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ORIGINAL PAPER

In the Club? How Categorization and Contact Impact the Board Gender Diversity-Firm Performance Relationship

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Abstract
Meta-analytic results show that board gender diversity is modestly associated with firm performance, but there is notable heterogeneity among findings. Board gender diversity allows access to women's perspectives, potentially helping boards, but diversity can also trigger biases that exclude women directors, such that boards do not integrate meaningful perspectives. Addressing this problem, we leverage the categorization-elaboration model, contact theory, and critical mass theory to build new theory as to how men directors can serve as allies to women directors to better leverage diverse perspectives. We empirically test how considerations that reduce out-group categorization and bias against women moderate the board gender diversity-firm performance relationship. Our results show that gender diverse boards perform better with more formal contact among men and women director colleagues, and that gender diverse boards with more men directors who only have prior experience working with token-women, perform worse. Our work helps explain how and why board gender diversity can improve or detract from firm performance. This extends the literature by illustrating the important consequences that occur when firms do (or do not) have men directors who are likely to be allies of gender diversity.

Keywords Boards of directors · Gender diversity · Inclusion · Tokenism · Women executives

Introduction

In 2020, 47% of new S&P 500 directors on boards were women (Spencer Stuart, 2020). Meta-analyses show a small positive relationship between the number of women board members and firm performance (Hoobler et al., 2018; Post & Byron, 2015). However, many studies conclude that there is either no, or even a negative, relationship between board gender diversity and firm performance (Adams et al., 2015; Kirsch, 2018; Terjesen et al., 2009), explaining why meta-analyses show small effect sizes and substantial heterogeneity. Research has not yet fully reconciled these equivocal results. This is problematic, given both a sociological imperative and legislation mandating greater diversity on boards (Jamali, 2020; Kirsch, 2018; Ziady, 2020).

Scholars do know some relevant contingencies of the board gender diversity-firm performance relationship. However, the work thus far has been upon societal or national-level factors, such as gender parity and shareholder protections in the national context in which a focal board operates (Post & Byron, 2015), as well as the degree the culture is egalitarian (Hoobler et al., 2018). An unexplored consideration is that effectiveness of women on boards requires their inclusion in board activities and that some men executives are better than others at including and working with women colleagues. Put differently, consideration of the characteristics of men directors on a board and/or board processes of social interactions between director colleagues are also likely to explain the substantial heterogeneity of board gender diversity-firm performance studies, independent of national context or culture.

We leverage the categorization elaboration model (CEM)—a model that explains conditions under which diverse groups show better or worse performance than homogenous groups. CEM proposes that diversity simultaneously triggers two pathways (van Knippenberg et al.,

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2004). First, diversity can create information elaboration, where access to more diverse perspectives can lead to richer group discussions and improved decision-making (van Knippenberg et al., 2004). This aligns with theoretical views previously used to explore the board gender diversity-firm performance relationship, including agency theory (Adams & Ferreira, 2009), resource dependence theory (e.g., Hillman et al., 2007), and upper echelons theory (Jeong & Harrison, 2017; Post & Byron, 2015). These views converge on the idea that women can bring valuable perspectives to enhance board decision-making processes.

CEM also proposes diversity may trigger social categorization processes that can lead to intergroup bias, resulting in reduced cohesion (van Knippenberg et al., 2004). Such reduced cohesion may then affect corporate governance because effective board monitoring necessarily involves interdependent tasks and responsibilities (Hillman & Dalziel, 2003; Tasheva & Hillman, 2019). Though some corporate governance research explores social categorization/intergroup bias considerations (e.g., Oliver et al., 2018; Zhu et al., 2014), such considerations are largely absent from the literature linking board gender diversity to firm performance. This is a meaningful omission. Scholars know much about the obstacles women face in the upper echelons, but know comparatively little about what role men directors can play in serving as allies of gender diversity initiatives, or in creating an environment that is inclusive for women.

The few studies exploring men allies of gender diversity (e.g., Joshi et al., 2015; Sawyer & Valerio, 2018) emphasize how such research is critical both for firms to realize the performance potential of having more women, and to ensure equitable treatment of women executives. This is consistent with arguments that the onus for establishing an inclusive culture in a diverse organization should fall upon members of the majority (e.g., men) who seek to leverage the perspectives of diverse members (Krause & Miller, 2020). Such perspectives may not be incorporated if minority members are expected to 'fit in' or be ostracized. That is, in order to achieve the desired performance effects, the role of the majority group in inclusion is crucially important in incorporating the minority group. Social categorization/intergroup bias explains why diverse groups struggle; thus, providing a means for building better theory on how, when, and which men executives will be more effective allies of gender diversity.

Our paper extends theory on social categorization and intergroup bias into the boardroom. To do so, we bring together insights from contact theory (Allport, 1954; Dovidio et al., 2017; Pettigrew & Tropp, 2006), and critical mass theory (Joecks et al., 2013; Kanter, 1977; Konrad et al., 2008; Torchia et al., 2011) to illustrate when and how categorization occurs that can harm gender diverse boards. We test how the board gender diversity-firm performance relationship is impacted by categorization processes influenced by the amount of formal contact that occurs between men and women director colleagues on a given board, and the prior contact experience men directors have had with women director colleagues.

We make three primary contributions. First, we test how contingencies related to boardroom processes and the boardroom contact histories of men directors help impact the efficacy of diverse boards, helping further reconcile the heterogeneity of findings of past board gender diversity-firm performance studies. Second, our work extends contact theory, illustrating how, why, and which specific types of contact may minimize categorization processes and foster more equitable treatment of minority group members. Third, we extend critical mass theory by exploring how a man director's experience of working (or not) with a critical mass of women colleagues may spillover to have consequences for the boards on which he serves in future. Using 1,108 observations from 245 firms, our results show that (a) the degree men and women director colleagues of a given board have formal board contact impacts firm performance, and (b) gender diverse boards perform worse when the men directors have only ever worked on boards with token numbers of women.

Theoretical Background and Hypotheses

The Challenges of Leveraging Board Gender Diversity

Scholars have proposed multiple reasons to expect having more women directors could benefit the financial performance for a given firm. Some have leveraged upper echelons theory to suggest a positive relationship between women directors and firm performance (e.g., Byron & Post, 2016; Post & Byron, 2015). Upper echelons theory establishes that an executive's personal experiences, values, and personality (i.e., cognitive frames) influence how the firm's strategic situation is interpreted to influence firm-level outcomes (Hambrick & Mason, 1984). Women directors have different cognitive frames than men directors (Adams & Funk, 2012; Bart & McQueen, 2013; Campbell & Minguez-Vera, 2008; Groysberg & Bell, 2013). Including different perspectives should improve governance practices and decision-making (Post & Byron, 2015). Qualitative evidence indicates women directors contribute to enhancing the firm's performance by bringing unique perspectives (Joecks et al., 2019), consistent with evidence that gender diverse top management teams positively affect firm performance by reducing risk-taking (Jeong & Harrison, 2017). Agency theory and resource dependence theory also inform this relationship. Empirical evidence indicates women directors are more vigilant

monitors (Adams & Ferreira, 2009) and help firms access unique external resources (Hillman et al., 2007; Pfeffer & Salancik, 1978). For instance, women directors have connections with influential community members that may be different from their men colleagues (Hillman et al., 2002).

Common among these theories is that women directors can add unique value to a board; value that may stem from different personal experiences, ideas, monitoring intensity, or resources. Regardless of which mechanism leads women to contribute, all perspectives recognize that the contributions women bring are only useful if those contributions are included in board decision-making (Hillman & Dalziel, 2003; Tasheva & Hillman, 2019). Hence, it is useful to understand why, when, and how some boards are more likely than others to use the perspectives brought by women directors. Extant research shows gender discrimination with assignment to board committees (Bilimoria & Piderit, 1994; Peterson & Philpot, 2007) or committee chair positions (Field et al., 2020), and evidence boards may appoint women largely for impression management (Chang et al., 2019; Naumovska et al., 2020; Solal & Snellman, 2019). Women directors are also likely to be excessively scrutinized for being aggressive (Eagly & Karau, 2002; Meister et al., 2017; Pesonen et al., 2009), potentially leading them to withhold their perspectives. Critical mass theory also explains that a minimum threshold, at least three women, increases the likelihood that women directors are viewed as more than tokens (Joecks et al., 2013; Kanter, 1977; Konrad et al., 2008). In this respect, prior literature demonstrates that while women can bring valuable perspectives, those perspectives on boards might nevertheless be overlooked and/or underappreciated (Farh et al., 2020; Mayo et al., 2020).

As part of our broader project to explore moderators of the board gender diversity-firm performance relationship, we also leveraged opportunities we had to speak with executives about if/how they personally had experiences consistent with the above literature (indicating women directors' perspectives may be overlooked and/or underappreciated). While the ultimate purpose of this empirical paper is to use quantitative data to test how categorization, contact, and critical mass theory considerations moderate the board gender diversity-firm performance relationship, these interviews elicited compelling comments from executives who have direct involvement with boards or have served on boards that contributed to our theory development based on our research question. Such comments are not meant to be an exhaustive qualitative study, but rather serve as practical illustrations of how the tenets of the aforementioned theories can and should be leveraged to enable more effective gender diverse boards.

