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How strong is the association between social media use and false consensus?☆

Cameron J. Bunker *, Michael E.W. Varnum

Arizona State University, USA

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ABSTRACT

In series of studies, we sought to assess the extent to which social media use was related to the false consensus effect. Study 1 ($N = 493$) and Study 2 ($N = 364$, preregistered) assessed the relationship between social media use and the false consensus effect for three psychological characteristics: political attitudes, personality traits, and fundamental social motives. Study 3 ($N = 875$) explored lay beliefs about the strength of the relationships between social media use and false consensus effects. Across studies, we found that heavier use of social media was associated with stronger false consensus effects. However, these effects were smaller in magnitude than lay beliefs about these linkages.

1. Introduction

Many have suggested that social media may give people an exaggerated sense that their beliefs and opinions are widely held. Indeed, some have suggested that social media platforms may serve as echo chambers: spaces where people primarily interact with others who share similar traits, beliefs, and other psychological characteristics (Bakshy et al., 2015; Jamieson & Cappella, 2008; Sunstein, 2009).[1] To the extent that this is the case, one would expect that heavier social media use will lead to a stronger tendency to overestimate how much others are like themselves—a bias called the "false consensus effect" (Ross et al., 1977). Lending support for this prediction, some studies suggest that heavier social media users may be more likely to project their political attitudes onto others compared to lighter users (e.g., Luzsa & Mayr, 2019). However, little research has examined whether heavier social media users show stronger false consensus effects for attributes other than political attitudes.

In the present work, we seek to assess the relationship between social media use and the false consensus effects across a broad range of traits and attributes including the Big Five personality traits and the Fundamental Social Motives. We also attempt to replicate prior work linking social media use to false consensus effects for political attitudes. Finally, we assess the extent to which lay theories hold that such linkages exist and compare people's estimates for the strength of these associations with our empirically derived estimates of their strength.

1.1. Literature review

The false consensus effect reflects an egocentric bias which causes people to overestimate how much others are like themselves (Ross et al., 1977). Prior research has shown that false consensus effects are reliable, tend to be moderate in size, and occur for various characteristics such as opinions, beliefs, and personality traits (Marks & Miller, 1987; Mullen et al., 1985). Potential explanations for the false consensus effects include 1) selective exposure (people typically associate with similar others and make social projections accordingly), 2) availability (a person's own characteristics are likely to come to mind more easily than characteristics of a dissimilar other), 3) resolution of ambiguity (many social contexts are ambiguous and people must rely on their own characteristics to evaluate others), and 4) motivation (people believe that their own characteristics are rational and appropriate; they are motivated to believe that others share these characteristics, for this justifies

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* Corresponding author.
E-mail address: cjbunker@asu.edu (C.J. Bunker).

[1] The label "echo chamber" has been associated with the related concept of "filter bubbles," which concern algorithms that expose people primarily to content that matches their own preferences (Bruns, 2019; Pariser, 2011). We note that both echo chambers and filter bubbles are contested ideas (see Bruns, 2019; Dubois & Blank, 2018).

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their own characteristics; Krueger, 1998).

Why might social media use amplify false consensus effects? Social media platforms provide and indeed steer users toward interacting with like-minded others, leading to segregated, ideologically homogenous networks (Bakshy et al., 2015; Conover et al., 2012; Del Vicario et al., 2016; Flaxman et al., 2016). In fact, a number of recent studies show that social media users tend to connect with others that are similar to themselves (Del Vicario et al., 2016; Quattrociocchi et al., 2016; Schmidt et al., 2017; Zollo et al., 2017). To the extent that people tend to take their own opinions or those of peers as a reference point for making judgments about the extent to which such views or tendencies are shared in the broader population (see Davis et al., 1986; Epley et al., 2004; Tversky & Kahneman, 1974), one might expect that the more one engages with social media, the more this would exacerbate the false consensus effect (e.g., Luzsa & Mayr, 2019; Wojcieszak, 2008). And indeed, prior work provides initial support for the proposal that false consensus effects occur more among heavier users of online platforms (Luzsa and Mayr, 2019; Wojcieszak, 2008, 2011).[2] However, prior work has largely focused on political attitudes. Thus, it is not clear whether the link between social media use and the false consensus effect might extend to different domains or attributes or may be limited to political beliefs.

