

I Alone Can Fix It: Examining interactions between narcissistic leaders and anxious followers on Twitter using a machine learning approach

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Abstract

Due to their confidence and dominance, narcissistic leaders oftentimes can be perceived favorably by followers, in particular during times of uncertainty. In this study, we propose and examine the relationship between narcissistic leaders and followers who are prone to experience uncertainty intensely and frequently in general, namely highly anxious followers. We do so by applying machine learning algorithms to account for personality traits in a large sample of leaders and followers on Twitter. We find that highly anxious followers are more likely to interact with narcissistic leaders in general, and male narcissistic leaders in particular. Finally, we also examined these interactions in the context of highly popular leaders and found that as leaders become more popular, they begin to attract less anxious followers, regardless of leader gender. We interpret and discuss these findings in relation to previous work and outline limitations and future research recommendations based on our approach.

1 | INTRODUCTION

In recent years, the literature on narcissism, and specifically narcissistic leaders, has grown substantially with more and more papers examining the effect of narcissism on behavioral outcomes (for an overview, see Smith et al., 2018). According to past studies, narcissists seem to have two sides: a dark side and a bright side. On the dark side, narcissists commonly display a lack of sympathy, a tendency toward cruelty and foresight, moodiness, and irritability. On the bright side, narcissists are commonly perceived to be charming, persuasive, and overachieving, all of which describe attributes closely associated with leadership (Cragun et al., 2019). Indeed, narcissistic leaders make a positive impression due to their charisma and extraversion

(Grijalva, Harms, et al., 2015), in particular during times of uncertainty (Nevecka et al., 2013). During such times, individuals experience increased anxiety and worry, and in turn associate themselves with leaders who seem confident, dominant, and who seem to be able to provide safety and stability. Since narcissistic leaders portray themselves as favorable than the rest and show a sense of authority, deviance, and success, we propose that anxious followers favor and therefore interact more often with narcissistic leaders than non-narcissistic leaders. We examine this relationship further by examining leader–follower interactions on the public Twitter platform, particularly interactions between narcissistic leaders and anxious followers.

Using the same (social media) setting, we also examine gender moderation effects on the relationship between

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narcissistic leaders and anxious followers. Previous work (Grijalva, Newman, et al., 2015) has shown that agentic characteristics such as vanity, self-centeredness, and aggression, all of which are closely associated with narcissism are evaluated differently in male and female narcissistic leaders. We argue that such characteristics are more likely to be tolerated in male narcissistic leaders, but viewed as unfit or unacceptable in female narcissistic leaders. Evidence suggests that leaders who exhibit unacceptable characteristics associated with the opposite gender are more negatively characterized (de Hoogh et al., 2015). Put differently, we expect that anxious followers view and therefore interact more often with male narcissistic leaders than female narcissistic leaders.

Finally, previous research (Hong et al., 2012) has confirmed that social media user accounts are mainly judged based on visual cues of the profile and profile metrics, most importantly the post source's popularity (i.e., number of followers). Hence, we account for this potential boundary condition by examining the proposed relationship in a sample of popular versus less popular narcissistic leaders.

2 | NARCISSISTIC LEADERS AND FOLLOWERS OF NARCISSISTIC LEADERS

Narcissism is characterized by grandiosity, self-absorption, vanity, feelings of entitlement, willingness to exploit others, and overly positive self-views (DeWall et al., 2011). Past research (Nevicka et al., 2011) has suggested that narcissists are attracted to and succeed in prominent occupations because they have a constant need to showcase their capabilities to gain admiration. Hence, narcissists tend to willingly take up leadership roles, since a leadership role provides narcissistic leaders an appealing stage from which they can flaunt their prevalence over others (Rosenthal & Pittinsky, 2006). Yet, the narcissistic leader persona is a combination of both positive and negative attributes (Gruda et al., 2020). Narcissists also are exploitative, oversensitive to criticism, arrogant, and can lack empathy—attributes that can make narcissists seem disruptive and negatively affect their followers (Rauthmann & Kolar, 2013). In short, narcissists can have a beneficial or detrimental impact on others around them. In this article, we argue that whether narcissistic leaders are seen favorably depends largely on follower-specific characteristics.

While most of the previous leadership literature has taken a leader-centric perspective, recent work has been emphasizing the importance of the follower in leader–follower interactions and relationships (Northouse, 2019; Padilla et al., 2007; Smith et al., 2018). For example,

Padilla et al. (2007) state that for destructive leadership to occur, a match between the right kind of leaders and followers is required, including the right context. In this study, we argue that leadership is a relational phenomenon, involving both leaders and followers. Hence, to understand why narcissistic leaders can be perceived (un)favorably, we argue that it is important to focus on the followers of such leaders as well. One particular follower characteristic which has been largely ignored so far is follower anxiety.

2.1 | Narcissistic leaders and anxious followers

Anxiety occurs both in a state as well as trait form (Spielberger et al., 1970). State anxiety is a psychological state of a person and is event-specific. For example, an upcoming presentation might cause an individual to experience a temporary increase in state anxiety. On the other hand, trait anxiety describes a psychologically stable form of anxiety and is not event-specific. Put differently, individuals who score high on trait anxiety are more anxious than others in general and experience anxiety more intensely and frequently than others.

Anxiety plays a particularly crucial role in explaining the experience and behavior of individuals during times of uncertainty (e.g., a natural disaster, an economic crisis, or a pandemic) and might help explain why narcissists especially are sought during such times. Since narcissistic leaders are perceived to be charismatic and dominant and display supreme confidence, such traits are likely perceived as desirable by followers especially in such circumstances (Padilla et al., 2007).

We argue that highly anxious followers are more likely to rely on narcissistic leaders as such followers are likely to experience particularly intense feelings of anxiety and, in turn, are motivated to seek out guidance, security, and safety in their (narcissistic) leaders. Such followers may assume that these leaders can restore order and remove instability which will make them feel safe (Nevicka et al., 2013). Less anxious followers would be less likely to seek out narcissistic leaders, as they might tend to rely on themselves instead. This is in line with work by Rast (2015) who examined the link between self-uncertainty and leader prototypicality and work by Nevicka et al. (2013). Hence, we hypothesize the following:

Hypothesis H1. *Leader narcissism is positively related to leader–follower interactions and this relationship is positively moderated by follower anxiety, such that highly anxious followers are more likely to interact with narcissistic leaders than non-narcissistic leaders.*

3 | NARCISSISTIC LEADERS, ANXIOUS FOLLOWERS, AND LEADER GENDER

Previous work has shown that all narcissists share similar traits, including grandiosity and a sense of superiority (e.g., Campbell et al., 2011). However, some research also has found support for existing differences between male and female narcissists (e.g., Grijalva, Newman, et al., 2015). Based on the social role theory, previous scholars have argued that gender stereotypes derive mainly from the assignment of men and women to social positions within their cultures by society (Eagly et al., 1992). For example, women are considered as polite, welcoming, and nurturing whereas men are considered to be dominant and brazen. This gender discrimination gave rise to gender stereotypes in society, which differently influences the perception of males and females in society (Grijalva, Newman, et al., 2015).

