ . Comparing all relevant terms produced by women and men, also revealed no  
492 significant difference in abstractness,  $t(39) = 1.85$ ,  $p = .071$ ; concreteness,  $t(39) = -1.82$ ,  $p = .076$ ;  
493 or emotionality,  $t(39) = -0.17$ ,  $p = .863$ . The most frequently produced words by women (Panel  
494 A) were *identity* (39% of the sample) and *sex* (27%). For men (Panel B) *masculine* was the  
495 most frequently produced word (22%), followed by *identity* (19%). Figure 2 shows the  
496 dendrograms resulting from Hierarchical Cluster Analysis (HCA) for each group.

497

498 [PLEASE INSERT FIGURE 2 HERE]

499

500 The data from both groups supported a good clustering tendency (women's  $H = 0.58$ ;  
501 men's  $H = 0.69$ ). Even though some words overlapped between the two groups ( $n = 9$ ), the cluster  
502 analyses revealed differences between men and women too. For instance, *identity*—one of the  
503 most frequently produced terms by both groups—was mentioned by men together with  
504 *feminine*, *masculine* and *sex*, suggesting a relation between perceptual and physical properties  
505 and gender identities. For women, however, *identity* appeared closely related to social terms  
506 (*construct*, *role*, *freedom*) and subsequently connected with *fluidity*, *sex*, *behavior* and *society*,  
507 suggesting a non-deterministic perspective on gender identity.

508 It is also noteworthy that although traditional bigender terms were mentioned by both  
509 groups, they are differently positioned in the dendrograms. On the one hand, *male* and *female*  
510 are represented in a small biological cluster, in the women's dendrogram, which in turn is  
511 connected to words that seem to challenge a traditional binary conception of gender  
512 (*transgender*). In the men's dendrogram, however, the clustering of *male* and *female* appears  
513 as a linguistic association to the grammatical category of gender, as indicated by the link  
514 between the two terms and the word *grammar*. *Masculine* and *feminine* are part of a small

515 linguistic cluster for women (indicated by the presence of the word *music*); for men they are  
 516 part of a cluster marking the identity-laden value of gender, possibly delimited by sexual  
 517 differences (*sex*). *Woman* co-occurred with *man* in the men's responses, while in the women's  
 518 dendrogram the word *woman* was coupled with *feminism* along with *difference* and *queer*,  
 519 whereas *man* does not appear. *Difference* and *culture* are both part of a socio-cultural cluster in  
 520 both groups. While women generally associated *culture* with *sexuality* in a cluster including  
 521 *masculinity* and *femininity*, men often mentioned them together with *rights* and subsequently  
 522 *man* and *woman*.

523 In sum, there are notable qualitative differences between the two groups. Although the  
 524 conceptualization of gender by men included social and cultural features (e.g., *rights* was  
 525 mentioned by men, but not women), terms explicitly challenging a binary and heteropatriarchal  
 526 system were not highly salient: most words referred to the perceptual, biological and physical  
 527 sphere; for women, social, cultural and experiential features played a more central role. Women  
 528 mentioned words with social and political value (e.g., *queer*, *feminism*, *construct*, *stereotype*,  
 529 *fluidity* and *binarism*) consistent perhaps with their social experience of historically being  
 530 considered a subaltern identity. This relates to the notion of "androcentrism", that implies "the  
 531 privileging of male experience and the "otherizing" of female experience, such that males and  
 532 male experience are treated as a neutral standard or norm ... and females and female experience  
 533 are treated as a sex-specific deviation from that allegedly universal standard" (Bem, 1993; p.  
 534 41; for a recent review see Bailey, LaFrance & Dovidio, 2019).

