



# Opening the black box of teacher leader development: An investigation of teachers' motivation to lead

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## ABSTRACT

This article introduces the concept of teachers' motivation to lead. Using a sample of  $N = 652$  German teachers and structural equation modeling, we examine whether teachers' affective motivation to lead affects their leadership intentions. Leader self-efficacy, leadership experience, and personal characteristics are relevant predictors of teachers' motivation and intentions. Male teachers show a higher affective motivation to lead than female teachers, which is reflected in stronger leadership intentions. The findings underscore the significance of integrating leadership experience into the initial stages of teacher education. In order to bring more women into leadership positions, interventions that address motivational aspects seem appropriate.

## 1. Introduction

School leaders play a crucial role in school effectiveness, improvement and change (Day & Simmons, 2013; Leithwood et al., 2020). However, the shortage of qualified school leaders globally is a significant challenge (Snodgrass Rangel, 2018; Montecinos et al., 2022). In addition, women are under-represented in school leadership positions worldwide (Martínez et al., 2021). These issues often stem from an unattractive position and often inadequate qualification paths for new and existing leaders (Boyce & Bowers, 2016; Farley-Ripple et al., 2012). Despite a substantial body of literature on school leader and leadership development, the lack of models and systematic empirical evidence hinders progress in both practice and research. Most studies in educational research focus on formal training, mainly aimed at training aspiring or new school leaders (Versland, 2016), and focusing on specific leadership techniques (Gümüş et al., 2021), often without providing a clear and useful framework for the qualitative professional development of school leaders (Daniëls et al., 2019). Consequently, in a recent review Daniëls et al. (2019, p. 119) state: "Research on how effective leadership development takes place is still in its infancy."

A comprehensive understanding of leadership development, however, extends beyond a singular leadership theory and training in associated behaviors; it encompasses long-term and complex developmental processes throughout individuals' lives (Day & Dragoni, 2015; Liu et al., 2021). As noted by Day et al. (2014), it is important to distinguish between leader development and leadership development in this regard. Thus, Liu et al. (2021) state that leader development involves expanding one's capability to lead in complex and varied situations across the lifespan. It encompasses multiple developmental stages and diverse contexts. Leader development addresses psychological processes that occur within individuals through learning and is about intrapersonal

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competencies (Wallace et al., 2021). In contrast, leadership development focuses on expanding the collective capacity in social relationships to engage effectively in leadership roles and processes (McCauley & Palus, 2021). It refers to the collective development of interpersonal competence (Day, 2000) and requires interaction in at least a social dyad (Wallace et al., 2021). The underlying agentic view suggests self-accelerating spirals of leader and leadership development (Avolio & Hannah, 2008; Day & Dragoni, 2015; Day & Sin, 2011; DeRue et al., 2009): Leadership experiences bring about changes in individuals and influence the development of leaders, which in turn affects the exercise of leadership (and vice versa).

The extent of such spirals depends on various contextual conditions and antecedents, with personality (e.g., extraversion), self (e.g., self-efficacy), and learning-related (e.g., goal orientation) factors playing an important role (Vogel et al., 2021). Specifically, self-regulatory processes are believed to support leader and leadership development (Day & Sin, 2011). For instance, Avolio and Hannah (2008) propose that the effective development of leaders and leadership depends on an individual's developmental readiness, which includes self-efficacy, motivation, and the ability to develop. Despite numerous theoretical assumptions and empirical findings, a coherent theory of leadership development is still lacking (Day et al., 2021). However, Chan and Drasgow's (2001) leader development model, which introduces the motivation to lead (MTL) construct, appears promising as it bridges the gap between leader and leadership (Kwok et al., 2021; Ugwuanyi & Pietsch, 2024) demonstrated that). MTL quantifies the type and degree of motivation individuals have to engage in leadership. It is an "individual-differences construct that affects [an individual's] decision to assume leadership training, roles, and responsibilities and (...) his or her (...) intensity of effort at leading (...) and persistence as a leader" (Chan & Drasgow, 2001, p. 482). Consequently, it is considered a proximal leader variable affected by leader self-efficacy and various (more or less) stable leader antecedents, such as cultural values, personality traits, and demographic characteristics (Badura et al., 2020).

