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"Many others are doing it, so why shouldn't I?": How being in larger competitions leads to more cheating

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ABSTRACT

In many spheres of life, from applying for a job to participating in an athletic contest to vying for a date, we face competition. Does the size of the competition pool affect our propensity to behave unethically in our pursuit of the prize? We propose that it does. Across four studies, we found that a larger (vs. smaller) number of competitors led participants to cheat more in a performance task to earn undeserved money. We also explored the psychological mechanisms of competition pool size to explain why and how being in a larger competition pool increases cheating. Our findings reveal a serial mediation pathway whereby having a larger number of competitors increases expectations of the absolute number of cheaters in the competition group, which heightens perceptions that cheating is an acceptable social norm, which leads to more cheating. We also examined and ruled out various alternative psychological mechanisms for this effect. We discuss the theoretical and practical implications of our finding that being in a large group of competitors can increase people's propensity to cheat for personal gain.

1. Introduction

In many aspects of our professional and personal lives, we are put into competitive situations—those where the presence of others affects our own outcomes. From winning a prestigious award and getting into an elite university, to securing an interview for a desired job and gaining a coveted promotion, success often depends on the number of people vying for the same reward. In competitive situations, the size of the competition field can vary widely, from a small number of individuals (e.g., making an offer on a house) to hundreds of individuals (e.g., college admissions). Notably, the desire to succeed in competitive contexts can sometimes drive people to cheat. News stories, such as the recent college-admissions scandal involving wealthy parents who offered bribes to get their offspring into prestigious universities (Greenspan, 2020), and magazine articles, such as a recent piece describing how students feel pressure to cheat because they expect numerous peers to cheat (Appiah, 2020), suggest that cheating is common in competition pools and needs to be better understood. Given how frequently we encounter competitors throughout life, the current research seeks to understand whether having knowledge of the number of competitors can affect our propensity to behave unethically.

It has been well established that various competitive factors, such as the state of being in a competition (e.g., Hegarty & Sims, 1978; Pierce, Kilduff, Galinsky, & Sivanathan, 2013), the individual attributes of competitors (e.g., Vriend, Jordan, & Janssen, 2016), or the relational attributes between competitors (e.g., Kilduff, Galinsky, Gallo, & Reade, 2016; Yip, Schweitzer, & Nurmohamed, 2018), can influence unethical behavior. However, competition pool size is a simple yet important contextual characteristic of competitions that, to date, has been neglected in the behavioral ethics and management literatures (see Swab & Johnson, 2019 for a review). This is surprising, given that the number of competitors is often common knowledge and is an early consideration of participants in competitive contexts (Garcia & Tor, 2009). Past research has examined the effect of the number of competitors on a variety of competitive tendencies and behaviors, such as competitive motivations and performance (Garcia & Tor, 2009; Vandegrift & Duke, 2015; Vandegrift & Holaday, 2012), competition entry choices (Boudreau, Lacetera, & Lakhani, 2011), productivity (Certo, Sirmon, & Brymer, 2010), effort (Orrison, Schotter, & Weigelt, 2004), and sabotage levels (Harbring & Irlenbusch, 2008). However, much of this research has focused on competitive behaviors in contexts that lack opportunities for dishonesty; as a result, the relationship between the

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number of competitors and individual dishonesty has yet to be directly examined in the competition literature.

In this paper, we explore the relationship between the number of competitors and cheating behavior, and investigate the psychological mechanisms explaining this effect. Across four studies, we demonstrate that individuals belonging to larger competition pools are more likely than those in smaller pools to cheat to gain a monetary bonus in a competitive performance task. We propose that this is in part due to people's expectations of a higher absolute number of cheaters in their group (which may act as a proxy for how prevalent they perceive cheating to be), which in turn strengthens people's perceptions of cheating as socially acceptable behavior. We also test and rule out a number of alternative psychological mechanisms for this effect.

In examining the effects of competition pool size on individual unethical behavior, we seek to advance literature in several ways. First, we make a contribution to the behavioral ethics and competition literatures by investigating an important but as yet unexamined link; we show that the number of competitors may influence not only competitive motives (e.g., Boudreau, Lakhani, & Menietti, 2016; Boudreau et al., 2011; Garcia & Tor, 2009; Vandegrift & Duke, 2015; Vandegrift & Holaday, 2012), but also dishonest behavior. Second, we offer insights into the psychological processes explaining why and how competition pool size affects unethical behavior. Third, we extend prior work on competition group size, which has largely focused on behaviors in contexts where cheating was not possible—or, at least, where cheating was not an accessible course of action for all participants (e.g., Garcia & Tor, 2009). Thus, our research demonstrates that in contexts where there is an opportunity (compared with no opportunity) to cheat, the psychology of the situation is distinct. Lastly, our work provides further support for the role of social contexts in predicting ethical behavior (Gino, Ayal, & Ariely, 2009; Kouchaki, Gino, & Feldman, 2019; Kouchaki & Kray, 2018; Moore & Gino, 2013).

2. Competition group size and unethical behavior

2.1. Larger competition groups and social norm effects

In competitive contexts—those in which the outcome for each competitor is negatively correlated with those of other competitors (Beersma et al., 2003; Deutsch, 1949; Garcia & Tor, 2009)—the main objective is to win by achieving a superior outcome relative to others. Because the probability of whether one wins a competition depends on how many competitors one has and how well other competitors perform, participants inherently pay attention to both the quantity of competitors and the actions of their competitors in competitive settings (Deutsch, 1949; Festinger, 1954; Garcia & Tor, 2009; Graf, König, Enders, & Hungenberg, 2012; Solnick & Hemenway, 1998). Past work has suggested that competitive, as compared with non-competitive, contexts draw attention to how other competitors can threaten one's self-interest (e.g., Batson & Moran, 1999; Kelley & Stahelski, 1970a,b), such as by thinking about others' possible use of cheating to win (e.g., Pierce et al., 2013). Pierce et al. (2013) propose that people in competitive contexts are more likely than those in cooperative contexts to think of how a competitor's actions could threaten their own outcomes, such as by anticipating their counterparts' potential to act dishonestly. This anticipation in turn increases their own unethical behavior as a means of protecting their self-interest from the potential cheating of others. Taken together, these ideas suggest that competitive contexts focus people's attention on both the quantity of their competitors and their competitors' possible unethical actions because competitive contexts encourage considerations of how the presence and actions of others could threaten oneself.

Hence, being in a larger (vs. smaller) competition pool could increase cheating by influencing one's expectations of others' cheating. Specifically, considering how many competitors in one's competition pool might cheat to win can be a proxy for whether people are thinking of the extent that cheating is happening. In other words, expectations of the number of people who cheat can, by extension, indicate how common people may perceive cheating to be. When people think about others in the competition group who will likely cheat, the expected number of cheaters is likely bound to be higher in larger (vs. smaller) competition groups due to a higher quantity of total competitors, even if the probability of cheating remains similar across different competition pool sizes. Expectations of a higher absolute number of cheaters in larger, as compared with smaller, groups may convey a stronger perception that cheating is more common. For instance, 20 expected cheaters among 100 competitors appears more numerous and conveys a greater perception that cheating is common than 4 expected cheaters among 10 competitors (because 20 cheaters is 16 more cheaters than 4 cheaters), a phenomenon known as the *ratio bias* (Denes-Raj & Epstein, 1994; Kirkpatrick & Epstein, 1992; Yamagishi, 1997).

In many judgment and decision-making situations involving probabilities of winning and losing (which includes competitive contexts), people tend to focus more on the numerator of a ratio (the number affected) than on the denominator (the number at risk). This is because the denominator is more confusing, as it captures both the number affected and unaffected (Passerini, Macchi, & Bagassi, 2012; Reyna & Brainerd, 2008). According to cognitive-experiential self-theory (Epstein, 1998)—a dual-processing theory that distinguishes between the rational processing system and the experiential processing system—the ratio bias exists because of people's reliance on the experiential system. People prefer to focus on numerators—which are small and involve a single number—rather than on relations between numbers because they are easier to visualize and understand (Pacini & Epstein, 1999). Indeed, past studies have found that when people are presented with a choice between a 1-in-10 or a 10-in-100 chance of winning, they are more likely to choose the 10-in-100 option with the larger numerator for winning, even if both ratios are proportionally the same (Denes-Raj & Epstein, 1994; Kirkpatrick & Epstein, 1992; Pacini & Epstein, 1999). In fact, people will consistently choose a 7-in-100 chance of winning over 1-in-10 chance of winning, even if the odds of winning are actually lower in the former option, simply because seven chances of winning appears more numerous (and thus appears more favorable) than one chance of winning (e.g., Kirkpatrick and Epstein, 1992).

In turn, because people who are susceptible to the ratio bias place greater weight on absolute numbers than on ratios, expectations of a higher absolute number of cheaters in larger- competition-groups—due to a higher quantity of total competitors—may make people conclude that cheating is more common. This, in turn, can increase perceptions that cheating is socially acceptable behavior. According to Cialdini, Reno, and Kallgren (1990), social norms can be distinguished between descriptive norms that inform people about what is being done and injunctive (also known as prescriptive) norms that inform people about what is socially approved or accepted. In larger (vs. smaller) competition pools, stronger perceptions that cheating is acceptable may be a consequence of perceptions of more numerous cheaters. Indeed, Morris, Hong, Chiu, and Liu (2015) theorize that there are three distinct steps regarding behavioral perceptions and actual behavior: (1) perceptions of a behavior as prevalent leads to (2) ideas of this behavior being socially approved, which in turn leads to (3) intentions to engage in this behavior. These steps echo David Hume's famous *is-ought to* problem, such that what ought to be is often inferred from what is.

Past empirical studies have demonstrated that people perceive socially undesirable behavior less harshly when the behavior is perceived as more prevalent (e.g., Chui & Grieder, 2020; McGraw, 1985; Trafimow, Reeder, & Bilsing, 2001; Welch et al., 2005). Studies have also shown that people can make explicit inferences from what they perceive to be common behaviors to whether they perceive these behaviors to be appropriate (e.g., Eriksson, Strimling, & Coultas, 2015). As a result, we aim to test whether competition group size affects perceptions of the prevalence of cheating (measured as expectations of the absolute number of competitors who will cheat), which in turn increases people's

approval of cheating on the competitive task.

Being in a larger competition group may thus increase cheating behavior via stronger perceptions that cheating is acceptable. Because injunctive norms convey to people what is socially approved and acceptable in the reference group, they are widely known to affect behavior (see Morris et al., 2015, for a review). Indeed, peer influence via injunctive norms has been found to predict a variety of anti-environmental, antisocial behaviors, and unethical behaviors, such as littering, vandalism (Cialdini et al., 1990; Reno, Cialdini, & Kallgren, 1993), and dishonesty (Gino, Gu, & Zhong, 2009). Specifically, Gino et al. (2009) found that when people think that a particular unethical behavior is normative and prevalent in their group, they are more likely to follow suit.

