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# How do managers react to a Peer's situation? The influence of environmental similarity on budgetary reporting<sup>☆</sup>

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## ABSTRACT

We investigate the impact the degree of similarity between one's decision environment and that of a referent peer has on budgetary reporting. Self-categorization theory suggests that greater environmental similarity leads individuals to adjust their behavior to adhere to the social norms of peers within the same environment. We look at a reporting environment where managers *can* observe environmental similarity but *cannot* observe peers' behavior (e.g., managers do not communicate their budget reports between departments). In this setting, we find that managers facing a similar decision environment to that of a peer manager report higher budgets than managers facing a dissimilar decision environment. Further, consistent with the idea that managers base their perceptions about the group's social norms on their own desired behavior when peer behavior is unobservable, we find evidence that managers predict peers to report as they would, given similar environmental circumstances. Our findings provide a valuable insight into how peer *environments*, without knowledge of peer *actions*, can subtly affect managerial behavior.

## 1. Introduction

Prior accounting research examines the effects of managers' individual characteristics and institutional factors on budgetary reporting (Brown et al., 2009; Hannan et al., 2006; Evans et al., 2001; Chow et al., 1988). However, managers often make budgetary reporting decisions not in isolation, but surrounded by other "peer" managers. Recent research shows how managers' decisions are influenced by peer behavior (Emett et al., 2018; Huddart and Qu, 2014). While peer behavior is important, we examine the impact that merely the similarity of a peer manager's decision environment to one's own has on budgetary reporting. This is especially relevant as managers generally know less about their peers' actions than about their peers' environment.<sup>1</sup> The process of comparing and acting on the degree of similarity between one's own environment and that of a referent other is called self-categorization. In this study, we identify how self-categorization influences managers' budgetary reporting.

Self-categorization theory suggests that managers feel a part of a group

when they share common environmental circumstances with other peer managers (Turner et al., 1987). As a manager feels part of a group, s/he is prone to behave in ways that adhere to the perceived social norms of those peer group members (Wenzel et al., 2002; Wenzel, 2001; Hogg and Terry, 2000; Mummendey and Wenzel, 1999). Of course, there may be situations, such as when submitting budget reports, where a manager is unable to observe peer managers' behaviors. In these situations, the manager forms expectations about social norms by projecting his or her own beliefs on peer group members (Bauman and Geher, 2002; Baumeister et al., 1998). That is, a manager expects peers to behave the same way the manager intends to behave – a consensus effect (Ross et al., 1977). Applying this consensus effect to self-categorization theory, we expect managers in a more similar environmental situation to that of a peer manager feel less inhibited in engaging in their desired behavior and, inasmuch the manager acts on the lowered inhibition, they will engage in that behavior to a greater degree. In this study, we examine the effect of environmental similarity on budgetary reporting behavior through self-categorization and the consensus effect.

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<sup>1</sup> For example, managers may be aware that they and their peer managers are all submitting budgets for an upcoming fiscal period, but are unaware of how much budget each manager is submitting and even less aware of whether the submission is in excess of that needed to accomplish the objective.

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We manipulate the degree of self-categorization through environmental similarity. We introduce environmental similarity to the managers by providing information about a manager's own workforce span of control and a peer manager's span of control. We believe that span of control is a business environment dimension that is ubiquitous in managerial decision-making (Ernst et al., 2004), is easily compared between managers, and has been found to be relevant in the context of participative budgeting (Hannan et al., 2010). Specifically, we inform participants, playing the role of departmental managers, that the number of employees they supervise is identical to the number of employees a peer manager supervises. We then manipulate environmental similarity by informing the participant about a future workforce change (or lack thereof) in the peer's department. To avoid evoking behaviors associated with distributive fairness and reciprocity, we attribute the workforce change to exogenous economic conditions.

Empirically, we find that those whose expected span of control is the same submit higher budgets than those whose expected span of control differs. We also find that those whose expected span of control is the same report higher levels of perceived similarity to the peer, supporting the theoretical connection between environmental similarity and self-categorization. As further support of self-categorization reporting behavior, we find a positive association between participants' self-reported perceived similarity and their budget reports. Utilizing a second experiment, we test the relation between environmental similarity and the consensus effect (i.e., the belief that perceived peers would behave similarly to oneself). We find further evidence that supports our causal model, connecting greater environmental similarity to similar reporting behavior and to higher levels of budgetary over-reporting.

We contribute to the participative budgeting literature in two ways. First, we incorporate a key component to decision making in organizations – the presence of other decision makers (i.e., peers) surrounding the manager – into a budgetary reporting task. Second, we demonstrate how an environmental factor (similarity between one's own and a peer's decision environment) influences budgetary reporting even when managers cannot observe peers' actual behavior. Specifically, self-categorization behavior leads those with greater similarity of one's own situation to that of a peer manager to report higher reported budgets. One potential application of this finding is that owners consider limiting communication about similarities between managers' environmental conditions in cases where managers may desire to behave in ways that are detrimental to the owners' welfare.<sup>2</sup>

The remainder of the paper is organized as follows: Section 2 provides a review of relevant literature and develops our hypothesis; Section 3 describes the experimental method and design; Section 4 reports results; and Section 5 summarizes, discusses the study's findings and limitations, and concludes.

## 2. Literature review and hypothesis development

### 2.1. Participative budgeting

In participative budgeting, managers propose and receive approval from firm owners to incur budgeted costs in return for promised value (e.g., providing a good or service benefiting the firm's owners). Managers often possess more precise information about the actual costs required to deliver the promised value than do firm owners. Further, managerial control systems may be sufficiently weak that managers have the opportunity to over-report, receiving approval for budgets in excess of the actual cost of resources needed (Hannan et al., 2010, 2006; Dunk, 1993; Chow et al., 1988; Melumad and Reichelstein, 1987;

<sup>2</sup> Alternatively, owners might consider mitigating the negative reporting effects of self-categorization by offering additional information, such as attributions that explain changes or lack of changes in span of control, which differentiates environmental conditions across departments despite similar changes to span of control.

Baiman and Evans, 1983).<sup>3</sup> Managers can then benefit from over-reporting by increasing their personal compensation and perquisite consumption (Yermack, 2006; Borokhovich et al., 1997), investing in value-decreasing “pet” projects (Giroud and Mueller, 2011; Titman et al., 2004), inflating loyal employees' wages (Giroud and Mueller, 2011, 2010; Cronqvist et al., 2009; Bertrand and Mullainathan, 2003), and engaging in general empire-building behaviors (Chen et al., 2012; Masulis et al., 2007) at the owners' expense.<sup>4</sup>

Owners seek to minimize managers' personal use of excess budgets in order to increase the value of their firm. Prior literature has demonstrated both direct incentive mechanisms (Holmstrom and Milgrom, 1987) and individual behavioral characteristics such as honesty preferences influence managers' choice to over-report, suggesting managers have disutility for dishonest activities that may offset the utility of personal benefits gained by over-reporting (Rankin et al., 2008; Hannan et al., 2006; Evans et al., 2001).

Recent research has begun to examine the effect of peer behavior on individual decisions in settings of interest to management accountants (Emett et al., 2018; Huddart and Qu, 2014; Tayler and Bloomfield, 2011). As managers are often surrounded by their peers when making decisions, understanding the effect that peers have on the decision-making process is particularly important. Tayler and Bloomfield (2011) find that formal controls influence individuals' conformity to peer behavior (i.e., descriptive norms). Emmett et al. (2018) show that individuals asymmetrically respond to peers' actions when the individuals' behavioral norms are contrary to those actions, by conforming more with self-interested actions of peers than with altruistic actions of peers. In a managerial reporting setting, Huddart and Qu (2014) show that managers report more honestly when they observe that their peers report more honestly. While these studies focus on the influence of observed peer behavior, we focus on a more general construct of the mere presence of a peer and the resulting ability of a manager to compare his or her own environmental situation (rather than behavior) to that of a peer. Specifically, we employ self-categorization theory and the consensus effect to explain the expected impact of similarity between managers' and their peers' decision-making environments on budgetary reporting responses when managers cannot observe peer behavior.

### 2.2. Self-categorization theory and the consensus effect

Self-categorization theory suggests that people view themselves as part of a group of individuals whose characteristics (such as environmental situations) are similar to their own (Turner et al., 1987). People self-categorize into groups by mentally formulating a list of individual and situational characteristics that are common among members, resulting in group identities whose strength is commensurate with the degree of shared commonality (Latané et al., 1979). Group members feel less inhibited in acting on behaviors that they perceive to be common to a group because they believe those behaviors align with the group's social norms. Thus, the more similar the individuals' characteristics, the less inhibited those individuals feel in engaging in behaviors they believe to be consistent with a group's norms (Wenzel et al., 2002; Wenzel, 2001; Hogg and Terry, 2000; Mummendey and Wenzel, 1999).

We are specifically interested in settings where potential group

<sup>3</sup> Theoretically, firm owners approve managers' use of their resources. Practically speaking, we recognize that firm owners often delegate this budget approval authority to boards of directors and senior managers within the firm, each of whom may have an opportunity to use company resources to gain personal benefits.

