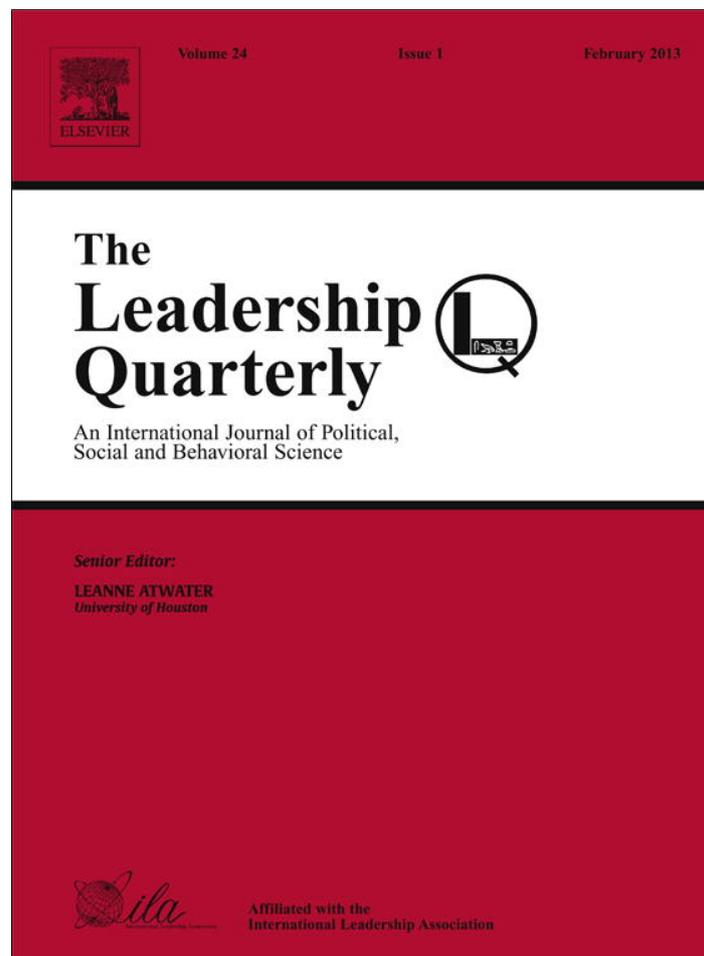


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# The Leadership Quarterly

journal homepage: [www.elsevier.com/locate/leaqua](http://www.elsevier.com/locate/leaqua)

## Are authentic leaders associated with more virtuous, committed and potent teams? ☆

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### ARTICLE INFO

#### Article history:

Received 1 July 2011

Received in revised form 27 July 2012

Accepted 21 August 2012

Available online 20 September 2012

#### Keywords:

Authentic leadership

Team virtuousness

Team affective commitment

Team potency

### ABSTRACT

Through a team-level analysis, the study shows how authentic leadership (AL) predicts team potency both directly and through the mediating role of team virtuousness and team affective commitment. Data about AL and team virtuousness were collected two months before data collection on team affective commitment and team potency. Fifty-one teams were selected for testing the hypotheses. The main findings are the following: (a) AL predicts team affective commitment through the mediating role of team virtuousness; (b) team virtuousness predicts team potency through the mediating role of team affective commitment; (c) AL predicts team potency through the mediating role of team virtuousness and team affective commitment. By focusing on two positive constructs (AL and team virtuousness), for which interrelations have rarely been explored, the study contributes to the Positive Organizational Scholarship movement, and suggests that AL and virtuousness are good in themselves and also potential facilitators of team success.

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### 1. Introduction

Team potency, the collectively-shared belief of a team that it can be effective (Lester, Meglino, & Koorsgaard, 2002; Shea & Guzzo, 1987), can be a very powerful motivator<sup>1</sup> (Gibson & Earley, 2007). Team potency differs from collective efficacy in that collective efficacy “concerns individuals’ beliefs not necessarily shared by others. Thus, potency is an attribute of groups whereas collective efficacy is an attribute of individuals” (Guzzo, Yost, Campbell, & Shea, 1993, p. 90; for a discussion about differences between team potency and related constructs, see Stajkovic, Lee, & Nyberg, 2009). Team potency influences a team to initiate action, the effort levels the team exerts for reaching goals, and how long the team’s efforts are sustained. The topic has been investigated in several settings (organizational, educational, sports, military; Stajkovic et al., 2009). In organizational settings, team potency relates to variables such as team problem solving, team learning, service performance, and team performance (e.g., Bandura, 1997; De Jong, de Ruyter, & Wetzels, 2005; Kirkman & Rosen, 1999; Lester et al., 2002; Shea & Guzzo, 1987; Sivasubramaniam, Murry, Avolio, & Jung, 2002; see Stajkovic et al., 2009 for a synthesis). However, little is known about the factors promoting team potency

☆ We are grateful to Bruce J. Avolio, William L. Gardner, and Fred O. Walumba for their permission to use the Authentic Leadership Questionnaire. We are also thankful to the three anonymous reviewers for their valuable and helpful comments and suggestions.

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<sup>1</sup> Although teams and groups have potential differences, Biemann et al. (2012) argued that both may be seen as “a clustering of individuals who are interdependent based on a set of common expectations or hierarchical structuring and who interact with one another as if they are a group”. For simplicity, we use the term “team” throughout the paper.

(Gibson & Earley, 2007; Lester et al., 2002). Guzzo et al. (1993) suggested that leadership is a key determinant of team potency, but empirical studies are scarce (Howell & Shea, 2006).

In this paper we focus on authentic leadership (AL) as predictor of team potency. The apparent degradation in the quality of the “overall moral fabric of contemporary leadership” (Avolio & Mhatre, 2012) creates a need for new theories that, like AL, focus on promoting what is right rather than focusing only on “results at whatever cost” to the exclusion of ethical considerations. Followers', teams', and organizations' effectiveness must be promoted via authentic leadership behaviors that also help to restore trust in leaders and organizations (Avolio & Mhatre, 2012; George, 2003). In times of a crisis of confidence (Avolio & Mhatre, 2012; George, 2003), studying and promoting AL is crucial for developing confidence in leaders and promoting “pragmatic outcomes” (Cameron, Bright, & Caza, 2004, p. 770). Considering the impact of team potency on team performance (Stajkovic et al., 2009), team potency may be considered to be a “pragmatic outcome” of AL, as we discuss below.

AL is a subject of growing interest among scholars (e.g., Avolio & Gardner, 2005; Walumbwa, Avolio, Gardner, Wernsing, & Peterson, 2008; Walumbwa, Luthans, Avey, & Oke, 2011) and practitioners (e.g., George, 2003). Both argue that AL promotes positive attitudes and behaviors of employees and contributes to individual and organizational/team performance. More empirical research is necessary for further testing this assertion. Although several empirical studies have been conducted for predicting individual level outcomes (Rego, Sousa, Marques, & Cunha, 2012a; Walumbwa, Wang, Wang, Schaubroeck, & Avolio, 2010; Walumbwa et al., 2008), studies are scarcer in predicting team level outcomes (Walumbwa et al., 2011). In consonance with Avolio, Gardner, Walumbwa, Luthans, and May, 2004, we consider that AL, although important, is not sufficient to achieve positive team outcomes. There is a process linking AL to team potency, and we suggest that team virtuousness and team affective commitment may be part of that process. We hypothesize that AL nurtures team virtuousness, which in turn promotes team affective commitment (Avolio, Gardner, Walumbwa, Luthans, & May, 2004; Rego, Ribeiro, & Cunha, 2010; Rego, Ribeiro, Cunha, & Jesuino, 2011) and, in this way, team potency. Both team commitment and team virtuousness are potential mediators, with research suggesting that both predict team performance (Neininger, Lehmann-Willenbrock, Kauffeldt, & Henschela, 2010; Palanski, Kahai, & Yammarino, 2011).

Team commitment is analogous to organizational commitment, except that the target of the psychological attachment is the team, not the organization. There is reason to believe that team commitment contributes more to the prediction of team-related criteria such as team potency than does organizational commitment (Den Hartog & Belschak, 2007; Fishbein & Ajzen, 1975; Riketta & Van Dick, 2005). AL may encourage team affective commitment through the mediating role of team virtuousness (Avolio, Gardner, Walumbwa, Luthans, & May, 2004). Team virtuousness refers to team contexts where “good” habits, desires, and actions (e.g., humanity, integrity, forgiveness, and trust) are practiced, supported, nourished, disseminated, and sustained, at both the individual and collective levels (Cameron et al., 2004). The topic has been “out of favor in the scientific community” (Cameron et al., 2004, p. 767) and out of the focus of practitioner attention (Rego et al., 2010). A few empirical studies have been conducted (Bright, Cameron, & Caza, 2006; Cameron et al., 2004; Rego et al., 2010, 2011), but to our knowledge none has focused on both AL and team virtuousness. This is surprising considering that both are core elements of Positive Organizational Scholarship (Cameron & Spreitzer, 2012). More empirical research is necessary for “legitimizing” them in both the scholars' and practitioners' communities (Cameron & Winn, 2012).

We hypothesize that AL fosters virtuous team climates, leading team members to share common positive perceptions about how virtuous the team is, which in turn increases team affective commitment and, in this way, makes the team more potent. For example, because authentic leaders set high standards for moral and ethical behavior, they nurture honesty, integrity, and trust within the team, developing positive/upward spirals within the team, making it more virtuous. Team virtuousness, in turn, creates team affective commitment (Rego et al., 2011), leading the whole team to feel more potent. Such effects may occur because, for example, team members develop meaning at work and gratitude for working in a virtuous team (Emmons & Shelton, 2001). As a consequence, they reciprocate with greater team affective commitment (Coyle-Shapiro, 2002; Eisenberger, Armeli, Rexwinkel, Lynch, & Rhoades, 2001). Through positive behavioral interactions within the team (Ilies, Morgeson, & Nahrgang, 2005), affective commitment translates into upward/positive collective spirals that make the team more potent.

## 2. Explaining the main constructs

### 2.1. Authentic leadership

AL can be defined as “a pattern of leader behavior that draws upon and promotes both positive psychological capacities and a positive ethical climate, to foster greater self-awareness, an internalized moral perspective, balanced processing of information, and relational transparency on the part of leaders working with followers, fostering positive self-development” (Walumbwa et al., 2008, p. 94). Authentic leaders are people “who have achieved high levels of authenticity in that they know who they are, what they believe, what their values are, and that they can act upon these values and beliefs while transparently interacting with others” (Avolio, Gardner, Walumbwa, Luthans, & May, 2004, p. 802).