In summary, given that being in larger (vs. smaller) competition pools would increase expectations of there being more numerous cheaters (due to there being a higher quantity of total competitors), this would lead to increased perceptions that cheating is socially approved, which in turn would lead to more cheating behavior. Thus, we predicted:

Hypothesis 1. *Individuals in larger (vs. smaller) competition pools will be more likely to cheat to earn more undeserved money.*

Hypothesis 2. *The relationship between being in a larger competition pool and cheating will be serially mediated by expectations of a higher absolute number of cheaters, leading to increased perceptions that cheating is acceptable.*

2.2. Larger competition groups and deindividuation effects

While perceived social norms can be a relevant outcome of competition group size that affect people's tendency to cheat, perceptions of the likelihood of being caught cheating are another outcome of being in larger competition groups that could increase cheating. Being in a larger competition group can strengthen perceptions of the likelihood that cheating will be undetected. Early research on groups proposed that being in large groups can have deindividuating effects (Diener, Lusk, DeFour, & Flax, 1980; Festinger, 1954; Zimbardo, 1969), leading people to commit behaviors viewed as antinormative by society, such as administering electric shocks to a stranger (see Postmes & Spears, 1998, for a *meta*-analytical review). Similarly, related research on the bystander effect has consistently demonstrated that as the actual number of bystanders in a group increases, people are less likely to help a person in need or to be charitable (Darley & Latané, 1968; see Fischer et al., 2011, for a review; Wiesenthal, Austrom, & Silverman, 1983). According to these classical deindividuation theorists, people commit more disinhibited behaviors in larger group settings because of a loss of individuality; feeling less scrutinized as individuals, their individual controls are removed, which releases them from internalized moral constraints (Festinger, Pepitone, & Newcomb, 1952). Thus, because deindividuation effects will likely be felt more strongly in larger, as compared with smaller, competition groups, it stands to reason that people in competition pools with more competitors will be more likely to perceive that cheating will go undetected, which in turn can influence people to cheat to win, due to the disinhibiting and deindividuating effects of being in larger groups.

In the last three decades, however, self-categorization theory has been proposed as an explanation for conformity-related deindividuation effects known as the social identity model for deindividuation effects (SIDE; Reicher, Spears, & Postmes, 1995). Like classical deindividuation theory, the SIDE model proposes that deindividuating circumstances decrease attention to individual characteristics and interpersonal differences within the group, which can lead to disinhibited behaviors. However, the SIDE model distinguishes itself from classical deindividuation theories (e.g., Diener et al., 1980; Festinger et al., 1952; Zimbardo, 1969) in that it considers people's sensitivity to perceived *group norms* as an important explanation for why people commit disinhibited behaviors in large group settings.

According to the SIDE model, deindividuation manipulations work via their effects on the level of self-categorization; under deindividuating conditions, people are likely to switch from a personal to a social level of categorization (Reicher, 1984; Spears, Lea, & Lee, 1990), which enhances the influence of perceived group norms on individual behaviors. Because deindividuating circumstances enhance the salience of the social self (Reicher et al., 1995), this not only influences perceptions that individual actions will be less scrutinized but can also increase conformity to perceived local and situation-specific norms. Most notably, the model proposes that this argument can be extended to normative cues that are not specifically tied to social or group identities but that might help a person interpret how to act in situation-specific circumstances (Postmes & Spears, 1998). In support of the SIDE model, Postmes and Spears' (1998) *meta*-analysis of the behavioral effects of deindividuation found a robust relationship between individuals subjected to different deindividuation situations and the conforming of their behaviors according to the perceived local and situation-specific norms of the group.

Based on the above rationales, the literatures on classical deindividuation effects, and the more recent SIDE model, we make an additional serial mediation hypothesis. It is possible that because individuals in larger (vs. smaller) competition pools expect more numerous cheaters in their group, they may also feel that the sheer quantity of cheaters will make individual scrutiny less likely, which leads to increased cheating.

Hypothesis 3. *The relationship between being in a larger competition pool and cheating will be serially mediated by expectations of a higher number of cheaters, leading to increased perceptions of the likelihood that cheating will be undetected.*

In summary, we investigate three mediators to explain the relationship between competition group size and cheating; we examine expectations of the absolute number of cheaters and perceptions that cheating is acceptable in a sequential manner (See Fig. 1a), and we examine expectations of the absolute number of cheaters and perceptions of the likelihood of cheating being detected in a sequential manner (see Fig. 1b).

2.3. Related work and alternative mechanisms

In our paper, we also consider past related research and examine several alternative mechanisms, such as perceived ease of winning, the probability of highly capable competitors, feelings of anonymity, and social-comparison processes. Below, we summarize these alternative mechanisms in more detail.

2.3.1. Perceived ease of winning

The ratio bias phenomenon induced in larger competition pools might also influence probability perceptions about the ease of winning, which can have implications for cheating in competitive settings. For instance, being in a larger competition group with 100 (as compared with 10) competitors might increase people's expectation that it would be easier to rank in the top 20% to win a reward because 20 available winning spots might appear more achievable than two available winning spots. If these initial expectations of success become unattainable (as would be the case in our unscrambling task, where not all of the word jumbles are actually solvable), people might be more likely to engage in rule-breaking behavior as a way to resolve cognitive dissonance to meet these initial expectations of winning. Indeed, past work has shown that when expectations of success are not met, people are more likely to engage in unethical behavior to achieve their initial expectations of success (Perry, Kane, Bernesser, & Spicker, 1990; Moore et al., 2014).

2.3.2. Probability of highly capable competitors

Similarly, the ratio bias at play in larger groups can affect people's perceptions of the probability of having competitors with higher-than-

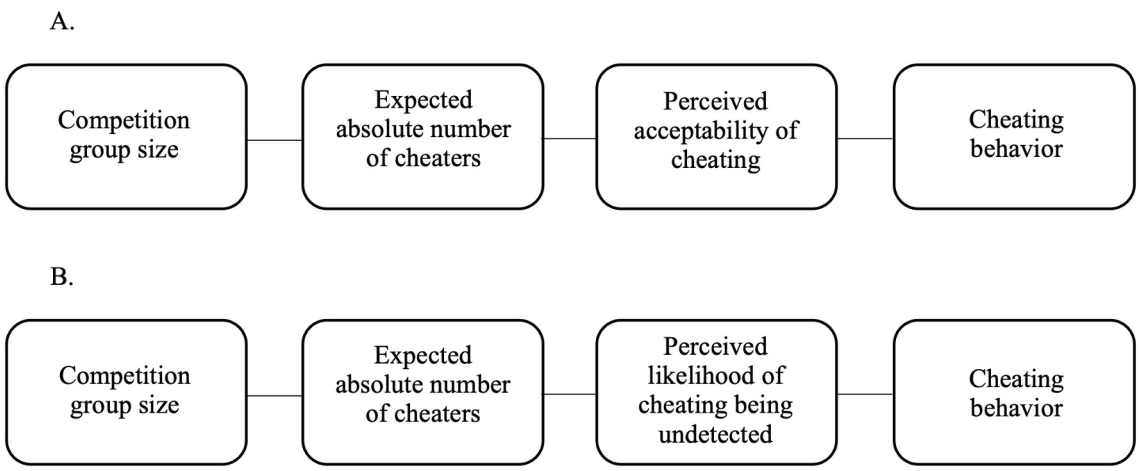

Fig. 1. Proposed theoretical models of the serial mediation effects of competition group size on cheating behavior.

average abilities. Those in larger (vs. smaller) competition groups might estimate a higher absolute number of highly capable competitors, which in turn can increase cheating behavior as a necessity to win (Schwieren & Weichselbaumer, 2010). For instance, past research on academic cheating has found that poor performers cheated more than others (Kerkvliet & Sigmund, 1999).

2.3.3. Feelings of anonymity

Third, in an effort to further explore whether deindividuation processes might come into play in large (vs. small) competition groups to affect cheating (Hypothesis 3), we examined another construct closely related to perceptions of cheating detection: feelings of anonymity. Some research suggests that being in a large group might increase personal feelings of anonymity (Festinger et al., 1952), which in turn may increase unethical behavior (Zhong, Bohns, & Gino, 2010). Although one might argue that anonymity is closely related to detection (because anonymity clearly decreases the likelihood of getting caught), feelings of anonymity and perceived detection of cheating are conceptually distinct. For instance, it is possible that one might expect to get away with cheating even under circumstances in which one is not anonymous, such as cheating in academic settings where students are clearly identifiable. Thus, a third alternative reason that competition group size might influence cheating are feelings of anonymity, which we distinguish from perceptions of whether cheating is detected.

2.3.4. Social-comparison processes

Past work on the effect of competition group size on feelings of competitiveness and social comparison, known as the *n*-effect (Garcia & Tor, 2009), shows that having a small number of competitors can increase people's competitiveness (Garcia & Tor, 2009), as competitive motivations are fueled by social-comparison processes (Festinger, 1954). In smaller groups, people can readily compare their performance with others, whereas in larger groups, social-comparison concerns are diffused because of the difficulty of comparing oneself to many competitors. As a result, this research suggests that smaller competition pools would lead to increased competitive motivations (Garcia & Tor, 2009). Given that some research has suggested that competitiveness can encourage more negative behavior (e.g., Kohn, 1992; Perry et al., 1990), research on the *n*-effect by Garcia and Tor (2009) would suggest an opposing prediction to ours: that smaller competition pools might lead to increased feelings of competitiveness.

However, there are some notable exceptions in the competition literature regarding the positive link between a small number of competitors and competitive motivations (e.g., Bennett, Pierce, Snyder, & Toffel, 2013; Orrison et al., 2004; Vandegrift & Duke, 2015; Vandegrift & Holaday, 2012). Moreover, the majority of past work on competition group size and competitive motivations did not specifically study or measure cheating; as such, it is not clear that competition pool size will also differentially influence competitive feelings in contexts where cheating is possible and measurable. To date, this issue has not been examined empirically because almost all studies on competition group size have been conducted in contexts that lacked a clear possibility of cheating, such that cheating behavior was not measurable and comparable across all participants. In competitive contexts where all competitors have the opportunity and means to lie about their actual performance, it will be clear to all competitors that theirs and others' true performance is unclear. Hence, we do not expect competition pool size to influence cheating via competitiveness.[1] However, given this past work on the effect of competition group size on feelings of competitiveness and social comparison (Garcia & Tor, 2009), which can have implications for cheating, we also test them as possible alternative mechanisms.

