COVID-19 is Feminine: Grammatical Gender Influences Future Danger Perceptions and Precautionary Behavior

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Abstract

Gendered languages assign masculine and feminine grammatical gender to all nouns, including nonhuman entities. In French, Italian, and Spanish, the name of the disease resulting from the virus (COVID-19) is grammatically feminine, whereas the virus that causes the disease (coronavirus) is masculine. In this research, we test whether the grammatical gender mark matters. In a series of experiments with French and Spanish speakers, we find that grammatical gender affects virus-related judgments consistent with gender stereotypes: feminine- (vs. masculine-) marked terms for the virus decrease perceptions of future danger of the virus and reduce intentions to take precautionary behavioral measures to mitigate contraction and spread of the virus (e.g., avoiding restaurants, movies, travel). Secondary data analyses of online search behavior for France, Spain, and Italy further demonstrate this negative relation between the anticipated threat (daily new cases and deaths, search for masks) and usage of the feminine- (vs. masculine-) marked terms for the coronavirus. These effects occur even though the grammatical gender assignment is semantically arbitrary.

Keywords: COVID-19, risk perceptions, gender, stereotypes, linguistics, gendered language, cross-cultural research.

COVID-19 is Feminine:

Grammatical Gender Influences Future Danger Perceptions and Precautionary Behavior

The Académie Française, the official authority in charge of regulating the French language, recently stated that COVID-19 is feminine. By this they did not mean that the disease had feminine characteristics, nor were they suggesting any gender disparagement. They simply meant that in French, the acronym for the disease, COVID-19, takes the feminine grammatical gender (*la COVID-19*), because it stands for “la maladie à coronavirus 2019” (the disease of coronavirus 2019), and the noun “disease” (*maladie*) takes the feminine grammatical gender. Unlike English, which does not assign gender to nonhumans, French is a gendered language, and thus assigns either the masculine article (*le*) or the feminine article (*la*) to all nouns. Remembering whether any noun takes the masculine or feminine gender mark can be difficult, but the situation for COVID-19 is potentially even more confusing because the umbrella term for the virus that causes the disease, coronavirus, takes the masculine gender mark (*le coronavirus*).

In this research, we investigate the question of whether the coronavirus and COVID-19 are grammatically masculine or feminine matters. More specifically, does referring to the virus as gendered affect consumers’ virus-related decisions and behaviors? On the one hand, there is ample reason to think that it should not. The primary reason is that assignment of grammatical gender to nonhumans is typically semantically arbitrary (Maciuszek & Świątkowska, 2019), and has no relation to qualities of the objects. For example, assignment of grammatical gender often differs across gendered languages: the moon is feminine in French and masculine in German. Within French, a masculine-associated product (necktie) is feminine but a feminine-associated product (mascara) is masculine.

On the other hand, despite the arbitrariness of assignment of grammatical gender, there is accumulating evidence that referring to objects as masculine or feminine affects the meaning assigned to the objects. For example, the word for “key” is feminine in Spanish but masculine in German. When native German and Spanish speakers were asked to spontaneously list three adjectives to describe a key, German speakers generated more masculine adjectives (e.g., hard, heavy, metal), whereas Spanish speakers generated more feminine adjectives (e.g., lovely, shiny, tiny; Boroditsky, Schmidt, & Phillips, 2003). In another study, Segal and Boroditsky (2011) coded artists’ depictions of the gender of various concepts (love, truth, death, etc.), and analyzed correspondence between the personified gender in the artistic depictions and the grammatical gender of the concept in the artists’ language. Artists’ depiction of gender matched the grammatical gender of the concept in 78% of the 750+ cases. Finally, grammatical gender not only affects meaning assigned to objects, it also affects human-to-human relations. Compared to genderless languages (e.g., English), speakers of gendered languages exhibit greater gender prejudice (DeFranza, Mishra, & Mishra, 2020) and less gender equality (Prewitt-Freilino, Caswell, & Laakso, 2012).