<sup>4</sup> Anecdotally, one of the authors, while employed by a Fortune-100 company, observed cases where lower- and mid-level managers manipulated budget submissions for personal gain. In one case, the manager manipulated budgets across projects to avoid requesting resources when justification was more difficult (e.g. creating a “bank” of resources to ease the manager's workload). In a second case, the manager manipulated budgets to avoid layoffs within that manager's team.

members are aware of one another but cannot observe each other's actual behavior. For example, an organization with multiple division managers who each privately submit a budget to corporate headquarters would represent such a setting. In this case, managers who face particular environmental circumstances must base their perceptions about acceptable budget reporting norms on their *expectations* (rather than *actual* observation) about how other division managers who face similar circumstances would report.<sup>5</sup> In forming these expected group norms, Ross et al. (1977) suggest that an individual group member assumes that other group members behave as the individual would behave. Ross et al. call this the "consensus effect". Subsequent research establishes that the consensus effect is theoretically sound and prevalent in practice (Ellingsen et al., 2010; Vanberg, 2008; Dawes, 1989; Hoch, 1987). Thus, we expect that individuals who cannot observe actual peer behavior perceive that the group's social norms are consistent with their *own* behaviors. This argument is consistent with research that asserts that individuals utilize environmental characteristics to decipher acceptable norms of behavior (Blay et al., 2018; Cialdini and Trost, 1998).

In our participative budgeting setting, managers must decide whether to trade off reporting accurately (honest reporting) against accumulating wealth through over-reporting (self-interested reporting). In their review of experimental evidence of honesty and truth-telling behaviors, Rosenbaum et al., (2014) introduce the concept of individuals being classified into three groups: 1) those who always prefer honesty over self-interest (unconditional truth-tellers), 2) those who always prefer self-interest over honesty (unconditional over-reporters), and 3) those whose relative preferences for honesty and self-interest are dependent on environmental conditions (conditional over-reporters). The consensus effect, as applied to our participative budgeting in which peer behavior cannot be observed, suggests that managers project their own desired reporting behavior, be it unconditional truth-telling, unconditional over-reporting, or conditional over-reporting, on the peer manager. In sum, managers perceive their peers' behavior to be a mirror image of their own desired behavior.

Combining the consensus effect with self-categorization theory in our setting, we expect those managers who face more similar environmental circumstances to that of a peer will feel more justified in engaging in their *own* preferred reporting behavior. While we do not expect self-categorization to influence managers' reporting type, self-categorization theory and the consensus effect suggest that those managers who face more similar environmental circumstances to that of a peer feel more comfortable in engaging in their desired behavior.<sup>6</sup> Thus, those managers who are comfortable over-reporting and whose reporting decisions are influenced by environmental conditions (i.e., conditional over-reporters) are likely to *increase the magnitude of their budgets* when they find themselves in similar circumstances to those of a peer manager. In concept, the behaviors of those managers who prefer to report truthfully (i.e., unconditional truth-tellers) and those who maximize self-interest (i.e., unconditional over-reporters) would also be similarly reinforced. However, this would theoretically result

<sup>5</sup> We acknowledge that although peer managers may not directly observe each other's budget submission, they are likely to have a probabilistic understanding of what might be a reasonable range of budget within which a manager would submit. We discuss the implications of this notion as it relates to corporate stakeholders in the experimental instructions and task (Section 3.3) and in implications for practice (Section 5).

<sup>6</sup> It is possible that managers who desire to over-report consider whether an unseen peer's reporting behavior will increase the probability that headquarters will detect their own over-reporting behavior. If this were the case, managers might feel greater threat of detection when they are in dissimilar environmental circumstances because they are less confident in how an unseen peer would report, resulting in a more conservative budget report. As is discussed in Section 3.3, our experimental conditions impose no risk of detection on our participants so this potential explanation for the hypothesized pattern of behavior should be minimized. However, we cannot completely rule out the possibility that participants respond more conservatively in dissimilar environmental conditions due to higher detection uncertainty because we cannot directly measure participants' perceptions of and responses to detection risk.

in accurate reporting or max budget reporting regardless of the similarity of environmental circumstances since managers cannot behave any more honestly than by truthfully reporting the actual future costs or any more opportunistically than by reporting the max budget possible.<sup>7</sup> In short, in our participative budgeting setting, the effect of self-categorization on budgetary reporting through lowered inhibitions could only empirically manifest in managers who have conditional preferences for over-reporting (i.e., conditional over-reporters). Therefore, on average, we expect managers facing similar environmental conditions to report higher budgets than those who face dissimilar conditions.

**Hypothesis.** Managers in a more similar situation to that of a peer manager report higher budgets than managers in a less similar situation to that of a peer manager.

This hypothesis can also be framed using Bicchieri's (2006) model of social norm activation. Social norm activation theory requires three necessary and sufficient conditions for a norm to be activated: 1) a norm exists and applies to the current situation, 2) a sufficiently large subset of people conforms to the norm in similar circumstances, and 3) a belief that a sufficiently large subset of individuals expects conformance to the norm in similar situations (Blay et al., 2018; Bicchieri, 2006). The first condition holds in our setting as potential budgetary reporting norms are many (e.g., norm of slack taking, norm of honest reporting, etc.) and are well understood. The second condition runs parallel to the reasoning leading up to our hypothesis. Specifically, we argue that self-categorization and the consensus effect work in tandem to cause managers to infer that others behave as they do and that this inference strengthens in the degree of environmental similarity. That is, similar circumstances among individuals strengthens the belief that others (in addition to oneself) adhere to the norm (of over-reporting). The third condition is less relevant to our setting because our setting does not allow for monitoring or ensuring conformance to the reporting norm.

In Panel A of Fig. 1, we present a graphical model at the construct level summarizing the relations between environmental similarity, self-categorization, consensus effect, and desired reporting that lead to our hypothesis above.

### 3. Method and design

#### 3.1. Participants

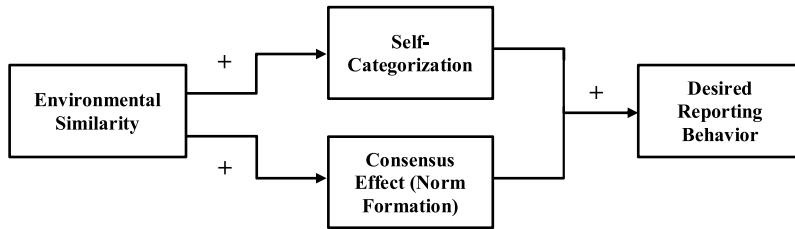
Fifty-seven (seventy-eight) business students recruited from upper division undergraduate and master's-level courses participated in Experiment 1a (Experiment 1b).<sup>8</sup> The students were randomly assigned to one of three (four) experimental conditions. Participants worked on the task individually and were given monetary compensation for participating in the study.<sup>9</sup> We exclude two participants each from Experiments 1a and 1b from our analyses who report budgets less than actual cost as this study is primarily concerned with the effect of environmental similarity on over-reporting relative to truthful reporting, rather than to altruistic (budget that is less than actual cost) reporting. All results are inferentially consistent if we include these participants in the analyses.

<sup>7</sup> Note that a discrete truthful report requires certain knowledge of actual future costs. It is possible that self-categorization behavior might interact with truthful reporting in an environment where actual future costs are uncertain. We leave this question for future research to investigate.

<sup>8</sup> The choice to recruit undergraduate and graduate business students is consistent with prior research in budgetary reporting (Rankin et al., 2008; Hannan et al., 2006).

<sup>9</sup> Immediately prior to the experiment, we collected social value orientation (SVO) data from the participants consistent with Van Lange et al., (1997) to control for any impact it may have on individual behavior (Upton, 2009; Parks and Rumble, 2001; Van Lange, 1999). The statistical results are materially consistent whether or not SVO measures are included as an independent variable in the empirical tests.

Panel A: Model at construct level



Panel B: Model tested with Experiments 1a, 1b, and 2

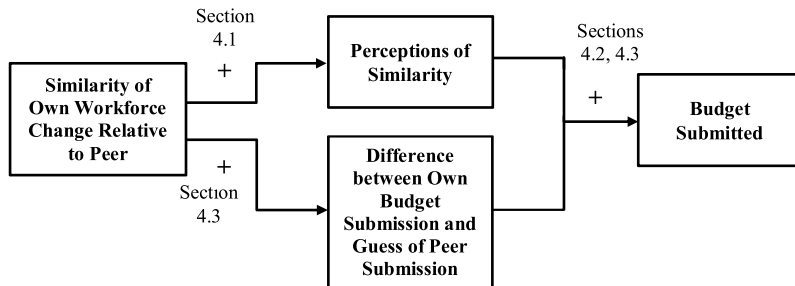


Fig. 1. Model of How Environmental Similarity Affects Budgetary Reporting. This figure shows the theoretical path by which environmental similarity affects budgetary reporting. Panel A shows this path at the construct level while Panel B presents the model at the operational level, while also indicating which sections of the paper test each link.