In the present work, we assessed false consensus effects for the Big Five personality traits (Soto & John, 2017) as well as individual differences in people's motivational priorities using a measure of the Fundamental Social Motives (Kenrick et al., 2010; Neel et al., 2016), in addition to replicating prior work on political attitudes. Both sets of characteristics capture broad and important variation in individual psychology, and they are conceptually and empirically distinct from each other and from political attitudes. The Big Five organize variation in individual personality at a descriptive, domain-general level (John et al., 2008), whereas the Fundamental Social Motives concern individual differences in drivers of human behavior, namely goals, at a functional, domain-specific level (Cook et al., 2021). Thus, the present work assessed false consensus effects for personality, goals, and attitudes, three broad, distinct classes of psychological phenomena.

Another major limitation of prior work is that assessments of false consensus effects did not assess how *irrational* people are when projecting their characteristics onto others. The focus was on projections of self-endorsements onto others, or the difference between estimated and actual consensus, rather than the relationship between self-endorsements and the difference between estimated and actual consensus. That is, prior work in this area has operationalized false consensus as "simple projection" or "correlational accuracy" rather than the "truly false consensus effect" (TFCE, see Krueger & Clement, 1994, p. 597). Researchers should account for the *actual* characteristics of the population in question for a correct assessment of the accuracy of people's estimates of consensus, and they should account for people's self-endorsements of characteristics when assessing false consensus (see Krueger & Zeiger, 1993; see Supplemental Materials for analyses using other calculations of false consensus). Thus, in the present work, we assessed links between social media use and TFCE across a wide variety of attributes, namely political attitudes, the Big Five, and the Fundamental Social Motives. Finally, we also sought to address what lay beliefs are regarding social media use and the false consensus effect, and we compared these lay estimates to the effects sizes we observed empirically.

[2] We note that Luzsa and Mayr (2019) did not replicate this finding in a subsequent sample of social media users recruited through online student groups. They discussed potential reasons for why this finding didn't replicate: participants in the second sample were recruited during a general election and may have been more likely to avoid responses that would make them seem biased given the ongoing debate about echo chambers and misinformation at that time. Indeed, participants in this second sample that scored higher on social desirability also showed lower rates of false consensus for political attitudes.

1.2. Overview of the present research

The present research tested two research questions. Our first research question was: *Do heavier social media users show higher rates of false consensus effects (RQ1)?* We examined whether heavier social media users showed higher rates of false consensus effects for three characteristics: The Big Five, political attitudes, and fundamental social motivations. We hypothesized that participants would show false consensus effects for the Big Five (Studies 1 and 2) and political attitudes and that social media use would positively predict false consensus effects for both characteristics (Study 2). We further explored false consensus effects for Fundamental Social Motives and whether social media use would predict false consensus effects for these characteristics as well (Study 2). We initially tested these links in a student sample (Study 1) and replicated the effects in a broader non-student sample (Study 2, preregistered). We then conducted a mini-metanalysis to estimate effect sizes across these samples and used equivalence testing to assess whether observed effects were different from null relationships.

Our second research question was: *To what extent does the relationship between social media and false consensus effects fit with the general public's ideas regarding social media and such echo chamber effects (RQ2)?* We explored lay beliefs regarding the relationship between social media use and false consensus effects for all three characteristics (Study 3). Data for all studies are freely available at https://osf.io/egrma/?view_only=c5c684fa5e574c25bd83ff10c943361.

2. Study 1

2.1. Method

2.1.1. Participants

Four hundred ninety-three undergraduate students took part in the study for course credit. Thirty-seven participants in this sample were removed from the following analyses due to incorrect responses to an attention check item leaving a final $N = 456$ (61.8% women, 38.2% men; $M_{age} = 18.99$; $SD_{age} = 2.44$; 66.2% White/Caucasian, 19.5% Latino/Latina, 18.0% Asian/Asian American, 4.8% Black/African American, 4.4% Middle Eastern, 2.4% American Indian, 1.8% specified another ethnicity). In the final sample, 5.3% identified as working class, 11.4% lower-middle class, 43.0% middle class, 34.9% upper-middle class, 3.9% upper class, and 1.6% did not specify one of these five categories.