We specifically asked 63 Chief Human Resource Officers (CHROs) of Fortune 500 companies if women directors face unique boardroom challenges and what those might be. CHROs spend considerable time in the boardroom, interacting with directors on topics such as executive compensation and succession planning, and are positioned to see challenges women directors face (Schepker et al., 2018). We also interviewed seven directors (three women and four men) who have collectively served on 22 distinct boards of Russell 1000 and/or comparably sized private companies, and who have all been C-suite executives, with three having served as CEOs. Three are also current chairpersons of publicly-traded, Fortune 200 companies.

Consistent with the aforementioned management studies indicating women directors' perspectives may be overlooked and/or underappreciated, 44% (28 of 63) of the CHROs told us women directors do indeed face boardroom challenges, with 57% (16 of 28) of those saying the biggest challenge was for women to be heard and/or included by men colleagues. For example, one CHRO said women directors struggle in "finding their voice without being overbearing", while another said "there are times when the men ignore [the] comments [of women directors]." Another said it was hard for women to "[be] heard and [have] their opinion taken into consideration," while another said "being viewed as part of the in-group" was challenging for women directors. All seven board members made similar comments. Inspired by these realities, our study focuses on the underexplored consideration of which men executives are likely to be allies of gender diversity initiatives and inclusion (cf. Joshi et al., 2015; Sawyer & Valerio, 2018), rather than focusing on tactics that members of the minority group (i.e., women) use to gain influence. Considering men allies is valuable because prior research indicates women often change their behavior and mute their own perspectives to fit in with the majority board culture (Pesonen et al., 2009). Such self-censoring limits information sharing, reducing the array of perspectives brought to the boardroom and negates potential benefits of diversity. Minority directors report that inclusion is achieved when majority group directors value diversity of thought and encourage divergent perspectives in discussion (Bernstein & Bilimoria, 2013). It is thus useful to consider how majority members incorporate the perspectives of the diverse, rather than the opposite. Thus, we incorporate group diversity literature (CEM, contact theory, and critical mass theory) to develop new theory about why men may or may not include women colleagues, affecting board contributions to firm performance.

Board Gender Diversity and Indicators of the Categorization Pathway

CEM states that diversity triggers processes that affect group performance along two pathways: Information elaboration and categorization (van Knippenberg et al., 2004). The information elaboration pathway shows how diversity

can lead to a broad array of perspectives to improve group information processing, decision-making and subsequently group performance (Bantel & Jackson, 1989; van Knippenberg et al., 2004). This is consistent with the variety of theories previously outlined that suggest greater board gender diversity can improve board decision-making and increase firm performance (Byron & Post, 2016; Post & Byron, 2015).

The social categorization pathway refers to how members classify others as either in-group or out-group based on similarities and differences (Hogg & Terry, 2000; van Knippenberg et al., 2004). Social categorization can lead to intergroup bias, or exhibiting less favorable behaviors toward perceived out-group members (Turner et al., 1987; van Knippenberg et al., 2004). This can lead to lower commitment (Tsui et al., 1992), increased conflicts (Jehn et al., 1999) and higher turnover (O'Reilly et al., 1989; van Knippenberg et al., 2004). Intergroup bias leads to seeing in-group members as more valid information sources (Brewer, 1979; Turner et al., 1987; van Knippenberg et al., 2004); thus, social categorization can negate the value of diverse members (van Knippenberg et al., 2004; Williams & O'Reilly, 1998). If women directors are categorized as out-group members, their perspectives may be ignored. Hence, for women directors to improve board effectiveness and firm performance, three things must occur. Women must (1) serve on the board, (2) share their perspectives, and (3) have men colleagues consider those perspectives. However, board gender diversity studies largely overlook factors impacting the latter two elements.

If women directors are excluded, paradoxically, more women mean fewer contributing board members. Since board conduct involves interdependent tasks and responsibilities (Hillman & Dalziel, 2003; Tasheva & Hillman, 2019), relying on fewer members not only limits the effectiveness of gender diversity, but can harm board performance, negatively impacting firm performance. As out-group categorization can lead to a group member feeling lower group commitment (Tsui et al., 1992), it is possible when there are women board members, but they are excluded, they feel resentment, further explaining those individual studies that find a negative board gender diversity-firm performance relationship. Neglect and microaggressions by men against women director colleagues could cause cohesion problems leading gender diverse boards to be largely dysfunctional. We do not focus on the direct board gender diversity-firm performance relationship, since the combination of aforementioned theories and statements imply it is how men treat their women director colleagues, and not just whether there are women, that impacts firm performance. We instead integrate contact theory and critical mass theory to address why, when, and how gender diverse boards access women directors' perspectives.

Contact Theory Applied to Men and Women Directors

Contact theory establishes that intergroup contact, i.e., between majority and minority group members, can reduce prejudice/decrease stereotyping (Allport, 1954; Dovidio et al., 2017; Pettigrew & Tropp, 2006). Contact theory comes from broader social psychology literature, and is not specifically a theory of corporate governance. That said, its underlying mechanisms can appropriately be applied to better understand gender diverse boards of directors. Out-group director influence on board conduct is stronger when directors share board service with in-group directors (Westphal & Milton, 2000), and boards whose members have experience receiving information from diverse inputs are more receptive to knowledge transfer across interlocks (Shropshire, 2010). In this sense, there are corporate governance studies consistent with the tenets of contact theory. Contact theory has been used to study stereotyping (e.g., ethnic, LGBTQ+, etc.), including how exposure to women in a professional setting reduces gender bias of men against women (e.g., Moss-Racusin et al., 2018; Prati et al., 2015). Thus, it is a conceptually appropriate framework for our study and one useful for exploring boardroom relationships.

While meta-analytic evidence indicates the interpersonal contact-stereotype reduction relationships is universal (Pettigrew & Tropp, 2006), scholars do not know which specific types of cross-gender contact most help reduce categorization/bias on boards. Allport's (1954) early work proposed that for intergroup contact to reduce prejudice, the contact would need to involve equal status between the groups in the situation, common goals, intergroup cooperation, and the support of authorities/institutions. However, Pettigrew and Tropp's (2006) meta-analytic assessment indicates these four aforementioned conditions are better thought of as enhancers of the intergroup contact-prejudice reduction relationships, and not absolutely necessary.

Pettigrew and Tropp's (2006) work establishes it is a reasonable baseline expectation that gender contact, i.e., contact between men and women, will help gender diverse boards be more effective. However, scholars do not yet know if some and/or which forms of gender contact may be comparatively most useful toward ensuring a gender diverse board is effective. Informed by these realities, our model looks at how men directors have two different types of 'contact' with women director colleagues. The first, formal board gender contact intensity, speaks to the degree men and women colleagues on a given board have frequent contact during formal meetings of the board and its committees. The second, men directors' critical mass gender contact history, speaks to whether men directors have previously had contact with women director colleagues, specifically by serving on boards with a critical mass of women (i.e., 3+).

Formal Board Gender Contact Intensity Between Men and Women Colleagues

Formal board gender contact intensity refers to the degree directors for a given board collaborated professionally across formal board settings with their director colleagues of a different gender. We rather focus upon *formal* board gender contact intensity, because it is an appropriate starting point for scholars exploring the consequences of having contact between men and women directors. Examining the impact of gender contact occurring within a formal board setting is consistent with meta-analytic evidence institutional support is a disproportionately critical condition for facilitating positive contact effects (Pettigrew & Tropp, 2006). At the same time, we acknowledge that contact in informal settings outside the boardroom is also likely to be valuable for similar reasons.

Contact theory suggests that high formal board gender contact intensity, indicating men and women colleagues formally work together more often, should reduce stereotyping, decreasing the likelihood of categorization and intergroup bias of women directors (Dovidio et al., 2017; Pettigrew & Tropp, 2006). If men directors have more formal meetings with women colleagues, men will be more likely to incorporate the perspectives of women directors, adding value identified by the information elaboration pathway. Formal board gender contact intensity is strengthened through board interactions, both during full board meetings and committee work.

We propose formal board gender contact intensity speaks directly to two of Allport's (1954) aforementioned conditions: institutional support and intergroup cooperation. Formal board gender contact intensity necessarily involves the gender contact occurring in a formal, institutionalized board setting. Formal board gender contact intensity also is a function of the holistic amount of (formal) cooperation men and women director colleagues have, i.e., the amount of contact and women director colleagues have working together in any formal board setting.

Formal board gender contact intensity may affect the efficacy of a gender diverse board for several reasons. First, contact between group members reduces stereotyping when members of a majority and minority group repeatedly interact (Allport, 1954; Pettigrew, 1998; Pettigrew & Tropp, 2006). Thus, more interactions between board members (including on committees) should reduce intergroup biases. Second, stereotyping is lessened when group members interact in multiple contexts (Pettigrew, 1998; Rothbart & John, 1985). Committees are specialized in focus (Kolev et al., 2019), representing a different context from full board meetings.

Intergroup bias against minority individuals is less likely when in- and out-group members can develop a common group identity (van Knippenberg & Schippers, 2007). Committee service creates opportunities to develop such a shared identity. Additionally, committees are drivers of board actions (Kesner, 1988; Kolev et al., 2019). If women serve on more committees, this creates opportunities for influencing firm performance. Recent research also indicates that cognitive diversity of members of a unit may be most valuable specifically when the unit is dealing with complex issues, and when conducting problem posing and hypothesis generation activities (Sulik et al., 2021). Board committees, as opposed to meetings of the full board, are more typically where directors (a) deal with nuanced/complicated governance considerations, (b) determine what specific problems afflict the firm, and (c) explore options for potential interventions/solutions (Finkelstein et al., 2009; Kolev et al., 2019). It is thus important to consider whether or not women and men directors work together in committee meetings, as well as meetings of the full board.