3. Overview of studies

Four experiments tested the relationships between competition group size, expectations of the absolute number of cheaters in the competition group, perceptions that cheating is acceptable, perceptions of the likelihood of cheating being undetected, and cheating behavior. Studies 1 and 2 tested the effect of competition group size on our dependent variable, cheating behavior. Studies 1 and 2 found that both in-person and online competition groups that were larger in size resulted in more cheating. Testing the direct effect of competition group size on our proposed mediators as well as on several alternative mediators, Study 3 showed that competition group size had a direct effect on expectations of the absolute number of competitors who will cheat but not on the other psychological mechanisms. In Study 4—which investigated a parallel-serial mediation model of the effects of competition group size on cheating by testing three mediators—expectations of the absolute number of cheaters was entered as a stage 1 mediator, whereas

[1] To test our contention that the number of competitors would not influence competitive feelings in cheating contexts, we conducted a 2 (Competition pool size *N*: small=10 vs. large=100) x 2 (Context: No cheating opportunity vs. Cheating opportunity) between-subjects study to compare the effects of competition group size on competitive motivations in cheating versus no-cheating contexts (see Supplementary Online Material). There, we find evidence demonstrating that the number of competitors had an effect on competitive motivations under "No Cheating Opportunity" contexts, but not under "Cheating Opportunity" contexts, suggesting that in cheating-opportunity contexts, the link between competition group size and cheating behavior is likely not explained by competitive motivations.

perceptions of cheating as acceptable and the perceived likelihood of cheating being undetected were simultaneously entered as parallel stage 2 mediators, such that each mediator controlled for the other. Study 4 found that when controlling for all three mediators, only the serial pathway via expectations of the absolute number of cheaters and perceptions that cheating was acceptable (Fig. 1a) influenced cheating behavior. In contrast, the serial pathway via expectations of the absolute number of cheaters and perceptions of the likelihood of cheating being undetected was not a significant pathway that influenced cheating.

Following Simmons, Nelson, and Simonsohn (2013) recommendations, we aimed for at least 50 participants per condition across all studies. We began with an in-person laboratory study with university students as participants. Given that our subsequent studies used participants from the online platform, Amazon Mechanical Turk, we oversampled in our online studies to achieve both a higher power and our aim of ensuring at least 50 participants per condition (due to our expectation that more online participants would fail comprehension questions, compared with laboratory participants). We measured actual cheating behavior to earn money in our studies. Data are available on the Open Science Framework: https://osf.io/7n2ym/?view_only=fee3fde7527941a29ba288254ccf4af0.

4. Study 1: Large in-person competition groups and cheating

In Study 1, we directly test Hypothesis 1—namely, whether being in a larger (vs. smaller) competition group elicits greater willingness to cheat on a competitive performance task. Importantly, we conducted this study in-person in the laboratory, with participants allocated into actual smaller or larger competition groups that corresponded with the number of competitors in their experimental condition. As such, participants were able to directly assess and feel the physical presence of the number of others in their competition group in addition to being informed about the competition group size in the study instructions.

4.1. Sample

Ninety-three participants (51.6% males, $M_{age} = 26.3$, $SD = 4.2$) from a large private university in the northeastern United States were recruited to participate in a laboratory study in exchange for money. They were given an opportunity to earn additional money based on their self-reported performance. Five participants who failed a comprehension item about the task being self-corrected—thus not recognizing the opportunity to cheat ("How is the performance on the task scored?")—were excluded from the analyses. The final sample consisted of 88 participants. Following guidelines from Simmons et al. (2013), we aimed for approximately 50 participants per condition, but it was subject to the availability of laboratory participants in the scheduled sessions.

4.2. Design and procedure

The experiment was a two-condition (Competition pool size *N*: small = 5 vs. large = 25) between-subjects design. This study was part of an hour-long series of studies for which participants received $20 as compensation. To increase the realism of our manipulation, participants were randomly assigned into actual competition groups with either 5 or 25 participants who were all physically present in the lab at the same time during the experiment.

In the instructions, participants were informed that they had a chance to be paid a bonus (up to $10) for completing a performance task. In the task, participants had to unscramble 10- word jumbles within three minutes, for which they would receive $1 per word jumble that they reported as solved (adapted from Kouchaki & Gino, 2016). Unknown to participants, the seventh word jumble was unsolvable. Importantly, the instructions made it clear that participants must unscramble the words in the order they appeared instead of switching between word jumbles. Participants were informed that if they successfully unscrambled the first three-word jumbles but not the fourth, only the first three jumbles would count as solved—even if they also successfully unscrambled subsequent word jumbles following the fourth (e.g., fifth, sixth, etc.). Participants had to report whether each word jumble was solved without having to actually write down the unscrambled words; this gave them the opportunity to lie. Participants only had to report the number of word jumbles they solved to qualify for a bonus. They further read that their odds of receiving a bonus would depend on how their individual performance compared with the individual performance of others in their assigned group of 5 (in the small-competition-pool condition) or 25 (in the large-competition-pool condition) in the lab; that is, they were competing to outperform others for an additional bonus of up to $10. If their performance was among the top 20% of their group, they would receive the bonus payment reported.

4.3. Cheating behavior

We used participants' self-reports of the total number of word jumbles solved as well as the frequency of participants who reported having solved the seventh word jumble to assess cheating behavior (the two measures correlated strongly with each other, $r = 0.652$, $p < .001$). Participants were able to earn $1 for every jumble solved; thus, with each additional word reported beyond the sixth word, participants earned more undeserved money.[2]

4.4. Results

4.4.1. Manipulation check

Participants in the large-competition-pool condition reported a significantly higher number of competitors present ($M = 25$, $SD = 0.00$) than did participants in the small-competition-pool condition ($M = 4.98$, $SD = 0.14$), $t(86) = -0.874.15$, $p < .001$, 95% CI for the mean difference = [−20.06, −19.97].

4.4.2. Cheating behavior

Comparing the number of participants who reported the seventh unsolvable word jumble as solved, we found a highly significant difference between conditions. More participants reported having solved the seventh unsolvable word jumble in the large-competition-pool condition than in the small-competition-pool condition, $\chi^2(1, N = 88) = 6.88$, $p = .009$, odds ratio = 3.23, 95% confidence interval (CI) for the odds ratio = [1.32, 7.90]. In the smaller ($N = 5$) competition pool condition, 26.53% of participants indicated having solved the seventh jumble, whereas in the larger ($N = 25$) competition pool condition, 53.85% of participants indicated having solved the seventh jumble. When comparing the total number of word jumbles reported as solved, we observed a similar pattern. Although the results were not significant between conditions, $t(86) = -1.62$, $p = .109$, $d = 0.35$, *95%* CI for the mean difference = [−1.82, 0.186], participants in the large-competition-pool condition reported solving a higher number of overall word jumbles ($M = 7.31$, $SD = 2.21$) than did participants in the small-competition-pool ($M = 6.49$, $SD = 2.46$). Fig. 2 shows the proportion of cheating on the unsolvable word jumble.

4.5. Discussion

Study 1 provides initial empirical support for Hypothesis 1 by demonstrating that being in a larger competition group elicits more cheating behavior (i.e., declaring an unsolvable word jumble as solvable

[2] For exploratory purposes, at the end of the study and after participants completed the performance task, we also assessed a few exploratory psychological measures after our dependent variable (see Supplementary Online Material).

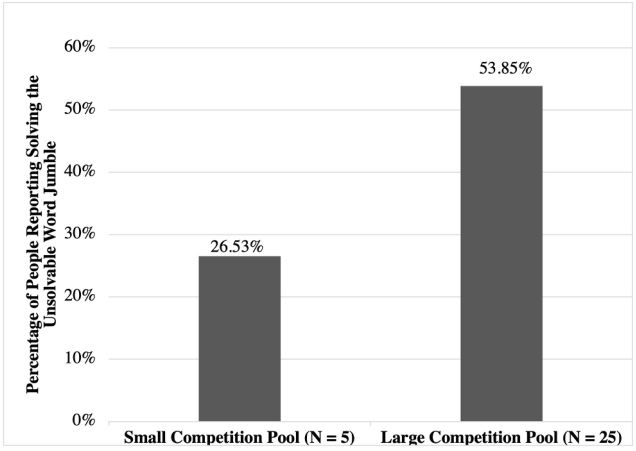

Fig. 2. Proportion of Cheating Behavior by Condition in Study 1.

in order to win undeserved money) than being in a smaller competition group. Though Study 1 showed that being in the actual physical presence of more (vs. less) competitors increased cheating, it is not clear whether this effect would also hold and remain robust when the presence of the number of other competitors is not physical and salient but only virtual. In Study 2, we test for this effect on an online platform with online competitors.

5. Study 2: Large online competition groups and cheating

In Study 2, we again test Hypothesis 1 and provide further evidence for the direct link between being in a large competition group and cheating behavior. To test for the generalizability of our proposed relationship, we used a different sample population (i.e., an online adult sample), a larger difference in magnitude between the size of the two competition groups for a more extreme comparison (i.e., 10 vs. 100 online competitors rather than 5 vs. 25 in-person competitors), and a different adaptation of the word-unscrambling performance task than used in Study 1.

5.1. Sample

Two hundred individuals (53.5% males, $M_{age} = 33.8$, $SD = 10.2$) recruited from Amazon Mechanical Turk whose location was set to the United States participated in the study for $1. Thirteen participants who failed the same comprehension question used in Study 1 were excluded from the analyses. The final sample consisted of 187 participants.

5.2. Design and procedure

The study was a two-condition (competition pool size *N*: small = 10 vs. large = 100) between-subjects design. Participants were randomly assigned to one of two conditions: groups of either 10 or 100 participants. They were informed they had a chance to be paid a bonus (up to $2) for completing a performance task. The instructions further read that their chance for a bonus would depend on how their individual performance compared with the individual performance of others in their assigned group of 10 (in the small-competition-pool condition) or 100 (in the large-competition-pool condition); that is, they were competing to outperform others for an additional bonus. If their performance was among the top 20% of the people in their group, they would receive the bonus payment reported. Participants were given an opportunity to engage in unethical behavior by completing a word-unscrambling task similar to that used in Study 1 (adapted from Wiltermuth, 2011) but with a difference; this time, the task involved unscrambling eight-word jumbles within two minutes, in which the third, fifth, and seventh word jumble were unsolvable. Participants could receive a bonus of $0.25 per word jumble that they reported having solved.