2.1.2. Materials

2.1.2.1. Truly false consensus effects. We obtained responses needed to compute TFCEs for the Big Five by using 10 items from the Big Five Inventory-2 Extra Short Form (Soto & John, 2017). Example items include "Is original, comes up with new ideas" (Openness) and "Is reliable, can always be counted on" (Conscientiousness). Following the standard procedure for assessing TFCEs (see Krueger & Clement, 1994), we modified the original response scales for each item as follows. First, participants responded either *yes* or *no* to indicate whether the item applied to themselves. Second, they estimated what percentage of other students would endorse the item (i.e., estimate what percentage of other students would respond *yes*, indicating that the item applied to themselves) on a 100-point scale (*0%–100%*).

We then computed a variable indicating participants' TFCEs for the Big Five personality traits. For this variable, we first computed the actual consensus of item endorsements (i.e., the percentage of participants who endorsed an item) and subtracted this percentage from each participant's estimated percentage of others' endorsements for each item.

These difference scores reflected how much the participants over or underestimated others' endorsements for each item. Then, we obtained TFCEs by saving the correlation between the difference scores and self-endorsements as a variable for each participant (i.e., a variable for each participant reflecting their TFCE for personality traits). Participant responses showing higher correlations between overestimation of other's endorsement of the items and their endorsement of the items indicated higher rates of TFCEs.

2.1.2.2. Social media use. We measured social media use with a widely used item from Ellison et al. (2007): "In the past week, on average, approximately how much time per day do you spend on social media?" We modified the original 6-point response scale for a wider range of possible time spent (1 = *less than 10 min* to 6 = *more than 5 h*) to reflect increases in time spent on social media compared to when this item was created ($M = 3.51$; $SD = 1.23$). We choose this item given that it is part of the most widely used instrument to assess the extent that people engage with social media (see Sigerson & Cheng, 2018 for a review).

2.1.3. Procedure

Participants took part in the study online via Qualtrics survey software. After the survey, participants were debriefed of the research, thanked for their participation, and received credit (for the full text of all materials, see https://osf.io/egrma/?view_only=c5c684fa5e574c25bd83ff10c943361).

2.2. Results

We first computed TFCEs for personality traits by examining the average of the participants' TFCEs for personality traits. The average TFCE was moderate in size ($r = 0.30$), suggesting that people show false consensus bias for personality traits, consistent with prior research. Next, we examined and found that the relationship between social media use and TFCEs for personality was small in effect size (r (451) = 0.10, 95% CI [0.01, 0.19]; $p = .041$). This correlation remained when controlling for the effects of age, gender, and socioeconomic status (r (438) = 0.10, 95% CI [0.01, 0.19]; $p = .041$).[3] We report additional analyses with other operationalizations of false consensus effects (e.g., simple projection: correlations between participants' endorsements and their estimates of others) in the Supplementary Materials.

Given the small effect size in the relationship between social media use and TFCEs for personality traits, it is informative to know whether this effect is meaningfully different from an absence of an effect. To address this question, we used a type of equivalence testing known as the "two one-sided test" (TOST; see Lakens, 2017; Lakens et al., 2018). To conduct the TOST procedure, researchers specify upper and lower equivalence bounds based on the smallest effect size of interest. If the observed effect in question falls within the equivalence bounds, the observed effect is considered statistically equivalent to zero. Following recommendations by Simonsohn (2015), we specified the effect size for the equivalence bounds according to the smallest effect our sample could detect with 33% power: $r = |0.10|$, which also represents a small effect size per conventional standards (see Cohen, 1988). The TOST revealed that the correlation between social media use and TFCEs on the Big Five was not statistically equivalent to zero ($p = .500$). Further, these tests suggested a non-zero effect when controlling for the effects of age, gender, and socioeconomic status ($p = .500$). These results suggest that the relationship between social media use and TFCEs for personality traits is small but robust and meaningfully different from the absence of an effect.

[3] We also tested and found that the relationship between social media use and TFCEs did not vary by European-American versus non-European American ethnicity (see Supplemental Materials).

3. Study 2

Study 1 found support for a link between social media use and false consensus effects for personality traits. In Study 2, we attempted to replicate this finding using a non-student sample and with the addition of measures of political attitudes and motivational priorities. The hypotheses, study design, and analysis plan were preregistered before data collection (see https://osf.io/6grkm?view_only=c5c684fa5e574c25bd83ff10c943361). Our key predictions were that we would observe false consensus effects for the Big Five and for political attitudes and that the strength of these effects would be positively correlated with social media usage. As exploratory analyses, we also assessed false consensus effects for the Fundamental Social Motives and their association with social media use.