However, women directors' committee presence does not itself guarantee their perspectives will be included, as they may still be expected to conform to men's boardroom norms (Pesonen et al., 2009). Rather, it may be critical to also consider how often a committee meets. Minority directors report feeling most included when their majority group colleagues seek out all perspectives (Bernstein & Bilimoria, 2013). More committee meetings create more opportunities for women to share their perspectives. Omitting this consideration may help explain heterogeneity in studies testing how women's committee membership impacts firm performance (e.g., Bennouri et al., 2018; Carter et al., 2010). We propose that formal board gender contact intensity, the overall degree men and women director colleagues collaborate in formal board settings for that board, should reduce the degree women are seen through a lens of stereotyping/bias and enhance their information sharing. As such, higher formal board gender contact intensity should lead to better recognition and incorporation of the perspectives of women directors, actualizing the potential benefits of having more women.

This is the first study to put forward the specific construct of formal board gender contact intensity. For this reason, we took time to find two real-world illustrative examples of what high vs. low formal board gender contact intensity may look like in practice among boards that each had three women directors. In the instance with low formal board gender contact intensity, each of the three women directors only sat on one committee with men director colleagues. Two of these women sat on the compensation committee, which only had two men directors serving and only met four times in the year. The other woman director sat on the audit committee, which had three men directors and met only four times. The full board also only met four times. In our broader sample, individual committees met on average 5.61 times in

a year, while the full board met on average 7.88 times in a year. Thus, while the aforementioned condition had seven cross-gender dyads on committees, and twenty-seven cross-gender dyads in the context of full board meetings, there were many fewer opportunities for cross-gender contact due to the relatively low number of meetings being held.

In the instance with high formal board gender contact intensity, two of the three women directors sat on more than one committee. One woman director sat on both the audit and compensation committee, the second on both the audit and nominating committee, and the third upon the compensation committee. The audit committee had three men directors, and met eleven times in the year. The nominating committee had four men directors and met six times, while the compensation committee had four men and met five times. The entire board also met thirteen times in the year. These illustrative examples show how considerations of (a) who serves on which committee(s), as well as (b) the number of committee meetings occurring, and (c) the number of full board meetings, all inform the ultimate degree there is formal board gender contact intensity. These examples also importantly illustrate how formal board gender contact intensity can vary even among boards with the same number of women directors.

Hypothesis 1 Formal board gender contact intensity moderates the board gender diversity-firm performance relationship, such that when formal board gender contact intensity between men and women director colleagues is high, the relationship between board gender diversity and firm performance will be more positive than when formal board gender contact intensity is low.

Men Directors' Gender Contact History

Contact theory arguments suggest it is plausible prior contact with women director colleagues will influence whether men directors currently stereotype women colleagues. If majority group members have contact with minority members, their willingness to promote the minority group's interests increases (Calcagno, 2016; Selvanathan et al., 2018). Men directors with a history of contact with women colleagues should be less likely to categorize current women directors as out-group. However, not all prior contact with women is beneficial. Members of minority groups are ignored when their relative presence in a group is modest, i.e., they are 'token' members (Kanter, 1977). Token members are discounted (Maass & Clark, 1984; Nemeth & Wachtler, 1983), and working with token-women colleagues may reinforce negative stereotyping (cf. Acker, 1990; Kanter, 1977). If the presence of minority individuals reaches a 'critical mass' (3+), prior research illustrates dynamics change and those individuals are more likely to be heard and included in group activities (Kanter, 1977; Konrad et al., 2008; Torchia et al., 2011; Tuggle et al., 2021), such that the stereotype reduction effects proposed by contact theory likely occur. We therefore assess if men have ever worked with a critical mass of women director colleagues.

Such a history is likely to change men director attitudes because when a critical mass of women is reached, men and women colleagues collaborate more and have higher quality discussions (Konrad et al., 2008). This implies men who have worked on a board that had three or more women directors are likely to have had more contact with those women colleagues. Moreover, Pettigrew and Tropp's (2006) meta-analytic work validates that equal status may enhance the intergroup contact-prejudice reduction relationship. Women directors report it easier to be heard by men colleagues when there are least two other women on the board (Konrad et al., 2008). Women directors specifically report that on 'critical mass' boards, (a) the men are more inclusive, supportive, and respectful, and that (b) directors of all genders adopt a less competitive style and are more cooperative (Konrad et al., 2008). Directors we interviewed made consistent comments. One woman director emphasized tokenism considerations lead her to turn down board offers, stating that she told inquiring parties: "if you don't have [other] women on the board, I don't want to talk." In this sense, a man director who has worked with a board with a critical mass of women directors has had contact with women in a context where women directors are in practice treated as equal status colleagues. In this way, men directors' history of working on critical mass boards speaks directly to Allport's (1954) consideration of equal status.

Combining critical mass and contact theory, we propose that if more men directors of a focal board have worked with a critical mass of women director colleagues (i.e., 'men directors' critical mass gender contact history' is high), this reduces intergroup bias on the present focal board, and thus women's perspectives are more likely incorporated. In our present work, we look at the consequences of having men directors who worked with a critical mass of women colleagues in a board setting, specifically. Men directors' history working with a critical mass of women *director* colleagues speaks to the final of Allport's (1954) four aforementioned considerations: commonality of goals. A gender diverse team of front-line employees may have very different work goals than does a board of directors. All boards ultimately have relatively similar work goals, in the sense of their goals to serve the interests of shareholders. For our purposes, the important reality is that the goals a man director had when serving on a past critical mass of women directors board, are the most similar a past critical mass work experience could be to his present duties on a given focal board.

Hypothesis 2 Men directors' critical mass gender contact history moderates the board gender diversity-firm performance relationship, such that when more men directors have critical mass gender contact history, the relationship between board gender diversity and firm performance will be more positive than when fewer men have such history.

Methods

Sample and Data Collection

Our sample consists of observations from non-financial, US-based S&P large-cap firms from 2010 to 2014. This followed the completion of substantive legislation in the wake of the 2008 financial crisis. In our literature review of contact theory, everything we read indicated the tenets of this theory were 'year invariant', such that there is no baseline reason to think using our sample is either more or less appropriate than using a sample from the latter half of the 2010s.

We excluded financial firms due to their unique legal requirements regarding committees. For example, bank holding companies have requirements regarding (a) the existence of both an audit and risk management committee (which cannot be merged), as well as (b) requirements over who must serve upon the risk management committee (Cornell Law School Legal Information Institute, 2022a, 2022b; Kolev et al., 2019). It is also problematic to compare firm performance of financial and non-financial firms when specifically assessing return on assets (ROA), as we do (Fama & French, 1992; Fich & Shivdasani, 2006; Gallo, 2016). Our initial sample had 1,365 firm-year observations. In gathering data, we excluded 255 observations for reasons of incomplete information (194 due to incomplete relevant information in Compustat and/or GMI Ratings; 61 due to incomplete relevant information in firm proxy statements). Two observations represented firms that only appeared once, and thus our fixed effects controls effectively dropped their impact. Our results therefore represent a final sample of 1,108 firm-year observations.

Measures

Dependent Variable

To test our model, we used an accounting-based performance measure: return on assets (*ROA*) calculated at time $t+1$. Accounting-based measures reflect the influence of internal management better than market-based measures, since the latter are more subject to exogenous factors (He & Huang, 2011; Hutchinson & Gul, 2004). ROA is also consistent with extant studies we seek to extend and has been used specifically as the outcome of interest in studies examining the board gender diversity-firm performance relationship such as Isidro and Sobral (2015), Liu et al. (2014), and Mahadeo et al. (2012). Recognizing that a ratio variable (e.g., ROA) may be problematic (see Certo et al., 2020), we replicated our primary analysis using a dependent variable of net income and results were consistent (see Supplementary Table S.1). The link between interpersonal dynamics of board members and firm performance represents an arguably distal relationship, but such an outcome variable is justifiable given (a) the multiple studies validating relationships between personal traits of executives and firm performance (cf. Isidro & Sobral, 2015; Mahadeo et al., 2012; Nekhili et al., 2018; Shin et al., 2015), (b) the dependent variables used by studies analyzed in meta-analyses with substantial heterogeneity that we seek to address (Hoobler et al., 2018; Post & Byron, 2015), and (c) CEM's focus on pathways that influence group performance as an outcome.

Predictor Variables

Women Directors

Board gender diversity was operationalized as a count of the number of women on the board by year. A count was employed given the treatment of women directors changes as the number of women increases from one to two, and from two to three (Konrad et al., 2008). Count measures are also common in board gender diversity studies (e.g., Bear et al., 2010; Carter et al., 2010). Results of our analyses were consistent when we used the Blau index, as well as using percent of directors who were women (see Supplementary Tables S.2–S.3).

Formal Board Gender Contact Intensity

To compute formal board gender contact intensity, we used proxy statements to manually code board committees, their members, and the number of meetings held in the relevant period. We also coded the number of full board meetings. Our ultimate variable is informed by the number of meetings listed for the purposes of testing how contact between men and women director colleagues impacts firm performance. We recognized a potential reliability issue if directors skip/miss meetings for committees of which they were members. Firm proxy statements for each observation in our sample explicitly verified every director attended at least 75% of the meetings they were supposed to attend.