3.2. Setting

The setting of this study has two unique characteristics that help answer the research question of interest. First, we manipulate managers’ workforce span of control, as defined by the number of subordinates they supervise (Urwick, 1956), as our proxy for similarity in the decision-making environment. We use span of control in the setting as it is a salient and dynamic feature of the modern workforce, one that is associated with managerial decision-making (Ernst et al., 2004) and, specifically, participative budgeting (Hannan et al., 2010). Further, span of control is a business environment dimension along which managers can easily compare themselves with other managers, given the availability of organizational charts.<sup>10</sup>

In our experimental setting, both the focal manager and the peer manager begin in a similar environmental condition with the same workforce span of control within the same firm. We then manipulate environmental similarity by providing participants with information that the manager’s and the peer’s span of control will either stay the same or change. Using this manipulation, we can identify the impact of anticipated environmental dissimilarity on budget reporting without introducing between-firm heterogeneity such as firm size and structure. Further, by using peers within the same company, we can better establish plausible similar/dissimilar conditions than if they were managers within different companies. To increase the salience of our manipulation, we attribute a small portion (from 2.7 to 5.4 percent) of participants’ compensation to their span of control.

Second, we offer a setting in which anticipated workforce changes are exogenously determined by economic conditions outside of the control of the firm. This exogenous attribution likely reduces good and bad intent as potential reasons for the action taken by the firm,

<sup>10</sup> We note that Hannan et al. (2010) manipulate span of control and find that increases in span of control reduce the number of projects accepted by superiors and result in lower project costs reported by subordinates. Hannan et al. (2010) link span of control to the number of projects that superiors must consider. In contrast, we manipulate environmental similarity through changes in span of control relative to an unseen peer. Further, we limit span of control to merely the number of subordinates in a department rather than the role, leadership level, or reporting complexity in order to minimize possible confounding effects.

reducing the managers’ strong, and often charged, response to perceived intentions (Falk et al., 2008; Falk and Fischbacher, 2006). Removing intent leaves only the consequence of the action itself (i.e., the anticipated workforce change) to influence budgetary reporting.

3.3. Instructions and task

We asked participants to make decisions in a business setting. The task required participants to take the role of a department manager in a manufacturing company. We presented the participants with an overview of the company and the division to which their department belonged. Also, they were informed that another, anonymous participant in the same session would (and did) take the role of a manager of a peer department in the same division of the company. These departments were designed to use similar technology and factor inputs (i.e., plastic injection molding) for their products but to be in independent product markets (automotive parts versus children’s playground equipment), lessening the chance that participants might perceive the demand for products manufactured by each of the two department’s to be related and/or that there would be departmental tradeoffs between labor inputs.<sup>11</sup> Before the participants knew which department they had been assigned to manage, they were required to read the instructions for both department managers’ roles. Providing both sets of instructions allowed participants to know the roles both they and their peer manager were taking. We present these instructions in the Appendix.

We gave the participants specific details regarding their decision scenario, modeled after Hannan et al. (2006).<sup>12</sup> We told participants that, as the department managers, they would need to determine what budget costs to

<sup>11</sup> In the event that participants felt they were competing for human resources and that environmental similarity increases this perception (the more similar the environment, the greater the competition for resources), we would expect participants to report smaller budgets in order for their department to appear more profitable than the peer manager’s department. If present, this confound would empirically manifest itself contrary to our hypothesis, biasing against confirmatory results.

<sup>12</sup> As our study is not investigating the effect of the appearance of honest behavior or impression management, our design differs from Hannan et al. (2006) in that we simplify the experimental setting by not assigning participants the role of the firm owner, but instead we refer to the firm owner as “Corporate” within the experimental instructions.



report to corporate headquarters (Corporate). We simulate the monitoring cost to Corporate of discerning the true production resources needed by informing participants that Corporate would never know their departments' actual costs but only a range of potential actual costs.<sup>13</sup> This range of potential costs was a uniform distribution of costs per unit of production (4.00 lira, 4.05 lira, 4.10 lira, ..., 6.00 lira) for 1000 units of production for the firm each period. Subsequently, we gave participants the actual cost for the product, allowing us to hold constant the potential for a moderating effect of uncertainty and risk-aversion on budgetary reporting (Kren, 2003; Chow et al., 1995, 1988; Young, 1985). Thus, any report submitted over the actual budget directly increases the manager's wealth while decreasing Corporate welfare.

Participants' compensation for the task had three components—a base salary of 1000 lira, a supervisory bonus of 100 lira per employee in the department, and the difference (from 0 to 1750 lira) between the budget reported and the actual cost.<sup>14</sup> Each participant began the experiment with four employees within their department. The sum of lira earned between the two periods was converted to dollars at the end of the task, averaging approximately \$13.00 of compensation per participant. Upon completion of the task, participants completed a post-experimental questionnaire. Participants took an average of fifteen minutes to complete the task. In Fig. 2 we present a flowchart showing the timing the experimental procedures.

### 3.4. Experimental design and treatments

Experiment 1a utilizes a  $1 \times 3$  between-subjects experimental design. Each participant received an announcement of a workforce change affecting the peer manager's department in a future period. We manipulated whether the announced peer's workforce change was an expansion (+1 employee), a reduction (-1 employee), or no change in headcount, while we announced that there was no workforce change for the focal manager's own department. In essence, we manipulated, through the peer's workforce change announcement, the similarity of the peer's situation vis-à-vis the focal manager's situation (i.e., an announcement of no workforce change for either department being more similar than an announcement of a workforce increase or decrease in the peer manager's department coupled with the announcement of no workforce change in the focal manager's department).<sup>15</sup>

<sup>13</sup> We base our design decision on the assumption that there is an economically optimal equilibrium between monitoring cost and cost of over-reporting (Antle and Eppen, 1985) that leaves at least some room for potential unobservable over-reporting. We further discuss our contribution in context of and potential limitations due to this design choice in Section 5.

<sup>14</sup> It is possible that the anticipated headcount change, and particularly its associated 100 lira relative pay difference between the manager and his or her peer, triggers a response to distributive fairness. However, we find no difference (untabulated) between conditions in participants' assessment of the importance of the supervisory bonus with respect to their budget report decision. If participants were responding to differences in relative pay, we would expect to find a difference in this measure. That being said, include control variables that capture differences in relative headcount changes to further account for potential influences of relative pay.

<sup>15</sup> By using actual participants to represent the anonymous peer managers, we incidentally collected data from subjects who receive an announced workforce change for their own department that is an expansion (+1 employee) or a reduction (-1 employee), while holding constant no workforce change for the peer manager's department. We do not use this data in any of our tests as we expect these participants' responses to be more directly influenced by the perceived fairness of their own workforce change rather than how dissimilar their workforce change is relative to their peer's lack of change. As such, these cells represent a relatively weak form of environmental dissimilarity when a focal manager's workforce changes. In Experiment 1b, we test our hypothesis using a stronger form of environmental dissimilarity (allowing both the focal manager's and the peer manager's workforce to change). That being said, including data from these excluded conditions as additional Not Same conditions, we continue to find a statistically significant effect of environmental similarity on budgets submitted.

In Experiment 1a, by not varying the focal manager's own workforce we attempt to hold constant the direct effect that a workforce change might have on the manager. However, we acknowledge that a real-world setting in which there is no change in a manager's own span of control environment is not as realistic as a setting in which both the focal manager's environment and the peer's environment are changing at the same time. As such, in Experiment 1b we manipulate the focal manager's own department is an expansion (+1 employee) or a reduction (-1 employee) while the peer manager's announced workforce change is either an expansion (+1 employee) or a reduction (-1 employee), resulting in a  $2 \times 2$  (Same/Not Same  $\times$  Own Decrease/Own Increase) between-subject design.

After reading introductory materials, instructions, and completing comprehension questions, participants received an announcement from Corporate headquarters stating the following:

"Due to economic factors outside the control of Corporate headquarters, the following will take place STARTING IN PERIOD 2:

- The headcount of < your department > will be INCREASED/DECREASED from four product engineers to five/three [MAINTAINED at four product engineers].
- The headcount of < the peer department > will be INCREASED/DECREASED from four product engineers to five/three [MAINTAINED at four product engineers]."

An explanation of the effects of the announced workforce change on future compensation and future costs followed the announcement. Participants then selected their budget to report for the first period and answered questions about their reporting choice. We then instructed the participants to make a budgetary reporting decision for the second period and asked additional debriefing questions. There were no manipulations introduced in the second period. The second period budgetary reporting decision was included to eliminate any perception of deception by following through with what the experimental materials indicated was going to happen.<sup>16</sup>

Although we designed the experiment to avoid invoking perceptions regarding distributive fairness by attributing the focal and peer department managers' future headcount changes to exogenous factors, we recognize that participants may be influenced by their consideration of their own treatment (direct reciprocity) and their own treatment relative to their peer's treatment (benchmarking). We control for direct reciprocity by including an indicator variable, "OWN WORKFORCE CHANGE", coded 1 if managers are told they will gain a headcount, 0 if told their headcount will remain unchanged, and -1 if told will lose a headcount.