3.1. Method

3.1.1. Participants

Three hundred sixty-four participants recruited from Prolific Academic took part in the study for $1.30. Nineteen participants in this sample were removed from the following analyses due to incorrect responses to an attention check item, leaving a final $N = 345$ (42.3% women, 55.7% men, 2.0% other/did not specify their gender; $M_{age} = 26.57$; $SD_{age} = 8.92$; 86.7% White/Caucasian, 6.1% Latino/Latina, 2.6% Asian/Asian American, 1.7% Black/African American, 1.7% Middle Eastern, 2.0% Indian/South Asian, 1.2% specified another ethnicity). In the final sample, 18.8% identified as working class, 25.5% lower-middle class, 44.3% middle class, 8.7% upper-middle class, 0.9% upper class, and 1.7% did not specify one of these five categories.

3.1.2. Materials

We assessed TFCEs in the same manner as Study 1. In addition to the personality traits items, we assessed TFCEs for political attitudes and Fundamental Social Motives. For political attitudes, we used 10 items (e.g., legalized euthanasia, protection of the environment over economic growth, social welfare programs) used in prior research on false consensus effects (i.e., Bauman & Geher, 2002; Luzsa & Mayr, 2019). To assess Fundamental Social Motivations (Self-Protection, Disease Avoidance, Affiliation: Group, Affiliation: Exclusion Concern, Affiliation: Independence, Status, Mate Seeking, Kincare: Family), we used 24 items from the Fundamental Social Motives Inventory (Neel et al., 2016). Sample items included "I like being part of a team" (Affiliation: Group) and "I am interested in finding a new romantic/sexual partner" (Mate-Seeking). These motives are theorized to reflect basic, overarching categories of goals related to recurrent adaptive challenges such as avoiding threats, acquiring resources, and caring for offspring (Kenrick et al., 2010; Neel et al., 2016), and they are distinct from political ideology and the Big Five. Participants in Study 2 estimated the endorsements of other Prolific Academic workers. Participants also reported their social media use using the same item as in Study 1 ($M = 3.56$; $SD = 1.31$).

3.1.3. Procedure

Participants took part in the study online via Qualtrics survey software. After the survey, participants were debriefed of the research, thanked for their participation, and compensated for their time (for the full text of all materials, see https://osf.io/egrma/?view_only=c5c684fa5e574c25bd83ff10c943361).

3.2. Results

We first examined whether TFCEs appeared for each of the three characteristics (see descriptives in Table 1). Average TFCEs across the three characteristics were small in effect size, suggesting that people also show false consensus bias for fundamental social motives in addition to political attitudes and personality traits.

Table 1
Descriptives for false consensus effects and correlations with social media use (study 2).

	True false consensus for political attitudes	True false consensus for the big five	True false consensus for fundamental social motives
M of effects	0.27	0.20	0.24
SD of effects	0.45	0.45	0.33
Correlation with social media use	0.11* [.00, .21]	0.17** [.06, .27]	0.12* [01, .22]
Correlation with social media use controlling for the effects of age, gender, and socioeconomic status	0.09 [-.02, .20]	0.18** [.07, .28]	0.10† [-.01, .21]

Note. $N = 345$. † = $p < .10$; * = $p < .05$; ** = $p < .01$. Brackets denote bounds for the 95% confidence interval.

To test whether social media use was associated with false consensus effects for the Big Five, political attitudes, and fundamental social motives, we observed the bivariate correlations between them (see Table 1). The relationships between social media use and TFCEs were small in effect sizes for each of the three characteristics: political attitudes (r (334) = 0.11 [0.00, 0.21], $p = .045$), Big Five (r (339) = 0.17, 95% CI [0.06, 0.27], $p = .001$), and Fundamental Social Motives (r (340) = 0.12, 95% CI [01, 0.22], $p = .026$ (see Fig. 1). Following Simonsohn's (2015) criteria, we specified equivalence bounds to reflect an absolute effect size of $r = 0.11$ to conduct TOSTs. The TOSTs revealed that these correlations were not statistically equivalent to zero: political attitudes ($p = .500$), Big Five ($p = .870$), Fundamental Social Motives ($p = .573$).