We computed cross-gender dyads for all board committees and the full board. For example, if the audit committee had two men and women directors each, this committee had four cross-gender dyads. The number of cross-gender dyads for each committee was then multiplied by committee meetings held. This process was replicated for the full board.

The values for each committee and the full board were then summed. We divided our initial value by the board's number of committees to align with practices employed by Delmestri et al. (2005). Finally, we also divided by the total number of directors; though results were consistent when not conducting this step (See Supplementary Table S.4).

To appropriately address potential multicollinearity issues, we used an orthogonalized version of this variable, as the raw score for formal board gender contact intensity had a high correlation with women directors ($r = 0.73$). Specifically, we regressed the (raw) moderating variable (formal board gender contact intensity) on the primary predictor variable (women directors) and used the residuals as the moderating variable (formal board gender contact intensity) in analyses. We also ran analyses using the non-orthogonalized (i.e., raw) measure; results were consistent (see Supplementary Table S.5). Moreover, we address the conceptual importance of our use of orthogonalized measures in our "Discussion" section.

Men Directors' Critical Mass Gender Contact History

Our measure for men directors' critical mass gender contact history leveraged MSCI's GMI Ratings database for the years 2005–2013. We integrated information on each man's totality of board appointments in a given year with data on the number of women on each firm's board. From this, we determined if each man director had served with three or more women colleagues on a publicly-traded firm's board (i.e., a critical mass) in the prior 5 years. Three or more women colleagues is grounded in theory. For instance, Konrad et al.'s (2008) work, which establishes that having three women on the board changes dynamics such that men listen more to women colleagues, specifies explicit reasons why board colleagues treat each other different if there is one versus two versus three or more women serving. The key takeaway is that there is a tipping point occurring in terms of how women are meaningfully included/valued when there are at least three women on a board (Konrad et al., 2008). Our final measure was a count of men on a focal board with at least one critical mass board experience in the prior 5 years. The correlation between the raw men directors' critical mass gender contact history score and women directors was 0.62, so we orthogonalized this measure. However, results were consistent when using a non-orthogonalized measure (see Supplementary Table S.6).

Covariates

To account for additional influences on ROA, we included the number of directors (total), the number of full board meetings, and inside directors (tally of not independent directors). We also included firm size (log of firm assets). The ability of directors to influence ROA can also be impacted by their experience as directors. Thus, we used data from MSCI's GMI Ratings to create covariates for (a) men's past directorship experience (average) in the prior 5 years, (b) women's past directorship experience (average) in the prior 5 years, (c) men's tenure (average), as well as (d) women's tenure (average) on the focal board. We used dummy-coding to account for CEO duality, (i.e., CEO is the board's chairperson), gender of CEO (firms with a woman CEO were coded as '1'), and industry effects, where we grouped firms into six categories based on standard industrial classifications (SIC), following Schepker et al. (2018). Extant literature indicates women directors may influence the attendance behaviors of directors generally, in terms of absentee rates (Adams & Ferreira, 2009). In this sense, it was valuable to include a covariate that spoke to how formal board gender contact intensity might itself be informed by women directors influencing attendance conduct. Committee chairs have particularly notable ability to set procedures and expectations for committee meetings, which could include attendance culture/expectations (Krause et al., 2016; Tuggle et al., 2010). We thus included a covariate for committees chaired by women directors (as a percentage of all board committees). We also used year fixed effects, and fixed effects for firm.

Analyses and Results

Analytical Specifications

Data are organized in an unbalanced panel. The sample originally consisted of 247 firms—all but two had observations for multiple years, and thus our sample represents multiple year effects for 245 firms. Potential for non-independence exists where the scores for lower level variables are influenced by the higher-level entity; failing to account for this can bias results (Bliese et al., 2020). Either a fixed or mixed effects model can address such non-independence concerns (Bliese et al., 2020). As is most common in the literature, we first use a fixed effects specification. We then conducted all analyses using mixed effects models (see Table 3) employing the hybrid model advocated by Certo et al. (2017) which also accounts for such bias.

Endogeneity Concerns

To address endogeneity concerns relating to treatment effects, such that firms do not randomly select the number of women directors, we employed a two-stage analytical procedure. Following best practices, we identified multiple instrumental variables to correspond to each of our three predictor variables (Semadeni et al., 2014). None of the

instrumental variables predicted ROA, and all had a direct effect ($p < 0.05$) on the corresponding predictor variable. Instrumental variables were conceptually relevant; each covaries with the predictor, but is not theoretically connected to ROA. *F* statistic (to assess instrument strength) and Sargan test (to assess exogeneity) (Semadeni et al., 2014) results indicated our instrumental variables were suitable. Conceptual reasons for instrumental variables and results of technical tests are in "Appendix". Using these instrumental variables, we employed a two-stage residual inclusion, using the first stage residuals as covariates in our hypotheses-testing models. Results were consistent when running our primary analyses without including such residuals (see Supplementary Table S.7).

Descriptive Data and Distributions of Variables Within Our Sample

Descriptive statistics for our analyses are shown in Table 1. To rule-out multicollinearity concerns, we calculated variance inflation factors (VIF). All values were below a VIF of 5.00, a common indicator of problematic levels of collinearity (James et al., 2013). We also examined the distribution of women directors. 8% of observations were boards comprised entirely of men (86 of 1,110; 31 firms). 57% (140 of 245) of firms in our sample which appeared in multiple years did see a change in the number of women directors serving between 2010 and 2014, but only four firms started with women and then later switched to all men. This is consistent with the trend that S&P 500 firms are becoming more gender diverse (Spencer Stuart, 2020). 24% of firm-year observations (271 of 1110) had boards with only one woman, 43% (472 of 1110) had two, and 25% (281 of 1110) had three or more women directors.

Analytical Tests of Hypotheses

Table 2 shows the results of our primary analyses using fixed effects estimation with standardized coefficients for non-dichotomous variables to ease interpretation. Model 1, containing covariates and women directors, shows that firm size, men's tenure (average), and women's tenure (average) are directly related to ROA. Women directors does not have a direct effect on firm performance ($\beta = 0.17$; $p = 0.924$). This is consistent with prior research (Chapple & Humphrey, 2014; Miller & del Carmen Triana, 2009) and a premise of this paper that the value women directors bring to board service can be negated by exclusion or bias. Model 2 incorporates direct effects for our moderators (formal board gender contact intensity, men directors' critical mass gender contact history). We do not see direct effects between our moderating variables and firm performance.

Model 3 presents the results of our hypotheses tests. Hypothesis 1 posits that the effect of board gender diversity on firm performance is contingent on formal board gender contact intensity. The interaction term between women directors and formal board gender contact intensity supports this hypothesis ($\beta = 0.63$; $p = 0.026$). As women directors can only be on boards at whole values, we assess values of women directors that occurred in our sample and plotted (Fig. 1) the effect of one (24% of observations) and three (19% of observations) women directors (equivalent to 0.90 SD below and 1.04 SD above the mean). We also calculated the marginal effects as a simple slopes analysis can be problematic when multiple interactions are predicted (Busenbark et al., 2021). To do so, and to ensure every condition depicted in Fig. 1 occurred multiple times in our sample, we set formal board gender contact intensity in Fig. 1 at 0.75 SD above and below the mean (1.16 and − 1.16, respectively).

The slope of low formal board gender contact intensity in Fig. 1 is negative; the slope of high formal board gender contact intensity is positive. Marginal effects indicate firm years with 1 SD more women directors are associated with lower subsequent firm performance ($\beta = -0.42$) when formal board gender contact intensity is low (− 1.16), but higher subsequent firm performance ($\beta = 0.52$) when formal board gender contact intensity is high (1.16). This is consistent with the CEM's proposition that diversity can positively or negatively impact group performance, depending on categorization of/bias against minority directors (van Knippenberg et al., 2004), and indicates formal board gender contact intensity helps explain why some studies find a negative board gender diversity-firm performance relationship (e.g., Adams & Ferreira, 2009; Ahern & Dittmar, 2012; He & Huang, 2011) while others find a positive relationship (e.g., Campbell & Minguez-Vera, 2008; Carter et al., 2003; Isidro & Sobral, 2015). In total, these results support Hypothesis 1.

In Hypothesis 2, we predicted the effect of board gender diversity on firm performance is contingent on men directors' critical mass gender contact history. The relevant interaction term in Table 2, Model 3, does not provide support ($\beta = 0.03$; $p = 0.929$).