We argue that since narcissism is associated with characteristics such as dominance, grandiosity, competitiveness, and a need for achievement, such characteristics align more with males than females. For example, previous research has shown that women displaying assertiveness, desire for power, and directive leadership styles are perceived more negatively and often face societal criticism (Rudman et al., 2012). Such display of assertiveness and superiority may have greater negative social affirmations for female leaders since such characteristics violate stereotypical gender-based expectations (Eagly et al., 1992). Similarly, work by Okimoto and Brescoll (2010) found that female politicians are judged adversely when they breach gender-based behavioral expectations, while de Hoogh et al. (2015) found that female narcissistic leaders were perceived more inefficient than male narcissistic leaders. Hence, it is likely that female narcissistic leaders may be evaluated less favorably by followers for displaying dominant behaviors such as those associated with narcissism, compared to male narcissistic leaders. Hence, we hypothesize the following:

Hypothesis H2. *Leader gender moderates the relationship between narcissistic leaders, follower anxiety, and follower engagement, in that anxious followers are more likely to interact with male narcissistic leaders than female narcissistic leaders.*

4 | LEADER NARCISSISM AND FOLLOWER ANXIETY ON SOCIAL MEDIA

To examine leader narcissism and follower anxiety in leader–follower interactions, we conduct our study using

interactions on the Twitter platform. This is due to several reasons, including data accessibility, the occurrence of leader–follower interactions in an unobtrusive environment, and the account of leader popularity.

First, we define leaders as individuals who are followed by others on Twitter. Hence, a regular employee (i.e., someone without managerial responsibilities and team oversight in their usual workplace) oftentimes can be perceived as a leader on social media platforms such as Twitter. Indeed, one could argue that similar to more traditional organizational leaders, Twitter leaders try to influence followers' communication content and patterns and can yield large referent and expert power. For example, Twitter leaders who are an expert in some field (e.g., a scientist, technician, craftsman, or journalist) and/or whose followers can identify with, often have a greater number of loyal online followers than those not considered an expert or likable (Ghosh et al., 2013). This might be the case, albeit these same leaders might not have managerial responsibility and supervisory oversight of others at their actual workplace. Thus, even though there is not a formal structure providing legitimate power, social media leaders can and do use many of the same bases of power as more traditional organizational leaders but at the same time can constitute regular employees and users.

Second, given that Twitter is public, it provides an ideal environment that facilitates the examination of interactions between individuals. Twitter has over 330 million monthly active users (statista.com), who on average post 6,000 tweets per second. Users can follow others' posts by subscribing to their posts; such users are referred to as followers. Via tweets users may convey their thoughts, feelings, and opinions whenever they choose (Naaman et al., 2010). Users may tweet several times per day or several thousand times per year, which makes these microblogs an ideal source to examine users' personality (Gruda & Ojo, 2021; Park et al., 2015).

Third, leaders (i.e., those who are followed by others on Twitter) do not hold a position of power or authority analog to traditional organizational settings. Although this missing power dynamic might seem like a hindrance in the study of leaders and followers, previous work has shown that these very same power dynamics can distort follower responses (Epitropaki et al., 2013). For example, obtaining follower ratings of their leaders in traditional organizational settings can prove to be difficult and result in a distorted response. This is due to followers oftentimes not feeling comfortable sharing truthful and honest information with researchers, who are employed by the organization, even though researchers promise anonymity and confidentiality. On the Twitter platform, however,

scholars may examine leaders-follower interactions in a naturally occurring and unobtrusive environment.

Finally, another important benefit of the Twitter platform is the ease of accounting for leaders' popularity. Popularity on social media platforms is represented by the number of followers of a given user profile. This implies that the reason for following another user on Twitter is, at best, secondary (Garcia et al., 2017). Popularity has been defined as the main motivation factor driving users to remain active and stimulate willingness to engage with other users on social media (Jin & Muqaddam, 2018) and the main factor in judging profiles (Hong et al., 2012). Concerning narcissism, in particular, Jin and Muqaddam (2018) found that followers are more likely to accept and embrace narcissistic behavior, when the post source's popularity is high, due to the desire to be affiliated with high popularity. This is especially the case for followers who have a high need for popularity themselves.

For this study, we examine whether leader popularity serves as a boundary condition to the proposed relationship between leader narcissism, follower anxiety, and leader gender. We would expect that high popularity among narcissistic leaders would essentially negate any leader gender or follower anxiety effects, as followers are likely to be drawn to both male and female narcissistic leaders, regardless of followers' trait anxiety. Most likely this would be due to the high number of followers displayed on leaders' profiles and followers' desire to be affiliated with leaders' portrayed popularity. We hypothesize the following:

Hypothesis H3. *Leader popularity constitutes a boundary condition for the relationship between leader narcissism, follower anxiety, and leader-follower interactions, in that followers of highly (un)popular leaders interact more (less) often with narcissistic than non-narcissistic leaders, regardless of leader gender.*

5 | METHODOLOGY

For this study, we developed and made use of three machine learning models, predicting (a) leader narcissism, (b) trait anxiety (Gruda & Hasan, 2019), and (c) Big Five personality traits (Gruda et al., 2020), to account for possible controls on the follower level. In this article, we introduce the development of a narcissism predictive model while we also provide descriptions about the pre-trained models used for anxiety and Big Five traits. Subsequently, we provide details about the dataset creation used in this study to test our hypotheses which includes

organizational leaders and the interactions with their followers, while applying the three predictive models to acquire scores for narcissism, anxiety, and Big Five personality traits.