5.3. Dependent measure

We used both the total number of unsolvable jumbles and the total number of all word jumbles reported as solved to assess cheating behavior (Kouchaki et al., 2019). The two measures strongly correlated with each other ($r = 0.88$, $p < .001$). Participants only had to indicate on each word jumble whether or not they had solved it without having to actually write down the unscrambled words; this gave participants the opportunity to lie.[3]

5.4. Results

As predicted, participants in the large (vs. small) competition pool reported having solved a higher number of unsolvable jumbles ($M_{\text{large } N} = 1.14$, $SD = 1.33$ vs. $M_{\text{small } N} = 0.747$, $SD = 1.45$, $t(179.3) = -2.164$, $p = .032$, $d = 0.28$, 95% CI for the mean difference = [−0.752, −0.036]) and all word jumbles in general ($M_{\text{large } N} = 5.18$ $SD = 2.13$ vs. $M_{\text{small } N} = 4.59$, $SD = 1.84$), $t(179.51) = -2.04$, $p = .043$, $d = 0.30$, 95% CI for the mean difference = [−1.17, −0.027]. Fig. 3 displays the number of unsolvable word jumbles and the total number of word jumbles reported as solved by condition.

5.5. Discussion

Supporting Hypothesis 1 and consistent with the results of Study 1, Study 2 again demonstrates that being in a group with a larger (vs. smaller) number of competitors increases cheating behavior. This further supports our proposition that cheating behavior is motivated by the presence of more rather than fewer competitors. In two studies, people in larger (vs. smaller) competition pools were more likely to cheat. However, Studies 1 and 2 did not allow us to examine the effect of competition group size on psychological mechanisms; in Study 3 and thereafter, we focus on investigating the psychological processes explaining the effect of competition pool size on cheating.

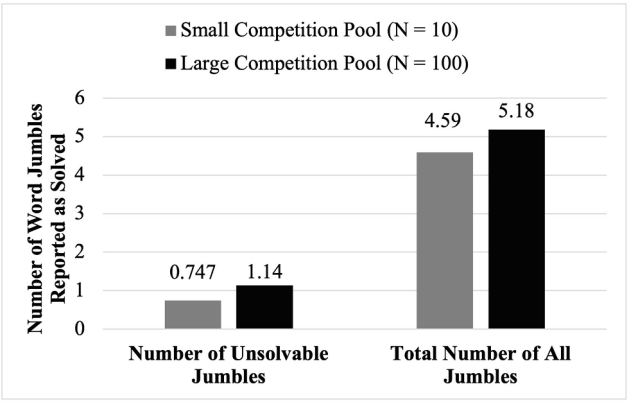

Fig. 3. Cheating Behavior by Condition in Study 2.

[3] For exploratory purposes, at the end of the study and after participants completed the performance task, we also assessed a few exploratory psychological measures after our dependent variable (see Supplementary Online Material).

6. Study 3: Competition group size and cheating psychological processes

In Study 3, we examine the direct effects of our independent variables on each of our proposed mediators. Specifically, we investigate whether being in a larger (vs. smaller) competition group influences expectations about the number of competitors who will cheat, perceptions of cheating as socially acceptable behavior, and perceptions of the likelihood that cheating would be undetected. Finally, we also measure and test the possible alternative mechanisms described earlier. We directly measure psychological mechanisms immediately after the number-of-competitors manipulation to test for the direct effects of competition group size on psychological processes.

6.1. Sample

Two-hundred and ninety-six unique individuals from Amazon Mechanical Turk whose location was set to the United States completed the study (52.6% males, $M_{age} = 37.66$, $SD = 11.61$). Fifty-nine participants who failed the same comprehension check from previous studies were excluded from the analyses. We also excluded responses from five participants who attempted the study more than once.[4] The final sample consisted of 232 participants.[5]

6.2. Design and procedure

The study was a two-condition (Competition pool size *N*: small = 10 vs. large = 100) between-subjects design. Participants were told that they would be completing a performance task in which we gave them instructions identical to those in Study 2. However, after reading the instructions, instead of completing the word jumble task, participants responded to questionnaire items that assessed their perceptions of the number of people in their group whom they thought would cheat, whether cheating was acceptable by people in the group, and whether cheating would be undetected, as well as other potential alternative mechanisms explaining our hypothesized relationship.

6.3. Dependent measures

6.3.1. Expectations of the absolute number of cheaters in the group

We asked one question to quantify expectations about others' cheating behavior. In the small competition group, the item read: "In your assigned group of 10 participants, how many people do you think would be likely to overreport their number of solved word jumbles, if any?" In the large competition group, the item read: "In your assigned group of 100 participants, how many people do you think would be likely to overreport their number of solved word jumbles, if any?"

6.3.2. Perceptions of whether cheating is acceptable

We used two items ("Overreporting the number of solved word jumbles in this task is in line with the norms of the group" and "People should overreport the number of solved word jumbles in this task in order to win the bonus," α = 0.72) to assess whether participants perceived cheating as acceptable on a 7-point scale ranging from 1 = Strongly disagree to 7 = Strongly agree.

6.3.3. Perceptions of whether cheating would be detected

Perceptions about whether cheating would be detected were assessed using two items ("People in my group who overreport their number of solved jumbles will likely not be detected," "People in my group who overreport their number of solved jumbles will likely get away with it," α = 0.89) on a 7-point scale ranging from 1 = Strongly disagree to 7 = Strongly agree.

6.3.4. Alternative mechanism #1: Perceived ease of success

We assessed perceived ease of success using the item "To what extent do you feel that it is easy to be in the top 20% of your group on this task?"(on a 7-point scale ranging from 1 = Not at all to 7 = Very much so).

6.3.5. Alternative mechanism #2: Perceived capabilities of other competitors

We assessed perceived capabilities of other competitors in the group with the item "How probable do you think it is for your group to consist of highly capable people (more than average ability)?" using a 7-point scale ranging from 1 = Not at all to 7 = Very much so.

6.3.6. Alternative mechanism #3: Feelings of anonymity

We assessed feelings of anonymity by asking participants "To what extent do you feel that you and your actions during this task are anonymous?" (adapted from Zhong et al., 2010) using a 7-point scale ranging from 1 = Not at all to 7 = Very much so.

6.3.7. Alternative mechanism #4: Competitive motivation

We also assessed competitive motivation using an item from Garcia and Tor (2009), "To what extent do you feel motivated to compete with the other participants in your assigned group?" on a 7-point scale ranging from 1 = Not at all to 7 = Very much so.

6.3.8. Alternative mechanism #5: Competitive intensity

To assess the intensity of competition, we asked participants, "To what extent do you feel that the competition is intense?" on a 7-point scale ranging from 1 = Not at all to 7 = Very much so.

6.3.9. Alternative mechanism #6: Social comparison

We assessed social comparison using an item from Garcia and Tor (2009), "To what extent do you feel inclined to compare your own performance to the performance of others in your group?" on a 7-point scale ranging from 1 = Not at all to 7 = Very much so.

6.4. Results

Table 1 shows the correlations of our independent and dependent measures.

6.4.1. Expectations of the absolute number of cheaters in the group

We found a significant effect of competition group size on the expectations of number of cheaters in the competition group, $t(123.67) = -14.25$, $p < .001$, $d = 1.79$, 95% CI for the mean difference = [−37.11, −27.68]), such that individuals in the larger competition naturally expected a larger absolute number of cheaters in their group ($M = 36.95$, $SD = 24.96$) than individuals in the smaller competition group ($M = 4.55$ $SD = 2.49$), even though, percentage-wise, individuals in the large competition group expected a lower percentage of cheaters (36.95%) than did individuals in the small competition group (45.55%).

6.4.2. Perceptions of whether cheating is acceptable

We did not observe a direct significant main effect of the number of competitors on perceptions of cheating as acceptable ($M_{\text{small } N} = 2.96$, $SD = 1.73$ vs. $M_{\text{large } N} = 2.80$, $SD = 1.56$), $t(240) = 0.762$, $p = .447$, $d = 0.10$, 95% (CI) for the mean difference = [−0.261, 0.590]).

[4] Because the "Prevent ballot box stuffing" option was left unchecked, five participants attempted to do the study more than once (identification based on their MTurk IDs and their IP addresses); as such, a total of 11 responses from these five participants were excluded from analyses.

[5] Given that we excluded responses from 64 participants, we also analyzed the data with all participant responses (N = 302), including 59 participants who failed the comprehension check and the 5 participants with 11 responses between them who attempted to complete the study more than once. Results remained consistent with no exclusions.

Table 1
Correlations of Variables in Study 3.

Variable	1	2	3	4	5	6	7	8	9
1. Competition group size									
2. Expectations of absolute number of cheaters	0.666**								
3. Perceived acceptability of cheating	−0.050	0.286**							
4. Perceived likelihood of cheating being undetected	0.071	0.218**	0.265**						
5. Perceived capability of others	−0.053	0.028	0.210**	−0.003					
6. Perceived ease of success	−0.042	0.015	0.329**	0.015	0.244**				
7. Feelings of anonymity	0.057	0.074	0.061	0.173**	0.074	0.147*			
8. Social comparison	−0.035	−0.017	0.064	0.087	0.039	0.178**	0.185**		
9. Competitive motivations	0.003	−0.039	−0.042	−0.064	0.144*	0.163*	0.291**	0.555**	
10. Competitive intensity	0.012	0.083	0.100	−0.003	0.164*	0.001	0.209**	0.523**	0.433**

* $p < .05$.
** $p < .01$.

6.4.3. Perceptions of whether cheating would be detected

We did not observe a direct significant main effect of the number of competitors on perceptions of whether cheating would be detected, ($M_{\text{small } N} = 4.63$, $SD = 1.58$ vs. $M_{\text{large } N} = 4.84$, $SD = 1.52$), $t(240) = -1.09$, $p = .28$, $d = 0.14$, 95% confidence interval (CI) for the mean difference = [−0.623, 0.180]).

6.4.4. Proposed alternative mechanisms

We did not find any significant differences between larger and smaller competition pools on perceived ease of ranking in the top 20% ($M_{\text{small } N} = 3.87$, $SD = 1.69$ vs. $M_{\text{large } N} = 3.74$, $SD = 1.56$), $t(230) = 0.631$, $p = .53$), perceived capability of others ($M_{\text{small } N} = 4.67$, $SD = 1.21$ vs. $M_{\text{large } N} = 4.54$, $SD = 1.27$, $t(230) = 0.807$, $p = .42$), feelings of anonymity during the task ($M_{\text{small } N} = 5.13$, $SD = 1.64$ vs. $M_{\text{large } N} = 5.30$, $SD = 1.48$), $t(230) = -0.859$, $p = .39$), competitive motivations ($M_{\text{small } N} = 5.05$, $SD = 1.70$ vs. $M_{\text{large } N} = 4.93$, $SD = 1.76$), $t(230) = -0.045$, $p = .96$, competitive intensity ($M_{\text{small } N} = 4.80$, $SD = 1.61$ vs. $M_{\text{large } N} = 4.84$, $SD = 1.51$), $t(230) = -0.176$, $p = .86$, and social comparison ($M_{\text{small } N} = 5.05$, $SD = 1.75$ vs. $M_{\text{large } N} = 4.93$, $SD = 1.76$), $t(230) = 0.527$, $p = .60$.