Mixed Effects Modeling

Bliese et al. (2020) conducted a literature review demonstrating that individual empirical articles within strategic management tend to be problematically vague about whether they expect a 'between' or 'within' relationship impacting firm-level outcomes. We noticed a similar reality among the individual empirical articles that make up the Post and Byron (2015) and Hoobler et al. (2018) meta-analyses. Using Bliese et al.'s (2020) language, this indicates it is not entirely clear if the hypothesized positive board gender diversity-firm performance relationship should be thought

Table 1 Means, standard deviations, and correlations among study variables

Variable	Mean	SD	Min	Max	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
[1] ROA	6.81	7.90	− 122.70	35.61												
[2] Directors (total)	10.91	1.92	5.00	18.00	− 0.09											
[3] Board meetings	7.88	3.01	4.00	33.00	− 0.14	0.11										
[4] Inside directors	1.34	0.63	0.00	5.00	0.06	0.11	− 0.07									
[5] Firm size	9.56	1.15	6.68	12.76	− 0.14	0.42	0.12	− 0.13								
[6] Men's past directorship experience (average)	13.47	2.40	5.67	21.57	0.06	0.05	− 0.04	− 0.16	0.18							
[7] Women's past directorship experience (average)	8.60	5.38	0.00	29.00	− 0.03	0.19	0.04	− 0.08	0.19	0.19						
[8] Men's tenure (average)	8.66	3.14	1.00	21.33	0.06	− 0.08	− 0.27	0.23	− 0.15	0.10	− 0.08					
[9] Women's tenure (average)	6.87	4.60	0.00	26.00	0.02	0.20	− 0.01	− 0.10	0.18	0.09	0.49	0.03				
[10] Committees chaired by women directors	0.16	0.17	0.00	1.00	0.00	0.06	0.06	− 0.08	0.10	− 0.07	0.30	− 0.08	0.31			
[11] Women directors	1.93	1.03	0.00	6.00	− 0.01	0.50	0.05	− 0.02	0.26	0.09	0.29	− 0.09	0.28	0.38		
[12] Formal board gender contact intensity	4.21	2.27	0.00	14.48	− 0.07	− 0.06	0.52	− 0.10	0.00	0.00	0.11	− 0.15	0.05	0.19	0.00	
[13] Men directors' critical mass gender contact history	3.47	3.10	0.00	14.00	0.05	0.25	0.03	− 0.06	0.21	0.20	0.07	− 0.07	0.04	− 0.04	0.00	− 0.06

$N = 1108$ in 245 firms; correlations at or greater than 0.06 have an associated $p < 0.05$. Correlations between formal board gender contact intensity and all other variables, as well as between men directors' critical mass gender contact history and all others, are based on orthogonalized versions of those variables. Reported means, standard deviations, minimums, and maximums for all variables are based on raw scores. Mean, SD, min., and max. for orthogonalized formal board gender contact intensity and orthogonalized men directors' critical mass gender contact history are [0.00; 1.55; − 4.27; 7.47] and [0.00; 2.44; − 5.45; 10.40], respectively

Table 2 Firm performance (ROA) effects of women inclusion on boards

Variable	Model [1]			Model [2]			Model [3]			Model [4]		
	Beta	*SE*	*p*	Beta	*SE*	*p*	Beta	*SE*	*p*	Beta	*SE*	*p*
Constant	− 0.40	6.13	.948	− 1.88	6.30	.766	− 1.11	6.31	.861	0.82	6.17	.895
Duality	− 0.19	0.77	.807	− 0.52	0.84	.537	− 0.61	0.84	.467	− 0.49	0.82	.554
Gender of CEO	1.38	2.77	.618	2.69	3.52	.445	3.46	3.55	.330	2.82	3.30	.393
Directors (total)	0.33	0.70	.643	0.65	0.75	.390	0.60	0.75	.425	1.23	0.81	.128
Board meetings	− 0.34	0.34	.315	0.16	1.93	.936	− 0.14	1.93	.943	− 0.39	1.93	.842
Inside directors	0.13	0.39	.728	− 0.12	0.43	.790	− 0.13	0.43	.761	− 0.05	0.39	.904
Firm size	− 6.86	1.75	.000	− 7.11	1.80	.000	− 6.69	1.80	.000	− 6.02	1.80	.001
Men's past directorship experience (average)	− 0.56	0.48	.240	− 1.10	0.62	.079	− 1.15	0.63	.067	− 0.52	0.50	.301
Women's past directorship experience (average)	− 0.39	0.48	.414	− 0.15	0.66	.820	− 0.13	0.66	.846	− 0.32	0.65	.621
Men's tenure (average)	1.96	0.52	.000	2.09	0.53	.000	2.14	0.53	.000	2.06	0.52	.000
Women's tenure (average)	1.18	0.55	.032	0.63	0.69	.360	0.63	0.68	.355	0.83	0.57	.144
Committees chaired by women directors	− 0.50	0.45	.263	− 0.19	0.51	.711	− 0.25	0.51	.633	− 0.39	0.47	.405
Women directors	0.17	1.77	.924	− 0.41	1.87	.825	0.05	1.88	.978	− 0.63	1.88	.739
Formal board gender contact intensity				− 0.81	3.20	.801	− 0.60	3.20	.851	− 0.17	3.20	.959
Men directors' critical mass gender contact history				2.94	2.22	.184	3.03	2.25	.178			
Men directors' tokenism only gender contact history										− 1.54	0.64	.017
Women directors × formal board gender contact intensity							0.63	0.28	.026	0.66	0.28	.020
Women directors × men directors' critical mass gender contact history							0.03	0.33	.929			
Women directors × men directors' tokenism only gender contact history										− 0.72	0.35	.042
Multiple R^2	0.60			0.60			0.61			0.61		
Adjusted R^2	0.48			0.47			0.48			0.48		

$N = 1108$ in 245 firms. Two-tailed tests. Industry, year, firm, and endogeneity controls included in all models. Variables are standardized; orthogonalized measures used for formal board gender contact intensity, men directors' critical mass gender contact history, and men directors' tokenism only gender contact history, respectively

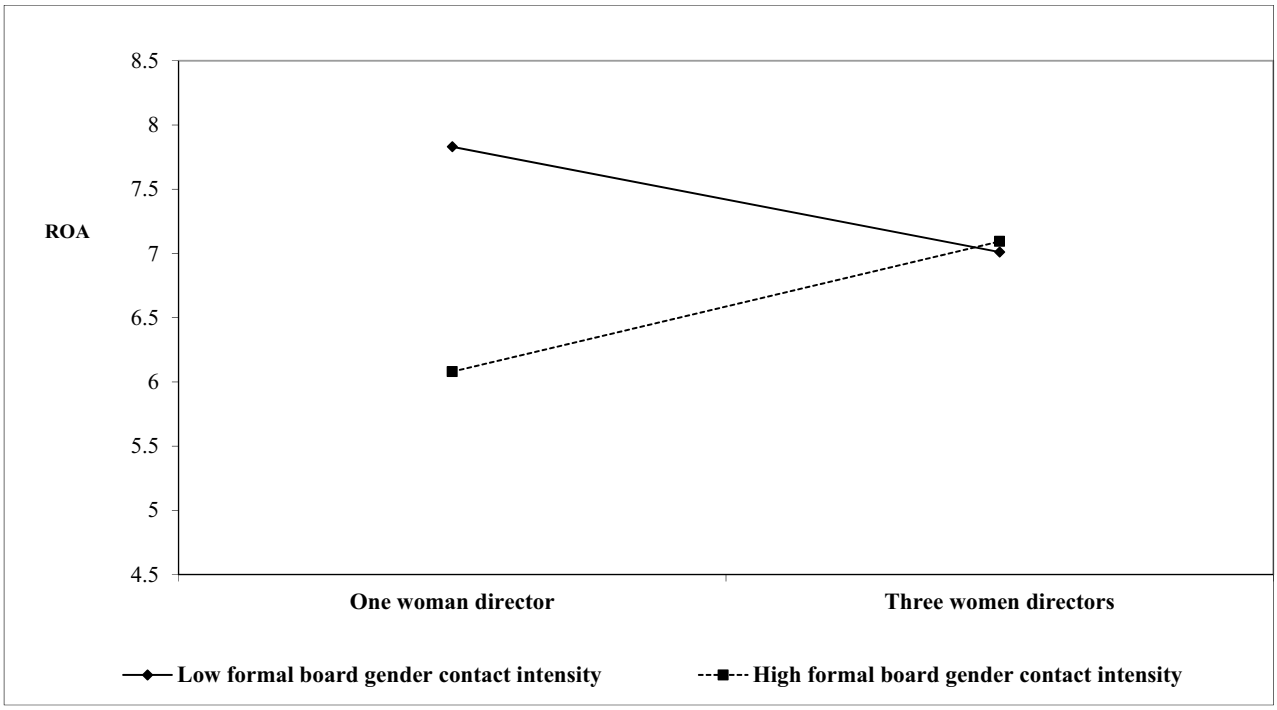

Fig. 1 Moderating effect of formal board gender contact intensity upon women directors-ROA relationship. This figure is based on standardized variables from Table 2, Model 3

of as a case where boards which tend to have more women directors likely outperform those which tend to have fewer women directors (i.e., between relationship). We were particularly interested in testing if our hypothesized moderators impact such a 'between' relationship.

While our analysis in Table 2 employed fixed effects modeling, a mixed effects model, where the random effect component of our model allows the intercept to vary across firms, can be informative and account for unobserved firm heterogeneity when using the mean of a firm-level variable of interest over the whole panel period observed (Bliese et al., 2020; Certo et al., 2017). This "hybrid model" (e.g., Certo et al., 2017) has two primary advantages: (1) it allows us to test the relationships of interest both within firm and between firms, a limitation of fixed effects models (within effects estimator) and (2) does not rely on assumptions of balance in the panel associated with the ANOVA model which underlies fixed effects estimation. This approach also allows for exploring cross-level interactions and is supported by the fact that women directors had an ICC(1) of 0.79, indicating the variance in women directors was mostly between firms rather than changing within firm over time.

To test these considerations, we created both group mean (i.e., average score for the firm across the time span of our sample) and demeaned scores for women directors (i.e., difference from the firm's mean for a given firm-year observation), consistent with best practices of mixed effects modeling (cf. Bliese et al., 2020; Certo et al., 2017). To replicate the fixed effects analysis, we tested a mixed effects model where the demeaned score for women directors was included as a covariate (testing the within effect), while women directors (group mean) was interacted with raw scores for our hypothesized moderators. These results are reported in full in Table 3.