Notably, the correlations between social media use and TFCEs were similar in effect size even after controlling for the effects of age, gender, and socioeconomic status for all three sets of characteristics: political attitudes (r (321) = 0.09, 95% CI [-0.02, 0.20], $p = .100$), Big Five (r (321) = 0.18, 95% CI [0.07, 0.28] $p = .002$), and Fundamental Social Motives (r (321) = 0.10, 95% CI [-0.01, 0.21], $p = .082$).[4] TOSTs revealed that these correlations were not statistically equivalent to zero: political attitudes ($p = .294$), Big Five ($p = .864$), Fundamental Social Motives ($p = .359$). Taken together, these results suggest small but meaningful relationships between social media use and TFCEs across a wide range of individual attributes and characteristics.

4. Mini-metanalysis

We conducted a mini-metanalysis of effect sizes observed in Studies 1 and 2 following mini-metanalysis guidelines from Goh et al. (2016). Goh and colleagues advocate for mini-metanalysis as standard practice even in the case of calculating effects across two studies. First, the overall effect size computed from the mini-metanalysis leads to greater reliability and replicability of observed findings. Second, this practice offers greater transparency as researchers can report insignificant findings that may be subject to publication bias and still be able to argue that an effect is indeed present across studies. Third, overall effect sizes reported in mini-metanalysis allow future researchers to more precisely determine required sample sizes for conducting replications or addressing similar research questions.

The mean weighted effect size for the relationship between social media use and TFCEs for the Big Five was small but statistically significant ($r = .13$, 95% CI [0.06, 0.20], $p < .001$). Further this effect held when simultaneously controlling for age, gender, and socioeconomic status ($r = 0.13$, 95% CI [0.06, 0.21], $p < .001$). Next, we conducted a TOST to assess whether this effect was statistically equivalent to zero using equivalence bounds of $r = -0.10$ and $r = 0.10$. TOST revealed that this effect was not statistically equivalent to zero ($p = .960$), nor was it equivalent to zero when controlling for demographic characteristics ($p = .960$). Taken together, these results suggest a small but robust relationship between social media use and false consensus effects for the Big Five.

Next, we computed the mean weighted effect size across the relationships between social media use and TFCEs for the Big Five in Study 1 and all three characteristics in Study 2 ($r = 0.12$, 95% CI [0.07, 0.18], $p < .001$). This effect was not statistically equivalent to zero ($p = .952$) and was robust when controlling for the effects of age, gender, and socioeconomic status ($r = 0.12$, 95% CI [0.06, 0.17], $p < .001$; TOST, $p = .841$). Taken together, these results suggest small but meaningful and robust associations between social media use and the strength of the false consensus effect.

5. Study 3

Studies 1 and 2 suggest small, but reliable and robust links between individual differences in social media use and the strength of false consensus effects. To what extent do these results fit with the general public's ideas regarding social media and such echo chamber effects? To address this question, in Study 3 we assessed lay beliefs about the relationship between social media use and false consensus effects and we compared these with effect sizes observed in Studies 1 and 2.

5.1. Method

5.1.1. Participants

Eight hundred seventy-five undergraduate students took part in the study for course credit. Seventy-one participants were removed from the following analyses due to incorrect responses on any of the three comprehension check questions (e.g., "Which of the following correlations represents a negative relationship between two variables?"), leaving a final $N = 804$ (60.8% women, 38.7% men, 0.5% other/did not specify their gender; $M_{age} = 19.38$; $SD_{age} = 2.66$; 61.7% White/Caucasian, 23.0% Latino/Latina, 20.6% Asian/Asian American, 5.1% Black/African American, 4.9%% Middle Eastern, 2.1% American Indian, 1.9% specified another ethnicity). Of the final sample, 6.2% identified as working class, 14.3% lower-middle class, 41.7% middle class, 31.5% upper-middle class, 4.9% upper class, and 1.4% did not specify one of the five categories. Participants reported their social media use on the same item used in Studies 1 and 2 ($M = 4.26$, $SD = 1.30$).

5.1.2. Materials

We assessed lay theories of the relationship between social media use and false consensus effects using a procedure adapted from Varnum (2013). Participants were asked to indicate the size of the correlations between social media use and false consensus effects using a slider (−1 to 1). The initial position of the sliders was zero. As participants may have been unfamiliar with the false consensus effect, we defined it in the instructions using a definition adapted from Wikipedia to ensure accessibility (for the full text of instructions, see https://osf.io/egrma/?view_only=c5c684fa5e574c25bd83ff10c943361).

