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Connectionism in Action: Exploring the Links between Leader Prototypes, Leader Gender, and
Perceptions of Authentic Leadership

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Abstract

Building on the connectionist model of leadership perceptions, this research investigates the relationships between leader gender and authentic leadership perceptions from a leadership prototype perspective. In a five-study series, we tested different cognitive processing dynamics that influenced leadership perceptions. Study 1 ($N=271$) demonstrated that female leader targets increased authentic leadership perceptions. Study 2 ($N=171$) showed this association for each of the four dimensions of authentic leadership. Study 3 ($N=100$) assessed the relationship between leader gender and authentic leadership perceptions with implicit measures (i.e., the accessibility of female names and female typed hobbies). Study 4 ($N=246$) extended this processing dynamic to consideration, another communal leadership style. Finally, a lexical decision making task in Study 5 ($N=200$) indicated that prototype inconsistent leadership styles (initiating structure, autocratic leadership) slowed down automated processing for female leader targets. We discuss contributions to information processing approaches to leadership and practical implications.

Keywords: agentic; authentic leadership; communal; connectionist model of leadership perceptions; gender; leader prototypes

In recent years, many women have advanced into the upper echelons of leadership. For example, the Forbes list of the world's most powerful women includes female leaders from the political realm such as Angela Merkel and Theresa May as well as corporate decision-makers such as General Motors CEO Mary Barra and Facebook COO Sheryl Sandberg. Despite these significant advancements, negative perceptions of women in leadership persist (Heilman & Eagly, 2008). Perceivers expect female leaders to be sensitive and strong (agentic), while male leaders only need to demonstrate strength in order to be perceived as effective (Johnson, Murphy, Zewdie, & Reichard, 2008). Yet, when women are described as agentic leaders, perceivers experience difficulties in cognitive encoding (Scott & Brown, 2006). How perceivers process leadership related attributes and how these cognitive processes affect leadership perceptions poses particular challenges for women in leadership (Hogue & Lord, 2007).

Leadership is a process of social perception (Lord, Brown, Harvey, & Hall, 2001; Lord, Foti, & De Vader, 1984; Lord, Foti, & Phillips, 1982). Leadership perceptions emerge from “a micro-level, psychological process that involves a single individual's perception of a potential leader” (Foti, Knee, & Backert, 2008, p. 179). The connectionist model of leadership perceptions suggests that complex cognitive dynamics between stable and flexible elements influence how individuals perceive leaders (Foti et al., 2008; Lord et al., 2001). Perceivers use leader prototypes, relatively stable cognitive categories of leaders compared to non-leaders. Leader prototypes shape leadership perceptions in interaction with more flexible contextual constraints at multiple levels in organizations. These constraints stem from leaders (e.g., trait dominance), perceivers (e.g., past experiences with leaders), and other elements (e.g., corporate culture). Gender is one of the contextual constraints that can affect leadership perceptions (Hogue & Lord, 2007; Johnson et al., 2008; Lord et al., 2001; Scott & Brown, 2006).

This conceptualization of leadership perceptions aligns with general models of cognitive processing according to which relatively stable memory structures (or top-down expectations) are matched against momentarily encountered stimuli (or bottom-up data) (Grossberg, 1999). When the brain processes new and complex information (e.g., during the first encounter with a new co-worker), top-down and bottom-up processes interact as patterns of activation spread to “reach an attentive consensus between what is expected and what is there in the outside world” (Grossberg, 1999, p. 1). Building on the connectionist model of leadership perceptions, we seek to advance the current understanding of the cognitive processing dynamics that incorporate the interaction between both top-down elements (i.e., leader prototypes) and bottom-up elements (i.e., leader gender, leadership style). When creating leadership perceptions, the available bottom-up data should alter the retrieval and reconstruction of leader prototypes. We explore the cognitive matching process between relatively stable leader prototypes with leader gender and leadership styles as more dynamic factors that affect leadership perceptions. Furthermore, we analyze different forms of cognitive processing dynamics, including explicit, pattern based, implicit, and automated processing. We test predictions derived from a connectionist perspective applied to the perceptions of authentic leadership for female leaders.

Whether leader prototypes differentially impact perceptions of authentic leadership for men and women has been subject to debates in the literature. Eagly (2005) suggested that women have been a social out-group in leadership for a long time and will be therefore less likely to be respected and to be perceived as authentic in their relations with followers than men. Hopkins and O’Neil (2015) also suggested a perceived mismatch between the attributes stereotypically ascribed to women and attributes inherent in authentic leadership. To date none of these arguments have undergone rigorous empirical testing, which is one purpose of this research.

To begin with, we analyze perceptions of authentic leadership when prototypes associated with female and male leader targets are *explicitly* activated (Study 1). We then analyze the four dimensions of authentic leadership separately, again looking at authentic leadership perceptions for female and male leader targets (Study 2). We use implicit measures to test how authentic leadership may activate leader prototypes associated with female and male targets (Studies 3 and 4). We also assess whether activation effects are similar for authentic leadership and other communal leadership styles (Study 4). Finally, we analyze automated encoding and compare response latencies for communal and agentic leadership styles (Study 5).

In summary, this research makes several contributions to the literature: First, it contributes to a better understanding of the relevance of cognitive processing dynamics for leadership perceptions from a connectionist perspective. Second, we provide empirical evidence to address previously unexamined arguments about the relationships between leader gender and authentic leadership. Third, the presented empirical evidence expands upon the current understanding of perceptions of communal and agentic leadership styles for female and male leaders in general, exploring potential boundary conditions to a female leadership advantage (Eagly & Carli, 2003). Fourth, we extend common methodological approaches to the study of leadership perceptions through conjoint analysis, implicit measurement, and a lexical decision making task (Uhlmann, Leavitt, Menges, Koopman, & Johnson, 2012).

Theory and Hypotheses

Leadership Perceptions

Leadership perceptions are formed on the basis of general mental categories (Lord et al., 1984; Lord et al., 1982; Lord & Maher, 1991). The superordinate category *leader* clusters into prototypes related to basic-level categories (e.g., business leader, military leader) and subordinate-level categories (e.g., male or female business leader). These mental categories, or leader prototypes, evolve through experience (e.g., with managers or teachers). They influence expectations for and evaluations of leadership that perceivers experience in future interactions.

Previous research has demonstrated that perceivers encode leader behavior in relation to leader prototypes. When (potential) leaders are encountered, perceivers compare perceived leader attributes to existing leader prototypes and draw further conclusions, for example about a leader's impact on group performance (Phillips & Lord, 1981). This two-step process of encoding the behavior of a target person and comparing it to a leader prototype can result in match (leader) or mismatch (non-leader) perceptions (Lord & Maher, 1991).

Connectionist model of leadership perceptions. Recent advances in cognitive science resulted in extensions of traditional leadership categorization theory (Lord et al., 2001). In contrast to previously held views of leader prototypes as stable mental representations (i.e., symbolic, storage-bin type structures), the connectionist model of leadership perceptions posits that mental representations of leaders are context-sensitive, dynamic states. Leadership perceptions thus arise from “a socially constructed, enacted process that involves bidirectional influences among multiple individuals” (Lord & Dinh, 2014, p. 159). Given the multitude of possible constraints, symbolic processing would require perceivers to have “an improbably large number of such relatively fixed prototypes to provide sufficient flexibility in perceiving

leadership” as well as “extensive experiences in each of these situations to develop appropriate prototypes” (Lord et al., 2001, p. 314).

The more recent model still acknowledges that relatively stable leader prototypes exist, which comprise multiple single although interconnected attributes associated with leadership (e.g., being decisive, dominant, intelligent, extraverted; Schein, 1973, 1975). Inputs from observable leader behaviors (e.g., leadership styles) and leader attributes (e.g., leader gender) feed into this prototype and activate certain units (e.g., decisiveness) rather than others (e.g., consideration). Higher-level contextual constraints such as culture (e.g., norms of appropriate leader behavior; Den Hartog, House, Hanges, Ruiz-Quintanilla, Dorfman, et al., 1999) and follower characteristics (e.g., work experience; Duehr & Bono, 2006) can also reinforce the activation patterns that drive individuals’ perceptions and judgments about their leaders.

Female Leaders

Leader prototypes are useful heuristics for judgments about leaders in a complex world. Heuristics, however, can also negatively affect leaders who are not seen as prototypical. This problem has been demonstrated comprehensively for female leaders (Heilman, 2001, 2012; Monzani, Hernandez Bark, van Dick, & Peiró, 2015; Nye & Forsyth, 1991; Scott & Brown, 2006). It has also been described as a gender bias toward female leaders (Eagly & Karau, 2002) or a ‘think manager, think male’ association (Schein, Mueller, Lituchy, & Liu, 1996). Role congruity theory of prejudice toward female leaders argues that negative judgments result from a perceived mismatch between attributes that are stereotypically ascribed to women and those ascribed to leaders (Eagly & Karau, 2002). Communal attributes, which perceivers ascribe to women (e.g., being helpful, kind, sensitive, gentle), do not correspond to the attributes ascribed to leaders and men (e.g., being ambitious, dominant, independent, forceful). Research conducted

over the course of several decades suggests that views of leadership are male typed rather than female typed (Boyce & Herd, 2003; Koenig, Eagly, Mitchell, & Ristikari, 2011; Schein, 1973, 1975; Schein et al., 1996; Sczesny, 2003). Men are generally preferred over women for male gender-typed positions, while for female gender-typed positions women are preferred (Davison & Burke, 2000) or no clear gender preference occurs (Koch, D'Mello, & Sackett, 2015).

According to the lack-of-fit model, biases against women in leadership result from prescriptive gender stereotypes, overgeneralized assumptions of what women and men ought to be like (Heilman, 2012). Successful female leaders suffer from interpersonal derogation because they violate expectations tied to female gender roles (Carli, Loeber, & LaFleur, 1995). Heilman, Wallen, Fuchs, and Tamkins (2004) demonstrated that when success was acknowledged, women but not equally successful men were less liked and more personally derogated. Nye and Forsyth (1991) showed for leadership effectiveness, but not for leader collegiality, that perceivers positively biased their ratings toward matching prototypes (i.e., male leaders with task-oriented styles or female leaders with socio-emotional styles). Scott and Brown (2006) found that agentic compared to communal leadership attributes were less accessible when perceivers responded to a female leader than when the leader was male.