Theoretical and empirical evidence (Gardner, Avolio, Luthans, May, & Walumbwa, 2005; Rego et al., 2012a; Walumbwa et al., 2008) suggests that the AL construct comprises four dimensions: (1) *Self-awareness* represents the degree to which the leader understands how (s)he derives and makes meaning of the world and is aware of his or her strengths and limitations, how others see him or her, and how (s)he impacts others (Walumbwa et al., 2008); (2) *Balanced processing* refers to the degree to which the leader objectively analyzes all relevant data before coming to a decision and solicits views that challenge deeply-held positions (Gardner et al., 2005; Walumbwa et al., 2008); (3) *Internalized moral perspective* refers to the degree to which the leader sets a high standard for moral and

ethical conduct, guides actions by internal moral standards and values (versus team, organizational, and societal pressures), and expresses decision-making and behavior consistent with such internalized values (Avolio & Gardner, 2005; Gardner et al., 2005; Walumbwa et al., 2008); (4) *Relational transparency* represents the degree to which the leader openly shares information, presents his/her authentic self to others, and expresses his/her true thoughts and feelings, reinforcing a level of openness with others that equips them with an opportunity to present their true ideas and advance challenging opinions and suggestions. Empirical and theoretical evidence suggests that a core AL factor can be extracted from the relationships among the four dimensions (Gardner et al., 2005; Kernis & Goldman, 2005; Rego et al., 2012a; Walumbwa et al., 2008).

Walumbwa et al. (2008, 2011) present several differences between AL theory and transformational and ethical theories, having found incremental validity of AL beyond ethical and transformational leadership. Avolio and Gardner (2005) also advance several differences between AL theory and transformational, charismatic, servant, and spiritual leadership theories. Although some overlap exists between AL and other leadership theories, AL has unique components. Still other authors (Avolio & Gardner, 2005; Avolio & Mhatre, 2012) argue that AL represents a *root construct* underlying other positive forms of leadership.

Literature has suggested that AL predicts several positive attitudes and behaviors, at both the individual (e.g., psychological capital, creativity, organizational citizenship behaviors, work engagement, good team outcomes; Avolio, Gardner, Walumbwa, Luthans, & May, 2004; Rego et al., 2012a; Walumbwa et al., 2010) and collective level (e.g., citizenship behavior; performance; Walumbwa et al., 2011). However, studies at the collective/team levels are scarce. We consider that, like other leadership constructs (Yammarino, Dionne, Chun, & Dansereau, 2005), AL may emerge as a collective phenomenon (Walumbwa et al., 2011), when team members share similar perceptions about the team leader's authentic behaviors (Biemann, Cole, & Voelpel, 2012; Waldman & Yammarino, 1999).

## 2.2. Team virtuousness

The Latin word *virtus* means “strength” or “excellence”. Virtues are habits, desires, and actions that produce personal and social good (Cameron & Winn, 2012). They can be defined as “core characteristics valued by moral philosophers and religious thinkers” (Peterson & Seligman, 2004, p. 13). These include six broad categories: wisdom, courage, humanity, justice, temperance, and transcendence (Peterson & Seligman, 2004). Virtuousness refers to the pursuit of the highest aspirations in the human condition. Team virtuousness refers to team contexts where the “good” habits, desires, and actions (e.g., humanity, integrity, forgiveness, and trust) are practiced, supported, nourished, disseminated, and sustained, at both the individual and collective levels (Cameron et al., 2004). Cameron et al. (2004) developed and validated an instrument for measuring the perceptions of organizational virtuousness including five dimensions: optimism, forgiveness, trust, compassion, and integrity. Organizational *optimism* means that organizational members develop a belief that they will succeed in doing well and doing good, even when faced with major challenges. Organizational *forgiveness* refers to the degree to which mistakes are quickly forgiven and used as opportunities for learning in a context characterized by high standards of performance. Organizational *trust* means that courtesy, consideration, and respect govern the organization and that people trust each other and their leaders. Organizational *compassion* represents the degree to which people care about each other, and whether acts of compassion and concern are common. Organizational *integrity* means that honesty, trustworthiness, and honor pervade the organization.

The literature has suggested that a core organizational virtuousness factor can be extracted from the relationships among the five dimensions (Rego et al., 2010, 2011). Statistically significant relationships between perceived organizational virtuousness and performance have been found (Cameron et al., 2004). Studies also suggest that perceptions of organizational virtuousness predict organizational citizenship behaviors and affective commitment, both directly and through the mediating effect of happiness at work (Rego et al., 2010, 2011). To our knowledge, very few studies have investigated virtuousness at the team level (e.g., Palanski et al., 2011). Taking into account that our study focuses on team potency as outcome, and on team leadership as predictor, we consider that team virtuousness is a more plausible mediator than organizational virtuousness (Neininger et al., 2010).

## 2.3. Team affective commitment

Organizational affective commitment is a form of attachment characterized by identification to and involvement with the organization, with some literature suggesting that such a bond leads to several positive outcomes, including in-role and extra-role performance (Allen & Meyer, 1996; Meyer, Stanley, Herscovich, & Topolnytsky, 2002). Team commitment is analogous to organizational commitment, except that the target of the psychological attachment is the team, not the organization. Thus, team affective commitment is an attachment characterized by an identification to and involvement with the team (Neininger et al., 2010).

Team commitment has rarely been investigated (Neininger et al., 2010), but there is reason to believe that it is a better predictor of team level outcomes than organizational commitment. Teams, especially in large organizations, are more salient in employees' everyday lives than the organization as a whole (Foote & Tang, 2008; Riketta & Van Dick, 2005). Work is carried out within the team, feedback is immediately available from the team, and team interactions are primarily undertaken within the team via face-to-face communications (Bishop, Scott, Goldsby, & Cropanzano, 2005). Thus, it is plausible that team commitment contributes more to the prediction of team-related criteria such as team potency than does organizational commitment (Den Hartog & Belschak, 2007; Riketta & Van Dick, 2005).

## 2.4. Team potency

Self-efficacy, defined as people's beliefs in their capabilities to organize and perform actions necessary to achieve a goal or an outcome (Bandura, 1997), is a key element of social cognitive theory. Self-efficacy relates with variables such as job satisfaction and job performance (Judge & Bono, 2001; Stajkovic & Luthans, 1998). The expression “collective efficacy” (“a group's shared belief in its conjoint capabilities to organize and execute the courses of action required to produce given levels of attainments”; Bandura, 1997, p. 447) was introduced by Bandura (1982) as a part of social cognitive theory's extension to the team level of analysis. According to this theory, “the higher the sense of collective efficacy, the better the team performance” (Bandura, 1997, p. 470). Although collective efficacy has origins at the individual level, collective efficacy is more than the sum of its parts (Gibson & Earley, 2007), thus emerging as a distinct collective phenomenon. A team of highly self-confident individuals does not necessarily give rise to a team with high collective efficacy.

Literature is inconsistent regarding the use of expressions such as collective efficacy and team potency. However, more recent research helps to distinguish both as follows: while team potency refers to cognitions about the general effectiveness (i.e., the team believes that it may confront *any* task or demand successfully), collective efficacy refers to the team belief about its perceived capability to perform a *specific* task or demand (Gibson & Earley, 2007; Stajkovic et al., 2009). This paper focuses on team potency. Most of the empirical and conceptual work investigating the construct has focused on its relationship with performance, little being said about the factors promoting and the processes underlying team potency (Gibson & Earley, 2007; Lester et al., 2002). Below, we present arguments in favor of how team potency is possibly predicted by AL through the mediating role of team virtuousness and team affective commitment.

## 3. Hypotheses

### 3.1. AL predicting team potency

Authentic leaders objectively analyze the relevant data (both outside the team and from team members) before coming to a decision, seek the followers' inputs for decision making, and solicit views that may challenge deeply-held positions (Walumbwa et al., 2008, 2011). They also openly share that information with the whole team, and use it to strengthen the team (Gardner et al., 2005). As a consequence, team members, both individually and collectively, become more confident in their abilities. As Walumbwa et al. (2011, p. 8) argues, “leaders sharing information provides team members with opportunities to develop collective intuition, expand their knowledge, learn from each other, and acquire new skills. This in turn raises team members' individual and in turn collective efficacy”.

Authentic leaders also focus on followers' talents and strengths, unleash their potential (Gardner & Schermerhorn, 2004; Luthans & Avolio, 2003), and emphasize their growth. As a consequence, employees' self-efficacy potentially develops through the effect of the self-fulfilling prophecy (Avolio, Gardner, Walumbwa, Luthans, & May, 2004; Gardner et al., 2005; Luthans, Youssef, & Avolio, 2007). Considering that self-efficacy also develops through vicarious learning, and that authentic leaders tend to be self-efficacious (Avolio & Gardner, 2005), one may expect that team members, both individually and collectively, develop a greater sense of efficacy by observing the leader and the other team members' behaviors and strengths. Authentic leaders may also promote work engagement and psychological empowerment of team members, thus giving rise to dynamics of collective work engagement and empowerment (Walumbwa et al., 2010) that translate into greater team potency (Akgün, Keskin, Byrne, & Imamoglu, 2007). Some literature (Bass, Avolio, Jung, & Berson, 2003; Howell & Shea, 2006; Kirkman & Rosen, 1999) suggests that by expressing confidence in team members' capabilities to pursue challenging tasks and to meet high performance expectations, transformational leadership (a construct with considerable overlap with AL; Avolio & Gardner, 2005) may advance team potency. From the above, we hypothesize that:

**Hypothesis 1.** AL predicts team potency.

Beyond the mechanisms mentioned above, two others may operate: team virtuousness and team affective commitment. Authentic leaders may cultivate team virtuousness, thus leading the team to develop team affective commitment, which in turn makes the team more potent. Next, we discuss how authentic leaders nurture team virtuousness.

### 3.2. AL predicting team virtuousness

Several reasons support the prediction that AL influences team virtuousness and, specifically, the five dimensions of the construct (see definitions above). For example, by adopting an internalized moral perspective, authentic leaders promote honesty and integrity within the team. They not only behave honestly and ethically, but also promote and reward others' ethical behaviors, and discourage unethical ones (Avolio, Gardner, Walumbwa, Luthans, & May, 2004). Team members who wish to behave ethically also feel secure in adopting ethical actions if they are assured that their leaders will support them (George, 2003). By being relationally transparent, behaving honestly, and adopting a balanced processing of information, authentic leaders also promote positive interpersonal relationships and trust with and within the team (Avolio, Gardner, Walumbwa, Luthans, & May, 2004; George, 2003; Walumbwa et al., 2011; Webber, 2002). Thus, one may expect that when leaders are authentic, role modeling processes develop at the team level (Avolio, Gardner, Walumbwa, Luthans, & May, 2004; George, 2003), integrity and

trust within the team flourish, and upward spirals of trust and integrity emerge at the team level (Walter & Bruch, 2008; Walumbwa et al., 2011).