5.1 | Building a narcissism predictive model

Previous work (Golbeck et al., 2011; Karanatsiou et al., 2020; Verhoeven et al., 2013; Wei et al., 2017) has shown that personality traits, including narcissism (Bollaert et al., 2019; Gruda et al., 2020) can be successfully measured in online contexts using social media data. Based on this argument, we followed a machine learning pipeline (Figure 1) to build a predictive model able to detect narcissism in Twitter profiles with high relative accuracy.

- a. *Data collection and ground truth dataset:* To collect our ground truth dataset for the prediction of narcissism, we recruited participants via an article published on the webpage of Psychology Today. At the end of the article, a link to a short survey was provided, in which, after providing consent, participants were asked to complete a scale on narcissism by Konrath et al. (2014), namely "To what extent do you agree with this statement: 'I am a narcissist? (Note: The word 'narcissist' means egotistical, self-focused, and vain)" using a 7-point Likert scale (1 = "Not Very True of Me" to 7 = "Very True of Me"), and to provide their public Twitter username/handle for research purposes. In total, 1,067 participants, located in the United States, completed the survey, indicated their public Twitter username, and provided consent for their social media data to be used for research. In total, 309,417 tweets were obtained from these participants.
- b. *Preprocessing:* After collecting users' data in the form of tweets history and profile attributes, we preprocessed users' tweets to maintain a noise-free dataset and extract meaningful features. Punctuations, digits, Unicode characters and stop words (e.g., the, at, where, that) were removed, while Twitter user mentions, retweet identifiers, and external links (URLs) were filtered out. We applied tokenization, in which the initial text is divided into individual chunks of single words to analyze words independently. Part-of-speech tagging was used to extract word-use features.
- c. *Features extraction:* We used four different feature categories based on user profile metrics, specified language use indicating narcissism (i-talk) as well as general language use and Big Five personality traits. As for the user profile metrics, we extracted Twitter attributes directly from the Twitter API while also

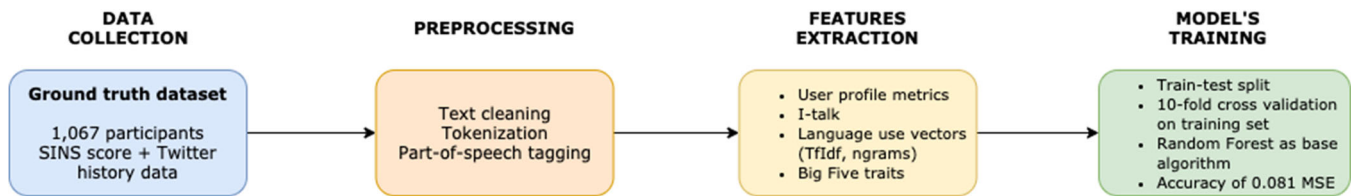


FIGURE 1 Building a narcissism prediction model

artificial features constructed from platform metrics which reflect users' behavior and description of self as outlined in Gruda et al. (2020). As for the language use, we identified specified words use indicating focus on one's self and narcissism (i-talk). Regarding general language expression, we applied an open vocabulary approach, which allows for unexpected language discovery based on word and phrase frequency of use and importance. The latter is computationally modeled with the term frequency-inverse document frequency (Tf–Idf) (Aizawa, 2003) and Ngram vectors, respectively. Tf–Idf is mostly used in information mining systems reflecting the importance of a word to a document in a collection, as the more often a word appears in a document, the more it is considered to be significant (Aizawa, 2003). N-grams represent sequential or phrasal language expressions offering expressive features producing vectors of word sequence frequencies. An overview of examined semantic features as outlined in Gruda et al. (2020) is provided in Table 1.

Finally, to account for other potential influencing variables, we also included in our analysis Big Five personality traits by using a pre-trained model (Gruda et al., 2020) to annotate the ground truth dataset.

- Model training:** The ground-truth dataset was split into a training (80% of all data) and testing (20% of all data) dataset and then we applied a 10-fold cross-validation scheme to produce an accurate model predicting narcissism scores as close as possible to users' actual personality scores. After experimenting with different regression algorithms, the best performing model was the Random Forest approach (Breiman, 2001), which provides a meta-estimator that enhances predictive accuracy and controls potential over-fitting. Model performance was evaluated using the mean squared error (MSE):

$$\text{MSE} = \frac{1}{N} \sum_{i=1}^N (Z_{y_i} - Z_{\hat{y}_i})^2$$

where y_i is the actual expected output; \hat{y}_i is the model's prediction; and N is the number of cases.

The MSE of this algorithm was .081 (overall range: 0–1), which constitutes fairly high prediction accuracy. Subsequently, we apply this algorithm to annotate our dataset of leaders and followers.

5.2 | Big Five predictive model

To account also for personality traits, we used the model developed in Gruda et al. (2020) based on the mini-IPIP scale (Donnellan, Oswald, Baird, & Lucas, 2006), which predicts Big Five traits with a fairly high prediction accuracy achieving an MSE .066. We applied this model to annotate the narcissism ground truth dataset and the dataset of leaders and followers.

5.3 | Anxiety predictive model

Anxiety was measured using the machine learning algorithm (Gruda & Hasan, 2018, 2019), based on the short version of the traditional State–Trait Anxiety Inventory scale by Marteau and Bekker (1992). The abbreviated scale consists of six items on a 4-point scale (1 = Not at all anxious and 4 = Very anxious). For example, a tweet with the content “Was feeling myself at work today” is scored 1.5 on average by five raters indicating low anxiety. Each tweet was scored on state anxiety and an average of all annotated tweets per user was used to derive trait anxiety scores for all followers in our dataset.

5.4 | Leaders–followers interactions: Dataset collection and annotation

To test our hypotheses, we collected and created a dataset of leaders–followers interactions on the Twitter platform. We define two phases, dataset collection and dataset

TABLE 1 Examined semantic features

Behavioral attributes	Description
Followers count	Number of followers a user has
Favorite count	Number of items a user marked as favorite
Statuses count	Number of statuses a user has posted
List count	Number of lists a user appears on
Days at Twitter	Number of days an individual uses the service, reflecting their experience in the platform
Frequency of status updates	Calculated by the division of the number of statuses with the days at Twitter, reflecting how active a user is
Number of links	Number of external links a user has shared in the platform
Number of hashtags	Number of hashtags a user has used to participate in public conversations
Number of user mentions	Number of times a user has mentioned another Twitter user
Number of retweets	Number of times a user has retweeted another users' content
Screen name length	Number of characters a user uses as their screen name
Description length	Number of characters a user uses to describe himself
Average tweet-length	Average length of each user tweet
Average words	Average number of words a user uses on their tweets
Average upper letter words	Average number of upper letter words in tweets reflect intense emotions and yelling at others

Note: As reported in Gruda et al. (2020, supplementary material).