In the face of persisting challenges for women in leadership, scholars have called for “novel solutions to this important leadership problem” (Hogue & Lord, 2007, p. 370). Eagly and Karau (2002) argue that the perceived mismatch between leader gender and leader prototypes “could vary in response to differing definitions of gender roles as well as leader roles” (p. 577). The impact of leader prototypes associated with female and male leaders is likely to vary for perceptions of specific types of leadership. We set out to explore the relationships between leader prototypes, leader gender, and perceptions of authentic leadership.

Authentic Leadership

While organizations and their members are grappling with conflicting social and economic pressures, authenticity has become “the gold standard for leadership” (Ibarra, 2015, p. 54). Individuals achieve authenticity in the alignment between their inner selves, their privately held values, thoughts and feelings, and the external display of these in interactions with others (Harter, 2002). From a conceptual standpoint, however, authentic leadership is not the same as feeling authentic. Whether a person feels authentic is fundamentally different from them being perceived as authentic by others. Both felt and perceived authenticity are subjective and perceptual in nature, yet, the first is self-referential and the latter refers to others’ views of the target individual (Randolph-Seng & Gardner, 2013). Being seen as authentic by others, specifically by one’s followers, lies at the heart of the currently best-established conceptualization of authentic leadership (Gardner, Cogliser, Davis, & Dickens, 2011).

While personal values and convictions matter for authentic leadership, it is quintessential that authentic leaders “build credibility and win the respect and trust of followers” (Avolio, Gardner, Walumbwa, Luthans, & May, 2004, p. 806). The essence of authentic leadership lies within its relational nature. The ultimate purpose of authentic leadership is to create authentic followership (Leroy, Anseel, Gardner, & Sels, 2015). Authentic leaders build strong interpersonal relationships that have been shown to contribute to followers’ basic needs satisfaction and to feelings of authentic followership (Leroy et al., 2015). Moreover, recent research demonstrated that perceptions of authentic leadership “vary as a function of the degree to which leaders are seen to enact a collective self by advancing the collective interests of their ingroup” (Steffens, Mols, Haslam, & Okimoto, 2016, p. 727). In other words, authentic leaders are advocates of others’ well-being and act in line with others’ needs and interests.

Building on its relational nature, we argue that authentic leadership is perceived as a communal leadership style. Communion concerns consideration for others and interdependent self-construal (i.e., integrating “the self in a social unit through caring for others”; Abele & Wojciszke, 2007, p. 751). According to recent conceptualizations, authentic leadership entails four dimensions, each of which has inherent communal attributes with the purpose to serve the collective rather than to simply benefit the leader him or herself (Walumbwa, Avolio, Gardner, Wernsing, & Peterson, 2008). First, authentic leaders demonstrate *self-awareness*. They strive to understand their own personal values as well as strengths and weaknesses in order to be able to assess and understand their own impact on others. Authentic leaders seek to gain feedback through interactions with others (Neider & Schriesheim, 2011) because they “recognize how dependent they are on forces outside of themselves” (Morris, Brotheridge, & Urbanski, 2005, p. 1332). Ultimately, increased self-awareness allows authentic leaders to be interpersonally sensitive and to consider the needs and interests of the people they lead.

Second, authentic leaders show *relational transparency*. They openly share information with others and express their true thoughts and feelings. Authentic leaders “present their true inner emotions” (Gardner, Fischer, & Hunt, 2009, p. 468). By presenting their ‘true self’ to others, authentic leaders show that they are vulnerable and foster mutually trusting and nurturing relationships with followers (Wang, Sui, Luthans, Wang, & Wu, 2014). The relationships that authentic leaders build are “founded on principles of social exchange” (Gardner et al., 2009, p. 472). They also promote follower development (Gardner, Avolio, Luthans, May, & Walumbwa, 2005). Strong interpersonal relationships help authentic leaders address followers’ basic needs and create authentic followership (Leroy et al., 2015).

Third, authentic leaders' *internalized moral perspective* manifests in actions guided by ethical values even in the face of external pressures. Authentic leaders resolve moral dilemmas in responsible ways rather than for the purpose of "preserving their own career survival" (May, Hodges, Chan, & Avolio, 2003, p. 247). The values that authentic leaders pursue incorporate support and benevolence for others. They "minimize personal goals, focusing instead on understanding those they serve and, more importantly, exercising influence on behalf of others" (Diddams & Chang, 2012, p. 594). Authentic leadership is associated with actions for the collective rather than the pursuit of the leader's self-interest (Steffens et al, 2016).

Fourth, *balanced processing* refers to encouraging others to voice opposing points of view. Authentic leaders carefully consider all relevant information before reaching a conclusion, even when these views challenge their own firmly held beliefs. Importantly, they actively seek the dialogue with their followers, soliciting and considering different perspectives. Authentic leaders incorporate others' views to reach the best possible decisions for the collective. They consider others' opinions in a non-defensive manner, exactly because they realize their own limitations and imperfections (Diddams & Chang, 2012).

Based on these theoretical views and empirical findings we argue that authentic leadership represents a communal leadership style. While for some leadership styles empirical evidence supports that they are positively associated with female leaders (e.g., transformational leadership; Vinkenburg, van Engen, Eagly, & Johannesen-Schmidt, 2011), the relationships between leader prototypes, leader gender, and perceptions of authentic leadership lack rigorous empirical testing (Eagly, 2005; Hopkins & O'Neil, 2015).

According to the connectionist model of leadership perceptions, cognitive patterns of communal attributes are more likely to be activated when the target of leadership perceptions is

female rather than male. Lord et al. (2001) argue that “if the gender of a potential leader affects the leadership prototype that is likely to be used by perceivers, then priming male or female categories should systematically affect the accessibility of traits used to define leadership” (p. 323). This prediction aligns with previous research demonstrating that perceivers experience less difficulty in accessing communal attributes when the target of leadership perceptions is female (Scott & Brown, 2006). Based on these findings we propose that activation of female leader prototypes positively impacts authentic leadership perceptions. When perceivers are explicitly instructed to rate female leaders, communal attributes are activated. Communal attributes, in turn, are associated with authentic leadership. Due to spread of activation within the network of interconnected cognitive units, communal attributes will be more accessible than agentic attributes. When explicitly instructed to rate male leaders, however, agentic attributes are activated. Agentic attributes are less likely to be associated with authentic leadership. To summarize, we posit the following:

Hypothesis 1. Leader gender predicts authentic leadership perceptions. Female leaders are more likely to be associated with authentic leadership than male leaders.

Study 1

This study analyzes the relationship between leader gender and authentic leadership perceptions with experiments in two samples of students ($N=130$) and working adults ($N=141$).

Method

Participants. The first sample consisted of 130 students from a German university (66 men, 64 women). Students were between 18 and 28 years old ($M=21.9$, $SD=2.4$) and in their fourth semester of study ($M=4.0$, $SD=2.4$). They studied toward degrees in Social Sciences (47.7%), Engineering/IT (18.5%), Humanities (10.0%), Natural Sciences (7.7%), Life

Sciences/Medicine (3.8%), and other fields (7.7%), with 4.6% missing. One hundred nine participants had previous work experience (e.g., internships, student jobs, vocational training). We approached participants at various locations on campus and invited them to a paper-pencil based survey. Participation took approximately ten minutes. It was incentivized with three Euros.

The second sample consisted of 141 German-speaking working adults (71 women, 69 men, 1 missing) in full or part time employment. Participants were between 21 and 63 years old ($M=40.1$, $SD=9.9$) and had two to 48 years of work experience ($M=18.1$, $SD=10.3$). Participants represented organizations from different industries: service (40.4%), manufacturing (21.3%), retail (6.4%), social, education, and health (5.7%), public administration (5.0%), research and science (2.8%), and other sectors (16.3%), with 2.1% missing. Seventy-eight participants had management experience. We approached participants through a German social network website and administered the survey online. Participation took approximately ten minutes. It was not incentivized.

Design. We used a one-factorial between-subjects design with the factor leader gender (female, male, control). Participants were randomly assigned to one of the three conditions. In line with previous findings that men and women rate leadership styles differently (e.g., transformational and transactional leadership; Maher, 1997), the design included participant gender (female, male) as a covariate. We collected authentic leadership perceptions as the dependent measure.

Procedure. At the beginning of the survey, anonymity and voluntary participation were confirmed. We manipulated the independent variable leader gender with the following question: “How likely are female leaders/ male leaders/ leaders in general to do the following?”.

Subsequently, participants indicated authentic leadership perceptions for one of the three groups. At the end of the survey, participants provided demographic information.

Dependent measures. We assessed authentic leadership perceptions with the German version of the Authentic Leadership Questionnaire (ALQ; Peus, Wesche, Streicher, Braun, & Frey, 2012) consisting of 16 items developed and validated by Walumbwa et al. (2008). The ALQ measures authentic leadership based on four dimensions. The ALQ items were slightly adapted to fit the research paradigm (i.e., using plural rather than singular): (1) self-awareness (e.g., “Female leaders/ male leaders/ leaders in general know when it is time to re-evaluate their positions on important issues”), (2) relational transparency (e.g., “Female leaders/ male leaders/ leaders in general say exactly what they mean”), (3) internalized moral perspective (e.g., “Female leaders/ male leaders/ leaders in general make difficult decisions based on high standards of ethical conduct”), and (4) balanced processing (e.g., “Female leaders/ male leaders/ leaders in general listen carefully to different points of view before coming to conclusions”). Based on earlier results of the factorial structure of the German ALQ (Peus et al., 2012) and in line with the original factorial solution (Walumbwa et al., 2008), we used a composite score of authentic leadership perceptions as a second-order factor comprised of the dimensions as four first-order factors. Participants rated the items on 7-point Likert scales ranging from 1 (*very unlikely*) to 7 (*very likely*). The scale showed very good reliability in the student sample ($\alpha=.84$) and excellent reliability in the working adult sample ($\alpha=.93$).

Results

Analyzing both samples separately, we first calculated an ANCOVA with the factor leader gender (female, male, control), participant gender as a covariate, and authentic leadership perceptions as the dependent variable. Next, we calculated post-hoc tests based on Fisher’s test

of least significant differences (LSD) and 95% confidence intervals to compare the two experimental conditions (i.e., female leader, male leader).