We control for benchmarking effects in several ways. First, we interact OWN WORKFORCE CHANGE with our environmental similarity manipulation indicator, "SIMILARITY OF WORKFORCE CHANGE", to assess whether the focal manager reciprocates, if at all, differently when their peer manager's headcount is expected to change in the same direction as the focal manager's headcount. Second, we create a variable, "DIFFERENCE IN WORKFORCE CHANGE", that measures the difference between the peer's anticipated headcount change and the participant's own (lack of) headcount change, a variable whose value ranges from -2 if the peer

<sup>16</sup> In this study, the first period is the only period of interest for a number of reasons. The first period is the only period in which all managers faced the same reporting and compensation environment. Additionally, the experimental manipulation (anticipated change in workforce) occurred only once, prior to the first period, allowing us to cleanly measure participants' reaction to the anticipated change without the impact of the actual headcount change. Finally, using the second period as a dependent variable may introduce undesired noise that may confound attribution to our intended manipulations (Falk et al., 2008).

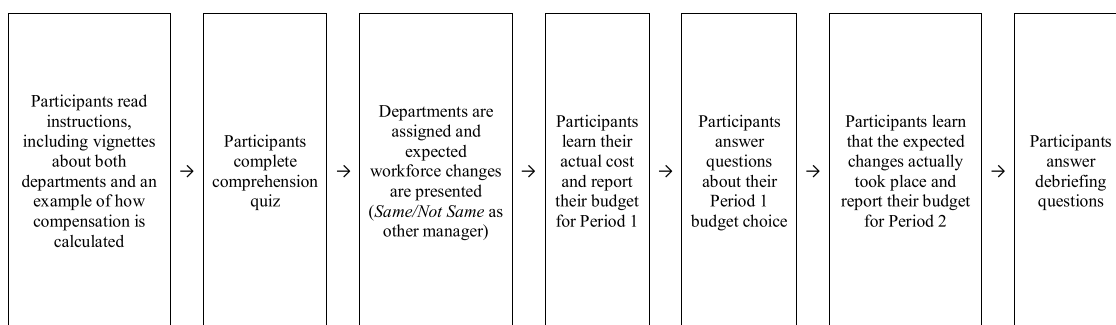


Fig. 2. Flowchart of Experimental Procedure.

This figure provides a breakdown of the experimental steps in the order they were given to the participants. The entire experiment took about 15 min to complete.

manager loses a headcount and the focal manager gains a headcount to 2 if the peer manager receives a headcount and the focal manager loses a headcount. If a focal manager were benchmarking the fairness of their treatment, we would expect this variable to be positively associated with budget reporting.<sup>17, 18</sup> To further assess managers' use of peer headcount change in their reporting decision, we ask participants to report the weight they placed on the peer's headcount change when making that decision.<sup>19</sup> We then interact this weight by DIFFERENCE IN WORKFORCE CHANGE to identify the moderating effect of attending to the peer's headcount change on benchmarking behavior.

Finally, it is possible that managers who are consciously attending to their peer's treatment may be less likely to engage in self-categorization behavior (crowding out). We control for potential crowding out by interacting the weight placed on the peer's headcount change with SIMILARITY OF WORKFORCE CHANGE. If crowding out were occurring, we would expect the self-categorization effect of environmental similarity to be diminished, resulting in a negative coefficient on that interaction.<sup>20</sup>

It is also important to note that, consistent with prior literature (Rankin et al., 2008), the actual cost across treatments for the first period is held constant (in this study, actual cost was 4.25 lira per unit). This design choice allows for an identical amount of over-reported budget to be available to all participants.

<sup>17</sup> In additional analysis, we examine participant responses to a question about the fairness of their change (or lack of change) in span of control and find that there is a difference between participants' perceived fairness due to "OWN WORKFORCE CHANGE" ( $p = 0.075$ , two-tailed) and "DIFFERENCE IN WORKFORCE CHANGE" ( $p = 0.001$ , two-tailed). The differences in perceived fairness further accentuate the need to include controls for direct reciprocity and benchmarking effects.

<sup>18</sup> Although we attribute the prospective headcount changes to exogenous economic conditions, it is possible that managers may consider their expected headcount change to be the result of their own performance. In this case, to improve their relative performance, focal managers who benchmark against their peer might report a lower budget when they are losing a headcount while the peer is gaining a headcount. Consequently, we assess the significance of the benchmarking variables using a two-tailed expectation.

<sup>19</sup> The self-reported importance of the peer's headcount change is measured on a 1 – 7 point Likert scale, from "No importance" to "High importance".

<sup>20</sup> The process of self-categorization is primarily a subconscious activity (Keller and Chen, 2017; Hale, 2017), while competitive benchmarking is likely a conscious activity. Consequently, we expect greater overt focus on the peer's headcount situation to result in benchmarking rather than self-categorization. However, it is possible that managers consciously assess environmental similarity in an effort to discern reporting norms, in which case we would expect the interaction between the weight placed on the peer's headcount change and SIMILARITY OF WORKFORCE CHANGE to be positively associated with budget reports. Thus, we maintain a two-tailed expectation for the crowding out controls in our empirical tests.

### 3.5. Dependent measure

The dependent variable of interest is the budget reported for the first period.

## 4. Results

### 4.1. Link between environmental similarity and self-categorization

To corroborate the theoretical link between environmental similarity and self-categorization (see Panel B of Fig. 1), we assessed perceived similarity by asking participants to rate their level of agreement (on a 9-point scale) with the following statement: "You and the department manager of the other department in the Injection Molding Division (i.e., Auto Parts Department) faced similar situations." As reported in Table 1, those participants with the same expected workforce situation as their peer rated their agreement at an average level of 2.84, significantly higher than zero ( $t = 10.01$ ;  $p < 0.001$ , two-tailed).<sup>21</sup> In contrast, participants with a different expected workforce situation rated their agreement at an average level of 0.22, which does not differ from zero ( $t = 1.01$ ;  $p = 0.316$ , two-tailed). In untabulated analysis, we find that the difference in perceived similarity between participants with the same expected workforce situation and different expected workforce situation is also significant ( $p < 0.001$ , one-tailed). Not only do these analyses serve as a check of our manipulation of environmental similarity, but they also provide evidence that environmental similarity has a significant effect on the extent of self-categorization as measured by perceptions of similarity.<sup>22</sup>

### 4.2. Descriptive statistics and hypothesis tests

On average, focal managers who faced the same headcount change as the peer manager over-reported their budget by 0.536 lira per unit (Table 1). In contrast, focal managers whose headcount change differed from their peer over-reported their budget by 0.280 lira per unit. Not only do the reporting differences statistically differ ( $p = 0.003$ , one-tailed), but they represent an economically significant difference in the proportion of available over-reporting available to the participants (0.000 to 1.750 lira). Specifically, those in a similar workforce change condition use an average of  $(0.536 / 1.750 =)$  31% of the available

<sup>21</sup> Throughout the results we report estimated marginal means that account for reciprocity, benchmarking, crowding out, and other potential confounding factors captured by our control variables.

<sup>22</sup> We observe a significant effect of the direction of the peer's headcount change on perceived similarity. The difference in perceived similarity between those in No Change/Peer Increase (0.89) and No Change/Peer Decrease conditions ( $-0.89$ ) is significant ( $p = 0.023$ , two-tailed). The difference in perceived similarity between peer change conditions reinforces the need to account for potential benchmarking behavior vis-à-vis the peer's treatment.

**Table 1**  
Estimated Marginal Mean (Standard Error) for Perceived Similarity and Budget Over-Report, and Number of Participants by Condition.

(Experiment 1)			
Similarity of Workforce Situation <sup>a</sup>	Estimated Marginal Mean (Standard Error) <sup>b</sup>		
	Perceived Similarity <sup>c</sup>	Budget Over-report <sup>d</sup>	N
Same (1a & 1b)	2.84 (0.28)	0.536 (0.073)	57
No Change (1a)	3.15 (0.50)	0.618 (0.120)	20
Decrease (1b)	2.12 (0.51)	0.629 (0.137)	17
Increase (1b)	3.15 (0.47)	0.375 (0.126)	20
Not Same (1a & 1b)	0.22 (0.22)	0.280 (0.057)	74
No Change/Peer Increase (1a)	0.89 (0.50)	0.244 (0.122)	17
No Change/Peer Decrease (1a)	-0.89 (0.49)	0.289 (0.119)	18
Decrease/Peer Increase (1b)	0.17 (0.45)	0.374 (0.121)	20
Increase/Peer Decrease (1b)	0.70 (0.46)	0.210 (0.123)	19
Total (1a & 1b)	1.36 (0.18)	0.391 (0.045)	131

<sup>a</sup> This represents the similarity of the expected workforce situation compared to that of a peer. We manipulated this condition by communicating a future increase, decrease, or no change in headcount in a peer manager's department while communicating a future increase, decrease, or no change in headcount within one's own department. Whether or not the change in headcount was the same for the manager and the peer determines the similarity of the change.