6.4.5. Mediation analysis

Given our serial mediation predictions, and as evidenced by the strong correlations between our proposed stage 1 mediator (i.e., the perceived number of cheaters) and our stage 2 mediators (i.e., perceptions of whether cheating is acceptable and whether cheating would be detected), we next conducted two independent simple mediation analyses for both measures. Results from two separate bootstrapping analyses (with 5000 iterations) showed that competition group size significantly increased expectations of the absolute number of cheaters in the group ($b = 32.39$, $SE = 2.39$, $p < .001$), which in turn separately increased (a) perceptions of cheating as socially acceptable ($b = 0.04$, $SE = 0.005$, $p < .001$) and (b) perceptions that cheating would be undetected ($b = 0.02$, $SE = 0.006$, $p < .01$), respectively. Results also indicated significant indirect effects via expectations of the absolute number of cheaters on both perceptions of cheating as acceptable (indirect effect = 0.76, $SE = 0.10$, bias-corrected 95% CI interval [0.5769, 0.9611]) and perceptions that cheating would go undetected (indirect effect = 0.41, $SE = 0.11$, bias-corrected 95% CI interval [0.1922, 0.6196]) such that the 95% bias-corrected confidence interval for each of the indirect effects excluded zero. Importantly, in our correlations analysis, we did not find any evidence of significant associations between any of our alternative mechanisms and our independent variable or our proposed stage-one mediator (i.e., the expected number of cheaters in the group); thus, we found no evidence for the significance of any of the alternative mediating variables.

6.5. Discussion

Providing partial support for Hypotheses 2 and 3, Study 3 demonstrated that being in a larger (vs. smaller) competition pool leads to a higher absolute number of expected cheaters in the group. In turn, expectations of a higher absolute number of cheaters increased perceptions that cheating is acceptable (as hypothesized in H2) and would go undetected (as hypothesized in H3). Moreover, we did not find that competition group size significantly influenced any of our alternative mediators (feelings of anonymity, social comparison, perceived capability of others, perceived ease of scoring in the top 20%, competitive motivations, or competitive intensity); nor were any of these alternative measures significantly associated with expectations of the absolute number of cheaters in the group.

Study 3, however, only investigated the effect of competition pool size on our proposed mediating variables and alternative mechanisms; although this allowed us to rule out variables as alternative mechanisms, we did not measure our main dependent variable of cheating to test for serial mediation.

7. Study 4: A parallel serial mediation model

Study 4 investigated the effect of competition group size on cheating behavior and the potential mediating roles of the expected absolute number of cheaters, perceptions of cheating as acceptable, and perceptions of the likelihood that cheating would be undetected. Due to our repeated findings from earlier pilots (not reported in the manuscript) and previous studies showing non-significant effects of competition pool size on our proposed alternative mechanisms (i.e., see main results in Study 3; see Supplementary Online Material for additional exploratory findings from Studies 1 and 2), we focused on investigating our proposed mediators in Study 4. To test for mediation, expectations of the absolute number of cheaters, perceptions of cheating as acceptable, and perceptions of cheating as undetectable were measured before (MacKinnon, Fairchild, & Fritz, 2007) participants completed the performance test in which cheating was possible.

7.1. Sample

Four-hundred and four individuals whose location was set to the United States were recruited from Amazon Mechanical Turk to complete the study (51.4% males, $M_{age} = 37.18$, $SD = 16.64$). Seventy-seven participants who failed the same comprehension check from previous studies were excluded from the analyses. The final sample consisted of 327 participants.[6]

[6] Given that we excluded 77 participant responses, we also analyzed results with all participant responses without any exclusions ($N = 404$). Results remained consistent with no exclusions.

7.2. Design and procedure

The study was a two-condition (competition pool size *N*: small = 10 vs. large = 100) between-subjects design. Participants were randomly assigned to groups with either 10 participants (small-competition-group *N* condition) or 100 participants (large-competition-group *N* condition). Participants were given similar task instructions as in Study 2; they were asked to solve, within two minutes, eight-word jumbles that had not been used in the previous studies (e.g., ETRNCA), for which they would receive a bonus of $1 if their reported total number of solved word jumbles was within the top 20% of their group. The third, fifth, and seventh word jumbles were unsolvable.

After participants read the task instructions, they were prepared for their upcoming task (e.g., expectations about the difficulty level and the opportunity to lie) by being given a mini practice round consisting of three practice jumbles in which they had to indicate which word jumbles they solved without being asked to write down the unscrambled words (e.g., DIRDNE). When participants finished completing the practice round, they answered questions in random order assessing their perceptions of (1) the number of others in their group they thought would cheat, (2) the likelihood of cheating being undetected, and (3) cheating as a socially approved behavior. Afterwards, participants continued to the actual performance task of unscrambling the word jumbles.

7.3. Dependent measures

7.3.1. Expectations of the absolute number of cheaters in the group

We used the same item from Study 3 to quantify perceptions about others' cheating behavior.

7.3.2. Perceptions of whether cheating is acceptable

We used the same measure from Study 3 (α = 0.80).

7.3.3. Perceptions of whether cheating would be detected

We used the same measure from Study 3 (α = 0.89).

7.4. Results

Table 2 shows the correlations of our independent and dependent variables.

7.4.1. Expectations of the absolute number of cheaters in the group

Replicating Study 3, we found a significant effect of competition group size on the perceived absolute number of cheaters in the group, $t(169.37) = -19.503$, $p < .001$, $d = 2.23$, 95% CI for the mean difference = [−46.52, −38.01]). People in the large competition group naturally perceived a higher absolute number of cheaters in their group ($M_{\text{large } N} = 47.36$, $SD = 27.25$) than individuals in the smaller competition group ($M_{\text{small } N} = 5.07$, $SD = 4.44$).

Table 2
Correlations of Variables in Study 4.

Variable	1	2	3	4	5
1. Competition group size					
2. Expectations of absolute number of cheaters	0.737*				
3. Perceived acceptability of cheating	0.050	0.293**			
4. Perceived likelihood of cheating being undetected	−0.022	0.181**	0.396**		
5. Number of unsolvable word jumbles reported as solved	0.105	0.194**	0.474**	0.196**	
6. Total number of all word jumbles reported as solved	0.111*	0.185**	0.352**	0.176**	0.781**

* $p < .05$.
** $p < .01$.

7.4.2. Perceptions of whether cheating is acceptable

We did not find a significant main effect of the number of competitors on whether cheating was perceived as acceptable behavior, ($M_{\text{large } N} = 3.09$, $SD = 1.834$vs. $M_{\text{small } N} = 2.92$, $SD = 1.74$), $t(325) = -0.897$, $p = .371$, $d = 0.10$, 95% CI for the mean difference = [−0.567, 0.212].

7.4.3. Perceptions of whether cheating would be detected

The number of competitors on perceptions of whether cheating would be detected was not significant, ($M_{\text{large } N} = 4.84$, $SD = 1.59$ vs. $M_{\text{small } N} = 4.91$, $SD = 1.69$), $t(325) = 0.400$, $p = .690$, $d = 0.04$, 95% CI for the mean difference = [−0.285, 0.430].

7.4.4. Cheating behavior

Supporting Hypothesis 1, participants reported solving a higher number of unsolvable words ($M_{\text{large } N} = 1.26$, $SD = 1.20$ vs. $M_{\text{small } N} = 1.01$, $SD = 1.15$), $t(325) = -1.90$, $p = .058$, $d = 0.21$, 95% CI for the mean difference = [−0.503, 0.009]) and a higher number of total words ($M_{\text{large } N} = 4.65$ $SD = 2.31$ vs. $M_{\text{small } N} = 4.14$, $SD = 2.33$), $t(325) = -2.006$, $p = .046$, $d = 0.22$, 95% CI, for the mean difference = [−1.02, −0.001] in the larger-competition-pool condition as compared with the smaller-competition-pool condition.

7.4.5. Mediation analysis

We first conducted two separate sets of serial mediation analyses using Model 6 of the PROCESS macro (Hayes, 2018; Preacher & Hayes, 2008) to test whether the effect of competition pool size on cheating behavior was mediated through the perceived number of cheaters and perceptions that cheating is acceptable (H2) and through the perceived number of cheaters and perceptions of the likelihood of cheating being undetected (H3), respectively.

We first tested Hypothesis 2; the results indicated that the larger-competition-pool condition led to expectations of a higher absolute number of cheaters, which then increased perceptions of overreporting as acceptable behavior, resulting in increased cheating. Findings indicated significant indirect effects for each of our cheating dependent variables. For the number of unsolvable words reported as solved, the 95% bias-corrected confidence interval (CI) for the size of the indirect effect (0.46, $SE = 0.09$) via expected number of cheaters and perception of overreporting as acceptable in a serial manner excluded zero (bias-corrected 95% CI [0.3016, 0.6431]). Similarly, for total words reported as solved, the 95% bias-corrected confidence interval (CI) for the size of the indirect effect (0.65, $SE = 0.16$) excluded zero (bias-corrected 95% CI [0.3637, 0.9768]).

We next tested Hypothesis 3; the findings indicated that the larger-competition-pool condition led to expectations of a higher absolute number of cheaters, which then increased perceptions of the likelihood of cheating being undetected, resulting in increased cheating. Findings indicated significant indirect effects for each of our cheating dependent variables.

For the number of unsolvable words reported as solved, the 95% bias-corrected confidence interval (CI) for the size of the indirect effect (0.12, $SE = 0.05$) via the expected number of cheaters and the perception of cheating being undetected in a serial manner excluded zero (bias-corrected 95% CI [0.0336, 0.2283]). Similarly, for total words reported as solved, the 95% bias-corrected confidence interval (CI) for the size of the indirect effect (0.22, $SE = 0.09$) excluded zero (bias-corrected 95% CI [0.0535, 0.4222]).

Both of these serial-mediation analyses suggest that expectations of the absolute number of cheaters serve as a key stage 1 mediator that influences both perceptions of cheating as socially accepted and perceptions of the likelihood of cheating being undetected to mediate the

link between competition pool size and cheating. As a final test, we next ran a parallel-serial mediation analyses using Model 81 of the PROCESS macro (Hayes, 2018), entering all three mediators so that each mediator was controlled for by the others. Evaluating a parallel serial mediation model with all our measured mechanisms is important because the effects of a mediator may change in the presence of other mediators (MacKinnon, Coxe, & Baraldi, 2012). Following guidelines from Hayes (2018), we conducted two-step bootstrapping mediation tests with 5000 iterations in which expectations of the absolute number of cheaters was entered as the stage 1 mediator and perceptions of cheating as socially acceptable and the likelihood of cheating being undetected were entered as parallel stage 2 mediators.