In the student sample, leader gender significantly predicted authentic leadership perceptions, $F(2,124)=15.137, p=.000, \eta_p^2=.196$.¹ Participant gender did not have a main effect, $F(1,124)=.378, p=.540$, and did not interact with leader gender to predict authentic leadership perceptions, $F(2,124)=2.572, p=.080$. In line with Hypothesis 1, participants indicated significantly higher levels of authentic leadership perceptions for female leaders ($M=4.78, SD=.76$) than for male leaders ($M=3.92, SD=.54; CI[.54,1.15]$). The average level of authentic leadership perceptions for leaders in general ($M=4.41, SD=.81$) was between the two experimental conditions. In sum, the results supported Hypothesis 1.

Table 1 summarizes the means, standard deviations, and cell sizes for the dependent variable authentic leadership perceptions by leader gender and participant gender for the student sample in Study 1.

----- Please insert Table 1 about here -----

In the working adult sample, leader gender also predicted authentic leadership perceptions significantly, $F(2,134)=9.275, p=.000, \eta_p^2=.122$.² Participant gender did not have a main effect on authentic leadership perceptions, $F(1,134)=.055, p=.815$. Again, in line with Hypothesis 1, participants indicated significantly higher levels of authentic leadership perceptions for female leaders ($M=4.72, SD=.91$) than for male leaders ($M=3.99, SD=.99; CI[.27,1.10]$). The average level of authentic leadership perceptions for leaders in general

¹ The main effect of leader gender on authentic leadership perceptions occurred on all four dimensions of authentic leadership in the predicted direction: self-awareness, $F(2,124)=18.403, p=.000, \eta_p^2=.229$, relational transparency, $F(2,124)=6.958, p=.001, \eta_p^2=.101$, internalized moral perspective, $F(2,124)=7.308, p=.001, \eta_p^2=.105$, and balanced processing, $F(2,124)=8.498, p=.000, \eta_p^2=.121$.

² The main effect of leader gender on authentic leadership perceptions occurred on all four dimensions of authentic leadership in the predicted direction: self-awareness, $F(2,134)=9.579, p=.000, \eta_p^2=.125$, relational transparency, $F(2,134)=7.278, p=.001, \eta_p^2=.098$, internalized moral perspective, $F(2,134)=4.687, p=.011, \eta_p^2=.065$, and balanced processing, $F(2,134)=10.230, p=.000, \eta_p^2=.132$.

($M=3.71$, $SD=1.22$) was below the two experimental conditions. However, in this sample, an interaction effect between leader and participant gender occurred, $F(2,134)=4.728$, $p=.010$, $\eta_p^2=.066$. Female participants ($M=5.06$, $SD=.84$) indicated higher levels of authentic leadership perceptions for female leaders than male participants did ($M=4.24$, $SD=.81$; $CI[.33, 1.65]$). In sum, the results supported Hypothesis 1.

Table 2 summarizes the means, standard deviations, and cell sizes for the dependent variable authentic leadership perceptions by leader gender and participant gender for the working adult sample in Study 1.

----- Please insert Table 2 about here -----

Discussion

Results from the first study supported the hypothesis that leader gender predicts authentic leadership perceptions. When participants rated female leaders they were more likely to attribute authentic leadership than when they rated male leaders. The study also replicated initial findings from a student sample with working adults. In the working adult sample, female participants indicated higher levels of authentic leadership perceptions for female leaders than male participants did. This finding matches earlier studies demonstrating variations of the ‘think manager, think male’ association between male and female participants (Brenner, Tomkiewicz, & Schein, 1989; Duehr & Bono, 2006). Maher (1997) found that only female participants rated female leaders higher in transformational and contingent reward leadership, but lower in management-by-exception and laissez-faire leadership than male leaders. Since about half of our participants had management experience, views of female respondents may reflect favorable ratings of their in-group shaped by own experiences of exclusion from male networks (McDonald, 2011) or social identity threat (Scheepers & Ellemers, 2005). In addition, working

adults indicated lower perceptions of authentic leadership in the control condition (i.e., for leaders in general) than when they rated female or male leaders. Many working adults are likely to have experienced the downsides of bad leadership (Schyns & Schilling, 2013). These results support that contextual constraints such as work experience affect leadership perceptions.

Study 1 builds on the notion that attributes of authentic leadership are associated with female leader prototypes. Since authentic leadership is a multi-dimensional construct, it is important to understand whether all of its dimensions function in similar ways. We therefore implemented conjoint analysis to test different patterns of authentic leadership in Study 2.

Study 2

This study analyzes different configurations of authentic leadership in a working adult sample ($N=171$). We test the extent to which the four authentic leadership dimensions (self-awareness, relational transparency, internalized moral perspective, balanced processing) are associated with female and male leaders.

Pattern Approaches

Patterns of attributes better predict whether others categorize a target person as a leader than each single attribute alone (Foti, Bray, Thompson, & Allgood, 2012; Foti & Hauenstein, 2007; Smith & Foti, 1998). These findings correspond to the notion of activation spread in connectionist networks (Lord & Dinh, 2014). While each unit of the network can be meaningful, when two or more units receive repeated and conjoint activation, the strength of association between them increases (Lord et al., 2001). Once certain patterns are learned, the network completes perceptions through gap-filling processes, even if only some of the relevant units receive initial activation. We build on pattern approaches to better understand cognitive processing of the four authentic leadership dimensions with conjoint analysis methodology.

Traditionally employed in marketing (Orme, 2010), conjoint analysis is an increasingly popular research method in the fields of management (Shepherd, Patzelt, & Baron, 2013), social cognition and stereotyping (Caruso, Rahnev, & Banaji, 2009), and leadership (Soutar & Ridley, 2008). Conjoint analysis enables researchers to measure real-world judgments (Aguinis & Bradley, 2014). The basic tenet is “that people do not evaluate alternatives one attribute at a time”, but rather “a bundle of attributes simultaneously” (Soutar & Ridley, 2008, p. 463). The connectionist model of leadership perceptions predicts that when networks are strongly connected, activation spreads through gap filling. Gap filling has been described as “a process that smooths out slight variations in input patterns to produce stability in the leadership prototypes created by slightly different input configurations” (Lord et al., 2001, p. 333). As perceivers seek to interpret external inputs, missing information is inferred. A subset of external inputs (e.g., authentic leadership attributes) thus ought to prompt an overall activation pattern.

Previous results demonstrate positive associations between communal leadership attributes and female leaders (Johnson et al., 2008; Scott & Brown, 2006). We suggest that all four dimensions of authentic leadership are communal in nature and should therefore relate positively to prototypes associated with female leaders. We expect that high rather than low levels of self-awareness, relational transparency, internalized moral perspective, and balanced processing are associated with female leaders, since all four dimensions entail communal attributes. To summarize, we posit the following:

Hypothesis 2. High levels of self-awareness, relational transparency, internalized moral perspective, and balanced processing are more likely to be associated with female leaders than low levels of these authentic leadership dimensions.

Method

Participants. One hundred seventy-one German-speaking working adults (86 men, 80 women, 5 missing) in full or part time employment participated in the study. Participants were between 20 and 72 years old ($M=43.7$, $SD=11.7$) with one to 50 years of work experience ($M=23.1$; $SD=12.8$). They represented organizations from different industries: service (24.0 %), manufacturing (16.4 %), retail (13.5 %), public administration (13.5 %), social, education, and health (12.3 %), research and science (2.9 %), and other sectors (14.6 %), with 2.9 % missing. Forty-eight participants had management experience. We administered the questionnaires online in collaboration with a market research institute, and recruited participants through a professional panel provider (respondi). This approach allowed us to prescreen participants' gender and work experience to ensure the representativeness of the population of interest. Participation took approximately five minutes. Participants were reimbursed by the panel provider.

After initial screening, 26 participants were excluded from analyses because of missing data (i.e., more than two out of 16 profile comparisons missing), speedy responses (i.e., response time of less than 80 seconds) or a low coefficient of determination. The coefficient of determination is an adjusted R^2 measure with low values indicating arbitrary response patterns. In line with previous literature, we used a cut-off criterion of $R^2 < .30$ (Soutar & Ridley, 2008).

Procedure. At the beginning of the study, anonymity and voluntary participation were confirmed. Participants then completed sixteen profile comparisons. Each comparison consisted of two leader profiles presented side by side in random order. Each profile contained four statements representing the four dimensions of authentic leadership. Specifically, within a profile, each dimension of authentic leadership was varied to indicate either high or low levels of self-awareness, relational transparency, internalized moral perspective, and balanced processing. At the end of the survey, participants provided demographic information.

Materials. We developed a set of 16 leadership profiles for conjoint analysis. Two levels (high, low) represented each of the four dimensions of authentic leadership. We developed the descriptions for each dimension and its two levels based on the authentic leadership literature (Gardner et al., 2011; Neider & Schriesheim, 2011; Peus et al., 2012) and items of a validated German version (Hörner, Weisweiler, & Braun, 2015) of the Authentic Leadership Inventory (ALI; Neider & Schriesheim, 2011). We first wrote six statements per authentic leadership dimension (i.e., three statements describing low levels, three describing high levels of authentic leadership) in an iterative process. In a pretest, four leadership experts (two women, two men), who were blind to the study purpose, rated all statements, indicating how consistent they were with the definition of the respective authentic leadership dimension on 5-point Likert scales from 1 (*not at all consistent*) to 5 (*completely consistent*). We selected those statements that all experts found to be completely consistent with the respective dimension of authentic leadership.

The conjoint analysis comprised 16 profile comparisons with two profiles each (i.e., 32 profiles in total). Orthoplan in SPSS was used to generate the selected 32 profiles, which represented an orthogonal array of all possible profile comparisons. The selected profiles were relatively *balanced* such that each level (high, low) for each of the four dimensions of authentic leadership was equally likely to occur, *orthogonal* such that levels of attributes occurred together approximately the same number of times, and *fractional* such that a selection of all possible combinations was presented to respondents. Orthogonal arrays are typically preferred over comparisons based on all possible combinations of attribute levels due to their efficiency in terms of the number of comparisons that respondents are required to undertake. The design also ensures that the resulting parameter estimates are independent of each other (Green, Krieger, & Wind, 2001; Kuhfeld, Tobias, & Garratt, 1994).

Table 3 displays an English translation of the authentic leadership dimensions and levels used for conjoint analysis profiles in Study 2.