535 *3.4.2. The concept of gender as a function of sexual orientation.* There was no  
 536 significant difference in the total number of items listed by heterosexual participants ( $M= 8.64$ ;  
 537  $SD=2.83$ ) and homosexual participants ( $M= 8.30$ ;  $SD=2.81$ ),  $t(71) = 0.51$ ,  $p=.607$ , although  
 538 heterosexual participants showed higher agreement in the terms they mentioned, producing 22  
 539 words in common versus 12 words in the homosexual group. There was no significant

540 difference between the two groups in the number of abstract and concrete terms listed,  $\chi^2(1) =$   
541  $0.75$ ,  $p = .383$ , with heterosexual participants listing 8 abstract and 14 concrete terms, and  
542 homosexual participants listing 7 abstract and 5 concrete terms. Similarly, comparing all  
543 relevant terms, there was no significant difference in abstractness  $t(32) = -1.10$ ,  $p = .279$ ,  
544 concreteness  $t(32) = 1.10$ ,  $p = .276$ , or emotionality ratings  $t(32) = -1.16$ ,  $p = .251$ , of the terms  
545 listed by heterosexual and homosexual participants. *Sex* was the most frequently produced word  
546 by the heterosexual group (Panel C) (31% of the sample), followed by *culture* (19%). The  
547 homosexual group (Panel D) produced *identity* (41%) and *masculine* (30%) most frequently.  
548 Figure 3 shows the dendrograms resulting from HCA performed on target concepts for each  
549 group.

550

551 [PLEASE INSERT FIGURE 3 HERE]

552

553 The data from both groups supported a good clustering tendency (heterosexuals'  $H =$   
554  $0.70$ ; homosexuals'  $H = 0.60$ ). Even though some words overlapped between the two groups  
555 ( $n = 9$ ), the cluster analyses showed interesting qualitative differences. *Sexuality* forms a separate  
556 cluster in both groups, but in the heterosexual group is paired with gendered terms (*man* and  
557 *woman*), while in the homosexual group it forms a separate and distinct cluster together with  
558 *rights* and *society*; *culture* is instead in a separate cluster connected with *fluidity* and *freedom*.  
559 *Masculine* and *feminine* form a separate small cluster in both groups but are associated with  
560 linguistic features such as *human* and *music* by the heterosexual group, but with *sex* by the  
561 homosexual group. *Sex* was instead frequently produced together with *masculinity* and  
562 *femininity* by the heterosexual group, indicating a connection between biological sex and  
563 physical appearance.



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

575           3.4.3. *The concept of gender as a function of "normativity"*. There was no significant  
576 difference in the total number of items listed by "normative" participants ( $M = 8.77$ ;  $SD = 2.49$ )  
577 and "non-normative" participants ( $M = 8.16$ ;  $SD=3.10$ ),  $t(78) = 0.96$ ,  $p = .337$ . There was also  
578 no significant difference between the two groups in the number of abstract and concrete terms  
579 listed,  $\chi^2(1) = 0.11$ ,  $p = .731$ , with "normative" participants listing 7 abstract and 10 concrete  
580 terms, and "non-normative" participants listing 9 abstract and 8 concrete terms. Similarly,  
581 comparing all relevant terms there was no significant difference in ratings of abstractness  $t(32) =$   
582  $-1.24$ ,  $p = .222$ , concreteness  $t(32) = 1.42$ ,  $p = .165$ , or emotionality  $t(32) = -0.08$ ,  $p = .934$ , listed by  
583 "normative" and "non-normative" participants.

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

588

[PLEASE INSERT FIGURE 4 HERE]

589

590

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

605           The words listed by both groups reveal differences in the conceptual representation of  
606 gender. The “normative” group frequently mentioned words referring to gender in a binary  
607 perspective (e.g., *male/female*, *woman/man*). In the “non-normative” group, the experiential  
608 and personal domain together with social and cultural aspects emerge more sharply (e.g.,  
609 *discrimination*, *expression*, *construct*, *fluidity*, and *queer*). At the broadest level, two main  
610 clusters emerged in the “normative” group: one explicitly referring to a binary perspective on  
611 gender which can be considered a more “concrete” cluster, composed of the words that were  
612 rated as more concrete (*woman*, *man*, *male*, *female*) with the addition of the word *transgender*.  
613 The second cluster is a more abstract cluster including words such as *sexuality*, *education*,

614 *society, stereotype* and *culture*. In the “non-normative” group, on the other hand, the concrete  
615 grounding relies mainly on the experiential corporeity of gender (*masculinity* and *femininity*  
616 connected to *expression*), but it is connected with *sex* and *fluidity*. Overall, the “normative”  
617 group emphasized a bigenderist perspective of gender, while the “non-normative” group  
618 referred to contextually-dependent and social phenomena challenging traditional bigenderist  
619 assumptions.

#### 620 **4. General Discussion**

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

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

639 conveyed by specific cultural and social contexts such as academic discussions and public  
640 debates.