For the number of unsolvable words reported as solved, results from our parallel-serial mediation analysis suggested that one of the indirect effect pathways was significantly positive. We observed a significant effect of competition group size on cheating via expectations of the number of cheaters and perceptions of cheating as acceptable, in serial fashion (indirect effect = 0.46, SE = 0.09, bias-corrected 95% CI interval = [0.2960, 0.6326]). In contrast, we did not observe a significant effect of competition group size on cheating via expectations of the number of cheaters and perceptions of the likelihood of cheating being undetected serial pathway (indirect effect = 0.01, SE = 0.04, bias-corrected 95% CI interval [−0.0722, 0.0987]), which included zero.

For the total number of words reported as solved, results from our parallel serial mediation analysis similarly demonstrated significant indirect effects via expectations of the number of cheaters and perceptions of cheating as acceptable in a serial manner (indirect effect = 0.62, SE = 0.156 bias-corrected 95% CI interval = [0.3392, 0.9577]), but not via the expected number of absolute number of cheaters and perceptions of the likelihood of cheating being undetected (indirect effect = 0.07, SE = 0.09, bias-corrected 95% CI interval = [−0.0830, 0.2562]).

Thus, for both our cheating dependent measures—the number of unsolvable words reported as solved and the total number of words reported as solved—it appears that the sequential model via perceived number of cheaters and perceived cheating injunctive norm was a better fit to the data than the sequential model via the perceived number of cheaters and perceptions of the likelihood that cheating would be undetected.

7.5. Discussion

Study 4 once again demonstrated that large competition groups encouraged more cheating, supporting Hypothesis 1. It seems that being in larger competition pools increases expectations of a higher absolute number of cheaters, which then increases perceptions of cheating as socially acceptable, leading to more cheating. A parallel serial pathway via perceptions of the likelihood of cheating escaping detection following increased expectations of a higher absolute number of cheaters was not significant. Although we found initial evidence supporting both Hypotheses 2 and 3 when two separate serial mediation analyses were conducted, the parallel serial model analysis (in which each mediator was controlled for by the others) indicated that competition group size only influenced cheating behavior via the pathways that included perceptions of cheating as acceptable (both as a single mediator and as a stage 2 mediator following expectations of a higher number of cheaters) but not via perceptions of the likelihood of cheating being undetected (neither as a single mediator nor as a stage 2 mediator following expectations of a higher number of cheaters) when perceptions of cheating as socially acceptable were also included in the model. Thus, our findings provide stronger evidence for our Hypothesis 2 than for our Hypothesis 3.

8. General discussion

Across four experiments involving both student and general population samples, and in-person and online competition groups, we tested whether being in larger competition pools would influence actual cheating behavior (see Table 3 for a summary of our main-effects results across four experiments). Our findings demonstrated that being in large competition groups increased cheating behavior, thus supporting Hypothesis 1. We also observed that this link was mediated in a serial manner by expectations of a higher absolute number of cheaters among competitors in the competition group and increased perceptions of cheating as socially acceptable, in support of Hypothesis 2. Although we observed some initial evidence supporting Hypothesis 3—that larger competition groups increased cheating because of expectations of a

Table 3
Summary of Main Effects in Studies 1 to 4.

Independent Variable(s)	Study 1 Competition Pool Size (Small vs. Large)	Study 2 Competition Pool Size (Small vs. Large)	Study 3 Competition Pool Size (Small vs. Large)	Study 4 Competition Pool Size (Small vs. Large)
Dependent Variables				
Percentage of people who reported solving the seventh jumble (unsolvable)	Small: 26.53% Large: 53.85%***	–	–	–
Number of unsolvable jumbles reported as solved	–	M_{Small}: .747 M_{Large}: 1.14*	–	M_{Small}: 1.01 M_{Large}: 1.26†
Total number of jumbles reported as solved	M_{Small}: 6.49 M_{Large}: 7.31	M_{Small}: 4.59 M_{Large}: 5.18*	–	M_{Small}: 4.14 M_{Large}: 4.65*
Expected absolute number of cheaters	–	–	M_{Small}: 4.55 M_{Large}: 36.95***	M_{Small}: 5.07 M_{Large}: 47.36***
Perceived acceptability of cheating	–	–	M_{Small}: 2.96 M_{Large}: 2.80	M_{Small}: 2.91 M_{Large}: 3.09
Perceived likelihood of cheating being undetected	–	–	M_{Small}: 4.63 M_{Large}: 4.84	M_{Small}: 4.91 M_{Large}: 4.84
Perceived capability of others	–	–	M_{Small}:4.67 M_{Large}: 4.54	M_{Small}:4.67 M_{Large}: 4.54
Perceived ease of success	–	–	M_{Small}:3.87 M_{Large}: 3.74	–
Feelings of anonymity	–	–	M_{Small}: 5.13 M_{Large}: 5.30	–
Social comparison	–	–	M_{Small}:5.05 M_{Large}: 4.93	–
Competitive motivations	–	–	M_{Small}: 5.05 M_{Large}: 4.93	–
Competitive intensity	–	–	M_{Small}:4.80 M_{Large}: 4.84	–

†p, <.10, *p < .05, **p < .01, ***p < .001.

higher absolute number of cheaters which in turn increased perceptions of the likelihood of cheating being undetected—this serial mediation pathway was no longer significant once perceptions of cheating as an injunctive norm was entered and controlled for in a parallel serial mediation model. This implies that the psychological pathway from competition pool size to cheating appears to be primarily driven by social-normative effects rather than by deindividuation effects.

Hence, our findings are consistent with past research on social norms showing that people defect more in social dilemmas when the group is larger (vs. smaller) because of the expectation that others might also defect (Bicchieri, 1990). Before engaging in deviant behavior, people adopt neutralization strategies, one of which is to believe that others will behave in the same way (Sykes & Matza, 1957). Thus, when people expect that others will cheat, they may be more motivated to convince themselves that doing so is acceptable and that they should do the same to avoid missing out (e.g., McCabe, 1992; Pierce et al., 2013).

8.1. Theoretical implications

Our research contributes to theories of unethical behavior in competitive contexts. To our knowledge, we have provided one of the first direct empirical tests of the number of competitors and cheating behavior. Extant research on competitive contexts and unethical behavior has not previously examined the number of the competitors as an important contextual characteristic affecting unethical behavior, instead focusing primarily on the effects of the state of being in a competition (e.g., Hegarty & Sims, 1978; Pierce et al., 2013), the individual attributes of competitors (e.g., Vriend et al., 2016), and the relational attributes between competitors (e.g., Kilduff et al., 2016; Yip et al., 2018). Our research extends the literature on unethical behavior and competition by considering how common knowledge of the number of competitors can affect people's cheating tendencies, and we find that having a large number of competitors can increase cheating.

Similarly, existing research on the effects of competition group size to date has mostly focused on competitive motivations and behaviors in contexts where cheating is not possible or not measured (e.g., Boudreau et al., 2011; Certo et al., 2010; Garcia & Tor, 2009; Orrison et al., 2004; Vandegrift & Duke, 2015; Vandegrift & Holaday, 2012). Thus, we extend this past work by showing that competition group size influences not only competitiveness, but also unethical behaviors. Although past work has suggested that being in a small competition group increases competitiveness, a phenomenon known as the *n*-effect (Garcia & Tor, 2009), more recent work has found that this relationship may not be as robust under certain conditions, such as when competitive behavior has an impact on others (e.g., Vandegrift & Holaday, 2012). Our research adds to this emerging research by identifying another unique context in which competition group size does not influence competitive motives: in anonymous and virtual competitions between strangers in which cheating on performance is a tenable behavioral option. That we did not find competitiveness to be a significant mediator in our investigation might be explained by past research on contexts under which competitive motivations are fueled. For instance, Festinger (1954) argued that one important factor fueling competitive motivations is the ability to assess unambiguous performance capability. In our research, because people had the opportunity to cheat, their true performance abilities could not be accurately assessed, which might have muted any effect of the number of competitors on competitive motivations. Because our goal was to examine competition pool size and cheating, and not competition size and competitive motivations, we chose a measurable cheating task in which people could cheat and artificially inflate their competitive performance on a task, departing from previous research designs on the number of competitors and competitiveness (e.g., Garcia & Tor, 2009; Vandegrift & Duke, 2015; Vandegrift & Holaday, 2012).

Our results from Study 4 also shed light on the psychological processes explaining the link between competition pool size and cheating. First, we observed that people belonging to larger, as compared with smaller, competition groups expected a higher absolute number of competitors in their group to cheat. According to the ratio bias phenomenon, despite similar or even lower percentages of expected cheaters in both smaller and larger competition groups, more numerous cheaters can make cheating appear more rampant in the minds of participants in the larger, as compared with the smaller, competition group due to people's tendency to focus on a single number and perceive a high numerator to be more numerous regardless of the denominator. Because people's perception of "what is" often informs their perceptions of "what should be" (Morris et al., 2015), we indeed observed that expectations of more numerous cheaters in the larger competition group in turn increased people's perceptions of the cheating behavior (i.e., over-reporting) as socially acceptable (a perceived injunctive cheating norm), which in turn influenced individuals to consequently engage in more cheating themselves.

Although our findings also suggest that being in larger competition groups may increase the likelihood of cheating via expectations of a higher number of cheaters, which leads to stronger perceptions of the likelihood of escaping detection, we ultimately found in a parallel-serial model that when all of our proposed mediators controlled for each other, the serial pathway via the perceived absolute number of cheaters and the perceived acceptability of cheating was the more significant pathway than the serial pathway via the expected absolute number of cheaters and the perceived likelihood of being undetected (which turned non-significant in the parallel serial mediation analyses). Our results imply that stronger perceptions of being undetected, which arise from expectations of a higher absolute number of cheaters in the larger competition pool condition, may indeed play a role in explaining why people in larger competition groups cheat more. However, the role may be more minor than we had initially anticipated. Indeed, the social norms pathway via expectations of the absolute number of cheaters and perceptions of cheating as acceptable appear to be much better at explaining the link between competition pool size and cheating behavior than the pathway via expectations of the absolute number of cheaters and perceptions of the likelihood of being detected.

Finally, our findings also contribute to previous research on perceived cheating norms and cheating behavior (e.g., Gino et al., 2009). In our studies, we find that people in larger competition groups expect a higher absolute number of their fellow competitors to cheat, which in turn increase their perceptions that cheating is socially acceptable, leading to more cheating. Hence, our research also makes a more general contribution to the ethical decision-making literature (e.g., see Tenbrunsel & Smith-Crowe, 2008 for a review) by showing that a mere environmental cue, such as the number of competitors, can influence people's cheating behavior via expectations of the number of others who will cheat, which, in turn, makes cheating appear more acceptable as a behavioral norm.