Participants reported a correlation representing the relationship between social media use and false consensus effects for each of the three characteristics. Although personality traits and political attitudes are accessible terms reflected in everyday language, the Fundamental Social Motives may have been unfamiliar to participants. Thus, we provided specific examples (e.g., seeking romantic partners, protecting oneself from danger) for participants to indicate the size of the correlation they believed exists between social media use and false consensus effects for the Fundamental Social Motives.

[4] As in Study 1, the relationship between social media use and TFCEs did not vary by European-American versus non-European American ethnicity in Study 2 (see Supplemental Materials for detailed results).

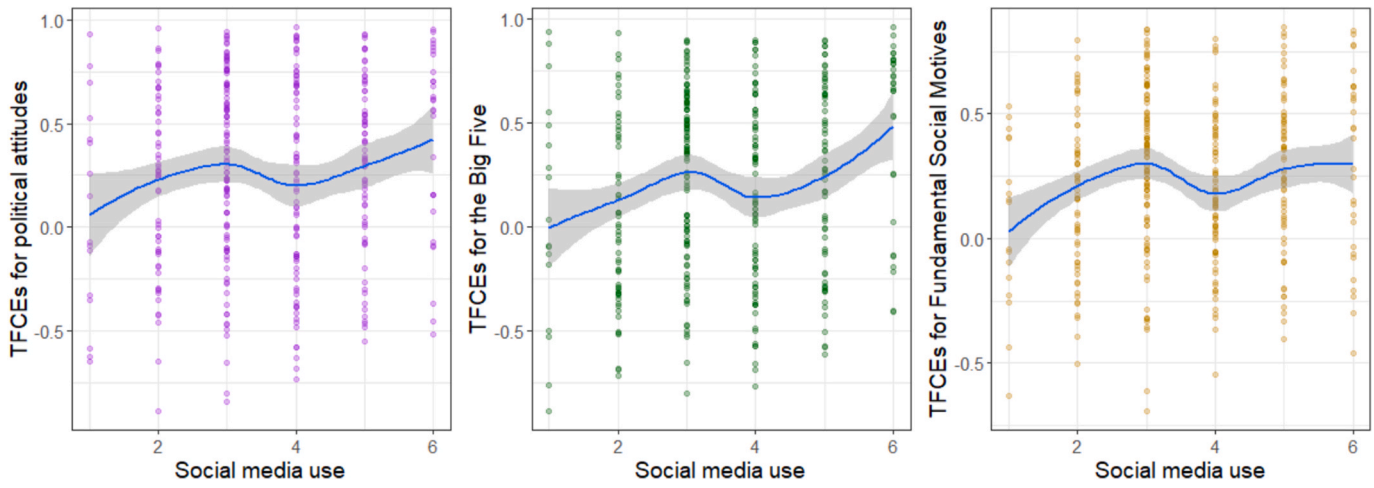

Fig. 1. High-density scatter plots of the relationship between social media use and true false consensus effects (TFCEs) in study 2 (N = 345).

5.1.3. Procedure

Participants took part in the study online via Qualtrics survey software. After the survey, participants were debriefed of the research, thanked for their participation, and received course credit (for the full text of all materials, see https://osf.io/egrma/?view_only=c5c684fa5e574c25bd83ff10c943361).

5.2. Results

Across domains participants estimated a positive correlation between social media use and false consensus effects (across domains: $M = 0.39$, $SD = 0.35$; political attitudes: $M = 0.44$, $SD = 0.45$; Big Five: $M = 0.35$, $SD = 0.44$; Fundamental Social Motives: $M = 0.38$, $SD = 0.39$). Notably, neither social media use, age, gender, ethnicity (European-American versus non-European American), nor socioeconomic status was associated participants' beliefs regarding the linkages between social media use and false consensus effects (*r*s ranged from −0.06 to 0.00, *p*s ranged from 0.085 to 0.971), suggesting consistency in such lay beliefs across demographic categories.