641         Our findings shed light on the debate concerning the distinction between sex and gender.  
642 Specifically, the results support the claim that sex and gender are entrenched in social context.  
643 People’s conceptual knowledge of gender seems to incorporate sexual and biological factors  
644 related to gender (e.g., *sex, female, male, body*), as well as aspects related to the performativity  
645 of gender (e.g., *femininity, masculinity, role, difference, expression*) which are inevitably  
646 embedded in social and cultural norms. As Butler (1993a) has argued the very distinction  
647 between sex as the corporeal fact of our existence, and gender as the social conventions shaping  
648 traditional femininity and masculinity is questionable, in that the perception of physical-sexual  
649 differences is affected by social conventions. Indeed, the adequacy of a two-sex system has  
650 been questioned as it does not include the full spectrum of human sexual configurations, which  
651 might be better characterized as lying on a continuum (see e.g., Fausto-Sterling, 1993). More  
652 recently, van Anders (2015) proposed the notion of gender/sex as “an umbrella term for both  
653 gender (socialization) and sex (biology, evolution) [...] reflects social locations or identities  
654 where gender and sex cannot be easily or at all disentangled.” (p.1181). Whatever the  
655 underlying “reality”, we show that gender/sex is conceptualized by Italian people as a  
656 multidimensional, dynamic and complex construct, reflecting the fact that sex and socio-  
657 cultural gender are entwined, and therefore making explicit the “being” and the “doing” of  
658 gender at the same time.

659         According to some proposals conceptual knowledge is affected by cultural, social, and  
660 linguistic factors (e.g. Boroditsky et al., 2011; Majid et al., 2004; Casasanto, 2009), and  
661 different populations may categorize things differently depending on the language spoken, and  
662 on the experiential (Casasanto & Lupyan, 2015) and cultural environment (Majid et al., 2018)  
663 they live in. In this vein, we hypothesized that individuals conforming to a “normative”

664 conception of gender would produce more words related to a bigenderist conception, while  
665 “non-normative” individuals would rely more on socio-cultural aspects of gender and on their  
666 personal experiences. A comprehensive categorization of gender experiences combining  
667 instrumental constructs such as the Kinsey Scale and tick-boxes with pre-given answers  
668 arguably rely on a cis-genderist and normative approach. We attempted to overcome this  
669 limitation by allowing participants to produce their own label for each variable (assigned birth  
670 sex, affirmed gender identity, and sexual orientation), using a blank text box. In spite of this,  
671 we are aware that our operationalization of “normative” and “non-normative” individuals is  
672 possibly problematic, in that it is not always an explicit assessment of participants’ of  
673 themselves, but an experimenter’s inference from participants’ answers. Nonetheless, in line  
674 with recent language and sexuality research (e.g., Motschenbacher, 2019), we aimed at  
675 exploring how normativity plays a role in the discursive construction of gender and sexuality.  
676 To avoid misconceptions and misgendering phenomena, and to fully account for gender in its  
677 full complexity, further research could make different choices for categorizing gender and  
678 sexuality experiences (e.g., see new instruments such as TMF Scale, Kachel et al., 2016; Multi-  
679 GIQ questionnaire, Joel et al., 2014, or Sexual-Romantic and Gender-Inclusive Scales, Galupo  
680 et al., 2017b).

681         Despite these caveats, we found some interesting differences in how people  
682 conceptualize gender. “Normative” individuals were more likely to mention dichotomous  
683 terms, while “non-normative” individuals mentioned words related to the social dimension of  
684 gender, such as *fluidity*, *construct*, and *queer*, along with terms such as *expression* and  
685 *discrimination*—pointing at specific personal experiences. Recent findings investigating  
686 gender identity among non-binary transgender individuals (Galupo et al., 2017a) showed that  
687 one central theme in self-descriptions was the notion of *fluidity*, suggesting that gender identity  
688 can fluctuate across time. Our results are in line with these findings, showing that the majority

689 of “non-normative” individuals, in contrast to “normative” individuals, mentioned the term  
690 *fluidity* in their associations with the term gender, along with terms such as *construct* and *queer*.  
691 In this regard, the inclusion of the term *queer* in the conceptualization of gender of “non-  
692 normative” individuals supports the importance of the social context in the embodiment of  
693 specific experiences. Indeed, over history, the term *queer* acquired the power to give visibility  
694 and legitimization to a community of individuals not conforming to bigenderist and  
695 heteronormative assumptions. In Butler’s words (1993b, p. 19) the term *queer* is “a site of  
696 collective contestation”, hence a term with a high social and political valence but rooted in  
697 personal experiences.