8.2. Practical implications

The number of competitors that one has is highly prevalent in many aspects of people's personal and organizational lives. Our findings suggest some important practical implications for organizations. First, given that the prevention of unethical behavior is a goal of many organizations and that most organizational contexts are generally competitive in nature, managers may want to carefully think about how they frame and organize their business units within the organization. For instance, creating smaller units or teams with fewer members within a larger department might help frame the size of the competition pool as smaller and decrease perceptions of unethical behavioral norms and unethical behavior within the department and organization. Organizations might also want to design incentives to limit the number of competitors for a performance or a sales bonus to avoid increasing social-norm perceptions that others will cheat to achieve higher performance outcomes and thus evoke an injunctive cheating norm that can influence individuals to similarly cheat more themselves. For individuals, one

practical implication of our research is that people might wish to self-select into smaller competition pools (e.g., smaller organizations with fewer employees) if they want to avoid being in an environment where cheating on performance is more likely to occur.

8.3. Strengths, limitations, and future directions

Our work has several noteworthy strengths. First, we conducted our studies in both the laboratory with actual competitors and on online platforms with abstract and virtual competitors, showing that the effect of the number of competitors on cheating holds even when the physical presence of other competitors is not immediately felt. Second, we measured unethical behavior by assessing actual cheating behavior rather than by assessing cheating intentions or self-reports. Third, we devoted effort to testing the strength of our mediators in different ways. We directly tested the link between our independent variable and our mediating variables and alternative mechanisms (Study 3), and we conducted a serial mediation study (Study 4). Fourth, in addition to examining our proposed mechanisms, we tested other possible alternative mechanisms.

There are several possible explanations for why we did not observe significant results for our alternative mechanisms. First, feelings of anonymity may have been similar across the two conditions, as all participants in both conditions were similarly aware of researchers' knowledge of participant online IDs on the study platform (that is, researchers could equally communicate with and pay participants, evaluate participants' reputations, and/or blacklist and whitelist participants via their online participant IDs in both large and small conditions). Thus, it is likely that competition group size had no significant influence on participants' feelings of anonymity during the study, given that it was relatively clear to all participants that they were not more or less anonymous than other participants completing the study online.

One possible reason we did not observe significant effects of competition group size on any of the mechanisms related to social comparison processes (i.e., social comparison, competitive motivations, competitive intensity)—as compared with past work on the *n*-effect by Garcia and Tor (2009)—is likely due to differences in the cheating context. In our studies, it was clear from the task instructions that overreporting was possible; participants simply had to self-report and check off whether they had solved each word jumble without having to provide a solution for it. Experimental studies on the *n*-effect by Garcia and Tor (2009) were not designed for the possibility of cheating to occur, nor was cheating measured.

Similarly, the fact that competition group size did not have an effect on the perceived capability of others and the perceived ease of success could also be attributed to the fact that cheating was possible. When there was an opportunity for all competitors to cheat, regardless of competition group size, both the perceived ease of success and the perceived capability of others were ambiguous and difficult to estimate due to the fact that many competitors in the competition pool could cheat (which would affect the probability of winning), and even incapable people could still win by cheating (which would decrease the relevance of others' capabilities). As a result, this is likely why competition group size did not have a significant effect on these alternative mechanisms.

It is important to note that we do not claim our proposed mechanisms as the only pathway explaining our effect. Rather, we find evidence demonstrating perceptions of numerous others who will cheat and perceptions of cheating as socially acceptable behavior to be one promising serial pathway explaining our effect. We focus our contributions on our primary effect—that having more competitors increases individual cheating behavior, an important link that has received little to no attention in the literature thus far, despite its serious implications. Future research should continue to explore other possible mechanisms explaining the relationship between competition group size and cheating behavior, such as the possibility that people care less about the effect of their actions on others in larger competition groups. For example, past research has shown that people are more likely to impose harm on others when they are in large (vs. small) competition groups because their actions may be perceived as less harmful to other individual competitors in larger groups (Vandegrift & Duke, 2015).

This leads us to a limitation related to our research design. First, although the expected number of absolute cheaters may capture whether people are considering the number of people who cheat, it is an imperfect measure of how prevalent people may perceive cheating to be. This is because not everyone is similarly susceptible to the ratio bias. People in the larger-competition-group conditions who are more susceptible to the ratio bias will be more likely to perceive cheating as more prevalent than those who are less susceptible to the ratio bias (a large percentage of individuals being susceptible than not as evidenced by ratio bias studies). In fact, those in the larger-competition-group conditions who are less susceptible to the ratio bias will likely realize that a higher absolute number of cheaters does not necessarily mean cheating is common (and may, in fact, be less of a common phenomenon). These variances in susceptibility to the ratio bias can give rise to within-group differences on whether overreporting is considered socially acceptable.

Another limitation is that we used a similar cheating behavioral measure across our studies (i.e., a performance-based task). Given the difficulty of finding an unethical behavioral measure that would allow us to feasibly manipulate the number of competitors, we felt it was important to use a performance-based task in our studies. Future studies could examine the effect of competition group size on other measures of the prevalence of cheating and other measures of dishonest behavior that are not based on a performance task.

A third limitation of our research is that we did not investigate individual differences as possible moderators. For example, previous research has shown a negative relationship between an individual's moral identity (Aquino & Reed, 2002) and cheating behavior (see Shao, Aquino, & Freeman, 2008 for a review). As such, an individual's moral identity could moderate the relationship between the number of competitors and cheating. Furthermore, personality characteristics might also influence the effect of competition group size on unethical behavior through normative perceptions. For instance, some individuals have a higher tendency of being influenced by social norms than others (Schwartz, 1973). Future research could investigate whether individual characteristics moderate the relationships between competition group size, perceptions that others will cheat and get away with it, and cheating behavior. Additionally, future research should also investigate the contextual boundary conditions of our effects, such as whether our effects would continue to emerge under less or non-competitive contexts or under another reward payment scheme, such as an absolute payment scheme rather than a relative reward payment scheme. Past economic research has shown that whether rewards are given based on relative or absolute performance can impact the likelihood of whether people engage in negative behaviors, such as sabotage for selfish gain (Chowdhury & Gürtler, 2015).

8.4. Conclusion

In life, we are often surrounded by competitors for coveted resources and prizes. The present research suggests that the presence of more competitors influences peoples' propensity to cheat for personal gain, in part due to higher expectations of the absolute number of likely cheaters in the competition pool, which strengthens perceptions of cheating as an acceptable behavior. Dishonesty may be more prevalent in larger, as compared with smaller, organizations (e.g., Dalton & Kesner, 1988) and schools (e.g., McCabe & Trevino, 1997), a phenomenon that has important implications for many of our major life decisions.

CRediT authorship contribution statement

Celia Chui: Conceptualization, Methodology, Investigation, Writing - original draft, Writing - review & editing, Supervision. **Maryam Kouchaki:** Conceptualization, Methodology, Investigation, Resources, Writing - original draft, Writing - review & editing, Supervision. **Francesca Gino:** Conceptualization, Methodology, Investigation, Resources, Writing - review & editing, Supervision.

Appendix A. Supplementary material

Supplementary data to this article can be found online at https://doi.org/10.1016/j.obhdp.2021.01.004.

References

Appiah, K.A. (2020, April 7). If my classmates are going to cheat on an online exam, why Can't I?. The New York Times Magazine. Retrieved from https://www.nytimes.com/.

Aquino, K., & Reed, I. I. (2002). The self-importance of moral identity. *Journal of Personality and Social Psychology, 83*, 1423–1440.

Batson, C. D., & Moran, T. (1999). Empathy-induced altruism in a prisoner's dilemma. *European Journal of Social Psychology, 29*, 909–924.

Beersma, B., Hollenbeck, J. R., Humphrey, S. E., Moon, H., Conlon, D. E., & Ilgen, D. R. (2003). Cooperation, competition, and team performance: Toward a contingency approach. *Academy of Management Journal, 46*(5), 572–590.

Bennett, V. M., Pierce, L., Snyder, J. A., & Toffel, M. W. (2013). Customer-driven misconduct: How competition corrupts business practices. *Management Science, 59*, 1725–1742.

Bicchieri, C. (1990). Norms of cooperation. *Ethics, 100*, 838–861.

Boudreau, K. J., Lacetera, N., & Lakhani, K. R. (2011). Incentives and problem uncertainty in innovation contests: An empirical analysis. *Management Science, 57*, 843–863.

Boudreau, K. J., Lakhani, K. R., & Menietti, M. (2016). Performance responses to competition across skill levels in rank-order tournaments: Field evidence and implications for tournament design. *The RAND Journal of Economics, 47*, 140–165.

Certo, S. T., Sirmon, D. G., & Brymer, R. A. (2010). Competition and scholarly productivity in management: Investigating changes in scholarship from 1988 to 2008. *Academy of Management Learning & Education, 9*, 591–606.

Chowdhury, S. M., & Gürtler, O. (2015). Sabotage in contests: A survey. *Public Choice, 164*(1–2), 135–155.

Chui, C., & Grieder, M. (2020). The effects of investigative sanctioning systems on wrongdoing, reporting, and helping: A multiparty perspective. *Organization Science, 31*, 1090–1114.

Cialdini, R. B., Reno, R. R., & Kallgren, C. A. (1990). A focus theory of normative conduct: Recycling the concept of norms to reduce littering in public places. *Journal of Personality and Social Psychology, 58*, 1015.

Dalton, D. R., & Kesner, I. F. (1988). On the dynamics of corporate size and illegal activity: An empirical assessment. *Journal of Business Ethics, 7*, 861–870.

Darley, J. M., & Latané, B. (1968). Bystander intervention in emergencies: Diffusion of responsibility. *Journal of Personality and Social Psychology, 8*, 377–383.

Denes-Raj, V., & Epstein, S. (1994). Conflict between intuitive and rational processing: When people behave against their better judgment. *Journal of Personality and Social Psychology, 66*, 819–829.

Deutsch, M. (1949). A theory of co-operation and competition. *Human Relations, 2*, 129–152.

Diener, E., Lusk, R., DeFour, D., & Flax, R. (1980). Deindividuation: Effects of group size, density, number of observers, and group member similarity on self-consciousness and disinhibited behavior. *Journal of Personality and Social Psychology, 39*, 449–459.

Epstein, S. (1998). Cognitive-experiential self-theory. In D. F. Barone, M. Hersen, & V. B. Van Hasselt (Eds.), *Advanced personality. The plenum series in social/clinical psychology*. Boston, MA: Springer.