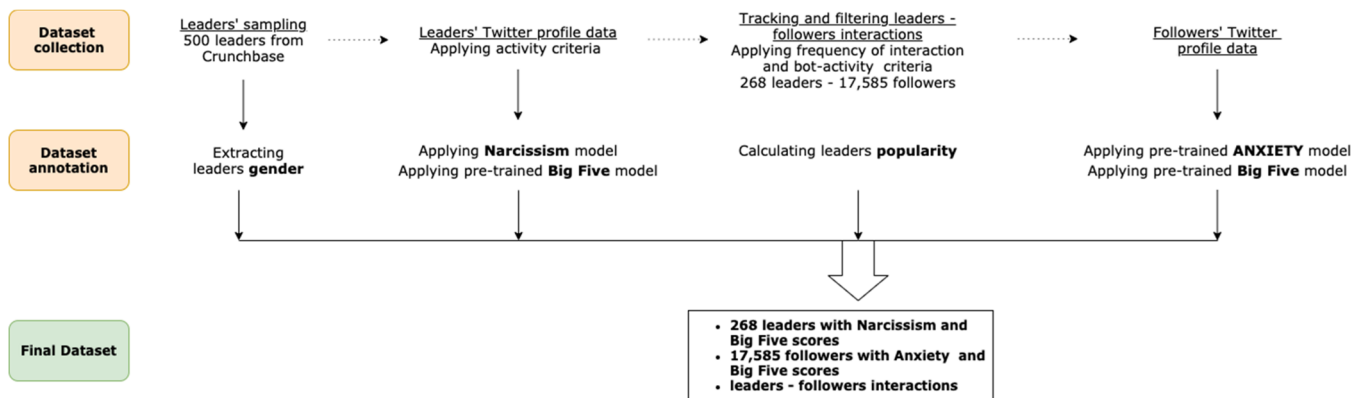


FIGURE 2 Dataset creation flow

annotation with discrete steps which lead to the final form of the dataset (Figure 2).

5.5 | Dataset collection

5.5.1 | Leaders sampling

Using an initial database of organizational leaders and employees, provided by Crunchbase (crunchbase.com), we randomly selected 500 highly active leaders on Twitter, and downloaded their public Twitter profile data.

5.5.2 | Leaders' Twitter profile data

We applied several criteria to clean this data before testing our hypotheses. We selected leaders whose tweets were published between January 1, 2018 and November 15, 2019, to extract the personality traits of leaders who were recently active on Twitter. Moreover, we defined a behavioral proxy to include leaders that are active on the Twitter platform, publish tweets regularly to increase follower engagement with their tweets. This proxy is the frequency of status updates defined by the number of status updates divided by the date of account creation. Based on this proxy we created three buckets of users in terms of

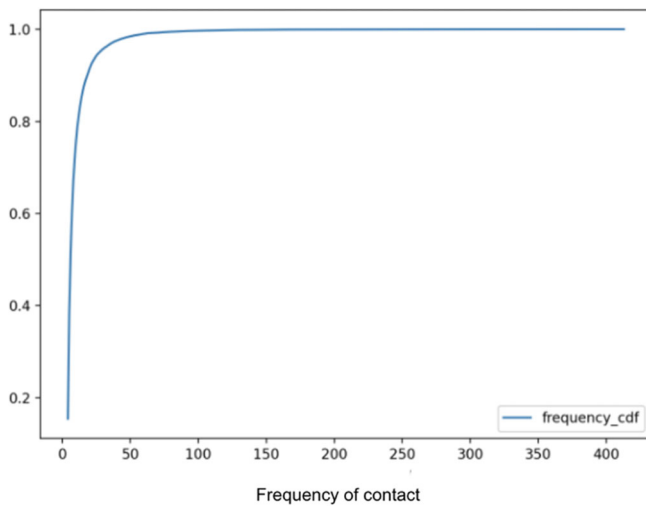


FIGURE 3 Frequency of interactions among leaders and their followers

activity indicating high, average, and low activity users. Leaders of this dataset are sampled from the high activity bucket.

5.5.3 | Tracking leaders–followers interaction

For this study, we were primarily interested in predicting the occurrence of leader–follower interactions. We argue that the number of leader–follower interactions (i.e., the frequency of followers responding to leaders' posts) can serve as a proxy for leader–follower relationships. Hence, followers who perceive leaders more favorably would be more likely to interact with those leaders as well. Before gathering tweets from leaders and followers in the aforementioned timeframe, we removed retweets from our dataset. Retweets or likes do not require much effort from followers (Ferrara et al., 2016). Hence, leader–follower interactions accounted only for unique followers' replies (or comments) to leaders' tweets. To ensure a realistic sample of leaders and followers, we only examine followers who have had at least four interactions with leaders on Twitter. The distribution of the replies/interactions among leaders and their followers in the collected dataset is shown in Figure 3.

In addition, we also accounted for the likelihood of automatic bots or bot-like accounts in our dataset. Here we followed recommendations provided by Cresci et al. (2015). For example, we ensure that both leaders and followers had posted at least 100 tweets at least 30 unique follower observations in our dataset. We also ensured that all followers in our dataset had at least 30 followers themselves and were part of at least one

Twitter list and who had at least one friend (i.e., two users follow each other). Finally, we also examined the ratio between friends count and follower count (friend count/follower count²) in our follower dataset. According to Cresci et al. (2015), this ratio is the most important feature for detecting fake Twitter followers (Cresci et al., 2015, table 18) with a higher ratio indicating higher bot-like similarity. Based on these criteria, we retained 90% of our dataset (ratio < .008).

We tested the validity of this approach by annotating a random sample of 1,000 Twitter followers on botometer (<https://botometer.osome.iu.edu/api>). Botometer is a tool that can recognize and categorize Twitter profiles as either bot-like or real users. Based on our random sample of 1,000 profiles, zero profiles were categorized as bot-like. Hence, we proceeded with the approach described above, which led to a final dataset of 268 leaders and 17,585 followers.