The presence of gender markers for nonhumans directs attention to gender distinctions and makes them more salient (Boroditsky et al., 2003), and these processes occur nonconsciously (Boutonnet, Athanasopoulos, & Thierry, 2012). Thus, stereotypical gender perceptions may be activated by grammatical gender. Based on this reasoning, we propose that grammatical gender may influence the way the coronavirus disease is perceived, and in particular, judgments of how dangerous the virus will be. Compared to men, women are perceived as weaker and more passive (Abele, 2003; Fiske, Cuddy, Glick, & Xu, 2002), whereas compared to women, men are perceived as more violent, aggressive, and destructive (Eagly & Steffen, 1986; Rudman, Greenwald, & McGhee, 2001). These stereotypical perceptions not only apply to humans, but also to entities that have human-like gender cues.

For example, hurricanes with feminine names cause more deaths than hurricanes with masculine names because people underestimate the severity of feminine-named hurricanes, resulting in less preparedness for potential negative consequences (Jung, Shavitt, Viswanathan, & Hilbe, 2014; but see Smith, 2016 for a rebuttal).

We extend this line of research, and combine it with the findings that grammatical gender can affect evaluations of objects. We propose that activating thoughts about the virus using the feminine-marked *la COVID-19* will lead to lower perceptions of future danger compared to activating thoughts using the masculine-marked *le coronavirus*, which in turn will lead to lower intentions of taking precautions to avoid contracting the virus in potential consumption episodes. More specifically, we hypothesize that future danger perceptions mediate the effect of grammatical gender on behavioral intentions.

We tested this proposition in a series of experiments with native French (Study 1) and Spanish speakers (Study 2). In Study 3, we ruled out a prominent alternative explanation, and in Study 4, we used Google Trends data for France, Spain, and Italy to determine whether the hypothesized effects can be observed in natural settings.

In all studies, participants provided informed consent, and we analyzed the data only after all measures had been collected. We excluded participants based on a priori rules that were applied before any data analyses. We measured mood and demographics in all studies, but their inclusion as covariates did not materially affect the results (full results are provided in the MDA). All measures and manipulations are provided in the MDA.

Study 1: Future Danger Perceptions and Precautionary Behavioral Intentions

Method

Participants and design. One hundred fifty-five members of the Clickworker online research panel (82 women, 69 men, 4 not indicated; $M_{age} = 30.92$, $SD = 10.72$) participated in

the experiment in exchange for \$0.30. We restricted participants to native French speakers who were located in France. The experiment was a one-factor (grammatical gender: *le coronavirus* vs. *la COVID-19*) between-subjects design. The experiment was conducted in French.

Procedure. Participants were told that they would be participating in a short study about the public's reactions to the recent pandemic. They were randomly assigned to one of the two conditions that manipulated grammatical gender via the study instructions and questions. In the masculine grammatical gender condition, the instructions and the questions referred to *le coronavirus*, and in the feminine gender condition they referred to *la COVID-19* (see MDA).

Participants first answered six questions (randomized order) concerning their future consumption behavior likely to be impacted by the coronavirus (likelihood of eating at a restaurant soon, traveling by plane, etc.), and then answered five questions (randomized order) that measured their future danger perceptions of the virus (how long will the virus remain dangerous, how likely it is that there will be a second wave, etc.). All items were measured along a 7-point scale. We created a composite measure of precautionary behavioral intentions ($\alpha = .72$) and future danger perceptions ($\alpha = .78$), with higher scores indicating greater cautionary behaviors and greater perceived danger. Participants then answered an attention check question and provided demographic and mood information.

Results

Data exclusion. Data from eight participants who failed the attention check were excluded from analyses.

Precautionary behavioral intentions and danger perceptions. As expected, participants intended to be less cautious in their future behaviors in the feminine grammatical

gender condition (mean [95% CI], 4.07 [3.79, 4.36]) than in the masculine grammatical gender condition (4.56 [4.28, 4.85]), $t(145) = 2.416, p = .017$, Cohen's $d = 0.398$, 95% CI for the mean difference = [0.09, 0.89]). Participants in the feminine condition also thought the virus would be less dangerous in the future (4.71 [4.43, 4.99]) than did participants in the masculine condition (5.14 [4.92, 5.36]), $t(145) = 2.348, p = .020$, Cohen's $d = 0.391$, 95% CI for the mean difference = [0.07, 0.79]).