George (2003) argued that authentic leaders are guided by the qualities of the heart—passion and compassion. Considering that authentic leaders act as role models and elevate positive emotions within the team (Avolio, Gardner, Walumbwa, Luthans, & May, 2004), one may expect that those qualities and high quality connections (Stephens, Heaphy, & Dutton, 2012) develop within the team, positive team affect spirals take place (Walter & Bruch, 2008), and dynamics of reciprocated positive acts occur at the team level (Avolio, Gardner, Walumbwa, Luthans, & May, 2004; Dirks & Ferrin, 2002). A possible consequence of such dynamics is greater compassion, forgiveness, and trust at the team level.

Gardner and Schermerhorn (2004, p. 275) noted that one “task of the authentic leaders is to raise optimism”. De Hoogh and Den Hartog (2008) suggested that ethical leadership (an authentic-like leadership; Avolio, Gardner, Walumbwa, Luthans, & May, 2004) relates significantly with employees' optimism about their future. In their view, by being fair, caring about followers' feelings, promoting transparent and open communication, rewarding ethical conduct, and investing followers with voice, such leaders make employees more positive and optimistic about their organization and work situation, and more willing to remain and contribute to its success. Authentic leaders also develop meaningful missions and visions, thereby leading team members to develop a sense of purpose in what the team does (George, 2003; Sivasubramaniam et al., 2002; Webber, 2002). Being self-confident, optimistic, hopeful, and resilient (Gardner et al., 2005), and acting as role models (Avolio, Gardner, Walumbwa, Luthans, & May, 2004), authentic leaders also lead the team members to feel optimistic about succeeding, even when faced with major challenges. Authentic leaders provide senses of self-determination, security, and trust, enabling followers to focus their energies on goal-related endeavors and on finding different pathways for solving problems and responding to opportunities (Avolio, Gardner, Walumbwa, Luthans, & May, 2004; Edmondson, 1999; Ilies et al., 2005). Considering the repeated behavioral interactions within the team (Ilies et al., 2005; Walumbwa et al., 2011) and the positive dynamics and upward spirals referred to above, one may reasonably expect that authentic leaders also promote optimism at the team level. From this we propose the next hypothesis:

**Hypothesis 2.** AL predicts team virtuousness.

### 3.3. *Team virtuousness predicting team affective commitment*

Employees tend to reciprocate treatment by their teams by adjusting their attitudes accordingly. Virtuous teams may lead employees to feel gratitude for working in such teams (Emmons & Shelton, 2001; Fredrickson, 1998), to feel psychologically safer, and to perceive team support, thus reciprocating with greater team affective commitment (Bishop et al., 2005; Coyle-Shapiro, 2002; Dayan, 2010; Paillé, 2009; Pearce & Herbik, 2004). “Affective events theory” (Weiss & Cropanzano, 1996) also helps to support such a relationship. This theory suggests that stable work environments influence the occurrence of positive and negative affective events. Experiencing these events leads employees to experience affective states. Affective states, in turn, may influence work attitudes. In line with this theory, working in a virtuous team is an important affective event, which triggers greater positive affects and leads individuals to experience greater team affective commitment (Lilius et al., 2008). Working in virtuous teams may lead team members to experience work as meaningful, thus taking on work as a mission rather than as a “job”, which in turn makes them more affectively attached to their teams and more committed to improve team performance. Positive affect at work may also make the job intrinsically rewarding, thus promoting team affective commitment (Eby, Freeman, Rush, & Lance, 1999; Kuvaas, 2006). Taking into account that teams induce repeated interactions (Ilies et al., 2005; Walumbwa et al., 2011), that affect is contagious (Hatfield, Cacioppo, & Rapson, 1994), and that positive affective similarity in work teams tends to emerge (Walter & Bruch, 2008), one may expect that positive/upward spirals develop within virtuous teams, the whole team experiencing more positive affect and increasing the respective team affective commitment. Hence:

**Hypothesis 3.** Team virtuousness predicts team affective commitment.

Considering the above arguments, it is reasonable to expect that AL facilitates team virtuousness, which in turn leads to greater team affective commitment. For example, by being relationally transparent, behaving honestly, and adopting a balanced processing of information, authentic leaders act as role models, thus promoting trust and integrity within the team, with upward spirals emerging at the team level (Walter & Bruch, 2008; Walumbwa et al., 2011), and the whole team reciprocating with greater team affective commitment (Bishop et al., 2005; Coyle-Shapiro, 2002; Dayan, 2010; Paillé, 2009; Pearce & Herbik, 2004). We thus propose the following hypothesis:

**Hypothesis 4.** AL predicts team affective commitment through the mediating role of team virtuousness.

### 3.4. *Affective commitment predicting team potency*

Team affective commitment may enhance team potency through several routes. Committed team members engage in more helping behaviors and intragroup cooperation (Neininger et al., 2010), thus increasing the team's belief that it will achieve its goals (Gibson & Earley, 2007). When team members (a) realize that the others identify with and are involved in the team, and (b) observe how others adopt/develop the corresponding positive attitudes, affects, and behaviors (e.g., positive affect,

initiative, work engagement, job involvement, and organizational citizenship behaviors; Allen & Meyer, 1996; Meyer et al., 2002), the consequences may be: (a) an increase in team positive energy (Vogel & Bruch, 2012), (b) a stronger sense of collective identity, and (c) a belief by the whole team that it is able to perform the tasks and to face challenges and opportunities more successfully (i.e., greater team potency; Shamir, House, & Arthur, 1993; Sivasubramaniam et al., 2002).

Studies at the individual level show that team affective commitment predicts variables such as personal initiative (Den Hartog & Belschak, 2007) and organizational citizenship behaviors (Bishop, Scott, & Burroughs, 2000; Foote & Tang, 2008). Initiative may take the form of engaging in proactive measures that promote team goal attainment, these measures including helping others and taking on duties not allocated to specific team members (Den Hartog & Belschak, 2007). Initiative may also make individuals more engaged in work (Sonnentag, 2003). Citizenship behaviors (e.g., helping colleagues, developing oneself, protecting the team) positively influence team effectiveness (e.g., they enhance coworker productivity and serve as an effective means of coordinating activities between team members; Podsakoff & MacKenzie, 1997). Thus, when adopting, observing, and benefiting from the initiative and citizenship behaviors within a team, team members develop a shared belief that the team will succeed in pursuing its goals. Studies also show that, at the team level, affective commitment predicts team performance (Dayan, 2010; Neiningner et al., 2010). Considering that prior team performance provides information about the team capabilities and enhances the team's beliefs in its own effectiveness (Jung & Sosik, 2003), one may expect that team affective commitment translates into better team performance and, subsequently, into greater team potency (De Jong et al., 2005; Lester et al., 2002). Hence:

**Hypothesis 5.** Team affective commitment predicts team potency.

Considering the above, one may expect that virtuous teams develop greater team affective commitment, which in turn translates into greater team potency. For example, when working in a team characterized by trust, integrity, compassion, and forgiveness, team members develop gratitude and pride in belonging to the team, and experience positive affect. Due to repeated interactions (Ilies et al., 2005; Walumbwa et al., 2011) and mood and emotional contagion (Hatfield et al., 1994), the whole team reciprocates with greater team affective commitment (Bishop et al., 2005; Coyle-Shapiro, 2002; Dayan, 2010; Pail  , 2009; Pearce & Herbig, 2004). As a consequence, intragroup cooperation develops (Neiningner et al., 2010), which in turn increases the team's belief that it will achieve team goals (Gibson & Earley, 2007). Thus, we hypothesize:

**Hypothesis 6.** Team virtuousness predicts team potency through the mediating role of team affective commitment.

Given the above arguments, it may be expected that authentic leaders will stimulate team virtuousness (Avolio, Gardner, Walumbwa, Luthans, & May, 2004; George, 2003; Walumbwa et al., 2011; Webber, 2002), thus leading the whole team to reciprocate with greater affective commitment (Coyle-Shapiro, 2002; Lilius et al., 2008) and become more cohesive (Gibson & Earley, 2007), which in turn makes the team feel more prepared to reach its goals (i.e., more potent). However, considering that AL may bolster team potency through mechanisms (see arguments supporting H1) other than team virtuousness and team affective commitment, we hypothesize:

**Hypothesis 7.** AL predicts team potency through the (partial) mediating role of team virtuousness and team affective commitment.

### 3.5. Alternative models

The seven hypotheses give rise to our model, depicted in Fig. 1. However, following Iacobucci, Saldanha, and Deng's (2007, pp. 152–153) suggestion ("The researcher should acknowledge the possibility of rival models, and test several, at least one in which the causal direction is completely reversed"), five alternative models are tested (Fig. 2) and compared with the hypothesized model. The first alternative model differs from the hypothesized one in that it does not include the path between AL and team potency. Several studies (including research about AL; e.g., Walumbwa et al., 2010) suggest that the impact of leadership on employees/team outcomes may be fully mediated by other variables (e.g., Wang, Law, Hackett, Wang, & Chen, 2005).

The second alternative model differs from the hypothesized one in that it does not include the path AL → team potency, and considers team potency as antecedent of team affective commitment. Kirkman and Rosen (1999) show that the more a team's members experience team empowerment (team potency being a dimension of this construct), the greater is the team's affective commitment. They suggest that this effect may arise from the high level of support and trust inherent in empowered teams. This alternative model also considers team virtuousness as antecedent of team potency. Theoretical and empirical evidence (see De Jong et al., 2005) suggests that adequate support, cooperation, communication, and information sharing (potential features of teams characterized by high levels of virtuousness) make team members feel more confident about their joint competence.

The third alternative model differs from the hypothesized one in that it does not include the path AL → team potency, and considers team virtuousness as antecedent of AL. One may consider that a virtuous context promotes or facilitates authenticity in leaders (Cooper, Scandura, & Schriesheim, 2005; Luthans & Avolio, 2003; May, Chan, Hodges, & Avolio, 2003), and that virtuous teams "repel" non-authentic leaders and attract authentic ones. Avolio and Gardner (2005, p. 327) argue: "Because all leadership interactions occur in a dynamic, emerging context, it is important for researchers to incorporate the context into their predictions of leadership development and effectiveness". Gardner et al. (2005, p. 348) also pointed out the "role that an inclusive, caring, ethical and strength-based organizational climate can play in the development of authentic leaders".