5.5.4 | Followers' Twitter profile data

Using leaders as seed and interactions with followers, we were able to identify and track respective followers' accounts and download their public Twitter information.

5.6 | Dataset annotation

After collecting leaders' and followers' Twitter profile data, we applied narcissism and Big Five predictive models to annotate leaders and anxiety and Big Five predictive models to annotate followers. The final dataset also includes leader gender and leader popularity.

5.6.1 | Leader gender

Leader gender was provided in the initial Crunchbase dataset and was coded female (0) and male (1). Observations that included an unspecified gender variable (e.g., missing data or coded as other) were dropped.

5.6.2 | Leader popularity

Leader popularity is represented by the number of followers for each leader account. Most analyses (H1 and H2) are based on leaders with less than 50,000 followers, while we specify leaders with more than 100,000 followers as highly popular (H3). The final statistics and distributions of the psychological variables are presented in Table 2 and Figure 4, respectively.

TABLE 2 Descriptive statistics of main variables

		Narcissism	Openness	Conscientiousness	Extraversion	Agreeableness	Neuroticism
Leaders	<i>M</i>	0.430	0.792	0.645	0.420	0.702	0.382
	<i>SD</i>	0.045	0.011	0.021	0.029	0.033	0.049
	Min	0.338	0.715	0.577	0.312	0.595	0.312
	Max	0.577	0.816	0.713	0.500	0.767	0.597
		Anxiety	Openness	Conscientiousness	Extraversion	Agreeableness	Neuroticism
Followers	<i>M</i>	2.270	0.776	0.700	0.320	0.653	0.387
	<i>SD</i>	0.104	0.017	0.017	0.017	0.022	0.032
	Min	1.513	0.389	0.232	0.232	0.442	0.319
	Max	2.827	0.759	0.759	0.759	0.737	0.459

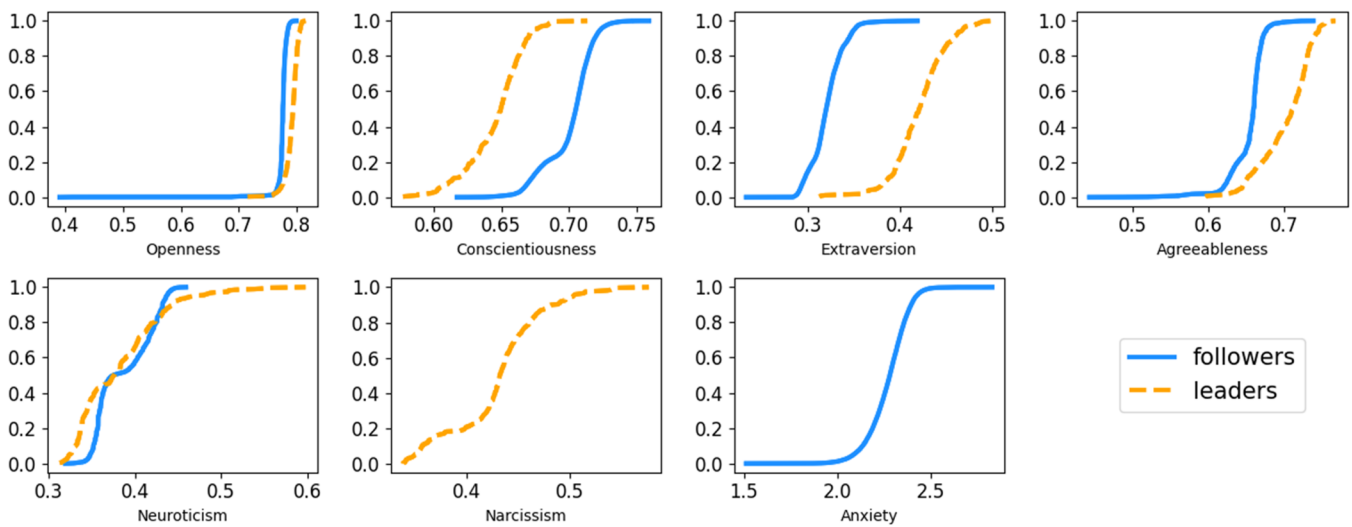


FIGURE 4 Distribution of leaders and followers dataset

6 | RESULTS

Since we aim to predict the number of leader–follower interactions (i.e., a count variable), we applied multilevel-mixed effects Poisson regressions, regressing our dependent variable onto leader narcissisms and follower anxiety. We follow the guidelines provided by Maas and Hox (2004), who recommend not to use a heteroscedastic-robust estimate of the variance, whenever samples are larger than 50 groups with more than 30 observations per group. Hence, we specified a random-effects model for all examined interactions. The main results (H1) are shown in Table 3, while results regarding the moderating effect of leader gender (H2) are found in Table 4. Finally, the results regarding leader popularity (H3) are found in Table 5.

The interaction between leader narcissism and follower anxiety positively predicted leader–follower interactions (Table 3, Model 3: $b = 2.87$, $SE = 0.64$; $z = 4.5$, $p < .001$). To better understand this interaction, we plot

it, respectively. Graphing the interaction ($\pm 1 SD$, Figure 5) shows that highly anxious followers engage significantly more often with narcissistic leaders than non-narcissistic leaders (simple slope = 0.84, $z = 2.02$, $p = .044$). In contrast, less anxious followers seem to engage just as frequently with non-narcissistic leaders as narcissistic leaders (simple slope = 0.21, $z = 0.53$, $p > .10$).

Second, we examined the moderating role of leader gender and the interaction of leader narcissism and follower anxiety. The moderating effect of gender on the interaction between leader narcissism and follower anxiety was significant (Table 4, Model 3: $b = 13.68$, $SE = 1.57$, $z = 8.72$, $p < .001$). Graphing the results ($\pm 1 SD$, Figure 6) shows that, in the case of male leaders, highly anxious followers were more likely to interact with narcissistic leaders (simple slope = 1.37, $z = 3.01$, $p = .003$) compared to less anxious followers (simple slope = 0.08, $z = 0.19$, $p > .10$). In the case of female leaders, slopes were not significant. In addition, the relationship between leader narcissism and

TABLE 3 Interaction of leader narcissism and follower anxiety on leader–follower interactions

Leader–follower interactions	Model 1	Model 2	Model 3	95% CI
Constant	−0.30 (−1.52)	2.85*** (4.28)	4.71** (2.45)	[0.94, 8.47]
Leader narcissism	0.14 (0.32)	−7.10*** (−4.66)	−6.09*** (−4.04)	[−9.04, −3.14]
Follower anxiety	1.09*** (40.29)	−0.29 (−1.04)	−.43*** (−1.53)	[−0.97, 0.12]
Leader narcissism × follower anxiety		3.18*** (4.96)	2.87*** (4.50)	[1.62, 4.13]
Leader tweet count			0.00 (2.07)	[−0.00, 0.00]
Follower tweet count			0.00*** (47.73)	[0.00, 0.00]
Wald χ^2	13.58**	1,647.82***	4,338.98***	

Note: *** $p < .001$, ** $p < .01$, * $p < .01$. CIs correspond to Model 3; Model 3 includes Big Five controls for leaders and followers, leader anxiety and follower narcissism; $n = 17,585$ followers (268 leaders).