Next, we tested whether participants' lay beliefs regarding social media use and false consensus effects were statistically different than the relationships observed in Studies 1 and 2. Detailed results for can be found in Table S3 of the Supplementary Materials. Across characteristics, participants overestimated the relationship between social media use and false consensus effects ($r_{\text{mean lay belief}} = .39$) compared to the observed weighted mean effect size across Studies 1 and 2 ($r_{\text{mean observed}} = 0.12$, $Z = 8.24$, $p < .001$, $Q = 0.29$). Indeed, lay people estimated such effects were more than three times larger than the actual relationships observed. The same pattern was evident when comparing lay beliefs to the observed findings by characteristic: Political attitudes ($r_{\text{lay belief}} = 0.44$, $r_{\text{observed Study 2}} = 0.11$, $Z = 10.24$, $p < .001$, $Q = 0.36$); Big Five ($r_{\text{lay belief}} = 0.35$, $r_{\text{observed Studies 1 and 2}} = 0.13$, $Z = 6.64$, $p < .001$, $Q = 0.23$); Fundamental Social Motives ($r_{\text{lay belief}} = 0.38$, $r_{\text{observed Study 2}} = 0.12$, $Z = 7.91$, $p < .001$, $Q = 0.28$).

6. General discussion

6.1. Summary of findings and implications

In the present research, we found that people who report heavier social media use show significantly stronger false consensus effects for a diverse set of psychological characteristics: political attitudes (Study 2), personality traits (Studies 1 and 2), and fundamental motives (Study 2). The meta-analysis, equivalence testing, and analyses controlling for demographic variables suggest these effects, though small, are reliable and robust. Interestingly, our work suggests that although the public has an accurate impression of the direction of these effects, lay people tend to overestimate their magnitude (Study 3).

We highlight three implications of the present research. First, the present findings conceptually replicate prior research linking social media use with the false consensus effects and suggest such linkages are present in domains beyond political attitudes. Early studies by Wojcieszak (2008; 2011) found that people in homogenous online groups (e.g., neo-Nazis and environmentalists) were likely to overestimate the percentage of the public that shared their political views. In a broader sample, Luzsa and Mayr (2019) found that heavier social media use is linked to projecting one's own political attitudes onto others. The present findings demonstrate that social media use is linked to overestimating the extent to which a wide variety of characteristics in individual psychology are shared by others. It is noteworthy that the links between social media use and such effects were not stronger for political attitudes than for the Big Five or Fundamental Social Motives. This finding is somewhat surprising given public discourse on how social media may polarize political views and our finding in Study 3 that lay beliefs regarding this link appeared strongest.

Second, taken together with recent work which suggests that researchers have overestimated the extent of ideological segregation on social media (e.g., Barberá et al., 2015; Dubois & Blank, 2018), one implication of the small associations observed in the present work (and the discrepancies between those associations and lay perceptions of them) is that social media may not be as strong of an echo chamber as many have feared. Given prior findings linking homogeneity of political attitudes and detrimental outcomes like societal polarization and the spread of misinformation (Del Vicario et al., 2016; Williams et al., 2015), concerns regarding online echo chambers are understandable. However, the present work is broadly consistent with recent critiques of the "social media as echo chamber" concept (e.g., Bruns, 2019; Dubois & Blank, 2018). In a similar vein, prior work has noted that researchers may have overlooked how much offline social interaction or other traditional media foster echo chambers (Guess et al., 2018). The discrepancies between the actual and lay perceptions of the relationships observed in present research further suggest that lay people may overlook this possibility as well.

Third, the present findings may have implications for our understanding of the mechanisms that lead to the false consensus effect. Marks and Miller (1987) have suggested that *selective exposure* is the primary cause of the irrational projection of one's traits onto others. However, Krueger (1998) review found little support for this view. In line with Krueger (1998) findings, the small association between social media use and false consensus observed in the present research suggests that selective exposure (which social media is presumed to amplify) is not likely the primary driver of the false consensus effect. In this light,

researchers may use social media as a context to study the false consensus effect or other projection effects and to evaluate potential explanations for them.

6.2. Limitations and future directions

Given the correlational nature of the present work, we cannot draw strong causal inferences, nor can we make strong claims regarding the direction of links between social media usage and false consensus effects. Although social media use may lead to higher rates of false consensus effects, the reverse is also possible. Indeed, some prior research has found that motivations for false consensus bias reflect a need to seek support for one's behavior (Sherman et al., 1984). Thus, people who show stronger false consensus effects might spend more time on social media seeking out evidence to support their beliefs or interacting with those who share them. To address these possibilities, future research might examine the relationship between social media use and false consensus using longitudinal or experimental designs.