Results were consistent with our primary analysis, in that (a) we do not find women directors (either demeaned or group mean variables) had a direct effect relationship with ROA, and (b) when testing the interactions, we only find support for Hypothesis 1. We have graphed this cross-level interaction between women directors (group mean) and formal board gender contact intensity in Fig. 2. We use the same levels as in Fig. 1 to facilitate direct comparison of the two figures; though we verified that all conditions in Fig. 2 actually occurred in our sample. In Fig. 2, we see that boards with high numbers of women directors (group mean) and high formal board gender contact intensity, have better expected performance than boards with high number of women directors (group mean) and low formal board gender contact intensity. Marginal effects indicate firm years with 1 SD more women directors (group mean) are associated with lower subsequent firm performance ($\beta = -0.25$) when formal board gender contact intensity is low (-1.16), but higher subsequent firm performance ($\beta = 0.69$) when formal board gender contact intensity is high (1.16). This indicates

Table 3 Firm performance (ROA) effects of women inclusion on boards (mixed effects model)

Variable	Model [1]			Model [2]			Model [3]		
	Beta	*SE*	*P*	Beta	*SE*	*P*	Beta	*SE*	*P*
Constant	0.42	1.46	.775	0.68	1.46	.641	0.69	1.47	.638
Duality	0.07	0.58	.902	0.07	0.58	.900	0.05	0.58	.937
Gender of CEO	2.41	1.94	.215	2.33	1.95	.231	2.05	1.96	.300
Directors (total)	− 0.10	0.41	.809	− 0.28	0.42	.510	− 0.29	0.42	.496
Board meetings	− 0.50	0.26	.060	− 0.58	0.37	.112	− 0.43	0.37	.254
Inside directors	0.30	0.29	.308	0.28	0.29	.334	0.29	0.29	.318
Firm size	− 0.68	0.40	.093	− 0.75	0.41	.065	− 0.81	0.41	.046
Men's past directorship experience (average)	− 0.02	0.32	.940	− 0.22	0.33	.503	− 0.23	0.33	.492
Women's past directorship experience (average)	− 0.48	0.33	.147	− 0.49	0.34	.144	− 0.37	0.34	.283
Men's tenure (average)	0.63	0.32	.045	0.69	0.32	.030	0.66	0.32	.038
Women's tenure (average)	0.51	0.35	.147	0.52	0.35	.141	0.57	0.35	.105
Committees chaired by women directors	− 0.10	0.32	.764	− 0.10	0.32	.757	− 0.13	0.32	.688
Women directors (demeaned)	− 0.26	0.49	.594	− 0.08	0.49	.872	0.07	0.50	.891
Women directors (group mean)	0.03	0.44	.952	0.10	0.44	.821	0.22	0.45	.630
Formal board gender contact intensity				0.15	0.47	.756	− 0.26	0.50	.606
Men directors' critical mass gender contact history				0.91	0.45	.044	0.92	0.46	.045
Women directors (group mean) × formal board gender contact intensity							0.62	0.28	.026
Women directors (group mean) × men directors' critical mass gender contact history							− 0.04	0.33	.911
Multiple R^2	0.15			0.15			0.16		
Adjusted R^2	0.49			0.49			0.49		

$N = 1110$ in 247 firms. Two-tailed tests. Industry, year, and endogeneity controls included in all models. Variables are standardized; orthogonalized measures used for formal board gender contact intensity and men directors' critical mass gender contact history

that higher formal board gender contact intensity is significantly more valuable for boards with more women directors on average, while low formal board gender contact intensity was harmful for boards with more women who served but beneficial when fewer women served. This further supports Hypothesis 1 and establishes that formal board gender contact intensity is valuable not only within firms when the number of women on boards is greater, but also indicates that any board who has 3 or more women should benefit from greater formal board gender contact intensity.

Post Hoc Analyses

Men Directors' Tokenism Only Gender Contact History

Hypothesis 2 suggested women directors' perspectives will be better incorporated if more men have prior contact with a critical mass of women director colleagues. Recent work proposes inclusion in organizations may involve dual considerations of directly promoting inclusion of historically marginalized individuals, as well as distinct considerations of preventing discrimination/exclusionary practices by majority members against minorities (Shore et al., 2018). Discussing this latter issue post hoc, we reasoned it may be relevant to consider how men directors' history might reinforce bias.

This is because working with 'token' numbers of women colleagues may reinforce or be indicative of gender bias (cf. Acker, 1990; Kanter, 1977). We thus created a measure of the tally of men with tokenism only gender contact history (i.e., men who worked with women, but never on a board with a critical mass of women on a board). In Table 2, Model 4, we replaced our moderating variable of men directors' critical mass gender contact history with the variable for men directors' tokenism only gender contact history. Results were consistent when we ran our model with three moderators (i.e., formal board gender contact intensity; men directors' critical mass gender contact history; men directors' tokenism only gender contact history) (see Supplementary Table S.8). We used an orthogonalized measure for men directors' tokenism only gender contact history, as it was highly correlated with women directors, though our results were consistent when using the non-orthogonalized measure (see Supplementary Table S.9).

The women directors by formal board gender contact intensity interaction ($\beta = 0.66$; $p = 0.020$) was again related to ROA. However, we also found that the women directors by men directors' tokenism only gender contact history

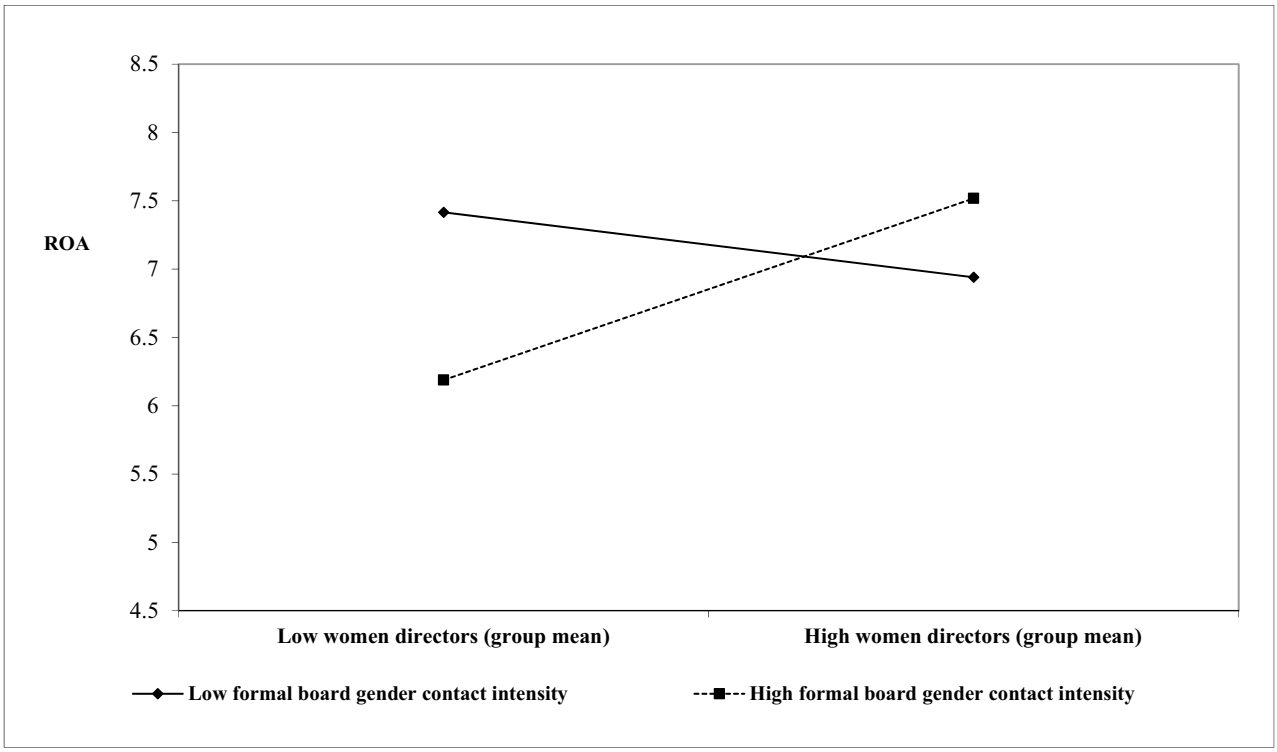

Fig. 2 Cross-level interaction) moderating effect of formal board gender contact intensity upon women directors (group mean)-ROA relationship. This figure is based on standardized variables from Table 3, Model 3

interaction ($\beta = -0.72$; $p = 0.042$) was also related to ROA. We graphed this in Fig. 3, with women directors set at the same levels as in Fig. 1. To ensure conditions occurred multiple times in our sample, men directors' tokenism only gender contact history was set at 0.75 SD above and below the mean (scores of 2.07 and − 2.07). Marginal effects indicate firm years with 1 SD more women directors are associated with only slightly negative firm performance ($\beta = -0.09$) when men directors' tokenism only gender contact history is low (− 2.07), but far more negative subsequent firm performance ($\beta = -1.17$) when men directors' tokenism only gender contact history is high (2.07). These results are practically and theoretically important because they indicate a board with gender diversity is less effective if a high number of men directors have previously only worked with token numbers of women directors. This finding is consistent with our theory and the arguments laid forth in Hypothesis 2, such that firms perform worse with more women directors who interact with men colleagues without prior board experience with women. In our "Discussion" section, we explore the implications of this finding.