Abbreviation: CI, confidence interval.

TABLE 4 Interaction of leader narcissism, follower anxiety, and leader gender on leader–follower interactions

Leader–follower interactions	Model 1	Model 2	Model 3	95% CI
Constant	−0.24 (−1.19)	−6.95*** (−4.70)	−4.76* (−2.06)	[−9.29, −0.23]
Leader narcissism	0.11 (.25)	16.94*** (5.02)	17.58*** (5.29)	[11.06, 24.09]
Follower anxiety	1.09*** (40.30)	4.09*** (6.64)	3.93*** (6.42)	[2.73, 5.13]
Leader gender	−0.06 (−1.27)	12.49*** (7.54)	12.30*** (7.53)	[9.10, 15.50]
Leader narcissism × follower anxiety		−7.52*** (−5.35)	−7.77*** (−5.58)	[−10.50, −5.04]
Leader narcissism × leader gender		−30.87*** (−8.17)	−30.47*** (−8.17)	[−37.77, −23.16]
Leader gender × follower anxiety		−5.58*** (−8.07)	−5.56*** (−8.09)	[−6.91, −4.22]
Leader narcissism × leader gender × follower anxiety		13.72*** (8.69)	13.68*** (8.72)	[10.60, 16.75]
Leader tweet count			0.00* (2.04)	[−0.00, 0.00]
Follower tweet count			0.00*** (47.70)	[0.00, 0.00]
Wald χ^2	1,625.42***	1,763.25***	4,458.95***	

Note: *** $p < .001$, ** $p < .01$, * $p < .01$. CIs correspond to Model 3; Model 3 includes Big Five controls for leaders and followers, leader anxiety and follower narcissism; $n = 17,585$ followers (268 leaders).

Abbreviation: CI, confidence interval.

follower anxiety differed as a function of leader gender. A pairwise differences in simple slopes comparison (with Bonferroni correction) test confirmed that both in the case of female leaders and male leaders, the slopes for less anxious followers compared to highly anxious followers differed significantly (female leaders: simple slope difference = -1.69 , $z = -5.58$, $p < .001$; male leaders: simple slope difference = 1.28 , $z = 8.22$, $p < .001$).

Finally, examined the effects of leader popularity (H3) by running our analyses in a separate sample of highly popular leaders (Table 5). Here, we found that the moderating effect of gender on the interaction between leader narcissism and follower anxiety remained significant but was much smaller (Table 5, Model 3: $b = 5.70$, $SE = 2.17$, $z = 2.63$, $p = .009$). Graphing the results ($\pm 1 SD$, Figure 7) shows that less anxious followers were more likely to follow narcissistic leaders, regardless of gender. For example, in the case of male leaders, less anxious followers were more likely to interact with narcissistic leaders compared to non-

narcissistic leaders (simple slope = 3.45 , $z = 2.22$, $p = .026$). In the case of female narcissistic leaders, this pattern was similar, although only marginally significant (simple slope = 3.39 , $z = 1.79$, $p = .073$). A pairwise differences in simple slopes comparison (with Bonferroni correction) test confirmed that both in the case of female leaders and male leaders, the slopes for less anxious followers compared to highly anxious followers differed significantly (female leaders: simple slope difference = -3.16 , $z = -9.60$, $p < .001$; male leaders: simple slope difference = -1.93 , $z = -5.74$, $p < .001$). Hence, we conclude that highly popular narcissistic leaders seem to attract less anxious followers, regardless of leader gender.

7 | DISCUSSION

Previous work has identified that narcissistic leaders are perceived favorably during times of uncertainty (Nevicka

TABLE 5 Interaction of leader narcissism, follower anxiety, and leader gender on leader–follower interactions (highly popular leaders)

Leader–follower interactions	Model 1	Model 2	Model 3	95% CI
Constant	0.89 (1.58)	−14.13*** (−7.60)	−15.07*** (−4.83)	[−21.18, −8.96]
Leader narcissism	1.82 (1.48)	35.14*** (8.77)	35.36*** (8.79)	[27.48, 43.24]
Follower anxiety	0.13*** (3.20)	6.56*** (9.23)	6.45*** (9.07)	[5.06, 7.85]
Leader gender	0.08 (.96)	6.97** (2.67)	4.93 (1.88)	[−.22, 10.08]
Leader narcissism × follower anxiety		−2.97** (−2.94)	−14.56*** (−9.60)	[−17.54, −11.59]
Leader narcissism × leader gender		−16.35** (−2.91)	−12.45* (−2.21)	[−23.5, −1.39]
Leader gender × follower anxiety		−2.97** (−2.94)	−2.30* (−2.27)	[−4.29, −0.32]
Leader narcissism × leader gender × follower anxiety		7.03*** (3.26)	5.70** (2.63)	[1.45, 9.94]
Leader tweet count			0.00 (.38)	[−0.00, 0.00]
Follower tweet count			0.00*** (24.95)	[0.00, 0.00]
Wald χ^2	13.58**	137.42***	1,081.42***	

Note: *** $p < .001$, ** $p < .01$, * $p < .05$. CIs correspond to Model 3; Model 3 includes Big Five controls for leaders and followers, leader anxiety and follower narcissism; $n = 17,585$ followers (268 leaders).

Abbreviation: CI, confidence interval.