Although MTL has three dimensions (affective/identity, social-normative, and non-calculative), the affective component is particularly important for leader identity development, leadership emergence, leadership behaviors, and leadership effectiveness (Badura et al., 2020). High scores on this dimension indicate enjoyment of leadership and are associated with self-perception as a leader, outgoing and sociable traits, value for competition and achievement, prior leadership experience, and confidence in one's own leadership abilities (Chan et al., 2000). This positive affective orientation motivates individuals to invest more time and effort into leadership, leading to greater effectiveness (Badura et al., 2020). Particularly, affective MTL is a strong predictor of leader emergence (Badura et al., 2022) and the pursuit of leadership careers, with intentions (i.e., plans of action in pursuit of behavioral goals Ajzen, 1985) to assume leadership positions are being the first indicators of career initiation and continuation (Stiehl et al., 2015; Lent et al., 1994), because intentions are considered "the most proximal psychological precursor of actual career choice" (Lechner et al., 2018, p. 59).

Unlike other theories, such as Judge et al.'s (2009) Leader Trait Emergence Effectiveness Model, Chan and Drasgow's (2001) leader development model, further, explicitly includes a change component consistent with social cognitive (career) theory (Bandura, 1997; Lent et al., 1994). Past leadership experiences shape an individual's leader self-identity and determine their competence and success in a leadership role (Guillén et al., 2015). From the perspective of social cognitive (career) theory, self-efficacy beliefs and motivation derived from past work experiences strongly predict career choices and ultimately observable outcomes (Lent et al., 1994). Accordingly, a self-reinforcing cycle of leadership experiences and leader identity formation is hypothesized and considered particularly important for both leader and leadership development (Machide & Schaubroeck, 2011). Consequently, Schyns et al. (2023) summarize the evidence base on MTL as follows: "There is little doubt about the relevance of the concept of MTL to leadership and leadership development, and this is particularly true of affective MTL". However, Chan and Drasgow's (2001) model and its relevance for school leader and leadership development have not been explored in educational research.

Against this backdrop, we examine whether this model can be applied to educational research and whether the findings from other disciplines, as synthesised in Badura et al.'s (2020) meta-analysis, can be replicated in relation to teachers. We are particularly interested in whether MTL is associated with an increased intention to take on leadership roles and responsibilities in schools. For the purpose of this study, data from Germany is utilised, as the country is experiencing a shortage of both teachers and school leaders (Seeliger & Håkansson Lindqvist, 2023; Tulowitzki et al., 2018)—a phenomenon also observed in many other European countries (Gorard et al., 2024; Montecinos et al., 2022).

## 2. Literature review

### 2.1. Teachers' intentions to lead

Both social cognitive career theory (SCCT; Lent et al., 1994) and theory of planned behavior (TPB; Ajzen, 1985, 1991) assume that careers can be planned and that intentions are an immediate, direct antecedent of actual behavior. Central to both theories is the assumption that self-efficacy is important in forming intentions, and that intentions probabilistically lead to behaviors and outcomes. This also applies to leadership roles in schools (Reeves & Lowenhaupt, 2016). Intentions are specific to target, action, and context (Ajzen, 2020) and are seen as indicators of effort and planning for behavior (Ajzen, 1991). Leadership intentions, thus, refer to the aspiration for specific leadership actions (Lent et al., 1994). Since intentions are context specific, for leadership in schools this means that intentions are directed at leadership actions to be taken in the school or the education system as a whole.

About 25 % of the variance in actual behavior can be explained by intentions (Ajzen, 2020). This also applies to leadership aspirations and intentions and their relationship to leader emergence (Netchaeva et al., 2022). Leader emergence is defined "as the process through which an individual becomes influential to relevant others in a manner that involves the implicit or explicit granting of the leader role" (Badura et al., 2022, p. 2070), with leadership intention being the volition that precedes the actions people take to

assert their identity as a leader (Kennedy et al., 2021). Research on teachers' aspirations and intentions mainly focuses on turnover and retention intentions (DeAngelis et al., 2013; van Borre et al., 2021). However, the available studies on leadership careers show that leadership intentions are generally not strong among teachers (Guihen, 2019; Klemenz & König, 2023; Watt & Richardson, 2008). Most teachers plan to exclusively teach throughout their careers (Wat et al., 2014), but there are teachers who aspire to school leadership roles early in their careers (Reeves & Lowenhaupt, 2016), and related aspirations are often present before entering college (Wolniak, 2023).