698         It is also worth noting that, our sample of “non-normative” individuals mentioned  
699 binary gendered terms such as *feminine* and *masculine* like our “normative” sample. This is in  
700 line with findings from Lederer (2019) who analyzed the speech and gesture of transgender  
701 individuals. Lederer (2019) found that although one person identified as a-gender, the gestures  
702 accompanying the elucidation of the term *a-gender* matched with the conceptual metaphor of  
703 gender as two bounded regions delimiting the boundaries between females and males. This  
704 suggest that the binary model of gender is so culturally entrenched that even in individuals  
705 questioning, rejecting, or moving across a bigendered schema it is still lurking.

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

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

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725

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GENDER IS A MULTIFACETED CONCEPT

992

993 **Table 1**

994

995 *Terms produced by at least 5% of participants (N= 80) ordered according to their frequency, and*

996 *associated rating scores on emotionality, abstractness, and concreteness. On the difference score, a*

997 *positive score indicates an abstract concept; negative score indicates a concrete concept.*

998

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
sexo	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

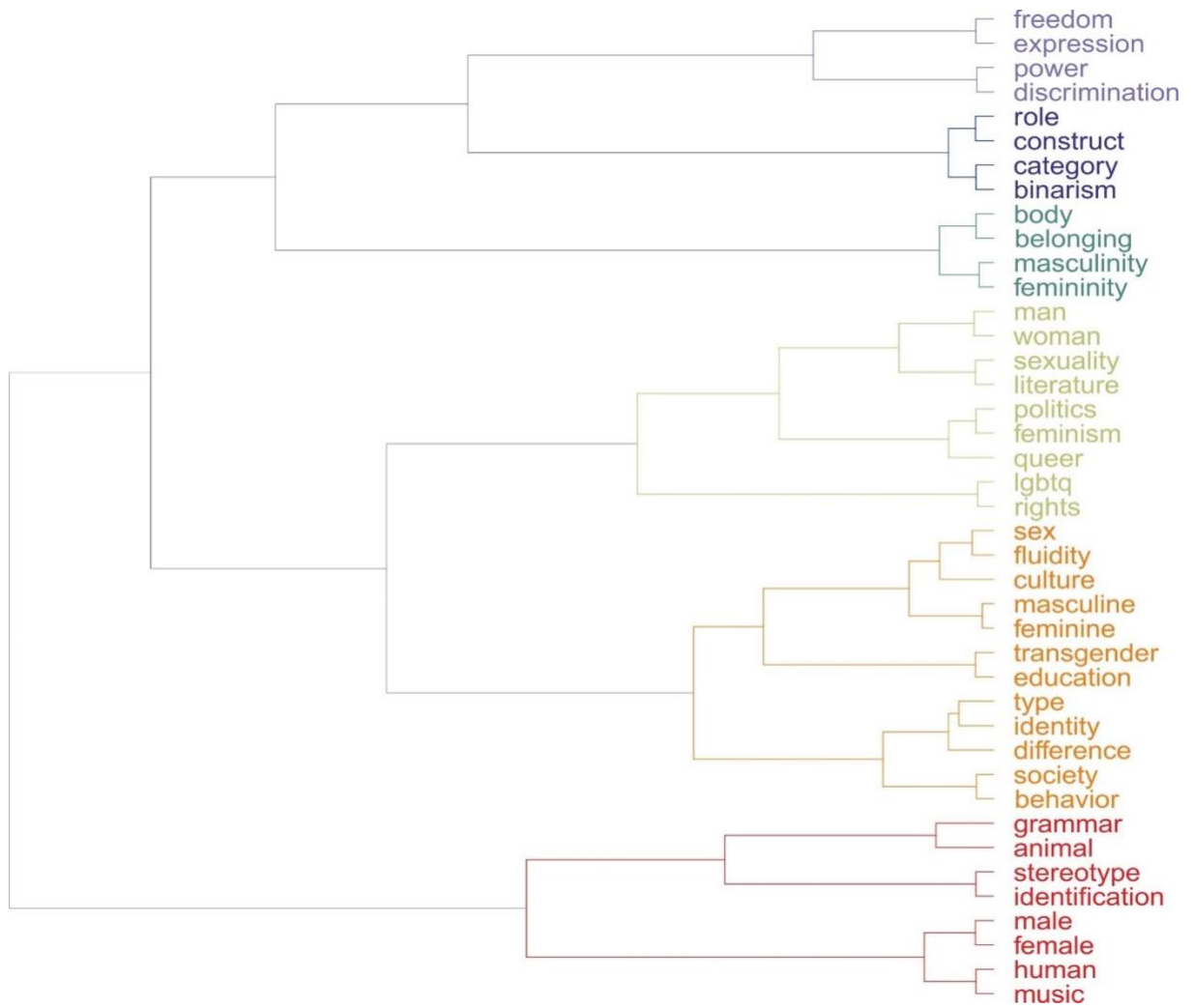
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999