Mediation. We tested for mediation with the PROCESS macro (Model 4) with 5,000 bootstrapping samples (Hayes, 2017), with grammatical gender as the independent variable, future behavioral intentions as the dependent variable, and future danger perceptions as the mediator (Figure 1). Grammatical gender condition significantly predicted future danger perceptions, $\beta = -0.38, SE = 0.16, t(145) = -2.348, p = .020$, 95% CI = [-0.70, -0.06], and future danger perceptions significantly predicted future behavioral intentions, $\beta = 0.42, SE = 0.08, t(144) = 5.504, p < .001$, 95% CI = [0.27, 0.57]. When we controlled for future danger perceptions, grammatical gender condition no longer predicted precautionary behavioral intentions ($p = .124$). Moreover, the indirect effect of grammatical gender on future behavioral intentions was significant, $\beta = -0.16, SE = 0.08, 95\% \text{ CI} = [-0.34, -0.02]$, indicated by the 95% CI not including zero, which suggests the effect of grammatical gender on precautionary behavioral intentions was mediated by perceived future danger.

Study 2: Replication with Spanish Speakers

The purpose of Study 2 was to determine whether the results generalize to a different gendered language. In Spanish, like in French, the disease is grammatically feminine (*la COVID-19*), whereas the virus is masculine (*el coronavirus*).

Method

Participants and design. One hundred fifty-two members of the Prolific Academic UK online research panel (68 women, 84 men; $M_{\text{age}} = 29.89$, $SD = 9.32$) participated in the experiment in exchange for £0.30. We restricted participants to native Spanish speakers, located in Spain. The experiment was a one-factor (grammatical gender: *el coronavirus* vs. *la COVID-19*) between-subjects design and was conducted in Spanish.

Procedure. The experimental procedure and the questions were identical to those of Study 1. We again created composite measures of precautionary behavioral intentions ($\alpha = .71$) and future danger perceptions ($\alpha = .77$). We used the same attention check question that we used in Study 1, and participants provided demographic and mood information.

Results

Data exclusion. Data from one participant who failed the attention check were excluded from analyses.

Precautionary behavioral intentions and danger perceptions. As expected, participants intended to be less cautious in their future behaviors in the feminine grammatical gender condition (4.27 [4.01, 5.53]) than in the masculine grammatical gender condition (4.75 [4.48, 5.03], $t(149) = 2.342$, $p = .011$, Cohen's $d = 0.41$, 95% CI for the mean difference = [0.11, 0.86]). Participants in the feminine condition also thought the virus would be less dangerous in the future (5.37 [5.16, 5.58]) than did participants in the masculine condition (5.71 [5.51, 5.90], $t(149) = 2.342$, $p = .020$, Cohen's $d = 0.381$, 95% CI for the mean difference = [0.05, 0.63]), replicating the results of Study 1.

Mediation. Grammatical gender condition significantly predicted future danger perceptions, $\beta = -0.38$, $SE = 0.16$, $t(149) = -2.342$, $p = .021$, 95% CI = [-0.69, -0.06], and future danger perceptions significantly predicted future behavioral intentions, $\beta = 0.48$, $SE = 0.07$, $t(149) = 6.653$, $p < .001$, 95% CI = [0.34, 0.62]. Replicating the results of Study 1, the

effect of grammatical gender on precautionary behavioral intentions was again mediated by perceived future danger ($\beta = -0.18$, $SE = 0.08$, 95% CI = [-0.36, -0.03]) (see Figure 2).

Alternative explanations. Thus far, in the interest of ecological validity, we chose to test our hypotheses using grammatically correct descriptions of the virus (*le / el coronavirus* and *la COVID-19*). However, doing so also introduces obvious experimental confounds: the two names differ in terms of phonetic qualities, they mean different things, and they may have different connotations. Thus, it is possible that the two names are perceived differently in terms of gender independently of the grammatical gender mark (Slepian & Galinsky, 2016).