Eriksson, K., Strimling, P., & Coultas, J. C. (2015). Bidirectional associations between descriptive and injunctive norms. *Organizational Behavior and Human Decision Processes, 129*, 59–69.

Festinger, L. (1954). A theory of social comparison processes. *Human Relations, 7*, 117–140.

Festinger, L., Pepitone, A., & Newcomb, T. (1952). Some consequences of de-individuation in a group. *The Journal of Abnormal and Social Psychology, 47*, 382–389.

Fischer, P., Krueger, J. I., Greitemeyer, T., Vogrincic, C., Kastenmüller, A., Frey, D., Heene, M., Wicher, M., … Kainbacher, M. (2011). The bystander effect: A meta-analytic review on bystander intervention in dangerous and non-dangerous emergencies. *Psychological Bulletin, 137*, 517–537.

Garcia, S. M., & Tor, A. (2009). The n-effect: More competitors, less competition. *Psychological Science, 20*, 871–877.

Gino, F., Ayal, S., & Ariely, D. (2009). Contagion and differentiation in unethical behavior: The effect of one bad apple on the barrel. *Psychological Science, 20*, 393–398.

Gino, F., Gu, J., & Zhong, C. B. (2009). Contagion or restitution? When bad apples can motivate ethical behavior. *Journal of Experimental Social Psychology, 45*, 1299–1302.

Graf, L., König, A., Enders, A., & Hungenberg, H. (2012). Debiasing competitive irrationality: How managers can be prevented from trading off absolute for relative profit. *European Management Journal, 30*, 386–403.

Greenspan, R. (2020, March 12). Lori Loughlin and felicity huffman's college admissions scandal remains ongoing. Here are the latest developments. Time Magazine. Retrieved from https://www.time.com/.

Harbring, C., & Irlenbusch, B. (2008). How many winners are good to have? On tournaments with sabotage. *Journal of Economic Behavior & Organization, 65*, 682–702.

Hayes, A. F. (2018). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach* (2nd ed.). New York, NY: Guilford Publications.

Hegarty, W. H., & Sims, H. P. (1978). Some determinants of unethical decision behavior: An experiment. *Journal of Applied Psychology, 63*, 451–457.

Kelley, H. H., & Stahelski, A. J. (1970a). Errors in perception of intentions in a mixed-motive game. *Journal of Experimental Social Psychology, 6*, 379–400.

Kelley, H. H., & Stahelski, A. J. (1970b). Social interaction basis of cooperators' and competitors' beliefs about others. *Journal of Personality and Social Psychology, 16*, 66–91.

Kerkvliet, J., & Sigmund, C. L. (1999). Can we control cheating in the classroom? *The Journal of Economic Education, 30*, 331–343.

Kilduff, G. J., Galinsky, A. D., Gallo, E., & Reade, J. J. (2016). Whatever it takes to win: Rivalry increases unethical behavior. *Academy of Management Journal, 59*, 1508–1534.

Kirkpatrick, L. A., & Epstein, S. (1992). Cognitive-experiential self-theory and subjective probability: Further evidence for two conceptual systems. *Journal of Personality and Social Psychology, 63*(4), 534.

Kohn, A. (1992). *No contest: The case against competition* (2nd ed.). Boston: Houghton-Mifflin.

Kouchaki, M., Gino, F., & Feldman, Y. (2019). The ethical perils of personal, communal relations: A language perspective. *Psychological Science, 30*, 1745–1766.

Kouchaki, M., & Gino, F. (2016). Memories of unethical actions become obfuscated over time. *Proceedings of the National Academy of Sciences, 113*, 6166–6171.

Kouchaki, M., & Kray, L. J. (2018). "I won't let you down": Personal ethical lapses arising from women's advocating for others. *Organizational Behavior and Human Decision Processes, 147*, 147–157.

MacKinnon, D. P., Coxe, S., & Baraldi, A. N. (2012). Guidelines for the investigation of mediating variables in business research. *Journal of Business and Psychology, 27*, 1–14.

MacKinnon, D. P., Fairchild, A. J., & Fritz, M. S. (2007). Mediation analysis. *Annual Review of Psychology, 58*, 593–614.

McCabe, D. L. (1992). The influence of situational ethics on cheating among college students. *Sociological Inquiry, 62*, 365–374.

McCabe, D. L., & Trevino, L. K. (1997). Individual and contextual influences on academic dishonesty: A multi-campus investigation. *Research in Higher Education, 38*, 379–396.

McGraw, K. M. (1985). Subjective probabilities and moral judgments. *Journal of Experimental Social Psychology, 21*, 501–518.

Moore, C., & Gino, F. (2013). Ethically adrift: How others pull our moral compass from true North, and how we can fix it. *Research in Organizational Behavior, 33*, 53–77.

Moore, C., Wakeman, S., & Gino, F. (2014). Dangerous expectations: Breaking rules to resolve cognitive dissonance. Harvard Business School NOM Unit Working Paper, (15-012).

Morris, M. W., Hong, Y. Y., Chiu, C. Y., & Liu, Z. (2015). Normology: Integrating insights about social norms to understand cultural dynamics. *Organizational Behavior and Human Decision Processes, 129*, 1–13.

Orrison, A., Schotter, A., & Weigelt, K. (2004). Multiperson tournaments: An experimental examination. *Management Science, 50*, 268–279.

Pacini, R., & Epstein, S. (1999). The relation of rational and experiential information processing styles to personality, basic beliefs, and the ratio-bias phenomenon. *Journal of Personality and Social Psychology, 76*, 972.

Passerini, G., Macchi, L., & Bagassi, M. (2012). A methodological approach to ratio bias. *Judgment & Decision Making, 7*, 602–617.

Perry, A. R., Kane, K. M., Bernesser, K. J., & Spicker, P. T. (1990). Type A behavior, competitive achievement-striving, and cheating among college students. *Psychological Reports, 66*, 459–465.

Pierce, J. R., Kilduff, G. J., Galinsky, A. D., & Sivanathan, N. (2013). From glue to gasoline: How competition turns perspective takers unethical. *Psychological Science, 24*, 1986–1994.

Postmes, T., & Spears, R. (1998). Deindividuation and antinormative behavior: A meta-analysis. *Psychological Bulletin, 123*, 238–259.

Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods, 40*, 879–891.

Reicher, S. D. (1984). Social influence in the crowd: Attitudinal and behavioural effects of de-individuation in conditions of high and low group salience. *British Journal of Social Psychology, 23*, 341–350.

Reicher, S. D., Spears, R., & Postmes, T. (1995). A social identity model of deindividuation phenomena. *European Review of Social Psychology, 6*, 161–198.

Reno, R. R., Cialdini, R. B., & Kallgren, C. A. (1993). The transsituational influence of social norms. *Journal of Personality and Social Psychology, 64*(1), 104.

Reyna, V. F., & Brainerd, C. J. (2008). Numeracy, ratio bias, and denominator neglect in judgments of risk and probability. *Learning and Individual Differences, 18*, 89–107.

Schwartz, S. H. (1973). Normative explanations of helping behavior: A critique, proposal, and empirical test. *Journal of Experimental Social Psychology, 9*, 349–364.

Schwieren, C., & Weichselbaumer, D. (2010). Does competition enhance performance or cheating? A laboratory experiment. *Journal of Economic Psychology, 31*, 241–253.

Shao, R., Aquino, K., & Freeman, D. (2008). Beyond moral reasoning: A review of moral identity research and its implications for business ethics. *Business Ethics Quarterly, 18*, 513–540.

Simmons, J. P., Nelson, L. D., & Simonsohn, U. (2013, January). Life after p-hacking. In Meeting of the society for personality and social psychology, New Orleans, LA (pp. 17–19).

Solnick, S. J., & Hemenway, D. (1998). Is more always better? A survey on positional concerns. *Journal of Economic Behavior & Organization, 37*, 373–383.

Spears, R., Lea, M., & Lee, S. (1990). De-individuation and group polarization in computer-mediated communication. *British Journal of Social Psychology, 29*, 121–134.

Swab, R. G., & Johnson, P. D. (2019). Steel sharpens steel: A review of multilevel competition and competitiveness in organizations. *Journal of Organizational Behavior, 40*, 147–165.

Sykes, G. M., & Matza, D. (1957). Techniques of neutralization: A theory of delinquency. *American Sociological Review, 22*, 664–670.

Tenbrunsel, A. E., & Smith-Crowe, K. (2008). Ethical decision making: Where we've been and where we're going. *The Academy of Management Annals, 2*, 545–607.

Trafimow, D., Reeder, G. D., & Bilsing, L. M. (2001). Everybody is doing it: The effects of base rate information on correspondent inferences from violations of perfect and imperfect duties. *Social Science Journal, 38*, 421–433.

Wiltermuth, S. S. (2011). Cheating more when the spoils are split. *Organizational Behavior and Human Decision Processes, 115*, 157–168.

Vandegrift, D., & Duke, K. (2015). Competitive behavior, impact on others, and the number of competitors. *Journal of Behavioral and Experimental Economics, 57*, 37–44.

Vandegrift, D., & Holaday, B. (2012). Competitive behavior: Tests of the N-effect and proximity to a standard. *Journal of Neuroscience, Psychology, and Economics, 5*, 182.

Vriend, T., Jordan, J., & Janssen, O. (2016). Reaching the top and avoiding the bottom: How ranking motivates unethical intentions and behavior. *Organizational Behavior and Human Decision Processes, 137*, 142–155.

Welch, M. R., Xu, Y., Bjarnason, T., Petee, T., O'Donnell, P., & Magro, P. (2005). "But everybody does it.'.': The effects of perceptions, moral pressures, and informal sanctions on tax cheating. *Sociological Spectrum, 25*, 21–52.

Wiesenthal, D. L., Austrom, D., & Silverman, I. (1983). Diffusion of responsibility in charitable donations. *Basic and Applied Social Psychology, 4*, 17–27.

Yamagishi, K. (1997). When a 12.86% mortality is more dangerous than 24.14%: Implications for risk communication. *Applied Cognitive Psychology: The Official Journal of the Society for Applied Research in Memory and Cognition, 11*, 495–506.

Yip, J. A., Schweitzer, M. E., & Nurmohamed, S. (2018). Trash-talking: Competitive incivility motivates rivalry, performance, and unethical behavior. *Organizational Behavior and Human Decision Processes, 144*, 125–144.

Zimbardo, P. G. (1969). The human choice: Individuation, reason, and order versus deindividuation, impulse, and chaos. In W.J. Arnold & D. Levine (Eds,), Nebraska Symposium on Motivation (pp. 237–307). Lincoln: University.

Zhong, C. B., Bohns, V. K., & Gino, F. (2010). Good lamps are the best police: Darkness increases dishonesty and self-interested behavior. *Psychological Science, 21*, 311–314.