1000

# GENDER IS A MULTIFACETED CONCEPT

1001



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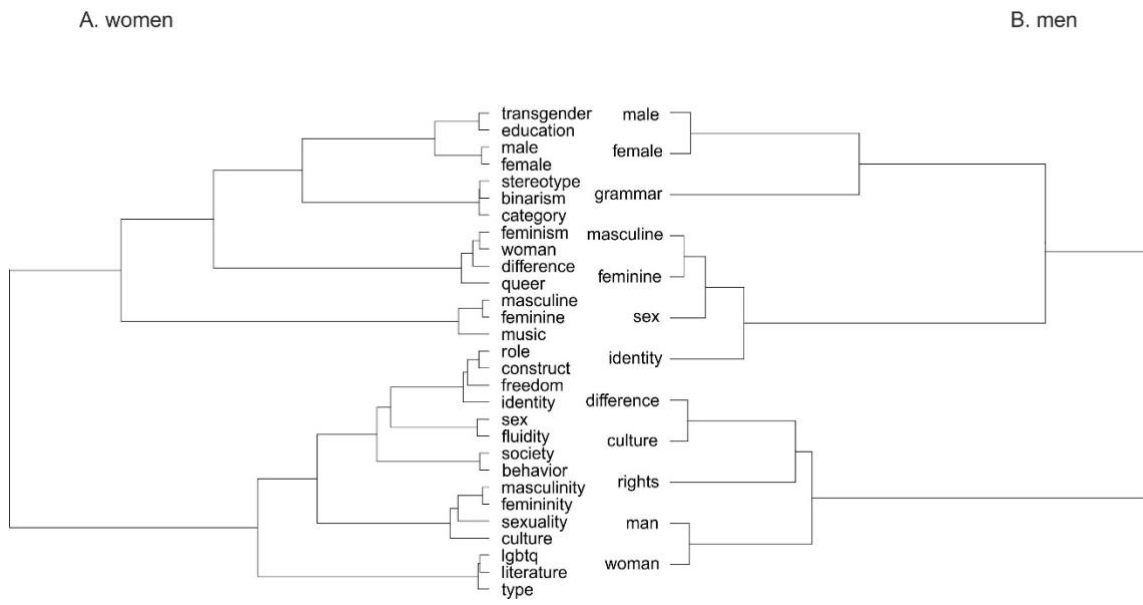
1004