----- Please insert Table 3 about here -----

Dependent measure. Participants indicated the extent to which they perceived one profile was more descriptive of a female (or male) leader than the other profile on a 7-point Likert scale ranging from 1 (*clearly profile 1*) through 4 (*profile 1 or 2 similarly*) to 7 (*clearly profile 2*). Participants were randomly assigned to the condition female leader or male leader through the rating instructions (“Please indicate which of the two leader profiles is more likely to be a woman/ man”).

Data analysis. We followed standard procedures for the analysis of conjoint data to calculate relative attribute importance and part-worth utilities (Orme, 2010). Relative attribute importance (i.e., differences between the level with the lowest and highest part-worth utility within each dimension divided by the sum of differences over all dimensions) is compared *across* authentic leadership dimensions. Part-worth utilities (i.e., beta scores for each attribute generated via linear regression) indicate participants’ relative preferences for one level compared to other levels of the *same* dimension of authentic leadership. Paired sample t-tests with Bonferroni adjustment compare differences in part-worth utilities per dimension.

Results

Attribute importance. We first analyzed whether the four dimensions of authentic leadership generally differed with regard to their impact on gendered leader prototypes. For each dimension, the percentage of variance explained was calculated. In both groups, self-awareness ($M_{\text{female}}=31.16$; $M_{\text{male}}=28.01$) and relational transparency ($M_{\text{female}}=27.99$; $M_{\text{male}}=31.52$) had a greater impact on subsequent ratings than internalized moral perspective ($M_{\text{female}}=19.89$;

$M_{\text{male}}=19.67$) and balanced processing ($M_{\text{female}}=20.96$; $M_{\text{male}}=20.81$). Thus, relative attribute importance values were similar, independent of whether participants rated male or female leaders. Self-awareness and relational transparency, each of which explained about 30 percent of variance, appeared to be more important than internalized moral perspective and balanced processing, which account for about 20 percent of variance in leader gender ratings.

Table 4 summarizes relative attribute importance (means, standard deviations) in Study 2.

----- Please insert Table 4 about here -----

Part-worth utilities. To test Hypothesis 2, we calculated normalized part-worth utilities. Part-worth utility values indicate the extent to which perceivers associate high and low levels of each dimension of authentic leadership with female or male leaders. Participants were significantly more likely to associate high rather than low attribute levels with female leaders. Significant differences in the predicted direction occurred for all four dimensions: self-awareness, $t_{\text{high-low}}(77)=2.021$, $p=.047$, $d=.229$, relational transparency, $t_{\text{high-low}}(77)=6.190$, $p=.000$, $d=.701$, internalized moral perspective, $t_{\text{high-low}}(77)=4.895$, $p=.000$, $d=.554$, and balanced processing, $t_{\text{high-low}}(77)=5.119$, $p=.000$, $d=.580$. In contrast, perceivers were not more likely to associate high rather than low attribute levels with male leaders. This was the case for three of the four dimensions: self-awareness, $t_{\text{high-low}}(66)=1.423$, $p=.159$, internalized moral perspective, $t_{\text{high-low}}(66)=1.761$, $p=.083$, and balanced processing, $t_{\text{high-low}}(66)=-.786$, $p=.435$. However, perceivers were significantly more likely to associate low rather than high attribute levels on the relational transparency dimension of authentic leadership with male leaders, $t_{\text{high-low}}(66)=-5.513$, $p=.000$, $d=.674$. In sum, the results supported Hypothesis 2.

Table 5 summarizes the part-worth utilities (means, standard deviations) in Study 2.

----- Please insert Table 5 about here -----

Discussion

The second study furthered our understanding of the relationship between leader gender and authentic leadership perceptions from a pattern perspective. The results supported the underlying assumption of a positive relationship between female leaders and authentic leadership. High compared to low levels of self-awareness, relational transparency, internalized moral perspective, and balanced processing predicted ratings of female leaders. This finding strengthens the notion that perceivers have female leaders in mind when prompted to think of authentic leadership. Perceivers may automatically deal with cognitive gaps when slight variations of authentic leadership patterns occur (e.g., inferring additional information, ascribing low attribute levels to contextual constraints). However, we also found that some of the dimensions elicited stronger associations than others. Relational transparency was more strongly associated with female leadership than all other dimensions. In addition, only this dimension related to male leadership and the association was negative (i.e., participants were more likely to think of male leaders when relational transparency was low).

When interpreting these findings, one needs to keep in mind that we only used one perceptual cue to represent each dimension of authentic leadership (in high and low variations). This restriction kept the number of necessary profile comparisons per participant manageable and was based on careful material development and pretesting. However, we readily acknowledge that the lack of stimulus sampling poses a threat to study validity (Wells & Windschitl, 1999). We encourage future studies using conjoint analysis to replicate these findings with different stimulus materials.

It is also important to note that while the findings of this study tested predictions based on person-oriented theory, we analyzed the data using variable-oriented methods. Scholars in the

leadership field increasingly recognize the value of person-oriented theory and methods (for details see Foti & McCusker, 2017). As opposed to the common variable-oriented approach in organizational psychology, the person-oriented approach treats the individual as the main unit of theorizing and analysis. We acknowledge that “true person-oriented research consists of *both* person-oriented theory and person-oriented methods” (Foti & McCusker, 2017, p. 196). Future studies can expand upon the work presented here using person-oriented methods. For example, these methods include latent class procedures for the purpose of “identifying and understanding unobserved subpopulations based on specific configurations or patterns” (Wang & Hanges, 2011, p. 25). Following our research, future studies may assess broader profiles of leadership perceptions for male and female targets based on person-oriented theorizing and analysis.

So far, we analyzed the relations between leader gender and authentic leadership perceptions in the form of explicit, actively prompted judgments. Yet, leadership perceptions arise from complex social-cognitive processes which are partly inaccessible to conscious reasoning. Explicit prompting of leader gender may have also increased socially desirable responding. We therefore set out to focus on implicit processing in the following studies.

Study 3

Leadership perceptions tend to occur “effortlessly, without intention, without awareness, and very quickly as part of a schema-activation process” (Lord et al., 2001, p. 320). The adjective checklists or rating scales commonly used in research of gender and leadership instead center on attitudes that perceivers can access consciously (Banaji & Greenwald, 1995). Implicit measures, in contrast, “provide estimates of individuals’ attitudes without our having to directly ask them for such information” (Fazio & Olson, 2003, p. 303). They reveal insights that perceivers would be reluctant or unable to express otherwise (Banaji & Hardin, 1996; Kawakami

& Dovidio, 2001). In Study 3, we therefore conducted an experimental design that varied authentic leadership perceptions and employed two implicit measures. First, we assessed the cognitive availability of female or male names (Banaji & Greenwald, 1995). Names are common implicit operationalizations of gender (Kasof, 1993). The advantage of names is that they can be used “without making it obvious that an effect of gender [is] being investigated” (Banaji & Greenwald, 1995, p. 182f.). Second, we measured cognitive availability of hobbies. Gender-typed hobbies have been shown to predict gendered perceptions above and beyond other information (e.g., target persons’ instrumentality and expressiveness; Lippa, 2005).

In line with our theoretical reasoning for the previous studies, we assume that the communal nature of authentic leadership activates leader prototypes associated with female leader targets. We posit that perceivers will implicitly associate authentic leadership more closely with female leaders than with male leaders.

Hypothesis 3. High levels of authentic leadership are more likely to activate implicit judgments associated with female leaders, including female names (*3a*) and female gender-typed hobbies (*3b*), than low levels of authentic leadership.

Method

Participants. One hundred German-speaking working adults (68 men, 29 women, 3 missing) in full time or part time employment participated in the study. Participants were between 22 and 62 years old ($M=40.2$; $SD=9.3$) and had two to 38 years of work experience ($M=17.3$; $SD=9.8$). They represented organizations from different industries: service (41.0%), manufacturing (21.0%), retail (11.0%), social, education, and health (5.0%), public administration (4.0%), and other sectors (15.0%), with 3.0% missing. Forty-six participants had management experience. We administered the questionnaires online and approached participants

through a German social network website. Participation took approximately 10 minutes.

Participants were invited to a raffle of three vouchers (25 Euros each) for an online retail store.

Design. We varied authentic leadership in a one-factorial between-subjects design (high authentic leadership, low authentic leadership, control). Participants were randomly assigned to one of the three conditions. We collected two implicit measures (leader names and hobbies).

Procedure. At the beginning of the study, anonymity and voluntary participation were confirmed. We employed a cover story with the aim of concealing the study purpose.

Participants read the description of a leader who was about to be promoted to manage the corporate communications department of a company based in Germany. After reading the description, participants indicated their perceptions of the leader's personal life (including the actual dependent measures), answered distractor questions (e.g., parenthood status, last name), and manipulation check items. Participants also provided demographic information.

Materials. We used validated written vignettes to manipulate authentic leadership (Cianci, Hannah, Roberts, & Tsakumis, 2014). We translated the original vignettes into German following a standard procedure of independent translation and back-translation (Brislin, 1970). The vignettes first informed all participants that the leader, like most typical leaders, was concerned with high-quality leadership, management, and teamwork as well as decision-making for efficiency and corporate profit. In the high authentic leadership condition, the vignette detailed how the leader frequently acted in line with the four dimensions of authentic leadership, that is, self-awareness (e.g., seeks feedback from others), relational transparency (e.g., displays true emotions), internalized moral perspective (e.g., makes decisions based on core values), and balanced processing (e.g., listens to different points of view). In contrast, in the low authentic leadership condition, the vignette described how the leader's behavior was rarely based on the

four dimensions of authentic leadership. The control condition did not provide any further information about the leader. None of the vignettes revealed the leader's gender. The original English vignettes are available in Cianci et al. (2014).³

Dependent measures. We asked participants to characterize the leader with a first name ("Which name would you give to this leader?") and three hobbies ("What do you think, which hobbies does this leader have?"). First names were coded with 0 (*male*) and 1 (*female*). We only included names in the analysis that indicated one gender unambiguously. Two independent raters (one male, one female), who were blind to the study purpose, rated the hobbies on 5-point Likert scales ranging from 1 (*typically male*) to 5 (*typically female*). Cohen's Kappa ($\kappa=.64$) showed sufficient interrater agreement. We created an average score across raters and hobbies.

For the manipulation check, participants rated authentic leadership with a validated German version (Hörner et al., 2015) of the ALI (Neider & Schriesheim, 2011) on 5-point Likert scales ranging from 1 (*not at all*) to 5 (*very much*). The scale had excellent reliability ($\alpha=.94$).