Robustness/Alternative Explanation Tests

We ran additional analyses to address broader robustness concerns. We used data from Execucomp to calculate 1-Year Total Shareholder Return (TSR) and 5-Year Total Shareholder Return (TSR). We did not find our predictor variables of interest impacted either 1-Year or 5-Year TSR (see Supplementary Tables S.10–S.11). This pattern is consistent with research indicating the relationship between board gender diversity and accounting returns is likely different from the board gender diversity-market performance relationship (Post & Byron, 2015; Solal & Snellman, 2019).

We performed additional analyses to address potential concerns regarding our chosen list of covariates. First, our model may have had too few covariates. Extant research suggests age and ethnicity may influence the interpersonal relationships between director colleagues (cf. Zhu et al., 2014). We replicated our analyses including additional covariates related to director age and ethnicity (leveraged from the ISS database). We took steps to ensure the information used was accurate. Specifically, we (a) used company websites to manually determine ethnicity of directors who did not have such details listed in ISS and (b) manually checked that all individuals were coded as having the same ethnicity in all years/instances in which they appeared in our sample. Individual directors were coded as either 'Caucasian' or 'person of color'. We then created unit-level covariates for men directors' age (average), women directors' age (average), number of person of color men directors, number of person of color women directors, and re-tested our primary

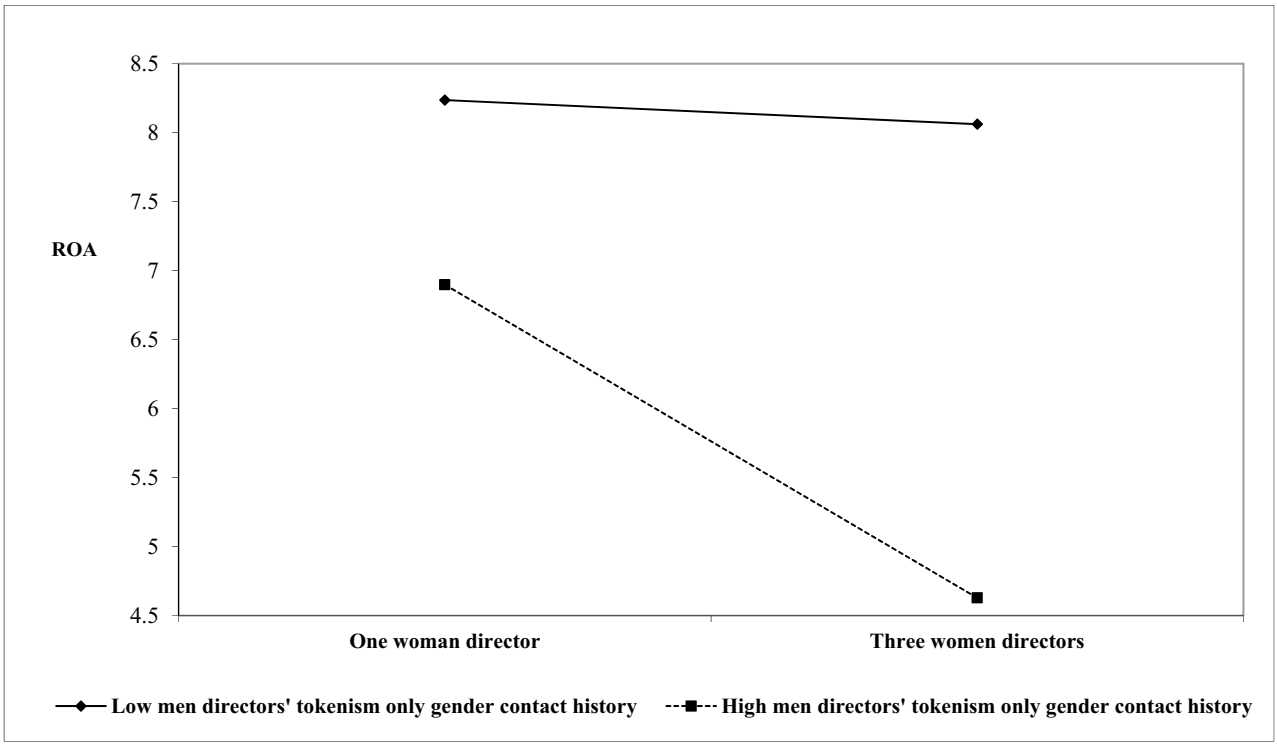

Fig. 3 Moderating effect of men directors' tokenism only gender contact history upon women directors-ROA relationship. This figure is based on standardized variables from Table 2, Model 4

analyses. We also replicated this process instead using covariates for (a) percent of men directors who were men of color, and (b) percent of women directors who were women of color. Results were consistent (see Supplementary Tables S.12–S.13). An inverse concern is our original model had too many covariates. Following best practice recommendations (cf. Becker, 2005; Carlson & Wu, 2012), we replicated our primary analyses with a streamlined model controlling only for firm, year, duality, gender of CEO, directors (total), firm size, men's past directorship experience (average), men's tenure (average), women's tenure (average), and endogeneity. Results were consistent (see Supplementary Table S.14).

An important consideration for addressing endogeneity is to consider plausible alternative explanations for demonstrated effects (cf. Bliese et al., 2020). We replicated our primary analyses, but replaced formal board gender contact intensity with two distinct moderators: gender contact in full board meetings and gender contact in committee meetings. If contact was the explanatory mechanism for our results, a measure that captured the full extent of formal contact between men and women colleagues should explain the women directors-firm performance relationship, rather than either individual components of such a measure. We find no interaction effects when splitting formal board gender contact intensity into these component variables (see Supplementary Table S.15). We also explored the possibility it may be women serving on particular committees, rather than having more instances of contact, that explain our results in Table 2. We replaced formal board gender contact intensity with a measure of the number of seats on major committees held by women. The results did not indicate an interaction predicting firm performance (see Supplementary Table S.16). We found similar results when using an orthogonalized version of number of seats on major committees held by women (see Supplementary Table S.17). Taken together, these analyses support the position that the results found in Table 2 are likely due to the amount of overall (formal) contact occurring between men and women directors.

Recent research indicates the integration of women into a top management team may be a function of having women incumbents (Post et al., 2020). Boards choose their own committee assignments (Finkelstein et al., 2009; Kolev et al., 2019; Krause et al., 2017), and thus formal board gender contact intensity could be impacted by the degree there are women 'incumbent' vs. 'newcomer' directors. While our original model included women's tenure (average), we deemed it important to verify effects in support of Hypothesis 1 held when controlling for additional considerations related to women directors' incumbent vs. newcomer status. We replicated our primary analyses, adding the standard deviation of women's tenure as a covariate. We also

replicated our primary analyses, adding both (a) the percent of women directors who were long tenured [i.e., more years of tenure than the mean score for every director (i.e., all men and women directors) in our entire sample], and (b) the percent of women directors who were newcomers (i.e., 1 year or less tenure score), as covariates. In both instances, the results were consistent with our primary analyses (see Supplementary Tables S.18–S.19).

Discussion

Leveraging the CEM, as well as integrating both contact theory and critical mass theory, we extend and empirically test theory about how to mitigate categorization and biased treatment of women directors. In doing so, we demonstrate that contact between men and women directors enhances the board gender diversity-firm performance relationship. This is consistent with explanations that intergroup contact reduces stereotyping and increases the likelihood women's perspectives (including decision-making insights, monitoring, and resource opportunities) are incorporated. We also find that firm performance suffers when a gender diverse board is comprised of more men who have exclusively worked on boards with token numbers of women. This latter finding is consistent with comments from directors of publicly-traded companies. One woman director said "if the men [on a board] do not have the experiences they need [with women], the chances of [the board] being successful would be low." One man director said if "[the board has directors that] haven't had experience [working with women] and been in insular environments, it is a problem." Another woman director said that the tech industry, with especially low board gender diversity (Emelianova & Milhomem, 2019), involves "a learning curve for everyone" when women join. The totality of our findings help to reconcile the conditions under which gender diverse boards may see better or worse performance.

Given our manuscript reports findings using orthogonalized measures, the appropriate interpretation of our work is that formal board gender contact intensity between men and women directors, beyond what can be expected simply by virtue of having more women, should help gender diverse boards to be more effective. Similarly, if a gender diverse board (particularly with three or more women), has an atypically high number of men directors who have worked in the past 5 years with women colleagues, but never with three or more women on the same board, this impedes the performance of that gender diverse board. Results were consistent when using non-orthogonalized measures, suggesting these constructs broadly (i.e., formal board gender contact intensity; men directors' tokenism only gender contact history) affect the performance potential of a gender diverse board.