The fourth and fifth alternative models represent the complete reversion of the hypothesized model, as suggested by Iacobucci et al. (2007). The rationale underlining the fourth model can be summarized as follows: (a) within high potency teams, team

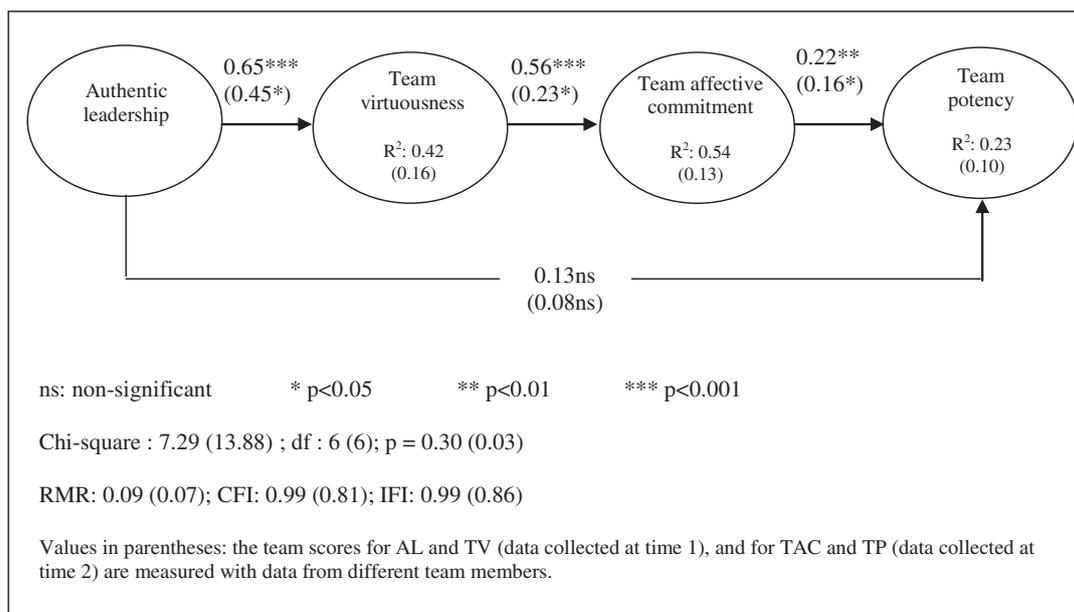


Fig. 1. Testing the hypothesized model (unstandardized path coefficients).

members develop perceived team support (Shelton, Waite, & Makela, 2010) and other positive attitudes (e.g., team identification), thus reciprocating with stronger affective commitment toward the team; (b) individuals highly committed to their teams develop more positive affect and high quality connections (Stephens et al., 2012), with positive team affect spirals taking place (Walter & Bruch, 2008) and dynamics of reciprocated positive acts occurring at the team level (Avolio, Gardner, Walumbwa, Luthans, & May, 2004), a possible consequence of such dynamics being greater compassion, forgiveness, and trust at the team level; (c) team virtuousness promotes or facilitates authenticity in leaders (see the arguments above regarding the third alternative model), and virtuous teams “repel” non-authentic leaders and attract authentic ones; (d) assuming that team potency is an enduring feature of teams, teams with greater potency may create dynamics that influence their leaders to behave more authentically (Sivasubramaniam et al., 2002).

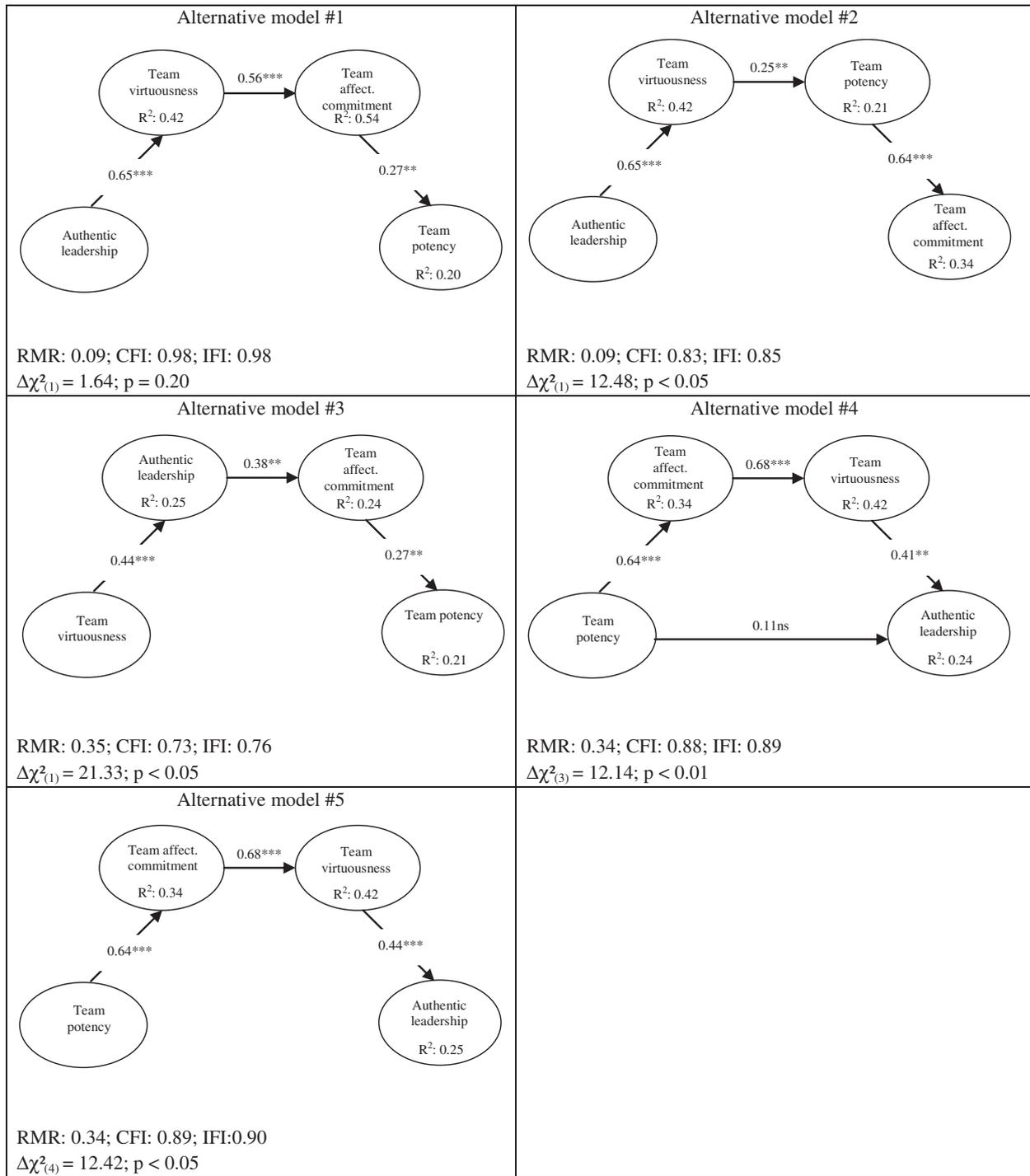
## 4. Method

### 4.1. Sample and procedures

The study was carried out in a Portuguese public university, employing 500 individuals operating in 59 teams (64.8% female; mean age: 42.6, standard deviation: 9.7; mean team tenure: 12.9, SD: 9.3; 17.4% had 9 or fewer schooling years, 22.4% had 12 years, 41.7% had a university degree, and 18.4% had a graduate degree). Team size ranged between 4 and 21 members (mean: 7.0; SD: 3.6). Teams performed administrative tasks, service to students, advising, accounting, human resource management, information and communication technology services, library services, social services, and communication and public relations. Most teams operated in different locations on the campus, and the level of task interdependence was moderate/high (most tasks required team members to interact in order to achieve good performance results; Stajkovic et al., 2009). Individuals reported their perceptions of team virtuousness and AL. Two months later, they reported their team affective commitment and the team's potency. Answers were anonymous, being sent by mail to the researchers or delivered directly to the researchers under closed cover.

After obtaining permission from the school administration, the researchers sent an e-mail message to all employees asking for cooperation. Next, they personally asked as many individuals as possible for cooperation. Because supervisors were invited to report other variables from a larger project, in each team, only subordinates participated. All individuals were informed that cooperation would require participating on two occasions. Two hundred and seventy eight individuals (response rate: 56%; 66.7% female) participated. They reported their perceptions of team's virtuousness and of AL. 5.9% had 9 or fewer schooling years, 31.3% had 12 years, 52.7% had a university degree, and 10.2% a graduate degree. Mean age was 39.2 years (SD: 8.6), mean tenure in the team was 7.3 years (SD: 6.0), and the mean length of supervisor-employee working relationship was 4.1 years (SD: 3.0). These data suggest that the characteristics of the participants in the study are very similar to those of the population, although the former are younger, show lower team tenure, and have more schooling years.

Two months later an e-mail message was sent to all employees asking them to participate in the second stage of the study. Individuals were personally asked to report their team affective commitment, as well as team potency. Two hundred and twenty-two individuals (67.0% female) participated, representing 80% of those who participated in the first stage of the study. 4.0% had 9 or fewer schooling years, 30.7% had 12 years, 55.5% had a university degree, and 10.4% had a graduate degree. Mean age was 38.6 years (SD: 8.20), mean tenure in the team was 6.8 years (SD: 5.39), and the mean length of the supervisor-employee working relationship was 4.0 years (SD: 2.91). These data suggest that characteristics of individuals who participated versus



ns: non significant; # p<0.10 \*P<0.05 \*\*P<0.01 \*\*\*p<0.001  
 Changes in chi-square refer to the comparison between each alternative model and the hypothesized model.

Fig. 2. Testing alternative models through structural equation modeling (unstandardized path coefficients).

those who did not participate in the second stage are similar. We also compared both groups for all AL and team virtuousness dimensions. No significant differences were found, except that individuals who did not participate in the second stage show a lower score in trust (4.0 against 4.3; *T*-test,  $p < 0.05$ ) than those who participated in both stages. It is possible that within-team trust has boosted the participation in the second stage of the study. Although, on the whole, the data suggest that most features of the sample were kept intact from the first to the second stage, one should not exclude the possibility that some part of the organizational reality is not reflected in the data upon which our model is tested. Matching the data collected in both moments, 51 teams (212 individuals; 66% female; mean age: 38.1, SD: 5.8; mean tenure in the team: 6.4, SD: 3.7; the mean length of the supervisor-employee working relationship: 3.9, SD: 1.9) with at least two members (14 teams with two members, 16 with three

members, 9 with four members, and 12 with at least five members) were retained for analysis. Teams from which at least two members (rather than three) participated in both stages were retained to increase the sample size.