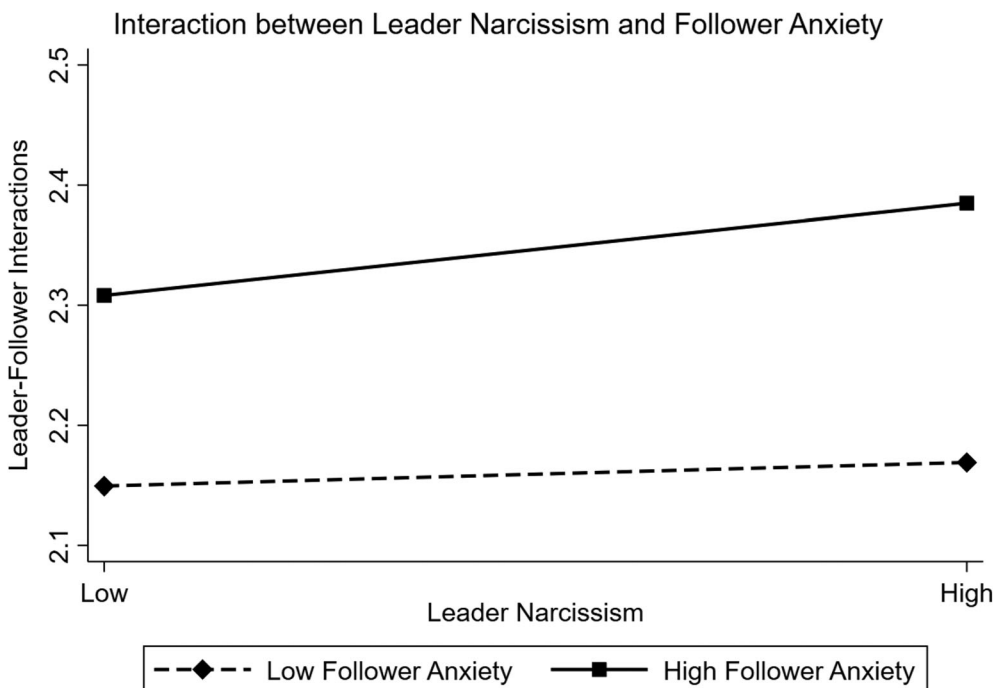


FIGURE 5 Relationship between the interaction of leader narcissism and follower anxiety predicting leader–follower interactions

et al., 2013) and that, in particular, followers with low self-esteem oftentimes are attracted to and become victims of such leaders (Nevicka et al., 2018). In this study, we contribute to the literature on narcissism, by investigating the relationship between leader narcissism and leader–follower interactions, moderated by follower anxiety. Since anxiety is characterized by a feeling of an expressive state that includes sentiments of nervousness and worry, anxious followers may be attracted to and feel the need to interact with narcissistic leaders as such leaders portray themselves as confident and superior. Put

differently, narcissistic leaders could be perceived favorably by highly anxious followers, because interacting with narcissistic leaders provides such followers a sense of security, confidence and helps them feel reassured that future uncertainty (e.g., the COVID-19 crisis, McCleskey & Gruda, 2020), can be dealt with effectively. Of course, narcissistic leaders may also create the illusion of uncertainty, and subsequently present themselves as the only logical choice for leadership. One example of such behavior is when political leaders exaggerate events or even refer to fake information to build up a fake narrative, designed to

FIGURE 6 Relationship between the interaction of leader narcissism and follower anxiety predicting leader–follower interactions by leader gender

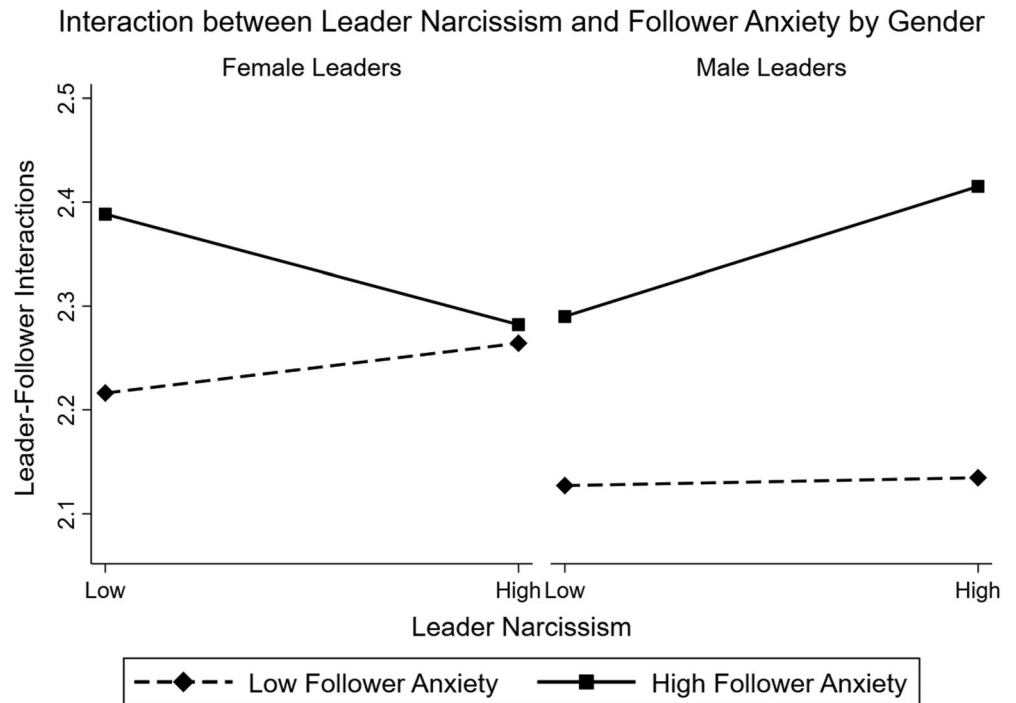
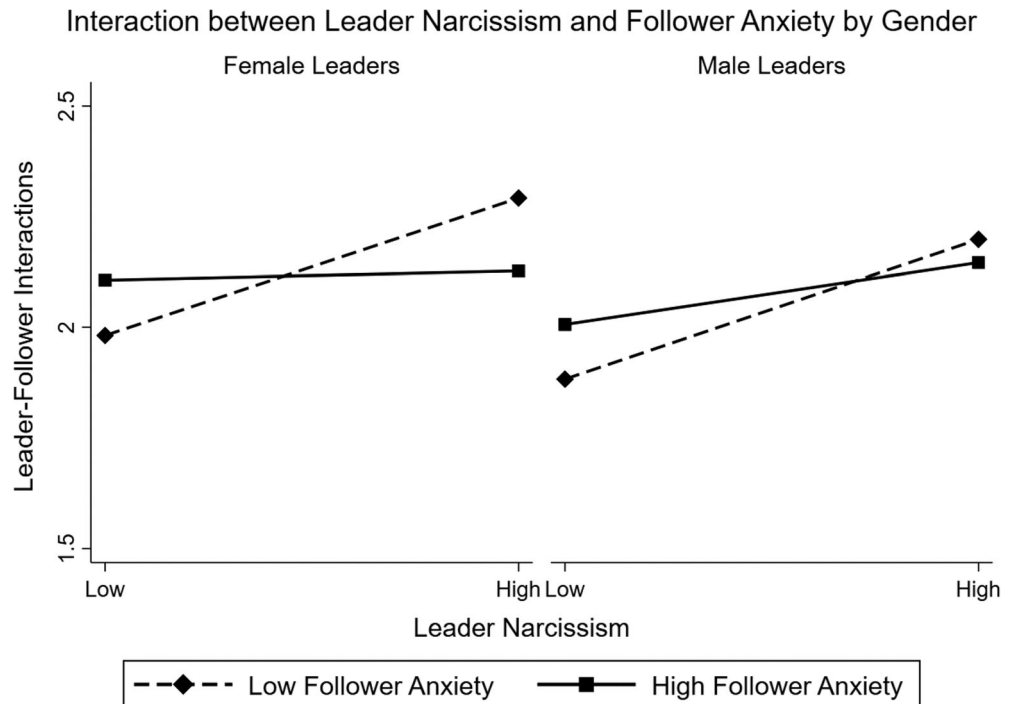