Theoretical Implications

Formal board gender contact intensity and men directors' tokenism only gender contact history do impact the board gender diversity-firm performance relationship; however, men directors' critical mass gender contact history does not positively moderate the board gender diversity-firm performance, as we had expected. This combination of effects is important for theorizing in multiple regards. First, our study informs scholarship on how contact theory (Allport, 1954; Dovidio et al., 2017; Pettigrew & Tropp, 2006) can be leveraged to build better corporate governance theory. Consistent with Pettigrew and Tropp's (2006) meta-analytic finding that institutional support is a particularly important condition for facilitating positive contact effects, we find formal board gender contact intensity (i.e., contact happening formally within the institution in question) positively moderates the board gender diversity-firm performance relationship. We also discussed how/why formal board gender contact intensity speaks to Allport's (1954) consideration of intergroup cooperation. Our theory indicates how equal status and commonality of goals, the remaining two of Allport's (1954) proposed conditions for contact to lead to reduced prejudice, are related to men directors' critical mass gender contact history. Yet men directors' critical mass gender contact history men directors did not impact the board gender diversity-firm performance relationship. This points to the possibility that some of Allport's (1954) proposed conditions for enabling contact theory's mechanisms may be disproportionately relevant for scholars exploring diversity in a board of directors' context.

Though men directors' critical mass gender contact history did not positively impact the board gender diversity-firm performance relationship, our supplemental analyses indicated men directors' tokenism only gender contact history negatively impacted that same relationship. This points to two important theory-building implications. Shore et al. (2018) propose achieving inclusion involves both promoting inclusion (e.g., having active allies of diversity) and also preventing exclusion (e.g., ensuring minorities do not experience discrimination). Men with tokenism only gender contact history may have had gender bias largely reinforced. Instead, it is men directors with critical mass gender contact history who likely have had the transformative experience that means they listen more to women colleagues (Konrad et al., 2008) and are less likely to see them through a lens of gender bias. That we find only the former consideration impacts the board gender diversity-firm performance

relationship builds theory because it indicates that, at least in an upper echelons boardroom context, the prevention of exclusionary practices or gender bias may be disproportionately important to achieving an inclusive culture.

Our findings help to further develop Kanter's (1977) work. Kanter (1977) establishes that when a critical mass is achieved, women are more likely to be included/valued by the unit (Kanter, 1977; Konrad et al., 2008), but a separate part of Kanter's (1977) work also discusses how or why members of minority groups are discounted, i.e., treated only as 'token' members. Though there is evidence validating these broad principles apply in a boardroom setting (e.g., Konrad et al., 2008), we are unaware of work that explores if/how a man director's experience with either tokenism or critical mass on one board may impact firm-level outcomes for future boards upon which he sits. Our results broadly support that the concepts Kanter (1977) discusses may spillover to impact the ability of directors to perform their duties at various boards on which they serve, but tokenism may spillover in ways that critical mass does not (and vice-versa).

Practical Implications

Board gender diversity is increasingly an inevitable reality of the modern business world (Spencer Stuart, 2020) and laws are being passed mandating board gender quotas (e.g., California: Jamali, 2020; Germany: Ziady, 2020). It is therefore important to understand what practices make gender diverse boards as effective as possible. Our work is valuable because we generate new insights about how board committee assignments/processes, and the history of the men on the board, matter to this end. Our findings indicate that firms that increase diversity without also ensuring formal board contact between men and women colleagues will underperform. Increasing the number of meetings on the full board, the assignment of women directors to committees, and/or the number of gender diverse committee meetings can make gender diverse boards more effective. Boards should leverage these findings, not by placing the burden on women to do more work, but rather foster opportunities for men and women directors to work together, as the burden for inclusion should fall more on majority members than on minority members (e.g., Joshi et al., 2015; Krause & Miller, 2020; Sawyer & Valerio, 2018).

Our results indicate men directors' tokenism only gender contact history negatively impacts the board gender diversity-firm performance relationship. While this does not imply a board should never nominate such a candidate, gender diverse boards should nevertheless exercise caution when considering such candidates. Although we do not find men directors' critical mass gender contact history directly impacts the board gender diversity-firm performance relationship, a process of elimination implies board nominating committees should nevertheless prioritize the recruitment/hiring of such men. There are three types of men directors who would not qualify as a 'tokenism only gender contact history man director': (a) men who only have prior directorship experience on all men boards, (b) men with no prior directorship experience, and (c) men with critical mass gender contact history. The first type of man director is increasingly non-existent, given nearly all boards now have at least one woman director (Spencer Stuart, 2020). Though individual first-time directors may often be valuable, it may be problematic to have every man on a board be a first-time director.

Areas for Future Research and Limitations

We looked only at US-based, S&P large-cap firms between 2010 and 2014. Our findings may not generalize to all other contexts. These concerns are mitigated by three realities. First, gender-progressive legislation is positively associated with women serving on boards (Thams et al., 2018). Second, board gender diversity positively impacts performance more for small firms, as directors in large firms have less direct control over performance (Li & Chen, 2018). In these respects, the effects we found may be stronger in countries with greater gender parity and/or for boards of smaller firms. Our review indicated the mechanisms underlying contact theory are year invariant, and thus there is not a theory-based reason to think our results would be radically different if we had used a sample drawn from different specific years. We nevertheless encourage other scholars to explore if the interaction effects we find herein hold when leveraging samples involving (a) firms headquartered in different countries, (b) different types of organizations (e.g., worker cooperatives, family-firms, non-profit organizations, etc.), and/or (c) observations involving different years. Such replication studies would generate a richer scientific understanding of precisely where/when/why the effects we find herein hold and/or are strongest, helping scholars more fully understand the board gender diversity-firm performance relationship.

Our test of the effects of formal board gender contact intensity upon the board gender diversity-firm performance relationship was appropriate, particularly given institutional support is a disproportionately critical condition for facilitating positive contact effects (Pettigrew & Tropp, 2006). We appreciate such a measure does not perfectly capture the degree men and women directors have contact, as it omits considerations of men and women directors having contact in informal settings. The tenets of contact theory could justify arguments that gender contact in an informal, social context could also reduce prejudice. In this sense, the results herein may well be a conservative estimate of the benefits of contact between men and women director colleagues. We encourage future studies to explore how informal contact

impacts colleague interactions for gender diverse boards. Such a project would be directly in keeping with a compelling anecdote shared us with by a woman director we interviewed. This individual expressed how she was deeply bothered when she "showed up to the board meeting and found the rest of the board [men] had been together golfing for two days, and no one had invited [her]."

Our results do not indicate any direct benefit to firm financial performance from having men directors with critical mass gender contact history, but they also do not indicate having such men directors harms firm financial performance. Future studies should explore if having such men directors may impact non-financial outcome variables that are important from an ethical perspective. Research on how to ensure firm-level actions that are good for society is perhaps most appropriate when scholars also have evidence the intervention (e.g., having more men directors with critical mass gender contact history) will not likely hurt financial performance. When men executives work with a critical mass of women director colleagues, the unit specifically discusses new and/or more controversial topics (Konrad et al., 2008; Tang et al., 2021). We encourage scholars to explore the possibility that after a man director works with a critical mass of women director colleagues, this has spillover effects such that he brings attention to specific issues during meetings for other boards on which he serves in future. This could be paired with extant literature on outcome variables which are (a) important from a sociological imperative, and also (b) associated with having more women directors (generally), such as corporate-social responsibility (see Bear et al., 2010; Byron & Post, 2016), and/or the promotion of more women throughout the firm (see Gould et al., 2018; Matsa & Miller, 2011). This latter issue is consistent with one woman director with whom we spoke saying that since a board on which she served achieved critical mass, "now in two self-assessments, the men directors are saying we need more female directors on this board."

Conclusion

Women directors bring unique perspectives to inform decision-making, monitoring, and resource opportunities. Yet, a board's ability to leverage such perspectives may be hindered by social categorization processes and intergroup biases that inhibit men's consideration of women's perspectives. Integrating CEM, contact theory, as well as research on both the phenomena of tokenism and critical mass, we extend research for both diversity and corporate governance scholars, helping organizations understand how to build and operate effective boards at a time when women directors serve in greater numbers than ever before. Specifically, formal board gender contact intensity is related to ROA, and the strength of this relationship exceeds what would be expected to exist merely by the presence of women directors serving. Further, men's history with tokenism negatively affects the relationship between women on boards and ROA, even when accounting for a focal board's current status of women.

Appendix: Detailed Description of Instrumental Variable Information

Instrumental variable (IV)	Associated variable in model	Why latter would covary with former	Why IV would not impact firm performance	*F* statistic; Sargan
Industry average women directors (tally)	Women directors	Being in industry with more women directors may pressure focal firm to do the same	IV does not capture degree women are on focal board	40.16; 0.28
Industry average portion of board who are women	Women directors	Being in industry with more women directors may pressure focal firm to do the same	IV does not capture degree focal board is comprised of women	40.16; 0.28
Audit committee seats	Formal board gender contact intensity	More seats on an essential committee should mean more men-women contact	Large committee has pros and cons: more human capital, but also less efficient.[1]	45.20; 0.49
Compensation committee seats	Formal board gender contact intensity	More seats on an essential committee should mean more men-women contact	Large committee has pros and cons: more human capital, but also less efficient.[1]	45.20; 0.49

Instrumental variable (IV)	Associated variable in model	Why latter would covary with former	Why IV would not impact firm performance	*F* statistic; Sargan
Women's appointments to critical mass boards (year prior)	Men directors' critical mass gender contact history	IV should be greater if focal board has had critical mass of women historically	Evidence only shows men improve skills from serving on critical mass board.[2]	25.75; 0.30
Women's appointments to critical mass boards (3 years prior)	Men directors' critical mass gender contact history	IV should be greater if focal board has had critical mass of women historically	Evidence only shows men improve skills from serving on critical mass board.[2]	25.75; 0.30

Source (1) Goodstein et al. (1994) and Kolev et al. (2019), (2) Konrad et al. (2008)

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Declarations

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