#### 4.2. Measures

To reduce common method biases (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003; Podsakoff, MacKenzie, & Podsakoff, 2012), different scale endpoints, formats, and ranges for the predictor and criterion measures were employed. Furthermore, data about team affective commitment and team potency were collected two months after data collection on AL and team virtuousness.

As in the majority of studies (Biemann et al., 2012), we relied on survey data gathered from team members and then aggregated these to the leader/team level of analysis for measuring AL, thereby adopting a referent-shift consensus composition model (Chan, 1998). For obtaining the team affective commitment scores, we adopted a direct consensus composition model (Chan, 1998), as other authors have done (e.g., Neining et al., 2010; Porter, 2005). Direct consensus composition models are similar to referent-shift models, but differ in that the referent of the construct operationalization shifts from the collective/team to the individual focus. Considering that team affective commitment is a bond between each individual and the team, asking individuals about the affective commitment of “team members as a whole” appeared less valid than asking them about their own bonds.

##### 4.2.1. Authentic leadership

Perceptions of AL were measured with the 16 five-point items of the Authentic Leadership Questionnaire (Copyright © 2007 Authentic Leadership Questionnaire (ALQ) by Bruce J. Avolio, William L. Gardner, and Fred O. Walumbwa. All rights reserved in all media. Distributed by Mind Garden, Inc. [www.mindgarden.com](http://www.mindgarden.com)). The questionnaire measures four dimensions: self-awareness, relational transparency, internalized moral perspective, and balanced processing. Sample items are: (a) “Seeks feedback to improve interactions with others” (self-awareness); (b) “Says exactly what he or she means” (relational transparency); (c) “Demonstrates beliefs that are consistent with actions” (internalized moral perspective); (d) “Listens carefully to different points of view before coming to conclusions” (balanced processing). The Portuguese version as translated and back translated by Rego et al. (2012a) was used. Individuals reported the frequency (0: “not at all”; 4: “frequently, if not always”) with which their supervisors adopted the 16 behaviors/attitudes. Confirmatory factor analysis (using LISREL with the maximum likelihood estimation method; covariance matrix as input; items loading only on one latent variable; the latent variables being allowed to correlate) tested the four-factor model, first at the individual level. A reasonably well-fitted model emerged, all Cronbach Alphas being higher than 0.70 (Table 1).

A second-order factor model, where the four AL dimensions loaded onto a higher AL factor, fitted the data reasonably well, the fit indices being very similar to those of the first-order model (Table 1). Considering the parsimony of this second-order model, we considered AL as a core construct. To obtain a composite AL score: (1) the study averaged the items for each of the four subscales to arrive at a composite average for each subscale; (2) then, the study averaged the averages for each of the four subscales (Cronbach Alpha: 0.95). Individuals' scores were then aggregated at the team level.

Confirmatory factor analysis was also carried out upon team-level data (see below the “Aggregating data at the team level” sub-section), for testing the four-factor model. Taking into account the small sample size ( $n = 51$ ), Root Mean Square Residual (RMR), CFI, and IFI were considered for assessing fit. Fit indices (RMR: 0.036; CFI: 0.86; IFI: 0.86) suggest that the model fits the data reasonably well. Lambdas range between 0.64 and 0.86, and Cronbach Alphas are higher than 0.80 (relational transparency: 0.87; internalized moral perspective: 0.86; balanced processing: 0.81; self-awareness: 0.84). The fit indices of the second-order factor model are equal to those of the first-factor model, no significant change in  $\chi^2$  relative to the difference in degrees of freedom ( $\Delta\chi^2_{(2)} = 1.5$ ;  $p = 0.47$ ) being found. Cronbach Alpha for AL using team-level data is 0.96.

##### 4.2.2. Team's virtuousness

Perceptions of team virtuousness were measured with the 15-item six-point Likert scales proposed by Cameron et al. (2004), after adapting them to the team level. The Portuguese version translated and back-translated by Rego et al. (2010) was used. Respondents were asked to report the degree to which the statements were false (1) or true (6). A confirmatory factor analysis (the procedures used to test the AL data were considered at this stage) upon the individual-level data was carried out for testing the five-factor model (Cameron et al., 2004). Considering that RMSEA (0.11) was higher than the 0.08 cutoff value, standardized residuals and modification indices were analyzed for locating sources of misspecification. After deliberation based on both techniques, two items (one referring to trust, another to forgiveness) were removed. A well-fitted 13-item model emerged, all Cronbach Alphas being higher than 0.80 (Table 2). A second-order factor model also fits the data adequately. Comparison of the first- and second-order shows no significant change in  $\chi^2$  relative to the difference in degrees of freedom ( $\Delta\chi^2_{(5)} = 4.9$ ;  $p = 0.43$ ). Thus, the second-factor model was selected for testing the hypotheses. To obtain a composite team virtuousness score (Alpha: 0.92), the items for each of the five dimensions were averaged to obtain a composite average for each of the five dimensions. Then, the averages for each of the five dimensions were averaged in turn to arrive at a composite team virtuousness score for each employee. Individual scores were then aggregated at the team level.

Confirmatory factor analysis was also carried out upon team-level data, for testing the five-factor model. Fit indices (RMR: 0.035; CFI: 0.92; IFI: 0.93) suggest that the model fits the data satisfactorily. Lambdas range between 0.64 and 0.92, and Cronbach Alphas are 0.81 (optimism), 0.82 (trust), 0.93 (compassion; integrity), and 0.87 (forgiveness). The fit indices of the second-order factor model (RMR: 0.036; CFI: 0.93; IFI: 0.93) are similar to those of the first-factor model, no significant change in  $\chi^2$  relative to

**Table 1**  
Authentic leadership: confirmatory factor analysis.

	1st-order factor model			2nd-order factor model		
	Lambdas <sup>b</sup>	Cronbach Alphas	Fit indices	Lambdas <sup>b</sup>	Cronbach Alphas	Fit indices
Relational transparency <sup>a</sup>		0.85			0.86	
Item # 1	0.75			0.74		
Item # 2	0.89			0.89		
Item # 3	0.98			0.99		
Item # 4	0.79			0.78		
Item # 5	0.76			0.76		
Internalized moral perspective <sup>a</sup>		0.85			0.86	
Item # 6	0.73			0.73		
Item # 7	0.80			0.80		
Item # 8	0.94			0.94		
Item # 9	0.90			0.89		
Balanced processing <sup>a</sup>		0.78			0.79	
Item # 10	0.78			0.78		
Item # 11	0.78			0.78		
Item # 12	1.00			1.00		
Self-awareness <sup>a</sup>		0.88			0.88	
Item # 13	0.97			0.97		
Item # 14	0.77			0.77		
Item # 15	0.98			0.98		
Item # 16	0.81			0.81		
Authentic leadership					0.95	
Relational transparency				1.00		
Internalized moral perspective				0.99		
Balanced processing				1.00		
Self-awareness				0.98		
<i>Fit indices</i>						
Chi-square			233.21			240.53
Degrees of freedom			98			100
Chi-square/degrees of freedom			2.4			2.4
Root mean square error of approximation			0.08			0.08
Goodness of fit index			0.88			0.88
Adjusted goodness of fit index			0.83			0.83
Non-normed fit index			0.93			0.93
Comparative fit index			0.94			0.94
Incremental fit index			0.94			0.94
Relative fit index			0.89			0.88

Notes:

<sup>a</sup> Item numbers are those of ALQ.

<sup>b</sup> Unstandardized paths.

the difference in degrees of freedom ( $\Delta\chi^2_{(5)}=2.11$ ;  $p=0.83$ ) having been found. Cronbach Alpha for team virtuousness considering team-level data is 0.92.

For testing the impact of removing two items from the team virtuousness' original measurement instrument (one referring to trust, another to forgiveness), we correlated the scores computed with the (three) original items versus the scores emerging from the two remaining items. When the individual-level data are considered, the correlations are 0.96, 0.96, and 1.00, respectively for trust, forgiveness, and overall team virtuousness. When the team-level data are considered, the correlations are 0.96, 0.97, and 1.00, also respectively. Thus, the impact of removing items seems not to be problematic.

#### 4.2.3. Team affective commitment

Team affective commitment was assessed at the individual level and then aggregated to the team level. Four items adapted from Meyer, Allen, and Smith (1993) were used: (1) "I would be very happy to spend the rest of my career with this team"; (2) "I really feel as if this team's problems are my own"; (3) "I feel 'emotionally attached' to this team"; (4) "This team has a great deal of personal meaning for me". Individuals were asked to report the degree to which each statement applied to them, on a 5-point scale (1: "the statement does not apply to me at all"; 5: "the statement applies to me completely"). Cronbach Alpha is 0.86 for individual-level data and 0.89 for team-level data.

#### 4.2.4. Team potency

Team potency (Cronbach Alpha is 0.88 for individual-level data and 0.87 for team-level data) was measured with six items (one being adapted from de Jong et al., 2005) from De Jong et al. (2005), who adapted them from Guzzo et al. (1993). The original items from De Jong et al. (2005) are: (1) "Our team has confidence in performing the job requirements"; (2) "Our team expects to be known as a high-performing team"; (3) "Our team feels it can solve any problem it encounters"; (4) "No task is too tough for our team"; (5) "Our team can get a lot done when it works hard". Considering that teams participating in our study were not

**Table 2**  
Team virtuousness: confirmatory factor analysis.

	1st-order factor model			2nd –order factor model		
	Lambdas <sup>a</sup>	Cronbach Alphas	Fit indices	Lambdas <sup>a</sup>	Cronbach Alphas	Fit indices
Optimism		0.78			0.78	
We are optimistic that we will succeed, even when faced with major challenges.	0.83			0.83		
In this team we are dedicated to doing good in addition to doing well.	0.87			0.87		
A sense of profound purpose is associated with what we do here.	0.93			0.94		
Trust		0.81			0.81	
People are treated with courtesy, consideration, and respect in this team.	1.12			1.12		
People trust the leadership of this team.	1.07			1.06		
Compassion		0.90			0.90	
Acts of compassion are common here.	1.13			1.13		
This team is characterized by many acts of concern and caring for other people.	1.22			1.22		
Many stories of compassion and concern circulate among team members.	1.14			1.13		
Integrity		0.90			0.90	
This team demonstrates the highest levels of integrity.	0.96			0.96		
This team would be described as virtuous and honorable.	1.10			1.10		
Honesty and trustworthiness are hallmarks of this team.	1.15			1.15		
Forgiveness		0.85			0.85	
We have very high standards of performance, yet we forgive mistakes when they are acknowledged and corrected.	0.99			1.00		
We try to learn from our mistakes here, consequently, missteps are quickly forgiven.	1.09			1.09		
Team virtuousness					0.92	
Optimism				1.00		
Trust				0.85		
Compassion				0.86		
Integrity				0.99		
Forgiveness				0.90		
<i>Fit indices</i>						
Chi-square			105.24			110.14
Degrees of freedom			55			60
Chi-square/degrees of freedom			1.9			1.8
Root mean square error of approximation			0.07			0.06
Goodness of fit index			0.93			0.93
Adjusted goodness of fit index			0.88			0.89
Non-normed fit index			0.97			0.97
Comparative fit index			0.98			0.98
Incremental fit index			0.98			0.98
Relative fit index			0.93			0.94

<sup>a</sup> Unstandardized paths.