To address this issue, we conducted another replication with native English speakers. English is a genderless language (doesn't assign gender to nouns). If coronavirus and COVID-19 have different connotations that are driving the effects, we should observe a difference in terms of consumers' future risk judgments and precautionary behavioral intentions. However, if the effects are driven by grammatical gender, as we hypothesized, we should observe no differences for English. The results showed that future danger perceptions and behavioral intentions were virtually identical between the two conditions ($ps > 0.75$). Full details are provided in the MDA.

Although these results with English speakers may alleviate some concerns about experimental confounds, they nevertheless may not be ideal, as they use a different participant pool and conclusions are based on null findings. To address this issue, in Study 3, we conducted an additional experiment in which we manipulated only the grammatical gender mark, holding the name constant.

Study 3: *le COVID-19* vs. *la COVID-19*

Although *coronavirus* takes the masculine and *COVID-19* takes the feminine grammatical gender, individuals often mistakenly use the wrong grammatical gender in French (*la coronavirus* and *le COVID-19*) instead of the correct usage (*le coronavirus* and *la*

COVID-19). In fact, the reason that the Académie Française felt compelled to emphasize that COVID-19 is feminine is that French speakers were often using the wrong gender (*le COVID-19*). This confusion allowed us to conduct the study by manipulating only the grammatical gender (*le COVID-19* vs. *la COVID-19*).

Method

Participants and design. One hundred fifty-three members of the Prolific Academic UK online research panel (48 women, 105 men; $M_{\text{age}} = 27.35$, $SD = 8.75$) participated in the experiment in exchange for £0.30. We restricted participants to native French speakers, located in France. The experiment was a one-factor (grammatical gender: *le COVID-19* vs. *la COVID-19*) between-subjects design and was conducted in French.

Procedure. The experimental procedure and the questions were identical to those of Study 1, except that in the masculine grammatical gender condition, the instructions and the questions referred to *le COVID-19*, and in the feminine gender condition they referred to *la COVID-19*. We created composite measures of precautionary behavioral intentions ($\alpha = .62$) and future danger perceptions ($\alpha = .67$). We used the same attention check question that we used in the previous experiments and participants provided demographic and mood information.

Results

Data exclusion. Data from three participants who failed the attention check were excluded from analyses.

Precautionary behavioral intentions and danger perceptions. Consistent with previous studies, participants intended to be less cautious in their future behaviors in the feminine grammatical gender condition (4.08 [3.82, 4.35]) than in the masculine grammatical gender condition (4.51 [4.27, 4.75]), $t(148) = 2.411$, $p = .017$, $d = 0.396$, 95% CI for the mean

difference = [0.08, 0.78]). Similarly, participants in the feminine condition thought the virus would be less dangerous in the future (5.02 [4.77, 5.27]) than did participants in the masculine condition (5.35 [5.18, 5.51], $t(148) = 2.176$, $p = .031$, $d = 0.359$, 95% CI for the mean difference = [0.03, 0.62]).

Mediation. Grammatical gender condition significantly predicted future danger perceptions, $\beta = -0.33$, $SE = 0.15$, $t(148) = -2.176$, $p = .031$, 95% CI = [-0.62, -0.03], and future danger perceptions significantly predicted future behavioral intentions, $\beta = 0.51$, $SE = 0.09$, $t(148) = 5.711$, $p < .001$, 95% CI = [0.33, 0.68]. The indirect effect of grammatical gender on future behavioral intentions was significant, $\beta = -0.17$, $SE = 0.09$, 95% CI = [-0.36, -0.02] and when we controlled for future danger perceptions, grammatical gender condition no longer predicted precautionary behavioral intentions ($p = .11$) (see Figure 3). These results replicate the findings of the previous studies and give strong support for our proposition that the effect is driven by the grammatical gender.

Across the three experiments, the findings have been highly consistent. In Study 4, we used Google search data to test whether similar findings might be observed in internet search behavior, and include a third gendered language (Italian), in which COVID-19 is feminine (*la*) and coronavirus is masculine (*il*).