<sup>b</sup> Marginal means and standard errors are all calculated based on OLS regression using the experiment's 1a and/or 1b data indicated.

<sup>c</sup> This variable represents the participants' self-reported level of agreement with the statement, "You and the department manager of the other department in the Injection Molding Division (i.e., [Name of other Department]) faced similar situations." The variable is measured using a {-4, -3, -2, -1, 0, 1, 2, 3, 4} where -4 is "strongly disagree", -2 is "moderately disagree", 0 is "neutral", 2 is "moderately agree", and 4 is "strongly agree".

<sup>d</sup> This variable represents the amount of excess budget reported by the manager, where the range is 0.00 lira per unit (actual cost) to 1.75 lira per unit (max available).

amount they could over-report while those in a dissimilar workforce change condition only use  $(0.280 / 1.750 =)$  16%.

We more formally test our hypothesis by comparing the amount of budget reported by focal managers whose peer manager received the same change in future workforce with that reported by managers whose peer manager received a different change in future workforce. In Table 2 Panel A, we report results of multi-variate analysis using the total sample (Experiments 1a & 1b), a sub-sample in which the focal manager's headcount is unchanged (Experiment 1a), and a sub-sample in which both the focal manager's and the peer manager's headcount changes (Experiment 1b). We find evidence that environmental similarity influences the magnitude of budgetary reporting within all three respective samples ( $p = 0.001, 0.003,$  and  $0.023$  respectively, one-tailed). These results support the prediction that self-categorization leads to higher budgetary reporting in a participative budgetary setting. That is, those managers who find themselves in a similar environment to that of their peer over-report more than managers who are in a dissimilar environment.

We only find marginal evidence of crowding out, in which the focal manager's attention to the peer manager's workforce change diminished the (sub-conscious) effect of self-categorization, in the sub-sample that includes focal managers whose workforce remains unchanged ( $-0.162, p = 0.052$ ). The absence of evidence of crowding out in sub-sample 1b may be because managers are attending relatively more to their own headcount change than that of the peer, supported by marginal evidence of direct reciprocation for the direction of the focal manager's own workforce change ( $-0.133, p = 0.079$ , one-tailed). The direct reciprocation effect of the focal managers' workforce change appears to be tempered by our deliberate choice to strip away as much intent on behalf of the "gift giver" (Falk et al., 2008; Falk and Fischbacher, 2006). In essence, participants appeared to have reciprocated only to compensate for their own expected loss in pay, but not to punish Corporate. Finally, we do not find evidence of benchmarking, presumably

due to a research design in which departments are not competing for resources.

To test the robustness of our result to the model in Panel B of Fig. 1, we substitute our manipulation of environmental similarity (i.e., workforce change relative to the peer) with participants' perceived situational similarity (to that of a peer) as the independent variable of interest. In Panel B of Table 2, we continue to see evidence of a significant positive effect of environmental similarity (through perceived similarity) on budgetary over-reporting ( $p = 0.012, 0.027$ , one-tailed) in all except the sub-sample in which both the focal and peer manager received a change in future workforce ( $p = 0.126$ , one-tailed). We find evidence of direct reciprocation for the direction of the focal manager's own workforce change ( $-0.192$  and  $-0.210, p = 0.043$  and  $0.059$ , one-tailed) in both the total sample (1a & 1b) and in the sub-sample in which both the focal and peer manager's headcount changes (1b). However, after substituting perceived similarity for our environmental similarity manipulation, we no longer observe any evidence of crowding out and continue to find no evidence of benchmarking. In sum, the evidence offered by substituting participants' perceptions of similarity for the environmental similarity manipulation supports our hypothesis that self-categorization leads to higher budgetary reporting.

#### 4.3. Supplemental experiment – evidence of a “consensus effect” and additional evidence of self-categorization

##### 4.3.1. The influence of environmental similarity on the “consensus effect”

We posit that the consensus effect is one where, absent direct observation of peer managers' reporting behavior, managers expect peers who face similar environmental circumstances to report in a similar manner to that which the managers themselves would report. In additional analysis, we seek to verify this process (see Panel B of Fig. 1) by comparing what managers report for themselves with what managers expect peer managers would report. Ideally, for such verification, we would observe whether managers project their own reporting behavior on that of an unseen peer. However, by asking each participant *directly* to both report for themselves and to predict what their peer would report under similar circumstances, we risk leading participants to answer in the same way simply to maintain internal consistency. To resolve this issue, we add a *between-subjects* manipulation to the  $2 \times 2$  design described in Section 3.4 in an additional experiment (Experiment 2). Specifically, we assign one group of participants to a condition in which they submit a budget report for their own department and a second group of participants to a condition in which they predict the cost that a peer manager would report. Those reporting for themselves are incentivized with a base wage and with any over-reported budget.<sup>23</sup> Those predicting for a peer are incentivized based on the accuracy of their prediction. The average remuneration for accuracy was designed to be approximately equal to what the prediction would have yielded the peer manager.

We match each of the participants who reported for themselves with each of the participants who predicted for a peer and calculate absolute differences between the budget submission and budget submission prediction. We then compare the difference in absolute differences between matched-pairs who have similar headcount change situations and matched-pairs whose headcount changes differ. If managers project their own reporting behavior on an unseen peer when that peer faces similar environmental circumstances, then we would expect smaller absolute differences (greater consensus effect) when matched participants are reporting/predicting under the same headcount change conditions than when facing different change conditions.

To illustrate, consider a case in which one participant submits a 4.60 lira budget report for themselves when they learn that their own headcount will decrease and the other department's headcount will increase. Suppose that participant is matched with a predicting participant who guesses that a peer

<sup>23</sup> We exclude the supervisory bonus from this additional data to offer assurance that the supervisory bonus is not the driving factor of the effect of environmental similarity.

**Table 2**  
Effects of Workforce Environment Similarity and Perceived Similarity on Budget Over-reports.

(Experiment 1) <sup>a</sup>			
Panel A: OLS Regression using Environmental Similarity to predict Budget Over-report <sup>b</sup>			
Factor <sup>c</sup>	1a & 1b Coefficient (p-value <sup>d</sup> )	1a Coefficient (p-value <sup>d</sup> )	1b <sup>e</sup> Coefficient (p-value <sup>d</sup> )
SIMILARITY OF WORKFORCE CHANGE <sup>f</sup>	0.520 (0.001)	0.919 (0.003)	0.393 (0.023)
SIMILARITY OF WORKFORCE CHANGE <sup>f</sup> x Weight placed on Peer workforce change <sup>g</sup>	-0.070 (0.136)	-0.162 (0.052)	-0.037 (0.538)
OWN WORKFORCE CHANGE <sup>h</sup>	-0.109 (0.302)		-0.133 (0.079)
OWN WORKFORCE CHANGE <sup>h</sup> x SIMILARITY OF WORKFORCE CHANGE <sup>f</sup>	-0.023 (0.922)		
DIFFERENCE IN WORKFORCE CHANGE <sup>i</sup>	-0.102 (0.378)	0.031 (0.861)	-0.153 (0.192)
DIFFERENCE IN WORKFORCE CHANGE <sup>i</sup> x Weight placed on Peer workforce change <sup>g</sup>	0.023 (0.294)	-0.019 (0.691)	0.032 (0.188)
Weight placed on Peer workforce change <sup>g</sup>	0.077 ( $< 0.001$ )	0.084 (0.001)	0.074 (0.001)
Adjusted R <sup>2</sup>	0.369	0.382	0.351
N	131	55	76
Panel B: OLS Regression using Perceived Similarity to predict Budget Over-report <sup>b</sup>			
Factor <sup>c</sup>	1a & 1b Coefficient (p-value <sup>d</sup> )	1a Coefficient (p-value <sup>d</sup> )	1b Coefficient (p-value <sup>d</sup> )
PERCEIVED SIMILARITY <sup>k</sup>	0.077 (0.012)	0.114 (0.027)	0.050 (0.126)
PERCEIVED SIMILARITY <sup>k</sup> x Weight placed on Peer workforce change <sup>g</sup>	-0.007 (0.480)	-0.019 (0.220)	0.004 (0.746)
OWN WORKFORCE CHANGE <sup>h</sup>	-0.192 (0.043)		-0.210 (0.059)
OWN WORKFORCE CHANGE <sup>h</sup> x PERCEIVED SIMILARITY <sup>k</sup>	0.010 (0.732)		0.017 (0.616)
DIFFERENCE IN WORKFORCE CHANGE <sup>i</sup>	-0.149 (0.154)	-0.099 (0.620)	-0.189 (0.164)
DIFFERENCE IN WORKFORCE CHANGE <sup>i</sup> x Weight placed on Peer workforce change <sup>g</sup>	0.025 (0.252)	0.004 (0.938)	0.034 (0.182)
Weight placed on Peer workforce change <sup>g</sup>	0.085 ( $< 0.001$ )	0.093 ( $< 0.001$ )	0.076 ( $< 0.001$ )
Adjusted R <sup>2</sup>	0.343	0.329	0.323
N	131	55	76

<sup>a</sup> Experiment 1 pairs participants whose headcount does not change with participants whose headcount does not change, increases, decreases (1a) and pairs participants whose headcount increases or decreases with participants whose headcount increases or decreases (1b).