“self-managed”, the item “Our team believes it can become unusually good at self-managing” was replaced by “Our team believes it can become unusually good at performing its tasks”.

Individuals were asked to report the degree to which each statement was true/false, on a 5-point scale (1: “completely false”; 5: “completely true”). Individuals' scores were then aggregated at the team level. Several authors (Bandura, 1997; Gibson & Earley, 2007; Stajkovic et al., 2009) have suggested that aggregation of individual's assessment is the preferred way of assessing team potency.

#### 4.3. Aggregating data at the team level

For testing if it is appropriate to aggregate data at the team level (Biemann et al., 2012; Bliese, 2000; LeBreton & Senter, 2008), we estimated ICC(1), ICC(2), and  $r_{WG(j)}$ . ICC(1) is a measure of within-group consensus, representing the proportion of total variance that can be explained by team membership. ICC(2) is an indicator of the reliability of the group mean differences, providing an estimate of the degree to which the mean accurately represents the group. While ICC(1) refers to the level of agreement among ratings from members of the same group, ICC(2) suggests whether groups can be differentiated on the variables under study.  $r_{WG(j)}$  is a measure of inter-rater agreement that calls for comparing the observed variances to the variance expected when there is complete lack of agreement between raters (i.e., random responding).

Although no absolute standard value for aggregation based on these measures has been established (Avolio, Zhu, Kho, & Bhatia, 2004; Biemann et al., 2012), Avolio, Gardner, Walumbwa, Luthans, and May (2004, p. 959) argued that “an  $r_{WG}$  equal to or greater than 0.70 and ICC(1) values exceeding 0.05 (Bliese, 2000) is considered sufficient to warrant aggregation” (see also Gelfand et al., 2011; James, Demaree, & Wolf, 1984). For ICC(2), values higher than 0.60 are usually considered to be sufficient (Bliese, 2000; Chen, Mathieu, & Bliese, 2004; Detert, Treviño, & Burris, 2007; Glick, 1985; Kenny & la Voie, 1985). Other authors have used different thresholds. For example, Michel, Lyons, and Cho (2011, p. 498) stated: “Although there are no definitive

cutoffs for these statistics, some general rules commonly used by organizational researchers include an ICC(1) value of at least 0.12,  $r_{WG}$  value of at least 0.60 (James, 1982), and an ICC(2) value of at least 0.60 (Glick, 1985). Zellmer-Bruhn (2003) also considered 0.60 as the cutoff value for  $r_{WG}$ .

For computing the expected variances that allow calculating  $r_{WG(J)}$  values, several authors (e.g., Biemann et al., 2012; LeBreton & Senter, 2008) recommend using several defensible null distributions. Thus, expected variances of team virtuousness, AL, and team affective commitment were estimated assuming both a uniform (rectangular) null distribution (“the most natural candidate to represent nonagreement”; Cohen, Doveh, & Nahum-Shani, 2009, p. 149) and a slightly skewed distribution. We considered slightly skewed distribution based on earlier studies where measures of perceptions of organizational virtuousness (Rego et al., 2010, 2011), authentic leadership (Rego et al., 2012a), and affective commitment (Rego et al., 2011) were included. For team potency, we also considered it reasonable to expect a slightly skewed distribution, because of a possible leniency bias on the part of the followers when describing their teams.

Table 3 depicts the results according to a template suggested by Biemann et al. (2012) to report aggregation results for consensus composition models. F ratios indicate that for the four variables of the study, group membership is statistically significant (Biemann et al., 2012), a finding indicating that aggregation is justified. All  $r_{WG(J)}$  values relative to the uniform distribution are higher than the cutoff value of 0.60 suggested by some authors (Michel et al., 2011; Zellmer-Bruhn, 2003), three being higher and one being close to the cutoff value of 0.70 suggested by other authors (Avolio, Gardner, Walumbwa, Luthans, & May, 2004; Biemann et al., 2012; LeBreton & Senter, 2008). Using the “revised standards” suggested by LeBreton and Senter (2008), a strong inter-rater agreement is found for AL, team virtuousness, and team potency, and a moderate/strong agreement is found for team affective commitment (LeBreton & Senter, 2008, Table 3, p. 836). The percentage of  $r_{WG(J)}$  values that exceed the cutoff value of 0.70 is 74%, 74%, 60%, and 84%, respectively for AL, team virtuousness, team affective commitment, and team potency. If the cutoff value of 0.60 is considered, the percentages are 82%, 80%, 68%, and 90%, respectively.

When the slightly skewed distribution is considered, three  $r_{WG(J)}$  values are higher than the cutoff value of 0.60 (two being close to the cutoff value of 0.70), one being lower. Using the “revised standards” suggested by LeBreton and Senter (2008), inter-rater agreement is moderate/strong for AL, team virtuousness, and team potency, and weak/moderate for team affective commitment. The percentage of  $r_{WG(J)}$  values that exceed the cutoff value of 0.70 is 62%, 62%, 44%, and 74%, respectively for AL, team virtuousness, team affective commitment, and team potency. If the cutoff value of 0.60 is considered, the percentages are 70%, 70%, 46%, and 74%, respectively.

All ICC(1) values are higher than the cutoff value of 0.06 (Avolio, Gardner, Walumbwa, Luthans, & May, 2004; Gelfand et al., 2011; James et al., 1984), two being higher than or close to the cutoff value of 0.12 (James, 1982; Michel et al., 2011). Taking LeBreton and Senter (2008) into account, ICC(1) values may be considered medium regarding team affective commitment and team potency, and medium/large regarding AL and team virtuousness (LeBreton & Senter, 2008; Murphy & Myors, 1998). All ICC(2) values are lower than 0.60 (the lowest cutoff identified in the literature), with the values for team affective commitment and team potency being particularly modest.

Although the results related to ICC(2) make the adequacy of aggregating data somewhat problematic, we consider that the findings regarding ICC(1) and the inter-rater agreement indices justify aggregation. For testing the impact of those less than desirable aggregations, we removed from the analysis the cases ( $n = 21$ ) in which both  $r_{WG(J)}$  values (uniform; slight skew) were lower than 0.60 in, at least, one variable. We then compared correlations emerging from that analysis with correlations emerging from the entire sample, and found that they are similar. For example: (a) the correlation between AL and team virtuousness is 0.49 ( $p < 0.01$ ) when the problematic cases are removed (against 0.57 in the entire sample; Table 4), (b) the correlation between team virtuousness and team affective commitment is 0.52 ( $p < 0.01$ ; against 0.59); (c) the correlation between team affective commitment and team potency is 0.42 ( $p < 0.05$ ; against 0.40). Structural equation modeling (SEM) carried out upon the data of the reduced sample also showed similar results to those emerging from the entire sample (Fig. 1), although the paths are somewhat higher (0.77,  $p < 0.001$ , against 0.65 for the entire sample; 0.65,  $p < 0.001$ , against 0.56; 0.25,  $p < 0.01$ , against 0.22; 0.25, non-significant, against 0.13). Considering these findings, the entire sample was used for testing the hypothesized model.

**Table 3**  
Aggregating data at the team level.

Measures	F ratio	$r_{WG(J)}$ . uniform		$r_{WG(J)}$ . slight skew		ICC(1)	ICC(2)	
		Mean	SD	Variance of the alternative null distribution <sup>a</sup>	Mean			SD
Authentic leadership (5) <sup>b</sup>	2.18***	0.79	0.23	1.34	0.67	0.34	0.22	0.54
Team virtuousness (6) <sup>b</sup>	2.17***	0.77	0.26	1.85	0.63	0.34	0.22	0.54
Team affective commitment (5) <sup>b</sup>	1.45*	0.68	0.26	1.34	0.49	0.35	0.10	0.31
Team potency (5) <sup>b</sup>	1.47**	0.79	0.18	1.34	0.67	0.24	0.10	0.31

Notes:

SD: standard deviation of  $r_{WG(J)}$  values.

<sup>a</sup> Variance estimates for the measure-specific null distributions were taken from LeBreton and Senter (2008, Table 2, p. 832).

<sup>b</sup> Numbers represent the number of response options.

\*  $p < 0.05$ .

\*\*  $p < 0.01$ .

\*\*\*  $p < 0.001$ .

**Table 4**  
Means, standard deviations, and correlations (team level).

	Mean	SD	1	2	3	4	5	6	7	8
1. Team size	4.2	2.90	–							
2. Mean age of team	38.1	5.83	0.10	–						
3. Mean schooling years of team (a)	2.7	0.51	–0.03	–0.50***	–					
4. Mean tenure of team	6.4	3.67	0.17	0.71***	–0.47***	–				
5. Mean length of the supervisor-employee working relationship of team	3.9	1.87	0.05	0.54***	–0.26*	0.66***	–			
6. Authentic leadership (AL)	2.7	0.60	0.05	0.03	0.00	–0.14	–0.06	(0.96)		
			<i>0.11</i>	<i>0.11</i>	<i>–0.12</i>	<i>–0.05</i>	<i>0.03</i>			
7. Team virtuousness (TV)	4.3	0.65	–0.18	–0.09	0.05	–0.14	0.02	0.57***	(0.92)	
			<i>–0.20</i>	<i>–0.18</i>	<i>0.21</i>	<i>–0.29*</i>	<i>–0.19</i>	<i>0.30*</i>		
8. Team affective commitment (TAC)	3.3	0.56	0.18	–0.04	0.03	0.04	0.02	0.40***	0.59***	(0.89)
			<i>0.18</i>	<i>0.00</i>	<i>–0.22</i>	<i>0.14</i>	<i>0.06</i>	<i>0.44***</i>	<i>0.29*</i>	
9. Team potency (TP)	3.9	0.38	–0.14	0.02	–0.01	0.10	0.03	0.35**	0.42**	0.40** (0.87)
			<i>–0.18</i>	<i>0.02</i>	<i>0.01</i>	<i>0.09</i>	<i>0.02</i>	<i>0.27*</i>	<i>0.41**</i>	<i>0.33*</i>

(a) 1: nine or fewer years of schooling; 2: 10–12 years; 3: university degree; 4: graduate degree  
Cronbach Alphas are in parentheses.