Study 4: Online Search Behavior

Method

We have provided experimental evidence that the use of the feminine gender mark when considering virus or disease reduces future danger perceptions and intentions to take precautionary behavioral measures to reduce risk of virus contraction. In Study 4, we test whether the same relations might be observed in virus-related search behavior. Specifically, we tested the hypothesis that as indicators of future danger of the virus increase (e.g., increased cases, deaths), use of the feminine grammatical gender would decrease. We also

tested the hypothesis that increases in search interest in precautionary measures (e.g., search masks) would be negatively associated with the use of the feminine grammatical gender.

To do so, we used the data from the EU Open Data Portal for the daily new cases and deaths caused by the virus (<https://data.europa.eu/euodp/en/data/dataset/covid-19-coronavirus-data>), which was compiled by the European Center for Disease Prevention and Control. We combined these data with Google Trends search statistics (<https://trends.google.com/trends/>). Google Trends calculates an index (0 – 100) of the relative frequency with which a particular word or phrase is entered as a search term in Google’s search engine, compared to the total search volume for a specified time period. To calculate the relative search popularity of the masculine and the feminine versions of the coronavirus, as well as the search popularity for masks, we used the Google Trends search data for the period March 1 – June 22, 2020 (which roughly corresponded to when we conducted the experiments and the peak of the pandemic in Europe). These data are standardized by Google to 100, where 100 is the maximum search interest for the time and location selected. To test the generalizability of the grammatical gender effects, we analyzed search data for France, Spain, and Italy, three languages in which coronavirus is grammatically masculine and COVID-19 is grammatically feminine.

To operationalize the search frequency of the masculine versus feminine grammatical gender, we calculated a daily femininity score of the virus (Fem_{vir}) for each country by deducting the search interest in the masculine-marked terms for the coronavirus from the search interest in the feminine-marked terms, as follows, using France as the example (see MDA for full details):

$$FemVir_{France} = [\text{Search interest in “la covid” and “la coronavirus”}] - [\text{Search interest in “le coronavirus” and “le covid”}].$$

Results

To smooth daily anomalies and reduce noise in the data (e.g., sudden drop in daily new cases and deaths on Sundays, and negative values for daily new cases and deaths), we calculated a simple 7-day moving average of daily new deaths, daily new cases, interest in masks, and femininity scores, and computed correlations between the femininity scores and the three other variables. As Figures 4a-c show, the hypotheses were supported for all three countries. For France (Figure 4a), Fem_{vir} correlated negatively with the number of new virus cases reported, $r(108) = -.65, p < .001$, the number of new deaths reported, $r(108) = -.82, p < .001$, and search interest in masks, $r(108) = -.36, p < .001$. Likewise, for Spain (Figure 4b), Fem_{vir} also correlated negatively with the number of new virus cases reported, $r(108) = -.59, p < .001$, the number of new deaths reported, $r(108) = -.32, p = .001$, and search interest in masks, $r(108) = -.43, p < .001$. Finally, the same pattern of correlations was observed for Italy (Figure 4c): number of new virus cases reported, $r(108) = -.55, p < .001$, the number of new deaths reported, $r(108) = -.33, p = .001$, and search interest in masks, $r(108) = -.74, p < .001$.

For robustness, we repeated the analysis using 3-, 5-, and 9-day moving averages for all countries. Details are provided in the MDA. The results indicate that the correlations are robust across different windows of moving averages.

General Discussion

As the coronavirus spreads all over the world, so does the sobering truth that swelling populations and increasing connectedness will likely make pandemics more common (Smith et al., 2014). At the moment, lacking a vaccine or effective treatment of the virus, research suggests that individual behaviors, such as social distancing, handwashing, and wearing masks, may effectively slow the spread of the disease. However, the success of these measures is dependent upon the willingness of individuals to adopt the behaviors, and one determinant of compliance is the extent to which individuals perceive the virus to be dangerous. Governments and organizations have used intuitive persuasive tactics (e.g.,

information on the spread of new cases, death rates from the virus, painful symptoms, etc.) to stress the danger of the virus and the importance of adopting behaviors to minimize risk of contracting the disease and spreading the virus.