Results

Manipulation check. Our analyses revealed a significant main effect of the experimental conditions on authentic leadership perceptions, $F(2,97)=111.096$, $p=.000$, $\eta_p^2=.696$. According to post-hoc tests with Bonferroni correction and 95% confidence intervals, participants expressed significantly higher authentic leadership perceptions in the high authentic leadership condition ($M=3.85$, $SD=.47$) than in the low authentic leadership condition ($M=2.03$, $SD=.46$; $CI[1.52,2.12]$), and the control condition ($M=2.95$, $SD=.57$; $CI[.59,1.20]$). Thus, the manipulation of authentic leadership was successful.

Hypothesis testing. To test Hypothesis 3a, we calculated cross tables and Pearson's chi-squared test for the dependent variable leader name. Out of 100 participants, 83 provided first

³ We gladly provide the Germany translations upon request.

names that indicated one gender unambiguously, 53 male names (63.9%) and 30 female names (36.1%). In the high authentic leadership condition, participants provided more female names (15 names, 55.6%) than male names (12 names, 44.4%). In the low authentic leadership condition, participants provided fewer female names (10 names, 35.7%) than male names (18 names, 64.3%). Also in the control condition participants provided fewer female names (5 names, 17.9%) than male names (23 names, 82.1%). Pearson's chi-squared test indicated a significant relationship between authentic leadership perceptions and leader name, $\chi^2(2,83)=8.467, p=.015$. Thus, the results supported Hypothesis 3a.

To test Hypothesis 3b, we calculated an ANOVA with the independent variable authentic leadership and hobby score as the dependent variable. Authentic leadership significantly predicted the hobby score, $F(2,96)=8.654, p=.000, \eta_p^2=.153$. According to post-hoc tests with Bonferroni correction and 95% confidence intervals, participants provided more female typed hobbies in the high authentic leadership condition ($M=3.12, SD=.47$) than in the low authentic leadership condition ($M=2.56, SD=.74; CI[.23, .89]$) and the control condition ($M=2.78, SD=.39; CI[.01, .67]$). Thus, the results supported Hypothesis 3b.

Discussion

Study 3 led to two new insights. We found that the cognitive association between authentic leadership and female leaders occurred implicitly. This finding extends previous research of gendered perceptions of leadership styles with explicit measurement paradigms (Koenig et al., 2011; Vinkenburg et al., 2011). Participants generated the lowest percentage of female names relative to male names in the control condition. When participants received only minimal information, their implicit judgments were strongly drawn towards male leaders. This finding aligns with the 'think manager, think male' association, indicating that perceivers'

general views of leadership tend to be male biased (Eagly, Karau, & Makhijani, 1995; Heilman, 2012; Schein, 1973). The following study aimed to test the generalizability of the current findings above and beyond the perceptions of authentic leadership.

Study 4

The purpose of Study 4 is to shed light on the generalizability of our previous findings to other communal leadership styles such as consideration (Fleishman, 1953; Stogdill, 1950). We suggest that communal attributes are associated with authentic leadership and therefore contribute to implicit cognitive processes associated with perceptions of female leaders. The same should be true for other leadership styles that have communal characteristics. Specifically, consideration incorporates “the degree to which a leader shows concern and respect for followers, looks out for their welfare, and expresses appreciation and support” (Judge, Piccolo, & Ilies, 2004, p. 36). Considerate leaders are “skilled at sensing and subsequently satisfying the needs of their followers” (Judge et al., 2004, p. 38). We therefore posit that consideration activates leader prototypes similarly to authentic leadership.

Hypothesis 4. High levels of authentic leadership as well as consideration activate implicit judgments associated with female leaders, including female names (*4a*) and female gender-typed hobbies (*4b*).

Method

Participants. Two hundred and forty-six German-speaking working adults in full time or part time employment participated in Study 4. Participants were recruited online in collaboration with a professional panel provider (respondi). Two hundred and twenty-seven participants completed the full survey (112 men, 115 women). They were between 19 and 65 years old ($M=43.1$; $SD=11.3$) and had between one and 47 years of work experience ($M=23.7$; $SD=12.6$).

Participants represented organizations from different industries: service (25.6%), public administration (16.3%), social, education, and health (15.0%), manufacturing (15.0%), retail (12.8%), research and science (0.9%), and other sectors (14.5%). Sixty-six participants had management experience. Participation took approximately eight minutes. Participants were reimbursed by the panel provider.

Design. We varied leadership style in a one-factorial between-subjects design (high authentic leadership, low authentic leadership, high consideration, control). Participants were randomly assigned to one of the four conditions. We collected the same implicit measures as in Study 3 (leader names and hobbies).

Procedure. At the beginning of the study, anonymity and voluntary participation were confirmed. Parallel to Study 3, participants read the description of a leader who was about to be promoted to manage the corporate communications department of a company based in Germany. After reading the description, participants indicated their perceptions of the leader's personal life (including the actual dependent measures), answered distractor questions (e.g., parenthood status, last name), manipulation check items, and provided demographic information.

Materials. We used the same validated written vignettes to manipulate authentic leadership that had been translated into German for Study 3. To manipulate consideration, we adapted vignettes that had been developed and validated to study relationship-oriented leadership (Ehrhart & Klein, 2001). The structure of all vignettes was similar to ensure comparability. The vignettes first informed participants that the leader, like most typical leaders, was concerned with high-quality leadership, management, and teamwork as well as decision-making for efficiency and corporate profit. In the high consideration condition, the vignette described how the leader treated followers with kindness and respect, showed concern for individual well-being,

emphasized communication, listened to personal and work-related problems, and showed recognition and appreciation for each individual team member. The control condition did not provide any further information about the leader. No vignette revealed the leader's gender.⁴

Dependent measures. We asked participants to characterize the leader with a first name ("Which name would you give to this leader?") and three hobbies ("What do you think, which hobbies does this leader have?"). First names were coded with 0 (*male*) and 1 (*female*). Subsequent analysis only included names that indicated one gender unambiguously. Two independent raters (one male, one female), who were blind to the study purpose, rated the hobbies on 5-point Likert scales ranging from 1 (*typically male*) to 5 (*typically female*). Cohen's Kappa showed acceptable agreement ($\kappa=.42$). We created an average score across raters and hobbies.

For the manipulation check, participants rated authentic leadership with a German version (Hörner et al., 2015) of the ALI (Neider & Schriesheim, 2011) on 5-point Likert scales ranging from 1 (*not at all*) to 5 (*very much*). The scale showed excellent reliability ($\alpha=.95$). They also rated consideration ($\alpha=.96$) with five items from a German translation (Heinitz, 2006) of the Leader Behavior Description Questionnaire (LBDQ; Halpin, 1957).

Results

Manipulation check. Results supported the validity of our experimental conditions. Analyses revealed a significant main effect of experimental conditions on perceptions of authentic leadership and consideration, $F(3,223)=46.777$, $p=.000$, $\eta_p^2=.386$. Follow-up univariate analysis for the manipulation check variables (authentic leadership, consideration) as well as post-hoc tests with Bonferroni correction and 95% confidence intervals showed the following:

⁴ The full text of the original English vignettes is available in Cianci et al. (2014) and in Ehrhart and Klein (2001). We gladly provide the German versions of the vignettes upon request.

Firstly, participants expressed significantly higher authentic leadership perceptions in the high authentic leadership condition ($M=3.81$, $SD=.78$) than in the low authentic leadership condition ($M=2.56$, $SD=.85$; $CI[.89,1.61]$) and the control condition ($M=3.38$, $SD=.52$; $CI[.07,.79]$). There was no significant difference in perceptions of authentic leadership between the high authentic leadership and high consideration conditions ($M=3.87$, $SD=.65$; $CI[-.41,.29]$), $F(3,223)=41.617$, $p=.000$, $\eta_p^2=.359$. The latter result suggests that authentic leadership and consideration are perceived as similar, belonging to the same overarching category of communal leadership styles. Secondly, participants expressed significantly higher consideration perceptions in the high consideration condition ($M=4.05$, $SD=.70$) than in the low authentic leadership condition ($M=2.30$, $SD=1.12$; $CI[1.31,2.20]$) and the control condition ($M=3.16$, $SD=.79$; $CI[.43,1.34]$). Again, there was no significant difference in perceptions of consideration between the high consideration and high authentic leadership conditions ($M=3.81$, $SD=.97$; $CI[-.22,.68]$), $F(3,223)=43.308$, $p=.000$, $\eta_p^2=.368$.

Hypothesis testing. To test Hypothesis 4a, we calculated cross tables and Pearson's chi-squared test for the dependent variable leader name. Out of 227 participants, 222 participants provided first names that indicated one gender unambiguously. The final sample of first names included 153 male names (68.9%) and 69 female names (31.1%). In the high authentic leadership condition, participants provided 33 male names (60.0%) and 22 female names (40.0%). In the low authentic leadership condition, participants provided 43 male names (78.2%) and 12 female names (21.8%). In the control condition, participants provided 39 male names (73.6%) and 14 female names (26.4%). In the high consideration condition, participants provided 38 male names (64.4%) and 21 female names (35.6%). In this study, participants were generally more likely to indicate male names than female names across all conditions. However, follow-up

comparisons demonstrated that the percentage of female names to male names nevertheless varied significantly between conditions. Participants mentioned more female names relative to male names in the high authentic leadership condition compared to the low authentic leadership condition, $\chi^2(1,110)=4.257, p=.039$, but not compared to the control condition, $\chi^2(1,108)=2.242, p=.134$. As expected, participants were equally likely to indicate female names relative to male names in the high authentic leadership and high consideration conditions, $\chi^2(1,114)=.235, p=.628$. The results partly supported Hypothesis 4a.

To test Hypothesis 4b, we calculated an ANOVA with the independent variable leadership condition and hobby score as the dependent variable. The leadership condition significantly predicted the hobby score, $F(3,216)=5.572, p=.001, \eta_p^2=.072$. According to post-hoc tests with Bonferroni correction and 95% confidence intervals, participants provided more female typed hobbies in the high authentic leadership condition ($M=2.99, SD=.42$) than in the low authentic leadership condition ($M=2.70, SD=.50; CI[.06,.51]$), but not compared to the control condition ($M=2.77, SD=.48; CI[-.02,.45]$). As expected, participants were equally likely to indicate female-typed hobbies in the high authentic leadership and high consideration conditions ($M=2.96, SD=.37; CI[-.19,.25]$). The results partly supported Hypothesis 4b.