<sup>b</sup> This variable is calculated as the difference between budget reported and actual unit cost (4.25 lira).

<sup>c</sup> Note that the Intercept is omitted from the linear regression model because the SIMILARITY OF WORKFORCE CHANGE and DIFFERENCE IN WORKFORCE CHANGE variables are mutually exclusive and all exhaustive.

<sup>d</sup> Bold-faced p-values are one-tailed, while normal-faced p-values are two-tailed.

<sup>e</sup> Experiment 1b restricts the sample to those participants whose own department's headcount change changed. Consequently, in Panel A, the combination of OWN WORKFORCE CHANGE, SIMILARITY OF WORKFORCE CHANGE, and DIFFERENCE IN WORKFORCE CHANGE subsume (render collinear) the interaction between OWN WORKFORCE CHANGE and SIMILARITY OF WORKFORCE CHANGE. Consequently, we omit the interaction between OWN WORKFORCE CHANGE and SIMILARITY OF WORKFORCE CHANGE from the OLS regression that estimates Budget Over-report using the experiment 1b sub-sample.

<sup>f</sup> This represents the similarity of the expected workforce situation compared to that of a peer. We manipulated this condition by communicating a future increase/decrease/lack of change in headcount in a peer manager's department while communicating either no change in headcount within one's own department (1a), an increase or decrease in headcount within one's own department (1b). Whether or not the change in headcount was the same for the manager and the peer determines the similarity of the change.

<sup>g</sup> This variable equals the self-reported weight placed on the anticipated change in the peer's headcount in forming the budget report (scale of 1–7 in increments of 1).

<sup>h</sup> This represents the direction of the change in one's own span of control, coded 1 (–1) if a headcount is added (removed) in the second period.

<sup>i</sup> This variable is coded as the relative difference in headcount change between the peer manager's and one's own department. For example, the variable would take the value of 1 (–1) if the peer manager is given an additional (loses a) headcount in the second period while one's own department's headcount remains unchanged, and coded 0 if both the peer manager's and one's own headcount changes in the same manner.

<sup>k</sup> This variable represents the participants' self-reported level of agreement with the statement, "You and the department manager of the other department in the Injection Molding Division (i.e., [Name of other Department]) faced similar situations." The variable is measured using a {–4, –3, –2, –1, 0, 1, 2, 3, 4} where –4 is "strongly disagree", –2 is "moderately disagree", 0 is "neutral", 2 is "moderately agree", and 4 is "strongly agree".



manager would report a 4.55 lira budget when faced with the same setting. The absolute difference between the matched-pair's report/prediction would be 0.05 lira. Now consider a second matched-pair, in which the reporting participant again submits a 4.60 lira budget when faced with a decrease in his/her own headcount and an increase in the other manager's headcount. However, in this case, suppose the matched predicting participant is faced with an entirely different situation: a pending headcount increase with a decrease in the other department manager's headcount. The predicting participant submits a 4.45 lira budget guess. The absolute difference generated by the second matched-pair, who were asked to report/predict under different headcount change situations, is 0.15 lira or  $(0.15 - 0.05 =) 0.10$  lira greater than the absolute difference associated with the first matched-pair who were asked to report/predict under the similar headcount change situations. In this example, the 0.10 lira smaller difference for the matched-pair facing the same setting would provide evidence of the consensus effect — that managers' expectations of other managers' reports are more aligned with their own reports when they are both reporting under similar circumstances than when they are reporting under differing circumstances.

To isolate the difference-in-absolute differences associated with situation similarities between matched-pairs, we create a matched-pair situation similarity indicator variable set to 1 if the reporting participant's own and/or other department's headcount are changing in the same direction as the manager for which the predicting participant is guessing. Conversely, the indicator variable is set to 0 if the reporting participant's own and other department's headcount are changing in the opposite direction as the manager for which the predicting participant is guessing. We include the matched-pair setting similarity indicator in an OLS regression that estimates the absolute differences between budget reports and budget predictions in matched-pair participants. Given our assumption that more similarity results in smaller absolute differences, we expect the parameter estimate on the indicator to be negative.

We recognize that between-subjects comparisons of budget reports and predictions are likely confounded by between-subject variation in decision criteria. For example, it is possible that participants who perceive environmental similarity differently have greater differences than those who more consistently perceive our similarity manipulation. Consequently, we control for differences in participants' assessment of environmental similarity by calculating the absolute value of the difference in participants' level of agreement (on a 9-point scale) with the following statement: "You and the department manager of the other department in the Injection Molding Division faced similar situations." Because our dependent variable of interest is the absolute difference between each pair of reporting/predicting participants and our control variable captures between-subject differences, we expect the control variable to have a positive coefficient.<sup>24</sup>

We administer this supplemental experiment (Experiment 2) to 480 Mechanical Turk participants, of whom 42 were removed from the sample because they reported/predicted budgets lower than actual cost.<sup>25</sup> Of the

remaining 438 participants, 208 were assigned the role of managers reporting for themselves and 230 were assigned the role of a manager predicting what a peer manager would report. Matching each reporting manager with each predicting manager results in  $(208 \times 230 =)$  47,840 matched-pairs.<sup>26</sup>

We present the distribution of participants across conditions in Panel A of Table 3. In Panel B, we report the marginal means and standard errors associated with the absolute difference in budget reported between our matched pairs. The untabulated difference in absolute differences across those pairs in similar situations (0.708) and those in different situations (0.724) is significant ( $p = 0.001$ ). The results of our multivariate analysis are reported in Panel C of Table 3. As expected, the parameter estimate on the headcount situation similarity indicator ( $-0.13$ ,  $p = 0.020$ , one-tailed) suggests that managers' expectations of what other managers would report are more aligned with their own reports when they face more similar headcount changes (the consensus effect). Also as expected, the similarity perception control variable is positive and significant ( $0.012$ ,  $p < 0.001$ ), indicating that differences in perceived similarity explain differences in budget reports/predictions.

#### 4.3.2. Additional evidence of the effect of environmental similarity on budgetary reporting

Using the additional Experiment 2 data, we again test our hypothesis. In Panels A and B of Table 4, we present marginal means for perceived similarity and budget over-reports.<sup>27</sup> In Panel C of Table 4, we present multivariate results using both the environmental similarity manipulation and perceived similarity. We find evidence consistent with Experiment 1b (reported in Section 4.2 and in Table 2) except for three differences. First, we do not find evidence of focal managers' direct reciprocity (parameter estimate on OWN WORKFORCE CHANGE does not differ from zero) in either the environmental similarity manipulation model or when we substitute perceived similarity for our manipulation. It is likely that this parameter became insignificant due to the lack of supervisory bonus in the experimental design. Second, we find evidence that the crowding out effect of increased weight placed on the peer's headcount change on the environmental similarity manipulation and on perceived similarity decreases the magnitude of over-reporting ( $-0.239$  and  $-0.138$ ;  $p < 0.001$  and  $p = 0.004$ , two-tailed). This significance might be due to decreased salience of the focal managers' own treatment by omitting the supervisory bonus. Lastly, and most importantly, we find that participants' perceived situational similarity (to that of a peer) is now significantly associated with over-reporting ( $0.115$ ,  $p = 0.003$ , one-tailed). This result is statistically consistent with that of the full sample (1a & 1b) and the sub-sample in which the focal manager's workforce is unchanged (1a) reported in Table 2. Overall, these analyses further corroborate our inference that environmental similarity increases budgetary over-reports through self-categorization and the consensus effect.

## 5. Summary and discussion

Our study introduces self-categorization theory and the consensus effect to the management accounting institution of participative budget reporting to explain the effects of the reporting environment on managers' budget decisions. Specifically, we investigate the influence of similarity between a manager's own and a peer manager's environment on budgetary reporting. We apply self-categorization theory to a participative budgeting setting in which managers cannot observe their peers' behavior, suggesting that managers who find themselves facing similar environmental conditions as

<sup>24</sup> Similarly, an unconditional truth-teller matched with either a conditional or unconditional over-reporter would potentially result in greater differences than when conditional over-reporters are matched with other conditional over-reporters. Further, those participants who self-report different weights on their own headcount change and on the peer's headcount change would likely have greater differences in their report. Results become stronger with the inclusion of three additional control variables: a reporting type mismatch indicator variable (set to 1 if only one participant reports true cost, and to 0 otherwise), a measure of absolute differences in weights placed on one's own headcount change, and a measure of absolute differences in weights placed on the peer's headcount change.

<sup>25</sup> It is possible that, although each of our participants was required to pass a set of comprehension check questions, some participants did not attend to the experimental materials as well as we would expect in a more controlled experimental laboratory setting. To identify such cases, we identify 267 influential observations of participant matched-pairs, as measured by absolute studentized residuals greater than 2. In untabulated analyses, results are somewhat stronger when these observations are excluded from the analysis.

<sup>26</sup> We cluster standard errors by each of the reporting managers to account for lack of independence between matched-pairs.