FIGURE 7 Relationship between the interaction of leader narcissism and follower anxiety predicting leader–follower interactions by leader gender (highly popular leaders)



increase their followers' worry and anxiety about the future. Once this is achieved, such leaders can then present themselves as the only solution to reduce uncertainty by referring to themselves as: "I Alone Can Fix It" (Lerer & Corasaniti, 2020). Such behavior is likely to particularly attract highly anxious followers, who are seeking to reduce intense feelings of uncertainty and worry about the future.

In addition, we find that leader gender plays an important role in moderating the relationship between leader narcissism and follower anxiety with male narcissistic leaders attracting more highly anxious followers compared to female narcissistic leaders. One of the underlying explanations for this could be social role theory; followers discriminate between leaders when it comes to gender (Eagly et al., 1992). While women are

supposed to be “communal” (caring, compassionate, gentle, kind), men are expected to be “agentic” (assertive, commanding, arrogant, individualistic). And whenever an individual does not respond to these standards, they are judged more negatively (Eagly et al., 1992). Since, many of the narcissistic qualities relate to, oftentimes socially unacceptable, agentic (e.g., selfish, arrogant, ruthless) rather than communal traits, female narcissistic leaders might be perceived to violate the stereotypical gender role of women. Whereas both male and female narcissistic leaders might come across as arrogant, insensitive, and ruthless, we find that male narcissistic leaders seem to be less punished than female leaders for being narcissistic. Regarding highly anxious followers, in particular, such followers may also prefer male narcissistic leaders over female narcissistic leaders as male narcissistic leaders fit the persona of someone who can provide stability and assurance.

Finally, we also found that leader popularity is an important factor to consider when examining the moderating role of leader gender. It seems that very popular narcissistic leaders seem to attract less anxious followers, regardless of leader gender. Hence, in the case of highly popular narcissistic leaders, the previously found pattern concerning highly anxious followers no longer applies. We speculate that it is likely that as narcissistic leaders gain popularity and essentially become celebrities, others begin following and interacting with them for different reasons than before their gained popularity. Put differently, while anxious followers might tend to turn to narcissistic leaders seeking to reduce their uncertainty and gain assurance, once narcissistic leaders have gained increased popularity, less anxious followers will turn and interact with narcissistic leaders, to be associated with that high popularity (Hong et al., 2012). In this case, leader gender does not seem to make a big difference anymore, in that less anxious followers turn to such leaders because of their popularity, not because of any uncertainty reducing benefits narcissistic leaders might be able to provide.

8 | LIMITATIONS AND FUTURE RESEARCH

Our study is not without limitations. First, as noted by Gruda and Hasan (2019), the applied anxiety machine learning algorithm is based on ratings provided by our zero-acquaintances. Hence, while the algorithm provides ratings of perceived anxiety, it does not measure experienced anxiety by the tweeter. This is an important limitation of such ratings (Qiu et al., 2012). Plus, the anxiety machine learning predictor scores and algorithm used in the study may be biased by the human raters'

own beliefs or anxiety dispositions. Future research could address this bias by examining and comparing the presented approach with other approaches as well, for example, word embeddings which perform well using neural network architectures. Nevertheless, we are confident that the anxiety algorithm is superior to self-report measures, due to multiple ratings per tweet and the amount and random composition of raters per tweet.

Second, although our study speaks to the interaction between leader narcissism and follower anxiety and is based on solid previous work in this space (Nevicka et al., 2013; Rast, 2015), we do not provide causal evidence to outline the reasons as why highly anxious followers tend to be attracted to narcissistic leaders. The exploration of this question constitutes the next step in understanding the affective outcomes of narcissists and narcissistic behavior on others. We encourage future research to explore this topic further, in particular by using experimental research designs and focusing on additional relational individual differences which might also be of relevance (see, e.g., Gruda & Kafetsios, 2020). Finally, while we focused on the relationship between traits, namely narcissism, and trait anxiety, future research ought to also explore the longitudinal effect of narcissistic leaders on anxiety experiences as well, namely follower state anxiety.

Third, another potential avenue for future research is to study the possible influence of culture on leader-follower interactions on Twitter. It could well be that certain qualities of narcissistic leaders are more condoned or tolerated in certain cultures than others (Hanges et al., 2021; House et al., 2004). Hence, further examination of leader-follower interactions on a more global scale could result in new insights on the influence of narcissistic leaders and follower anxiety.

9 | CONCLUSION

To conclude, this study examined the relationship between leader narcissism, follower anxiety, and leader gender, using machine learning algorithms. Based on a large sample of leaders and followers on Twitter, we find highly anxious followers are more likely to interact with narcissistic leaders in general, and male narcissistic leaders in particular. Finally, we also examined these interactions in the context of highly popular leaders and found that as leaders become more popular, they begin to attract less anxious followers, regardless of leader gender.

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