Discussion

Overall, findings from Study 4 largely supported the notion that authentic leadership and consideration function similarly. Both leadership styles are likely to activate female leader prototypes. Participants indicated predominantly female typed hobbies in these two conditions. The priming with communal leadership styles also rendered participants more likely to indicate female relative to male names when compared to the other conditions. However, independent of condition, male leader names were still mentioned more frequently than female leader names. In

this study, the implicit processing dynamic seemed to work as a buffer against a predominant ‘think manager, think male’ association. We developed a final study drawing on established methods of information processing research with a lexical decision making paradigm. It provides insights into automated cognitive processing of communal and agentic leadership styles more generally.

Study 5

Study 5 compares communal to agentic leadership styles while tapping into automated cognitive processes, which have been said to spur leadership perceptions (Lord et al., 2001; Lord & Maher, 1991). This final study is concerned with these less well understood cognitive dynamics “that occur without [perceivers’] awareness, without intent, without much effort, and without interference with other cognitive tasks” (Lord & Maher, 1991, p. 33). Dual processing models of person perception maintain that impression formation takes place in two stages. It begins with fast, unintentional, and effortless automated processing and moves into slower, intentional and effortful controlled modes only when perceivers are motivated (Brewer, 1988).

Devine (1989) distinguished between automatic and controlled processes in stereotyping, where the prior involves “unintentional or spontaneous activation of some well-learned set of associations or responses that have been developed through repeated activation in memory” (p. 6). Stereotypes are automatically elicited when one encounters or receives information about a category member (e.g., a man or woman). The inhibition of these automatically elicited stereotypes requires time and cognitive capacity involved in controlled processes (Lepore & Brown, 1997). The early stage of automatic encoding has been said to “significantly impact subsequent judgments, thoughts, and decisions about a target” (Scott & Brown, 2006, p. 231). Distinguishing automated from controlled processing is “fundamental to understanding

leadership perceptions” (Lord & Maher, 1991, p. 34). The most common research paradigm is still to collect explicit and potentially biased follower reports of leader behavior (Hansbrough, Lord, & Schyns, 2015). Yet, much of the previous research has been devoted to judgements, thoughts, and decisions that negatively affect women in leadership (Carli et al., 1995; Heilman, 2001, 2012; Johnson et al., 2008; Monzani et al., 2015; Nye & Forsyth, 1991). In this context, it appears particularly important to study automated cognition as participants may be reluctant or even unable to express their initial responses (Uhlmann et al., 2012).

Information processing tasks are tailored to measuring the cognitive accessibility of an underlying construct or its associations with other constructs of interest. These types of tasks are less likely to be influenced by biases (e.g., social desirability) than explicit ratings (Uhlmann et al., 2012). In order to explore perceivers’ automated cognitive processes, we adapted a lexical decision making paradigm from Scott and Brown (2006). We used the paradigm to analyze participants’ response latencies in trials with low cognitive control. Compared to our previous studies, this approach not only limits participants’ “awareness of what is being measured”, but also “their ability to control their responses” (Uhlmann et al., 2012, p. 557).

Scott and Brown (2006) investigated the impact of leader gender on the automated encoding of leadership behavior in relation to agentic and communal leadership traits. The authors measured response latencies as an indicator of automatic encoding. They found that leader gender affected the automatic encoding of agentic leadership, but not of communal leadership. Response latencies for agentic leadership traits were longer for women than for men, indicating lower levels of accessibility of these traits in the automated encoding stages. Following the example of Scott and Brown (2006), we developed a lexical decision making task to assess response latencies for communal and agentic traits presented in combination with

communal (authentic leadership, consideration) and agentic leadership styles (autocratic leadership, initiating structure) of female and male leader targets.

We assume that communal leadership styles (i.e., authentic leadership, consideration) correspond to female leader prototypes (Boyce & Herd, 2003; Eagly & Karau, 2002; Heilman, 2001, 2012; Koenig et al., 2011; Schein, 1973, 1975; Schein et al., 1996; Sczesny, 2003). When perceivers automatically encode female leaders' authentic leadership and consideration, the access to prototype-consistent traits is facilitated. In contrast, leadership styles that are identified as agentic, in our case autocratic leadership and initiating structure, run counter to leader prototypes associated with female leader targets. When perceivers automatically encode agentic leadership styles, the access to prototype-consistent traits should be slowed down for female leader targets. To summarize, we posit the following:

Hypothesis 5. Agentic leadership styles, but not communal leadership styles, inhibit automated cognitive processing of female leader prototypes.

Method

Participants. Two hundred students (105 men, 95 women) from a German university participated in Study 5. Students were between 18 and 54 years old ($M=22.7$, $SD=3.9$) and in their third or fourth semester of study on average ($M=3.6$, $SD=2.9$). They studied toward degrees in Social Sciences (54.0%), Engineering/IT (29.0%), Humanities (3.0%), Natural Sciences (5.5%), Life Sciences/Medicine (3.5%), and other fields (5.0%). Sixty participants had previous work experience (e.g., internships, student jobs, vocational training). We conducted the experiment in a laboratory located on campus. The experiment was computer based and run with the software SoSci Survey. It was supported and standardized by the use of the Online

Recruitment System for Economic Experiments (ORSEE; Greiner, 2004). Participation took approximately 30 minutes. It was incentivized with six Euros.

Design and Procedure. We varied two factors, leadership style (communal, agentic) and leader gender (male, female), in a within-subjects design. The study procedure was an adaptation of the lexical decision making paradigm developed by Scott and Brown (2006). In each trial, participants were presented with a behavioral sentence and a letter string (word or non-word) on a computer screen. After three seconds the behavioral sentence disappeared and was replaced by the letter string. Participants were instructed to respond to the letter string as fast as possible by pressing “Y” (for a word) or “N” for a non-word. We assessed response latency (in milliseconds) for each trial as the dependent variable.

At the beginning of the study, anonymity and voluntary participation were confirmed. Participants first completed six practice trials, which were not included in subsequent analysis. The following 128 trials were run in two blocks with a standardized break of one minute before the beginning of Block 2. In each block, participants completed 64 trials, half of which were experimental trials and the other half were control trials. In the 32 experimental trials per block, participants responded to 16 behavioral sentences twice, once with a male leader and once with a female leader. Each behavioral sentence was combined with a matching leadership trait (the “word” stimulus), half of which represented communal leadership styles and the other half agentic leadership styles (behavioral sentences and traits available from the Appendix). In the 32 control trials per block, participants responded to neutral behavioral sentences followed by a non-word stimulus. The control trials were included in the study to ensure that participants did not develop a response bias. Response latencies measured in control trials were not part of the subsequent data analysis.

Dependent measure. Taking the two blocks together, the data analysis was based on response latencies (in milliseconds) for 64 experimental trials, half of which were responses to male or female leader targets (i.e., 32 trials each) and half of which were responses to communal or agentic leadership styles (i.e., 32 trials each).

Materials. We adapted the following procedure from Scott and Brown (2006) to create the stimulus materials. First, we identified the behavioral sentences and corresponding trait words, which were subsequently used to operationalize communal and agentic leadership. The authors and a research assistant first identified 31 behavioral sentences for a communal leadership style, consisting of 16 items for authentic leadership from a German translation of the ALI (Hörner et al., 2015) and 15 items for consideration from a German translation of the LBDQ (Heinitz, 2006) as well as 26 behavioral sentences for an agentic leadership style, consisting of 15 items for initiating structure from a German translation of the LBDQ (Heinitz, 2006) and 11 items for autocratic leadership translated into German (De Hoogh, Den Hartog, & Koopman, 2004; De Hoogh & Den Hartog, 2008). Second, we matched each of the 31 behavioral sentences for communal leadership with a corresponding communal trait word and each of the 26 behavioral sentences for agentic leadership with a corresponding agentic trait word. We based the trait words on the results of a comprehensive study of agentic and communal trait content ratings in five countries, especially the German subsample (Abele, Uchrowski, Suitner, & Wojciszke, 2008). Following several reiterations, we matched each behavioral sentence with three trait words and asked four leadership experts, who were blind to the study purpose, to indicate the extent to which they associated each trait with the corresponding behavioral sentence (“1” *not at all* to “7” *very much*). For example, the behavioral sentence “The manager carefully listens to alternative perspectives before reaching a conclusion” was matched with the trait words

“considerate”, “conscientious”, and “cautious” (communal). Means of the expert ratings ranged from 3.25 to 7.00, suggesting that some trait words reflected the behavioral sentences better than others. We selected two trait words for each behavioral sentence based on the highest means from the expert rating (at least 4.00 on the 7-point Likert scale). Next, we entered the selected trait words into a paper-pencil based pretest with 51 students, who rated the extent to which each of the traits was perceived as stereotypically feminine (i.e., communal) or masculine (i.e., agentic). The 7-point Likert scale ranged from 1 (*very masculine*) to 7 (*very feminine*). This second pretest confirmed that the trait words were generally perceived as intended, but again some traits fit their underlying dimension (communion or agency) better than others ($3.69 < M_{\text{communal}} > 5.59$ vs. $2.28 < M_{\text{agentic}} < 5.00$). On the basis of the expert rating and the student rating, we selected 16 behavioral sentences and eight corresponding traits representing communal leadership (i.e., the sentences and traits most closely associated according to the expert rating ($5.25 < M_{\text{communal}} > 6.75$) and traits seen as feminine in the student rating ($4.78 < M_{\text{communal}} > 5.45$)). We also selected 16 behavioral sentences and eight corresponding traits representing agentic leadership (i.e., the sentences and traits most closely associated according to the expert rating ($5.00 < M_{\text{agentic}} < 7.00$) and traits seen as masculine in the student rating ($3.20 < M_{\text{agentic}} < 3.80$)). The eight selected traits for communion and agency differed significantly from one another in how stereotypically masculine or feminine they were rated on the 7-point Likert scale ranging from 1 (*very masculine*) to 7 (*very feminine*) ($M_{\text{communal}} = 5.08$; $M_{\text{agentic}} = 3.47$; $t(53) = 11.052$, $p = .000$, $CI[1.32, 1.90]$). Finally, we used eight male names and eight female names to operationalize leader gender. The names were selected based on a list of the most popular children’s names in Germany in the 1960s, and had been pretested regarding perceptions of attractiveness and intelligence associated with the name (Rudolph, Böhm, & Lummer, 2007).⁵

⁵ Overall, on a 6-point Likert scale (“1” not at all attractive/intelligent to “6” very attractive/intelligent) the selected

Results

We followed standard recommendations for the analysis of reaction time data to prepare the data for subsequent analysis (Baayen & Milin, 2010; Lachaud & Renaud, 2011; Whelan, 2008). We excluded 409 incorrect responses (3.2% of all responses) from subsequent data analysis (i.e., when participants indicated that a non-word had been presented, while in fact a word had been presented).⁶ We also set cut-off values below and above two standard deviations relative to the mean response latency ($M=821.21$, $SD=343.61$), excluding 559 responses (4.4% of all responses). Finally, we used only respondents whose ratings were likely to be based on automatic rather than controlled cognitive processing dynamics, using a zero-error response rate as an indicator of controlled cognitive processing. For subsequent analysis, we only used data from the 143 respondents, who had provided at least one incorrect response across all trials. We then analyzed the data with the linear mixed models procedure in SPSS including leadership style (communal, agentic) and leader gender (female, male) as fixed factors, subjects and trait words as random factors (intercept and slopes), and the dependent variable response latency (in milliseconds). This linear mixed model approach was selected to counteract biases arising from the influence of idiosyncratic reactions that participants may have to different stimuli (Baayen, Davidson, & Bates, 2008; Judd, Westfall, & Kenny, 2012).