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

1005

GENDER IS A MULTIFACETED CONCEPT

1006



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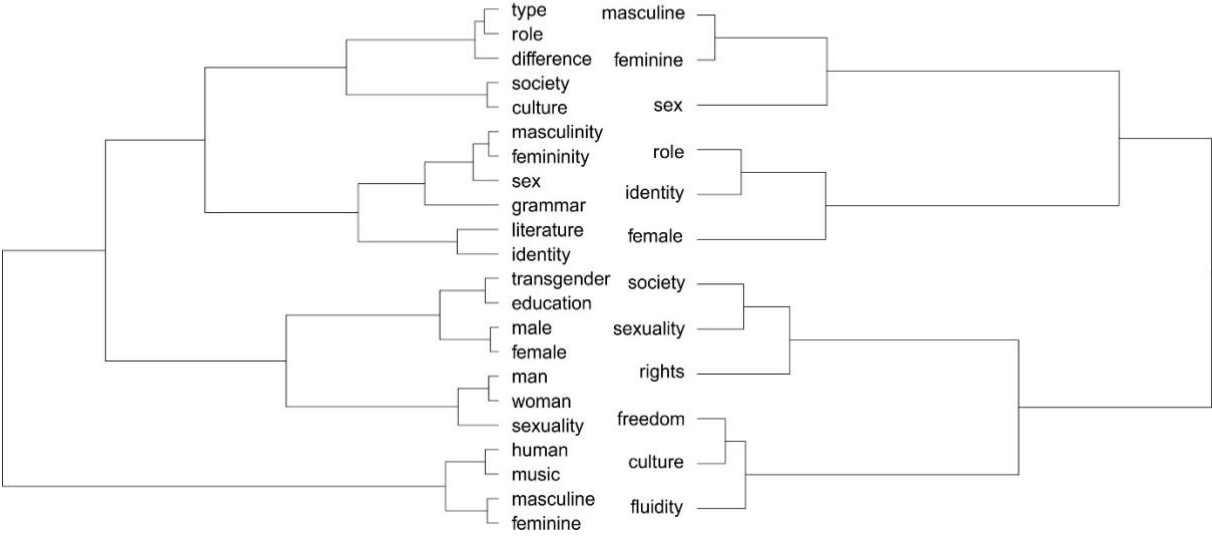
Figure 2. Dendrograms of words produced by at least 10% of (A) women and (B) men.

1009

GENDER IS A MULTIFACETED CONCEPT

C. heterosexuals

D. homosexuals



1010

1011

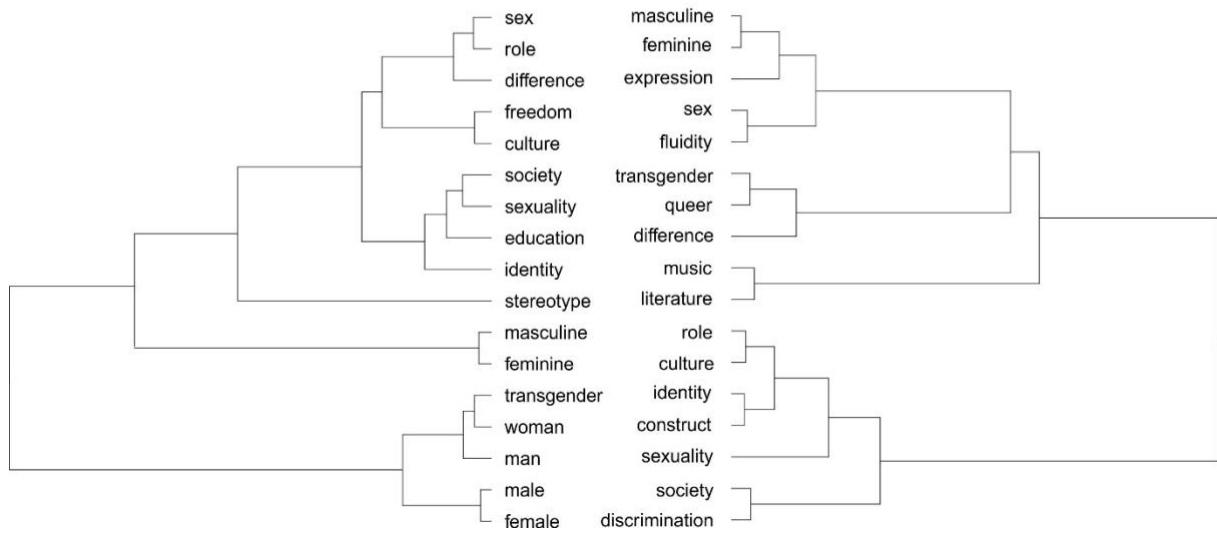
Figure 3. Dendrograms of words produced by at least 10% of (C) heterosexuals and (D) homosexuals.

1012

# GENDER IS A MULTIFACETED CONCEPT

E. "normative"

F. "non-normative"



1013

1014

1015

1016

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



## GENDER IS A MULTIFACETED CONCEPT

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<sup>1</sup>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).

<sup>2</sup> 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).

<sup>3</sup> 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.