<sup>27</sup> We continue to find differences between participants' level of agreement (on a 9-point scale) with the following statement: "You and the department manager of the other department in the Injection Molding Division faced similar situations." ( $p < 0.001$ , two-tailed, untabulated).

**Table 3**  
The Effect of Environmental Similarity on Consensus Effect Perceptions.

(Experiment 2)			
Panel A: Number of Participants by Condition			
Reporting for Self (Guessing for Peer)	Own (Peer) Workforce Change <sup>a</sup>		
	Own (Peer) Decrease	Own (Peer) Increase	Total
Similarity of Workforce Change <sup>b</sup>			
Same	54 (55)	55 (56)	109 (111)
Not Same	53 (55)	46 (64)	99 (119)
Total	107 (110)	101 (120)	208 (230)

Panel B: Estimated Marginal Mean (Standard Error) for Absolute Difference in Budget Report <sup>c</sup> by Matched-Pair Situation Similarity <sup>d</sup>			
Matched-Pair Situation Similarity <sup>d</sup> (Reporting/Guessing)	Own Workforce Change <sup>a</sup>		
	Own Decrease	Own Increase	Total
<i>Similar Situation:</i>			
Same/Same	0.700 (0.013)	0.704 (0.013)	0.702 (0.013)
Not Same/Not Same	0.715 (0.012)	0.715 (0.012)	0.715 (0.012)
Sub-total Similar Situation	0.707 (0.013)	0.710 (0.013)	0.708 (0.013)
<i>Different Situation:</i>			
Same/Same	0.716 (0.013)	0.714 (0.013)	0.715 (0.013)
Same/Not Same	0.727 (0.012)	0.727 (0.012)	0.727 (0.012)
Not Same/Same	0.721 (0.012)	0.729 (0.012)	0.725 (0.012)
Not Same/Not Same	0.727 (0.013)	0.729 (0.013)	0.728 (0.013)
Sub-total Different Situation	0.723 (0.012)	0.724 (0.012)	0.724 (0.012)

Panel C: OLS Regression Estimating Absolute Difference in Budgetary Report <sup>c</sup>				
Factor		B	Standard Error <sup>e</sup>	p-value <sup>f</sup>
CONSTANT <sup>g</sup>		0.696	0.014	< 0.001
MATCHED-PAIR SITUATION SIMILARITY <sup>d</sup>		-0.013	0.006	0.020
DIFFERENCE IN PERCEIVED SIMILARITY <sup>h</sup>		0.012	0.003	< 0.001
Adjusted R <sup>2</sup>	0.002			
Sample Size	208 Reporting participants x 230 Guessing participants = 47,840 matched-pairs			

<sup>a</sup> This represents the direction of the change in one's own span of control if reporting for oneself, coded 1 (-1) if a headcount is added (removed) in the second period; or the direction of the change in a peer's span of control if guessing what a peer would report.

<sup>b</sup> This represents the similarity of the expected workforce situation compared to that of a peer. We manipulated this condition by communicating a future increase/decrease in headcount in one's own department and in a peer manager's department. Whether or not the change in headcount was the same for the manager and the peer determines the similarity of the change.

<sup>c</sup> This variable is the absolute difference between the budget submitted by each participant asked to report for themselves and the budget guessed by each matched participant asked to predict what a peer would report.

<sup>d</sup> This is an indicator set to 1 when the manager's own/predicted manager's own headcount change is the same as the matched manager's peer/predicted manager's peer, and set to 0 otherwise.

<sup>e</sup> The standard errors are adjusted for lack of independence arising from using each reporting participant more than once in matched-pairs by clustering by reporting participant.

<sup>f</sup> Reported p-values are one-tailed.

<sup>g</sup> This is the average absolute difference between budget reports and guesses unexplained by other factors.

<sup>h</sup> This variable is the absolute difference between the self-reported perceived similarity of one's own departmental headcount situation with that of the peer department manager.

other managers are more comfortable engaging in their desired behavior since it is legitimized through the consensus effect.

We find that managers report higher budgets when they expect the same workforce span of control as a peer manager than when they expect a different workforce span of control. We also find evidence that managers expect a peer to report in a more similar way to their own reporting when faced with like changes to workforce span of control. These results support the premise that *when a manager cannot observe peer behavior*, the manager establishes a social norm for herself by projecting her own desired reporting behavior on the unseen peer, consequently empowering the manager to act on those desired behaviors more freely.

Our results contribute to the participative budgeting literature and have implications for accounting practice. While prior research

identifies individual and institutional factors (e.g., honesty preference, environmental uncertainty, information asymmetry, information precision) that affect budgetary reporting decisions, we demonstrate how an environmental factor, similarity of one's own circumstances to those of a referent other (i.e., peer), also influences budgetary reporting *even if there is no direct knowledge of the peer's behavior*. In addition, our results inform practice by illustrating how open communication about similarities between managers' environmental conditions can increase managers' reporting behavior. Specifically, knowledge of similar changes (or lack thereof) to managers' spans of control may increase budget over-reporting, potentially offsetting coordination, cooperation, and/or idea-sharing benefits derived from open communication. In response, corporate stakeholders may consider initiatives that emphasize differences and/or unique individualized decision processes (e.g.

**Table 4**  
Additional Evidence of the Effects of Workforce Environmental Similarity and Perceived Similarity, with Own Workforce Change, on Budget Over-report.

(Experiment 2)			
<b>Panel A: Est. Marginal Mean (Std. Error) for Perceived Similarity<sup>a</sup>, with Own Workforce Change<sup>b</sup></b>			
Reporting for Self	Own Workforce Change <sup>b</sup>		
Perceived Similarity <sup>a</sup>	Own Decrease	Own Increase	Total
Similarity of Workforce Change <sup>c</sup>			
Same	2.54 (0.25)	2.49 (0.25)	2.51 (0.18)
Not Same	-0.09 (0.24)	-0.17 (0.25)	-0.13 (0.16)
Total	1.23 (0.17)	1.28 (0.18)	1.26 (0.12)
<b>Panel B: Est. Marginal Mean (Std. Error) for Budget Over-Report<sup>d</sup>, with Own Workforce Change<sup>b</sup></b>			
Reporting for Self	Own Workforce Change <sup>b</sup>		
Budget Over-Report <sup>d</sup>	Own Decrease	Own Increase	Total
Similarity of Workforce Change <sup>c</sup>			
Same	0.695 (0.107)	0.688 (0.106)	0.692 (0.075)
Not Same	0.541 (0.102)	0.391 (0.108)	0.472 (0.069)
Total	0.619 (0.074)	0.553 (0.076)	0.587 (0.051)
<b>Panel C: OLS Regression using Similarity of Workforce Change<sup>c</sup> or Perceived Similarity<sup>a</sup> to predict Budget Over-report<sup>d</sup>, with Own Workforce Change<sup>b</sup></b>			
Reporting for Self			
Factor <sup>c</sup>	Similarity of Workforce Change Coefficient (p-value <sup>d</sup> )	Perceived Similarity Coefficient (p-value <sup>d</sup> )	
SIMILARITY OF WORKFORCE CHANGE <sup>c</sup>	1.033 (< 0.001)		
PERCEIVED SIMILARITY <sup>a</sup>		0.115 (0.003)	
SIMILARITY OF WORKFORCE CHANGE <sup>c</sup> x Weight placed on Peer workforce change <sup>e</sup>	-0.239 (< 0.001)		
PERCEIVED SIMILARITY <sup>a</sup> x Weight placed on Peer workforce change <sup>e</sup>		-0.138 (0.004)	
OWN WORKFORCE CHANGE <sup>b</sup>	-0.041 (0.298)	-0.064 (0.353)	
OWN WORKFORCE CHANGE <sup>b</sup> x PERCEIVED SIMILARITY <sup>a</sup>		0.025 (0.550)	
DIFFERENCE IN WORKFORCE CHANGE <sup>b</sup>	-0.027 (0.764)	-0.029 (0.813)	
DIFFERENCE IN WORKFORCE CHANGE <sup>b</sup> x Weight placed on Peer workforce change <sup>e</sup>	0.006 (0.774)	0.013 (0.685)	
Weight placed on Peer workforce change <sup>e</sup>	0.141 (< 0.001)	0.151 (< 0.001)	
Adjusted R <sup>2</sup>	<b>0.389</b>	<b>0.285</b>	

<sup>f</sup>Bold-faced p-values are one-tailed, while normal-faced p-values are two-tailed.

<sup>a</sup> This variable represents the participants' self-reported level of agreement with the statement, "You and the department manager of the other department in the Injection Molding Division (i.e., [Name of other Department]) faced similar situations." The variable is measured using a {-4, -3, -2, -1, 0, 1, 2, 3, 4} where -4 is "strongly disagree", -2 is "moderately disagree", 0 is "neutral", 2 is "moderately agree", and 4 is "strongly agree".

<sup>b</sup> This represents the direction of the change in one's own span of control, coded 1 (-1) if a headcount is added (removed).