Results indicated no significant main effect for leader gender, $F(1,6355.349)=1.308$, $p=.253$. A significant main effect was found for leadership style, $F(1,2112.476)=9.314$, $p=.002$, indicating that participants showed faster responses to communal leadership ($M=763.02$,

female names (Birgit, Claudia, Heike, Kerstin, Petra, Sabine, Silke, Susanne) received average attractiveness ($3.28 < M_{\text{female}} < 3.93$) and intelligence ($3.57 < M_{\text{female}} < 4.02$) ratings comparable to the average attractiveness ($3.09 < M_{\text{male}} < 3.77$) and intelligence ($3.63 < M_{\text{male}} < 4.14$) ratings of the selected male names (Frank, Jan, Jörg, Matthias, Michael, Peter, Thomas, Torsten).

⁶ Of the 409 incorrect responses given in total, 205 (50.1%) occurred in mismatched conditions (agentic leadership/female leader: 118 incorrect responses; communal leadership/male leader: 87 incorrect responses) and 204 responses (49.9%) occurred in matched conditions (agentic leadership/male leader: 116 incorrect responses; communal leadership/female leader: 88 incorrect responses).

SD=4.86) than to agentic leadership ($M=784.02$, $SD=4.88$). A marginally significant interaction effect occurred between leadership style and leader gender, $F(1,6355.349)=3.538$, $p=.060$.

Estimated marginal means with Bonferroni correction and 95% confidence intervals indicated that response latencies for a communal leadership style did not differ between male leaders ($M=764.25$, $SD=5.40$) and female leaders ($M=761.78$, $SD=5.39$; $CI[-6.76,11.68]$). For an agentic leadership style, however, participants showed significantly slower responses to female leaders ($M=789.08$, $SD=5.43$) than to male leaders ($M=778.97$, $SD=5.43$; $CI[-19.42,-.797]$).⁷ This result is in line with Hypothesis 5, suggesting that agentic leadership styles inhibit automated cognitive processing of behavior for female leader targets.

Discussion

The final study shed light on automated cognitive processing of communal and agentic leadership styles for female leader targets. We used a lexical decision making paradigm to reflect automated cognitive processes, which occur at the outset of perceiving a leader. The additional insights gained from this study align with previous findings by Scott and Brown (2006). Specifically, prototype inconsistent leadership styles (initiating structure, autocratic leadership) slowed down automated processing for female leader targets.

We acknowledge that the average response latencies in our study were longer than those in Scott and Brown's (2006) work. We obtained reaction times between 761.78ms (for communal-female target) and 789.08ms (for agentic-female target), while Scott and Brown (2006) indicated average values between 575.66ms (for agentic-male target) and 586.92ms (for

⁷ In the full sample, including participants without any error responses across 128 trials, there was only a marginally significant main effect for leader gender, $F(1,8932.125)=3.678$, $p=.055$, with similar response latencies to male leaders ($M=771.65$, $SD=3.21$) and female leaders ($M=777.13$, $SD=3.21$), and no significant interaction effect between leadership style and leader gender, $F(1,8932.125)=1.636$, $p=.201$. A significant main effect for leadership style indicated faster responses to communal ($M=764.00$, $SD=4.05$) than to agentic leadership styles ($M=784.79$, $SD=4.07$), $F(1,2981.040)=13.108$, $p=.000$.

communal-male target). This observation is important in light of the question to what extent we were able to assess automated cognitive processing.

It proves difficult to set a precise threshold to “differentiate preconscious from conscious processing [...] as this threshold likely varies from task to task as well as across individuals” (Moon & Lord, 2006, p. 332). Priming studies often build on the work of Neely (1977) and apply 500ms to define automaticity, while research in the neurosciences suggests that the mind may consciously perceive stimuli even at around 300ms (Dehaene, 2014). Blair and Banaji (1996) demonstrated that automated activation of gender stereotypes influenced responses when the probe stimulus occurred 250ms and 350ms after the prime stimulus, while perceivers were able to moderate the influence of automatic processes through conscious control for the onset of a probe stimulus at 2,000ms. Similarly, Moon and Lord (2006) set a time constraint of 350ms to preclude conscious processing of emotion eliciting stimuli and 2,000ms to allow for intentional strategies to operate.

We concur with the view that responses to implicit measures are likely to also incorporate some explicit aspects. These measures will typically reflect “the joint influences of both implicit and explicit processes, and it may not be possible to completely tease apart the two types of processes when assessing cognition and behavior” (Chong, Djurdjevic, & Johnson, 2017, p. 17). To ensure that our study tapped into a larger proportion of automated cognitive processing, we eliminated responses with latencies two standard deviations above the mean (i.e., 1,508ms) and participants with zero-error response rates, both of which we see as indicators of controlled cognitive processing.

This study also underscores the importance of advanced research designs and measurement methods in leadership studies (Schyns, Hall, & Neves, 2017), in particular

methodological advancements pertaining to implicit measurement approaches. While implicit measures are not yet commonly used in leadership research, they provide meaningful insights, especially when participants may be unable or reluctant to report their true attitudes (Chong et al., 2017). Implicit measurement is also a viable means to attenuate the obtrusiveness of explicit questionnaires, where it is possible that a construct did not exist as a meaningful entity in the perceivers' mind until it was measured (Lord, 2017). We next turn to discuss the wider contributions of this work to information processing approaches in leadership, research methodology, as well as practical implications for organizations.

General Discussion

The view of leadership as social perception is rooted in a longstanding tradition of leadership categorization theory (Lord et al., 1984; Lord et al., 1982) and more recently the connectionist model of leadership perceptions (Lord et al., 2001). Leader prototypes form a central element in this theoretical perspective. They function as relatively stable cognitive categories that shape leadership perceptions in interaction with more flexible contextual constraints, including leader gender and leadership style. While leadership perceptions originating from this interaction form a natural part of human interaction, the persisting negative perceptions of women in leadership require more careful empirical analysis of these cognitive processes and their consequences (Heilman & Eagly, 2008; Hogue & Lord, 2007). Traditional categories of leadership correspond to prototypes associated with male leaders, but the contemporary understanding of what it means to be a good leader appears to lean toward communal attributes, which are associated with female leaders (Eagly & Carli, 2003; Eagly et al., 1995; Eagly, Makhijani, & Klonsky, 1992).

Our findings contribute to the understanding of cognitive processes underlying the connectionist model of leadership perceptions as well as to the conceptualization of authentic leadership as a communal leadership style. Results from the first four studies challenge previous theoretical views assuming a mismatch between the attributes stereotypically ascribed to women and attributes inherent in authentic leadership (Eagly, 2005; Hopkins & O'Neil, 2015). We disagree with the notion "that authentic leadership is not gender-neutral and is especially challenging for women" (Hopkins & O'Neil, 2015, p. 1). According to our findings, authentic leadership is indeed not gender-neutral. It appears to be positively associated with women.

In addition, extending previous study paradigms in the leadership and gender literature (Koenig et al., 2011; Vinkenburg et al., 2011), our research incorporates different forms of assessing cognitive processes. Explicit and implicit measurement as well as employing a pattern approach to the four dimensions of authentic leadership pointed to the above described positive association. It is noteworthy that the relational transparency dimension of authentic leadership may contribute particularly to this positive association. In addition, the measurement of automated cognitive processes with response latencies opened up a new perspective. As previous research pointed out, female leader prototypes and communal leadership styles are cognitively associated, yet this association matters less in the initial, effortless encoding stages (Scott & Brown, 2006). In fact, it may depend on the stage of impression formation, being automated or controlled, whether communal leadership styles can play to a female leadership advantage (Eagly & Carli, 2003). In the face of a persistent gender disparity in leadership, our work provides one explanation why biases continue to influence leader selection (Koch et al., 2015) and evaluation (Johnson et al., 2008). If organizations discount the impact of social-cognitive processes, they hinder women's ascent up organizational ladders.

Of course, cognitive processes must also be considered in response to perceptions of male leaders. In the second study, leadership profiles described as low in relational transparency (i.e., leaders concealing their true thoughts and feelings) were associated with male leaders. Perceivers may be negatively biased against men, indicating potentially harmful prejudice (e.g., identifying men as strong and independent, but lacking interpersonal sensitivity). Given previous findings that men are seen as effective leaders when they are strong, but do not need to be seen as sensitive (Johnson et al., 2008), this aspect requires further exploration.

Limitations and Future Research

Our research is not free of limitations that should be kept in mind when interpreting the findings. The majority of our studies applied experimental designs that are suitable to establish causal relations between independent and dependent variables. Experts encourage these approaches to the study of authentic leadership as “particularly promising [...] for teasing out the effects of situational influences on perceived and felt leader authenticity due to the high level of control and internal validity they provide” (Gardner et al., 2011, p. 1141). Similar research designs have been applied in studies of leadership categorization theory (Johnson et al., 2008; Phillips & Lord, 1981; Scott & Brown, 2006) and gender stereotypes (Rosette & Tost, 2010; Ryan, Haslam, Hersby, & Bongiorno, 2011). Yet, they depict only part of organizational reality and we readily acknowledge that their ecological validity is constrained (Highhouse, 2009).