Given that social media use in the present work was self-reported, the present findings may also be susceptible to biases common to self-report instruments (e.g., social desirability, lack of self-knowledge; Paulhus & Vazire, 2007). Prior research has shown that people may over or underestimate their internet use—although peoples' estimates of their social media use tend to be more accurate than internet use in general (Scharkow, 2016). That said, there is some reason to believe such self-reports may be reasonably veridical, as subjective measures of time spent using smartphones—the primary device for social media use—have also been found to correlate moderately with objective measures (Andrews et al., 2015; Parry et al., 2021). Future research might seek to confirm the effects observed in our work with harder markers of social media use (e.g., data from users' smartphones).

One potential limitation of Study 3 is that the slider procedure for estimating correlations might bias participants towards overestimation. For example, with the initial position placed at zero, it might suggest to participants that all correlation values are equally likely, when in fact, generally speaking, correlations are more likely to be small than large. This could potentially increase the chance of overestimation. However, results from two previous sets of studies exploring lay beliefs about psychology suggest this is not the case. In a previous set of studies concerned with lay perceptions of links between social class and various psychological and behavioral tendencies (Varnum, 2013), from which the slider procedure was adapted, the average absolute value of estimated correlations was small ($r = 0.20$), and several estimated correlations had an absolute value of $r < 0.10$. In another set of studies assessing lay beliefs regarding gender, sexual behavior, and self-esteem using this slider method (Krems et al., 2021) the average absolute value of estimated correlations was similarly small ($r = 0.20$), and several estimated correlations had an absolute value of $r < 0.10$ as well. Taken together, these findings suggest that this method does not necessarily bias participants toward overestimating psychological correlations. In fact, these average lay estimated effect sizes are nearly identical to a recent empirical estimate of the average effect size in social psychology based on over 12,000 correlation coefficients found in 134 meta-analyses ($r = 0.21$; Lovakov & Agadullina, 2021). That said, it might be worthwhile for future researchers interested in lay beliefs regarding the consequences of social media use to assess these beliefs using other approaches as well.

It is also worth noting that we assessed overall social media usage, rather than platform-specific usage. Given that certain core elements appear in most social media (e.g., profiles and streams of user-generated content; Bayer, Triệu, & Ellison, 2020), the advantage of assessing social media use broadly is that the findings are less likely to be biased towards certain platforms. However, the relationship between social media use and false consensus may vary depending on what platform is specified. Social media platforms vary in affordances, norms, and practices, as well as algorithms that could be relevant to false consensus and other echo chamber effects. For example, the presence of echo chambers has shown to be more evident on Facebook than Reddit, which vary on how much users have control over their feeds (Cinelli et al., 2021). Such comparisons invite future research to investigate whether the relationships between social media use and false consensus vary by usage, affordances, and features of different platforms.

The present work also did not directly assess the extent to which participants had echo chamber experiences in their use of social media. Although prior work strongly suggests that such experiences are common on most major social media platforms, nonetheless future research might assess this directly along with other potential mechanisms to unpackage why social media use is linked to stronger false consensus effects.

Finally, this work is limited by the fact that it was conducted with largely European-American samples. Given prior work suggesting a broad range of psychological variation as a function of culture (i.e., Henrich et al., 2010; Varnum et al., 2010) it would be worthwhile to attempt to replicate the present work in other societies. That said, in the present work, we did obtain comparable results in both student and non-student samples, and the key effects did hold when controlling for demographic factors including ethnicity. Further, similar effects were observed for European Americans and ethnic minorities. Thus, there may be some reason to suspect such linkage might be present outside of the United States as well, but conclusions regarding generalizability beyond the United States cannot be made at present.

7. Conclusion

The present findings suggest that heavier social media users exhibit higher rates of false consensus effects across a range of psychological characteristics, broadly consistent with the "echo chamber" view of social media. However, these relationships were small by conventional standards and weaker than assumed by the general public. To better understand the strength of this effect, future work might assess the strength of effects of social media usage vs. other offline behavioral tendencies, situational factors, and individual differences on susceptibility to false consensus effects.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.chb.2021.106947.

Credit author statement

Cameron J. Bunker: Conceptualization, Methodology, Data curation, Formal analysis, Writing – original draft, Writing – review & editing. Michael E.W.Varnum: Conceptualization, Methodology, Writing – original draft, Writing – review & editing.

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