Values in italics: the team scores for AL and TV (data collected at time 1), and for TAC and TP (data collected at time 2) were calculated with data from different team members.

\* p<0.05.

\*\* p<0.01.

\*\*\* p<0.001.

Considering that the absolute values of skewness regarding AL, team virtuousness, team affective commitment, and team potency (at the team-level) were less than 1 (mean: 0.28; range: from –0.43 to –0.08) and all absolute values of kurtosis were lower than 3 (0.42; from –0.13 to 0.8), the data appear to be approximately normally distributed (Curran, West, & Finch, 1996; Hair, Money, Samouel, & Page, 2007).

#### 4.4. Testing discriminant validity and common source effects

We carried out a series of dimension-level confirmatory factor analyses to examine whether the four variables of the study (at the team-level) capture distinct constructs versus common source effects. The four-factor model includes four indicators loading on the AL factor, five indicators loading on the team virtuousness factor, four items loading on team affective commitment, and six items loading on team potency. The model fits the data reasonably well (RMR: 0.03; CFI: 0.89; IFI: 0.89). A three-factor model, where AL and team virtuousness merge into a single factor, does not fit the data well (e.g., CFI: 0.70; IFI: 0.71). Another three-factor model, where team affective commitment and team potency merge into a single factor, also shows a poor fit (e.g., CFI: 0.81; IFI: 0.82). A second-factor model, where AL and team virtuousness merge into a single factor, and team affective commitment and team potency merge into another single factor, also does not fit the data well (e.g., CFI: 0.63; IFI: 0.64). The single factor model also does not fit the data satisfactorily (e.g., CFI: 0.53; IFI: 0.54). These findings provide support for the discriminant validity of AL, team virtuousness, team affective commitment, and team potency.

Following Podsakoff et al. (2003, 2012), we compared two models for examining the extent to which the results are due to common method variance. The first is the four-factor model referred to above. The second model is identical to the first except for the addition of a latent method variance factor comprising the four indicators representing the four variables of the study (items for each construct were not considered because, in such a case, total sample size would be smaller than the number of parameters, the parameter estimates not being unreliable). The models do not differ significantly ( $\Delta\chi^2_{(2)} = 0.50$ ;  $p = 0.78$ ), and several fit indices (e.g., RMR: 0.03) are equal for both models. Although this finding is consistent with researchers suggesting that aggregation helps minimize the common method variance problem (e.g., Frese & Zapf, 1988; Liao & Rupp, 2005; van Emmerik & Peeters, 2009), the limitations of the unmeasured latent method factor technique referred to previously (Podsakoff et al., 2012; Richardson, Simmering, & Sturman, 2009) must not be neglected. Therefore, we carried out an additional test using different team members to obtain scores on different variables.

Specifically, we randomly selected half of the team members in each team and used their ratings alternatively so that the paths (Fig. 1) between variables collected at the same time were based on different sources (Jung & Sosik, 2002; Riggs & Knight, 1994; Sosik, Avolio, & Jung, 2002). For example, regarding data collected at time 1, each team was randomly split so that AL scores were computed with data from half of the team members and team virtuousness scores were computed with data from the other half. The same procedure was used for computing scores on team affective commitment and team potency (collected at time 2). We did not use different raters for calculating scores on the four variables because, in several teams (n = 30), fewer than four team members participated in the study. As we show later (Fig. 1), the paths of our hypothesized model (as well as the explained variances of the mediating/dependent variables) are weaker when this procedure is adopted (different-sources procedure) than when the four variables are computed through data from all team members who participated in the study (same-source procedure).

Considering this finding, it would be appropriate to use data from different team members for testing our model. However, considering the small number of participants in several teams, such teams would be characterized with data from a single individual, a procedure not suitable for a team-level study. For this reason, we decided (a) to test our model with data emerging from the same-source procedure, and (b) to compare such findings with those emerging from the different-sources procedure. As we will show, although the paths appear inflated with data from the same-source procedure compared to the different-sources procedure, the relational pattern between variables is similar in both.

#### 4.5. Control variables

Age, tenure, and schooling were included as controls because studies have shown that they relate to several dependent and independent variables, at both the individual and collective levels (e.g., Foote & Tang, 2008). The mean length of the supervisor–employee working relationship was also included as control because it can influence, or even reflect, the quality of the leader–member exchanges, and thus impact the way that individuals relate with their leaders and describe them. Team size was also included for control because it associates with satisfaction, participation, commitment, cooperation, and performance (Akgün et al., 2007; Cosse, Ashworth, & Weisenberger, 1999; Guzzo, Salas, & Associates, 1995; LePine, Piccolo, Jackson, Mathieu, & Saul, 2008).

### 5. Findings

Table 4 presents means, standard deviations, and correlations at the team/aggregated level. For the four variables of the hypothesized model, we see correlations from when such variables emerge from the same-source and from the different-sources procedures (see Section 4.4). With a single exception (correlation between mean tenure and team virtuousness, different-sources procedure), team size, age, tenure, schooling, and the length of supervisor–subordinate working relationship do not relate significantly with any independent, mediating, or dependent variables. AL, team virtuousness, team affective commitment, and team potency intercorrelate positively, both when correlations emerge from the same-source and the different-sources procedures. However, with one exception (AL–team affective commitment), the correlations are lower when data from the different-sources procedure are considered.

Iacobucci et al. (2007, p. 140) argued that structural equation modeling (SEM) is preferable to regressions, even for small sample sizes. Based on a series of simulations, they stated that “even in the simplest data scenarios, structural equations are a superior technology to regressions and so should always be used”. Through a Monte Carlo simulation, under varying sample sizes and varying effect sizes, Goodhue, Lewis, and Thompson (2012) found that that PLS (an approach frequently considered as better for testing models with small sample sizes) “certainly is not a silver bullet for overcoming the challenges of small sample size or non-normality. At reasonable sample sizes, LISREL has equal power and greater accuracy” (see also Marcoulides & Saunders, 2006; Marcoulides, Chin, & Saunders, 2009). Thus, the SEM approach (via LISREL) was used for testing the hypothesized model. Considering the small sample size (Marsh & Hau, 1999), the composite measures for AL, team virtuousness, team affective commitment, and team potency were used (i.e., scores in the respective items were averaged to form a score measuring each construct). Control variables were included, and paths not significant were removed. When variables are measured with data from the same-source procedure, all hypothesized paths are significant, except the AL → team potency one, with the model fitting the data reasonably well (Fig. 1). When AL and team virtuousness, and team affective commitment and team potency are measured with different sources, all hypothesized paths are also significant, except the one for AL → team potency. However, in comparison with the findings from the same-source procedure, the paths and the explained variances are weaker.

Five alternative models were compared with the hypothesized model (Fig. 2), for both the same-source and the different-source procedures. The empirical patterns are similar in each: (a) paths that are (non)significant for one procedure are also (non)significant for the other procedure; (b) the RMR indices that are (un)acceptable for one procedure are also (un)acceptable for the other procedure. Considering these similarities, we next present the findings emerging from the same-source procedure (see Section 4.4). However, recall that in most cases the (significant) paths are weaker with data from the different-sources procedure than with data from the same-source procedure.

The first alternative model differs from the hypothesized one in that it does not include the path between AL and team potency (emerging as non-significant in the test of the hypothesized model). All paths of this alternative model are significant and the model fits the data reasonably well. Considering the change in  $\chi^2$  relative to the difference in degrees of freedom, this alternative model does not differ significantly from (although it is more parsimonious than) the hypothesized one. The second alternative model differs from the hypothesized one in that it does not include the path AL → team potency, and considers (a) team potency as antecedent of team affective commitment, and (b) team virtuousness as antecedent of team potency. Fit indices of this model are not satisfactory. The third alternative model differs from the hypothesized one in that it does not include the path AL → team potency, and considers team virtuousness as antecedent of AL. Fit indices are unsatisfactory. The fourth and fifth alternative models represent the complete reversion of the hypothesized model (Iacobucci et al., 2007). The fifth model differs from the fourth in that the former does not include the path team potency → AL. Both models differ significantly from, and their fit indices are poorer than, the hypothesized one.

The findings point out two relevant features. First: the second, third, fourth, and fifth alternative models do not fit the data satisfactorily. Second: the first alternative model (which differs from the hypothesized model only in that it does not include the

path AL → team potency) fits the data reasonably well, although without significant differences from the hypothesized model. Because this alternative model is more parsimonious than the hypothesized one, it is selected as the most appropriate to mirror the data.

## 6. Analysis, discussion, and conclusions

### 6.1. Main findings, limitations, and future studies

Most of the empirical and conceptual work investigating team potency has focused on its relationship with performance, little being known about the factors contributing to its development (Gibson & Earley, 2007; Lester et al., 2002). Our study helps to explain the processes. The findings suggest that AL predicts team potency via the mediating role of team virtuousness and team affective commitment. Authentic leaders nourish team virtuousness, thus leading teams to develop greater team affective commitment and, in this way, team potency. The path between AL and team potency, when team virtuousness and team affective commitment are controlled, is not significant. This finding is consistent with the literature suggesting that the impact of leadership on employees and team outcomes may be fully mediated by other variables (e.g., Walumbwa et al., 2010; Wang et al., 2005). Alternatively, one may speculate that the non-significance of the path results from the small sample size. Future studies should include a larger sample of teams to clarify this issue.

On the whole, the findings show that AL stimulates team potency, a variable related to team performance (Sivasubramaniam et al., 2002; Stajkovic et al., 2009). The findings enrich the literature about the effects of AL at the team level, and suggest that at least two mechanisms through which such effects operate are team virtuousness and team affective commitment. These constructs are underexplored in the literature, our study revealing that they deserve additional attention from researchers and practitioners. By combining AL and team virtuousness in the same model, our study also enriches the Positive Organizational Scholarship (POS) movement (Cameron & Spreitzer, 2012). Empirical studies including both constructs are, to our knowledge, non-existent.