One shared feature of all studies is that data was collected in Germany. Therefore, we need to consider the extent to which the specific cultural setting may have influenced our results. This question is particularly relevant as previous research, for example the renowned GLOBE project, has demonstrated cross-culturally generalizable aspects, but also cultural variations of leadership prototypes. According to Den Hartog et al. (1999), several leadership attributes that

appear similar to authentic leadership were universally endorsed across 62 cultures (including Germany, former West and East), among them attributes such as being positive, just, honest, and communicative. Brodbeck et al. (2000) found cultural variations between leadership prototypes in 22 European countries depending on cultural values. In the Germanic cluster (Germany (former West and East), Switzerland, Austria), several of the nine most highly endorsed attributes overlapped with conceptualizations of authentic leadership and other communal leadership styles (integrity, non-autocratic, participative). Yet, when comparing ideal types of leadership for business managers in the United States and Germany, Schneider and Schröder (2012) found that ideals shifted over time toward charismatic leadership in the United States, but consolidated in coercive leadership in Germany. Taken together, it is likely that cultural values also influence which leader behaviors are seen as acceptable for male and female leaders in a given country. We recommend that future research tests the generalizability of our findings to other countries in Europe, the West (e.g., the United States), Asia, and other cultural settings.

In addition, while we conducted many of the studies with experienced working adult samples, future research can complement our approach by correlational designs and field surveys of leader-follower dyads or teams. For example, an additional research question concerns the accuracy of perceptual associations between female leaders and authentic leadership, which could be addressed in a multi-level study of team and individual perceptions of female and male leaders' authentic leadership. Similar to existing studies of transformational leadership, it would be interesting to explore whether female leaders actually display behavior in line with authentic leadership more frequently than male leaders do (Vinkenburg et al., 2011).

To further develop the current understanding of the connectionist model of leadership perceptions (Lord et al., 2001), future research might also test how authentic leadership and other

contextual constraints (e.g., leader's past performance, followers' self-schemas or identities, organizational culture) interact to predict the activation of prototypes, subsequent performance reviews, and promotion decisions (Inesi & Cable, 2015). This research might also include follower outcomes such as attitudes (e.g., trust in the leader; Dirks & Ferrin, 2002) or behavioral tendencies (e.g., loyalty; Chen, Tsui, & Farh, 2002).

Practical Implications

Despite the above stated limitations, our research makes relevant contributions to organizational practice. We believe that our findings can help derive recommendations that address persisting concerns about negative evaluations of women in leadership. Women are challenged to display “behavior that is both sufficiently businesslike and professional that they are credible as leaders and sufficiently feminine that they do not challenge [...] assumptions about gender” (Eagly et al., 1995, p. 126). Authentic leadership may not only be suitable for this purpose, but it is also a leadership style that contributes to organizational effectiveness (Gardner et al., 2011). The implementation of authentic leadership, however, requires careful reflection.

Based on our research, women in or aspiring to reach leadership positions as well as organizational decision-makers need to understand under which conditions perceptions of authentic leadership are likely to be cognitively associated with women in leadership. In other words, *when* does the activation spread in cognitive networks lead perceivers to think of women as leaders? It is important to keep the different stages of cognitive processing mind. For automated cognitions in early stages of encoding (e.g., spontaneous impression formation), the cognitive mismatch between agentic leadership styles and leader prototypes associated with female leaders appears to be more relevant (and problematic) than a match with communal leadership styles. However, for cognitive processes controlled by the perceiver, which occur

after the initial automated processing stage, communal leadership styles can trigger positive associations with women in leadership. We maintain that continuous advances in human resource practices (e.g., structured selection and promotion procedures) render these controlled processes meaningful. Thus, women can in fact profit from the positive cognitive association between authentic leadership (or consideration) and female leader prototypes.

We also provide initial empirical evidence to suggest that other communal leadership styles such as consideration might bridge the perceptual misfit between leader prototypes and attributes stereotypically ascribed to women (Hogue & Lord, 2007). Decision-makers in organizations who are in charge of evaluating and selecting leaders can benefit from these insights. The results are useful to motivate decision-makers to reflect on the impact of biases on their work. Some leadership styles are cognitively associated with certain groups of individuals (e.g., women or men), while others are not. Thus, assessments and selection decisions should be conducted in structured ways and apply clear criteria such that decisions are based on objective information rather than heuristic shortcuts. Over time and with increasing awareness of these cognitive processes, the participation of women and other currently underrepresented groups in leadership at all organizational levels ought to become the norm rather than the exception.

Conclusion

The five empirical studies presented in this paper build on a connectionist model of leadership perceptions and apply a variety of study designs. Findings shed light on the notion that perceivers might be prone to see women as authentic leaders. However, they also point to the importance of different forms of cognitive processing for leadership perceptions. We hope to inspire future research to test more factors that impact leader prototype activation, their automated and controlled components, and outcomes for leaders, followers, and organizations.

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Tables

Table 1. Means, standard deviations, and cell sizes for the dependent variable authentic leadership perceptions by leader and participant gender in Study 1 (student sample)

Dependent variable	Female leaders			Male leaders			Leaders in general		
	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>
Authentic leadership perceptions	45	4.78	.76	40	3.92	.54	45	4.41	.81
Male participants	22	4.60	.81	19	4.09	.61	25	4.32	.87
Female participants	23	4.95	.68	21	3.77	.42	20	4.52	.73

Note. *N*=130. Authentic leadership perceptions were measured on 5-point Likert scales.

Table 2. Means, standard deviations, and cell sizes for the dependent variable authentic leadership perceptions by leader and participant gender in Study 1 (working adult sample)

Dependent variable	Female leaders			Male leaders			Leaders in general		
	<i>N</i>	<i>M</i>	SD	<i>N</i>	<i>M</i>	SD	<i>N</i>	<i>M</i>	SD
Authentic leadership perceptions	44	4.72	.91	55	3.99	.99	41	3.71	1.22
Male participants	18	4.24	.81	33	4.09	.93	18	3.94	1.30
Female participants	26	5.06	.84	22	3.83	1.08	23	3.52	1.16

Note. *N*=140. Authentic leadership perceptions were measured on 5-point Likert scales.

Table 3. Authentic leadership dimension and levels used for conjoint analysis profiles in Study 2.

Dimension	Level	Description
Self-awareness	high	The leader is aware of their own strengths and weaknesses and knows the impact that they have on subordinates.
	low	The leader is not aware of their own strengths and weaknesses and does not know the impact that they have on subordinates.
Relational transparency	high	The leader openly shares information and speaks about their true thoughts and feelings with subordinates.
	low	The leader actively holds back information and does not speak about their true thoughts and feelings with subordinates.
Internalized moral perspective	high	The leader takes even difficult decisions based on their own moral values and standards, and does not deviate from them because of external pressures.
	low	The leader does not take difficult decisions based on their own moral values and standards, but is guided by external pressures.
Balanced processing	high	The leader actively collects a range of diverging information and includes them in the decision-making process, even if they contradict their own views.
	low	The leader does not collect information before making a decision, and ignores information that contradicts their own views.

Note. English translations of original German-language study materials.

Table 4. Relative attribute importance (means, standard deviations) in Study 2

Dimension	Female leader (<i>N</i> =78)		Male leader (<i>N</i> =67)	
	<i>M</i>	SD	<i>M</i>	SD
Self-awareness	31.16	21.65	28.01	22.57
Relational transparency	27.99	18.42	31.52	20.12
Internalized moral perspective	19.89	14.76	19.67	14.66
Balanced processing	20.96	14.13	20.81	16.28

Note. *N*=145. The sum of average importance scores across authentic leadership dimensions per group equals 100.

Table 5. Part-worth utilities (means, standard deviations) in Study 2

Dimension	Female leader (<i>N</i> =78)		Male leader (<i>N</i> =67)	
	<i>M</i>	SD	<i>M</i>	SD
Self-awareness				
high	19.83	21.43	17.10	21.30
low	11.33	21.56	10.91	20.85
Relational transparency				
high	23.63	21.48	5.28	12.00
low	4.36	9.31	26.23	23.29
Internalized moral perspective				
high	15.96	16.35	12.42	16.69
low	3.93	8.80	7.24	10.91
Balanced processing				
high	16.84	16.21	9.13	14.13
low	4.12	8.81	11.67	16.79

Note. *N*=145.

Appendix

Behavioral sentences and traits representing communal and agentic leadership styles in Study 5.

Leadership style	Trait word	Behavioral sentences
Communal	sensitive	Knows exactly the way others view his/her abilities.
		Is clearly aware of the impact he/she has on others.
	communicative	Clearly states what he/she means.
		Openly shares information with others.
	reliable	Shows consistency between his/her beliefs and actions.
		Is guided in his/her actions by internal moral standards.
	considerate	Carefully listens to alternative perspectives before reaching a conclusion.
		Encourages others to voice opposing points of view.
	understanding	Looks out for the personal welfare of his/her subordinates.
		Does personal favors for his/her subordinates.
caring	Consults with his/her subordinates before initiating actions.	
	Gets his/her subordinates' approval on important matters before going ahead.	
supportive	Treats all subordinates as his/her equals.	
	Puts suggestions made by subordinates into operation.	
warm	Makes subordinates feel at ease when talking with them.	
	Does little things to make it pleasant to be a member of the team.	

Behavioral sentences and traits representing communal and agentic leadership styles in Study 5
(continued).

Leadership style	Trait word	Behavioral sentences
Agentic	determined	Lets his/her subordinates know what is expected of them. Emphasizes the meeting of deadlines.
	strongminded	Makes his/her attitudes clear to subordinates. Speaks in a manner not to be questioned.
	assertive	Rules with an iron hand. Assigns his/her subordinates to particular tasks.
	achievement-oriented	Maintains definite standards of performance. Sees to it that his/her subordinates are working up to capacity.
	dominant	Orders his/her subordinates around. Takes firm measures if considered necessary.
	egoistic	Makes sure that his/her self-interests are always met. Acts like a tyrant.
	hardhearted	Shows no pity or compassion. Seeks revenge when wronged.
	obstinate	Is in charge and does not tolerate disagreement. Is unable to relinquish control of projects.

Note. English translations of original German-language study materials.