In this research, we demonstrate how a simple linguistic cue—the grammatical gender—affects both perceptions of danger, and as a result, intentions to engage in precautionary behaviors. Across two experiments with French speakers and one with Spanish speakers, and secondary data analysis of Google Trends search frequencies in France, Spain, and Italy, we show that the virus is considered less likely to be dangerous in the future when thoughts of the concept are activated with the feminine grammatical gender than when they are activated with the masculine grammatical gender, which in turn reduces intentions to engage in behaviors to reduce the chances of contracting the disease or spreading the virus in potential consumption episodes. Presumably, the grammatical gender mark activates stereotypical concepts related to masculinity and femininity, which are then used as a basis of judgment about the virus (Jung et al., 2014). Thus, ironically, the admonition of Académie Française for French speakers to correctly use the feminine grammatical mark for COVID-19, may serve to reduce compliance with measures to mitigate the spread of the virus and contraction of the disease.

Although the effects we observed are not large, they are highly consistent. A single-paper meta-analysis estimated the effect of grammatical gender on future danger perceptions at -0.38 [-0.56, -0.19] scale points and on precautionary behavioral intentions at -0.40 points [-0.59, -0.22]; see the MDA for full details. Furthermore, the Google Trends data are also remarkably consistent for France, Spain, and Italy, and also consistent with the experimental findings, and suggest that the findings are robust over different gendered languages.

Our research has implications for a number of research areas. First, the research contributes to the literature documenting the effects of seemingly irrelevant information on important judgments. Assignment of grammatical gender is arbitrary, and thus should not

logically influence judgments; speakers of gendered languages are well-aware that grammatical gender has no meaning for non-human entities. Second, our findings also extend research on grammatical gender effects and contributes to the larger debate as to whether language influences thought (Lucy, 1997; Whorf, 1952). Our research further confirms and extends the findings on the implicit nature of grammatical gender effects (Boutonnet et al., 2012; Cubelli, Paolieri, Lotto, & Job, 2011) by showing that grammatical gender can influence judgements and decision-making, even if such information is irrelevant and not explicitly elicited.

Our findings also suggest some avenues for future research. For one, although our research focused on specific virus-related judgments, grammatical gender is likely to influence other types of consumer judgments. For example, to the extent that grammatical gender nonconsciously activates gender-related concepts, it may influence judgments of gender-marked brand names and products. Further, to the extent that grammatical gender imparts human-related information (either masculine or feminine), the gender mark of a product (or the absence of gender marks in genderless languages) may influence how consumers interact with products, such as the extent to which they anthropomorphize them.

An additional question is the extent to which our findings generalize to other gendered languages. Our experimental findings show that the effects hold for both French and Spanish, and the Google Trends data are remarkably consistent for France, Spain, and Italy. However, French, Spanish, and Italian are similar in that they are romance languages and have two grammatical genders. Given that grammatical gender effects are more likely to occur in languages with only two grammatical genders (Maciuszek & Świątkowska, 2019), such as French and Spanish (Sera, Berge, & del Castillo Pintado, 1994), and Italian (Vigliocco, Vinson, Paganelli, & Dworzynski, 2005), one avenue for future research is to test the generalizability of the effect in languages with more than two grammatical genders.

To conclude, persuading citizens to adopt preventive behaviors to reduce the risk of contraction and spread of the coronavirus is paramount to controlling its spread. In this research, we show that a seemingly irrelevant grammatical cue affects perceptions of danger and intentions to take precautionary measures. Thus, even though the motivation of Académie Française for urging proper grammar usage is surely well-intentioned, it may have had unfortunate unintended consequences.

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Figure 1. Mediation model (Study 1: French speakers). Standardized coefficients are given; values in brackets are 95% confidence intervals. * indicates $p < .05$; ** indicates $p < .001$.

Figure 2. Mediation model (Study 2: Spanish speakers). Standardized coefficients are given; values in brackets are 95% confidence intervals. * indicates $p < .05$; ** indicates $p < .001$.

Figure 3. Mediation model (Study 3: French speakers). Standardized coefficients are given; values in brackets are 95% confidence intervals. * indicates $p < .05$; ** indicates $p < .001$.

Figure 4. Standardized moving averages for daily new cases, daily new deaths, search interests in masks, and the femininity scores (Fem_{vir}) for the period between March 1, 2020 – June 22, 2020, for France (panel a), Spain (panel b), and Italy (panel c).