The study is not without limitations, and future studies are necessary to investigate how and why AL impact team potency and other dependent variables (e.g., team performance). First, the team sample size is small, and the size of some teams (i.e., the number of participants of the same team) is also small. The study was carried out within a single organization. Although this condition controls for extraneous influences on the teams, it limits the generalizability of our findings. Future studies should collect a larger sample, with larger team sizes (with at least three members participating in the study), operating in different organizations. Testing if the findings are replicable in teams within different kinds of organizations and sectors is also recommendable. Future studies may also include the level of interdependence within teams (Stajkovic et al., 2009) as moderator. One may suspect that AL has stronger effects on team potency in highly interdependent teams than in less interdependent ones (Gibson & Earley, 2007). Our study does not allow testing such effects because the level of interdependence was not measured.

Second, although data about team affective commitment and team potency were collected two months after collecting data about AL and team virtuousness, the study does not allow an unquestionable determination of the hypothesized causality, and other causal links and explanations are plausible. For example, assuming that team potency is an enduring feature of teams, one may consider that teams with greater potency may develop dynamics that influence their leaders to behave more authentically (Sivasubramaniam et al., 2002). Although it is plausible that authentic leaders promote team virtuousness, it is also reasonable to suppose that team virtuousness promotes authenticity in leaders, or that virtuous teams reject non-authentic leaders and attract authentic ones. The fact that the reverse models (alternative models #4 and #5) have an unsatisfactory fit does not mean that reverse influences do not occur. Future studies may use a longitudinal design for clarifying these issues.

Third, the study included only two mediating variables, but others are plausible. For example, it is possible that authentic leaders develop meaningful missions and visions, thus leading teams to develop a sense of purpose in what the team does (George, 2003; Webber, 2002) and building a collective identity, which in turn leverages team potency (Shamir et al., 1993). Authentic leaders may also support intrateam psychological safety, goal clarity (Akgün et al., 2007), and collective hope, optimism, and resilience (Avolio, Gardner, Walumbwa, Luthans, & May, 2004; Walumbwa et al., 2011), thus increasing team potency. They may also encourage team affective tone (Avolio, Gardner, Walumbwa, Luthans, & May, 2004; Ilies et al., 2005), thus promoting team potency (Gibson & Earley, 2007). Future studies may include such variables as mediators.

Fourth, considering that authentic, ethical, and transformational leadership constructs share some commonalities (Walumbwa et al., 2008, 2011), future studies should include ethical and transformational leadership for control. Fifth, instead of focusing on team potency (i.e., generalized team efficacy), future studies may focus on task-specific beliefs. It cannot be taken for granted that team efficacy beliefs across different tasks are the same (Gibson & Earley, 2007). Sixth, some aggregation indices are modest (mainly ICC2; Table 3), a finding that calls attention to the question of homogeneity/heterogeneity within teams and the homogeneous/heterogeneous effects of leaders upon team members (Waldman & Yammarino, 1999). Future studies may clarify this issue by, for example, adopting a shift-referent composition model for team affective commitment and measuring team potency through “open discussion” (Gibson & Earley, 2007), instead of a survey.

Seventh: two items from the team virtuousness' original measurement instrument (one referring to trust, another to forgiveness) were removed because of psychometric reasons. We found that the correlations between the scores computed with the original items versus the scores emerging from the remaining items were very high, which suggests that the impact of removing items seems not to be empirically problematic. However, one cannot dismiss the possibility that underrepresentation of both dimensions (trust and forgiveness) on the team's virtuousness construct (Cooper & Richardson, 1986) may emerge from

such a truncation of data. Future studies should deal with this issue through securing similar representations of all dimensions on the team's virtuousness construct.

Eighth: future studies may include team performance as dependent variable. This would allow empirically testing a theoretically assumed, although not yet empirically validated, relationship between AL and team performance.

Finally, our study corroborates the findings of Podsakoff et al. (2012), who report evidence (covariation tends to be higher with data collected in the same source) showing that method biases can significantly influence the covariation between latent constructs. Considering the small number of individuals who (in several teams), participated in the study, it was not possible to measure the four variables with data from different individuals; rather, the different-sources procedure was used only for data collected at the same time. Moreover, the team's scores for several teams were based on data from a single team member, a procedure less than ideal. Future studies should collect data about all variables, even those measured at different moments, from different sources, and use at least two or three different individuals to measure each variable.

## 6.2. Implications for management

In spite of the above limitations, the study suggests that the AL and team virtuousness constructs interrelate, and that both may advance team affective commitment, team potency, and team performance (Stajkovic et al., 2009). Team virtuousness may be developed if leaders take several steps (Cameron, Mora, Leutscher, & Calarco, 2011; Rego et al., 2010, 2011). First, leaders may allow team members to experience a sense of positive purpose in their work, with positive consequences for work engagement and performance (Bunderson & Thompson, 2009). Bill George, author of *Authentic leadership* (2003), and former CEO of Medtronic, observed that “we need leaders who lead with purpose, values, and integrity; leaders who build enduring organizations, motivate their employees to provide superior customer service, and create long-term value for shareholders” (p. 9). He provided a good illustration of how to develop a virtuous sense of purpose among employees: inviting patients to share their experiences with Medtronic employees, allowing them to understand how important their work is for improving peoples' lives.

Second, leaders may create and sustain optimism, even when major challenges and difficulties are faced. Possible actions (Luthans et al., 2007) are (a) promoting employees' leniency for the past, (b) appreciating the present, (c) seeking opportunities for the future, and (d) maintaining realistic and flexible perspectives. Promoting realistic and flexible optimism is necessary for avoiding “Pollyanna” effects that lead teams to deal with organizational problems and opportunities without realism (Rego, Sousa, Marques, & Cunha, 2012b).

Third, leaders must act in a respectful, honest, trustful, courteous, and compassionate way, cultivating their credibility, as well as trust and social capital within the team. George (2003) suggested that by “leading with heart”, leaders are more able to establish closer relationships with colleagues, thus building teams whose collective business knowledge is greater than that of the leader.

Fourth, leaders should develop a strong focus on obtaining results and avoiding errors, together with a capacity to forgive (honest) errors and learn from them, encouraging psychological safety within the teams and helping the teams to be creative and improve continuously (Edmondson, 1999, 2008; Mainemelis, 2010). Edmondson (1999, 2008) provided several examples of how high standards of performance may be combined with a culture of forgiveness and learning from mistakes (e.g., introducing “failure parties” to honor intelligent experiments that failed). By fostering a combination of high accountability for meeting demanding goals with high psychological safety, team leaders may help teams to develop, and work within, “learning zones”. In such teams, (a) (honest) mistakes are assumed and used for improving processes and products/services, (a) team members know that their ideas are welcome and thus feel freer to propose creative and innovative solutions, (c) people feel safe to take risks in a context of clear and disciplined procedures and (d) improvement is continuously promoted, across all areas and levels.

Boosting team virtuousness may not only promote team affective commitment and team potency, but also support team members' positive affect, and engagement (Cameron et al., 2011), elevating the teams' performance. Such positive impact may emerge as the result of three kinds of effects (Cameron et al., 2011). *Buffering effects* mean that team virtuousness buffers the team from the negative effects of trauma or distress by enhancing resiliency, solidarity, and a sense of efficacy. *Amplifying effects* mean that team virtuousness facilitates team members' positive emotions and social capital. *Heliotropic effects* represent the inherent tendency of living systems toward positive energy and away from negative energy. Thus, virtuous teams cultivate “positive energy” among team members, and such positive energy elevates performance (Cameron et al., 2011), thus giving rise to “productive energy” teams, where high emotion and mental alertness match high activity levels, speed, and stamina (Vogel & Bruch, 2012).

Indirectly, the study also suggests that (a) selecting leaders with authentic features and (b) implementing training and development actions aimed at increasing AL (Avolio & Gardner, 2005; Avolio, Walumbwa, & Weber, 2009; Harvey, Martinko, & Gardner, 2006) may have a positive impact on team potency and performance. Considering that virtuous climates may also have a positive impact on performance and employee well-being (Cameron et al., 2004, 2001; Rego et al., 2010, 2011), promoting AL may also produce such positive effects through the mediating role of team virtuousness.

## 6.3. Concluding remarks

The study responds to a call by researchers who have argued that more empirical research is necessary to understand the mechanisms through which authentic leaders influence effective employees' behaviors and to expand the nomological network for AL (Avolio & Mhatre, 2012; Gardner, Coglisier, Davis, & Dickens, 2011). The study also enriches the literature on team potency, considering that little is known about the factors promoting such an important variable for team performance (Gibson & Earley,

2007; Lester et al., 2002). By showing how AL and team virtuousness may promote team potency, we also have taken an additional critical step toward helping organizations and their leaders to boost their teams' effectiveness.

As Cameron et al. (2004, p. 794) recommended, investigation of virtuousness in organizations represents an important opportunity in the fields related to the “highest human potential, ennobling qualities, and transcendent purposes”. However, concepts like authenticity and virtuousness have been underconsidered and undervalued, in academia and among practitioners. Although scholars themselves start putting such topics in the limelight, running the risk of being “accused” of naïveté, more empirical research is necessary for legitimizing them, in both the scholarly and practitioner communities (Cameron & Winn, 2012). Without empirically demonstrated “pragmatic outcomes” (Cameron et al., 2004, p. 770) AL and virtuousness are less likely to capture attention in both communities. Considering that team affective commitment and team potency promote team performance, our study suggests that acting authentically and fostering team virtuousness, leaders are more able to promote pragmatic outcomes, in which team potency (a kind of “soft criterion” of performance; Yammarino, Dionne, Schriesheim, & Dansereau, 2008) is such an outcome.

This study contributes to the team leadership and POS literatures (Cameron & Spreitzer, 2012). We do not suggest that the negative side of organizational life should be understudied and, in consonance with the POS movement, we acknowledge that the *positive* may produce the *negative* (e.g., Bunderson & Thompson, 2009), and that the *negative* may produce “some of the greatest triumphs, most noble virtues, and highest achievements” (Cameron et al., 2011, p. 289; see also Seligman, 2011). Rather, we agree with Cameron et al. (2011, p. 289) who argue that “[c]ognitively, emotionally, behaviorally, physiologically, and socially, evidence suggests that human systems naturally prefer exposure to the positive, so it is expected that organizational performance would be enhanced by positive practices.” Potent teams may be a critical path leading toward organizational positivity.

## Acknowledgments

Financial support from Fundação para a Ciência e Tecnologia (PTDC/IIM-GES/4455/2012).

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