<sup>c</sup> This represents the similarity of the expected workforce situation compared to that of a peer. We manipulated this condition by communicating a future increase/decrease in headcount in one's own department and in a peer manager's department. Whether or not the change in headcount was the same for the manager and the peer determines the similarity of the change.

<sup>d</sup> This variable is calculated as the difference between budget reported and actual unit cost (4.25 lira), ranging from 0.00 lira per unit to 1.75 lira per unit (max available).

<sup>e</sup> Note that the Intercept is omitted from the linear regression model because the SIMILARITY OF WORKFORCE CHANGE and DIFFERENCE IN WORKFORCE CHANGE variables are mutually exclusive and all exhaustive.

<sup>g</sup> This variable equals the self-reported weight placed on the anticipated change in the peer's headcount in forming the budget report (scale of 1-7 in increments of 1).

<sup>h</sup> This variable is coded as the relative difference in headcount change between the peer manager's and one's own department. For example, the variable with take the value of 2 (-2) if the manager loses (gains) a headcount while the peer manager is given an additional (loses a) headcount, and coded 0 if both one's own headcount and the peer manager's headcount change in the same direction.

diversity initiatives), in an effort to minimize self-categorization in favor of innovation and learning.<sup>28</sup>

We acknowledge that our assumption that corporate headquarters (our

<sup>28</sup> We thank an anonymous reviewer for bringing to our attention the recommendation to emphasize diversity to offset value-detracting self-categorization.

representation of corporate stakeholders) can only determine a range in which reside the true cost of production resources is an imperfect proxy for the notion that it is costly for headquarters to ascertain such information (Antle and Eppen, 1985). There may exist processes and controls that might limit the opportunity for managers to benefit from over-reporting, thus narrowing the range of potential over-reports. For example, headquarters may establish monitoring mechanisms such as "skip-level" interactions with lower-level employees, hands on standard-setting procedures (i.e. "less"

participative budgeting), and internal audit. We posit that each of these monitoring mechanisms require economic resources and/or impose psychological costs (Christ et al., 2008), leaving headquarters to determine whether the benefits of narrowing the range of potential over-reports merits the costs of monitoring. Our study informs this decision by bringing to light potential self-categorization costs associated with open communication of budgetary reporting environmental similarities.

Perhaps more pertinent to our study, there exist many organizations that have far more than two peer departments, offering more than one referent manager with whom a focal manager can observe environmental similarity. While it is possible that every department arrives at the same assumption about their unseen peers' reporting preferences (i.e. consensus effect), thus exacerbating self-categorization through a larger group size (Asch, 1951), it is also possible that managers believe that headquarters "uses" the reports from one department to benchmark the validity of reports from their own department. Further, if managers believe that *some* peer department managers are unconditional truth-tellers or unconditional over-reporters, then managers might posit that these peer departments' budget reports provide headquarters with the "book-end" values for a range of possible true costs, thus informing their available range of budget reports. It is also possible that a larger number of departments narrows the range of possible over-reports as more unconditional truth-tellers and over-reporters emerge. We encourage future research to investigate how a larger number of departments influences the consensus creation and self-categorization effects that we observe in our study.

## Appendix A

Each of participant was randomly assigned as the manager of either the Auto Parts Department or the Playground Equipment Department. However, before they knew their assignment, they went over the instructions for BOTH manager positions.

### Instructions for Auto Parts Department Manager

Imagine you are the manager of the Auto Parts Department of the Injection Molding Division of SpineArt Industries. The Playground Equipment Department is the only other department in the Injection Molding Division. Though your department manufactures plastic fuel tanks for light-vehicle cars (see Fig. A1 for an example) and the Playground Equipment Department manufactures plastic slides for playscapes (see Fig. A2 for an example), both departments utilize the same type of resources in their respective operations. You currently have four employees in your department – Alisa Peterson, Johnny Ludwig, Amber Defee, and Matt Donovan. All of these employees are product engineers who ensure a smooth production process. Alisa has been with the department for 15 years. Johnny transferred to the department 10 years ago and has worked for SpineArt Industries for 20 years. Amber has been with the department for 10 years. Matt has been with the department for 5 years. Corporate headquarters pays each product engineer 200 Lira per period.

For your services as the department manager, you receive a salary of 1000 Lira plus a supervisory bonus of 100 Lira for each employee in your department. This supervisory bonus is to compensate for the additional responsibilities you shoulder related to the number of employees in your department. Your department manufactures plastic fuel tanks that sell for 9.00 Lira per unit. The actual production cost per unit falls within the range of 4.00 Lira to 6.00 Lira, a range known by Corporate headquarters. The demand for the plastic fuel tank is known to be 1000 units.

At the start of the production period, you will submit a budget to Corporate headquarters for your department's production cost in the coming period. Corporate headquarters will then provide you with funds equal to the amount you have budgeted for the period.

As you have worked on the job, you have set up your own private forecasting system that reliably determines in advance exactly what your production cost will be in the coming period. That is, before you submit your budget, you will know FOR CERTAIN what your actual unit cost will be.

Because you alone are responsible for submitting your budget, you can decide whether to submit a budget that is equal to, more than, or less than

Several other characteristics of this study also highlight the need for future research. Specifically, we chose to use workforce span of control as our environmental similarity dimension along which managers compare themselves. It is possible that managers are more or less concerned about peers' span of control as they self-categorize or that, in practice, span of control comparisons introduce confounds that we omit from our experimental setting. For example, we chose to use an exogenous cause for the workforce change in our setting. Future research can investigate alternative environmental similarity dimensions and/or the potential incremental or interactive effect of endogenous causes (such as good and bad intentions) on budgetary reporting. In addition, due to the rational bounds of managerial reporting in the participative budgeting setting, we show that self-categorization results in increased over-reporting — a behavior that hurts the firm. However, future research can examine self-categorization in settings where "harmful" behaviors are bounded (e.g., by legal limitations), leaving only "beneficial" behaviors (e.g., organizational citizenship behaviors) available for managers to engage in more fully. Finally, our study suggests firms should be cautious in sharing information between managers about span of control environments. However, we do not investigate the effects of greater information-sharing, including headcount change attributions and/or departmental performance issues. It is possible that greater information-sharing might reduce perceived similarity and consequently mitigate any negative effects of self-categorization. We leave this investigation to future research.



Fig. A1. Plastic Fuel Tank Manufactured by the Auto Parts Department.





Fig. A2. Plastic Slide Manufactured by the Playground Equipment Department.

your actual cost. In addition to your 1000 Lira salary and the supervisory bonus of 100 Lira per employee in your division, you will get to keep for yourself any difference between the amount you receive from Corporate headquarters and your department's actual production cost.

Corporate headquarters will only know the amount of your budget. They will never be able to distinguish how much of that budget was spent on actual production versus how much (if any) you kept for yourself. That is, Corporate headquarters will NEVER be able to determine whether your budget equaled your actual cost.

#### Instructions for Playground Equipment Department Manager

Imagine you are the manager of the Playground Equipment Department of the Injection Molding Division of SpineArt Industries. The Auto Parts Department is the only other department in the Injection Molding Division. Though your department manufactures plastic slides for playscapes (see Fig. A2 for an example) and the Auto Parts Department manufactures plastic fuel tanks for light-vehicle cars (see Fig. A1 for an example), both departments utilize the same type of resources in their respective operations. You currently have four employees in your department – Kurt Parker, Kelleen Fuller, Mark Giles, and Trisha Walker. All of these employees are product engineers who ensure a smooth production process. Kurt has been with the department for 20 years. Kelleen has been with the department for 5 years. Mark transferred to the department 5 years ago and has worked for SpineArt Industries for 15 years. Trisha has been with the department for 10 years. Corporate headquarters pays each product engineer 200 Lira per period.

For your services as the department manager, you receive a salary of 1000 Lira plus a supervisory bonus of 100 Lira for each employee in your department. This supervisory bonus is to compensate for the additional responsibilities you shoulder related to the number of employees in your department. Your department manufactures plastic slides that sell for 9.00 Lira per unit. The actual production cost per unit falls within the range of 4.00 Lira to 6.00 Lira, a range known by Corporate headquarters. The demand for the plastic slide is known to be 1000 units.

At the start of the production period, you will submit a budget to Corporate headquarters for your department's production cost in the coming period. Corporate headquarters will then provide you with funds equal to the amount you have budgeted for the period.

As you have worked on the job, you have set up your own private forecasting system that reliably determines in advance exactly what your production cost will be in the coming period. That is, before you submit your budget, you will know FOR CERTAIN what your actual unit cost will be.

Because you alone are responsible for submitting your budget, you can decide whether to submit a budget that is equal to, more than, or less than your actual cost. In addition to your 1000 Lira salary and the supervisory bonus of 100 Lira per employee in your division, you will get to keep for yourself any difference between the amount you receive from Corporate headquarters and your department's actual production cost.

Corporate headquarters will only know the amount of your budget. They will never be able to distinguish how much of that budget was spent on actual production versus how much (if any) you kept for yourself. That is, Corporate headquarters will NEVER be able to determine whether your budget equaled your actual cost.

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