However, whether these intentions become reality and a leader identity is formed over time depends on contextual, institutional, and personal factors (Walker & Kwan, 2009). For example, positive role models at school (Welch & Hodge, 2018), gender (Wilson et al., 2006), and interest in taking on leadership responsibilities (Elton-Chalcraft et al., 2018; Hancock et al., 2006; Walker & Kwan, 2009) influence the desire to become a school leader and the emergence of educational leaders. In this regard it is important to bear in mind, that the formation of a leader identity is a lifelong developmental process that occurs in various contexts (Liu et al., 2021). This applies to educational leaders as well (Gronn, 1999), where self-awareness as a leader is crucial (Hall, 2004), especially during times of accession (Gronn & Lacey, 2004) when teachers are positioning themselves for leadership positions (Gronn, 1999). Accordingly, a complex developmental process of reflection and learning takes place during this phase, requiring both socialization into a new community of practice and the formation of a new role identity as an educational leader (Cunneen, 2021; Gronn & Lacey, 2004).

## 2.2. Motivation to lead

### 2.2.1. The construct

Thus, it is argued that leadership programs and training should focus on building aspirants' leader identities (Day & Harrison, 2007; Waldman et al., 2013). This is generally "an individual's self-definition based on a relatively stable set of meanings associated with a particular role" (Miscenko et al., 2017, p. 605) and therefore, in relation to potential leaders, a state in which an individual incorporates the leader role into their self-concept (DeRue et al., 2009). As Day et al. (2009) note, such an identity is important in the leader and leadership development process because it is thought to stimulate and motivate individuals to seek developmental experiences and opportunities to practice relevant leadership behaviors. Consequently, theory suggests that individuals interested in or performing leadership roles work towards developing a leader identity as a central part of their self-concept (Guillén et al., 2015).

Consistent with such an agentic view, and historically grounded in the literature of leadership motive patterns (Schyns et al., 2023), MTL has been defined as a motivational state that influences the intensity and persistence of an individual's efforts to take on leadership roles and responsibilities, to engage in leadership training and to persist as a leader (Chan & Drasgow, 2001). As Stiehl et al. (2015) note, particularly in the context of leader emergence, the motivational dimension of getting ahead can be recognised as important, and the construct of MTL can be seen as an explicit operationalisation of this. MTL was originally created as a three-dimensional construct consisting of affective/identity, social-normative and non-calculative MTL, with the first indicating enjoyment of leadership, the second understanding leadership as a privilege and duty, and the third viewing leadership positively despite the absence of personal benefits (Badura et al., 2020).

In particular, individuals who score high on affective MTL strongly strive to develop a leader identity (Guillén et al., 2015) and are more likely to develop in a formal leadership training program due to these individuals' preferences for growth, development, and risk-taking (Kwok et al., 2021). As Unsworth et al. (2018) show, such individuals often have and pursue clear goals for advancement to higher positions and authority and see themselves as capable of assuming leadership roles, with affective MTL often forming the core of their leader identity. The development and strength of a corresponding MTL generally results from three main individual factors: personality traits, values, and leader self-efficacy (Badura et al., 2020; Chan & Drasgow, 2001), although darker aspects of personality, such as narcissism and machiavellianism, may also play a role (Kennedy et al., 2021; Prundeanu et al., 2021; Schyns et al., 2023). As a dynamic state, MTL is also viewed as an attribute that can change over time based on leadership experiences, resulting in self-accelerating spirals of leader and leadership development (Kwok et al., 2021).

### 2.2.2. The antecedents

Already during the generation of the MTL construct, Chan et al. (2000, 228) stated that individuals with high affective MTL "tend to be outgoing and sociable (i.e., are extraverts), value competition and achievement (i.e., are vertical collectivists), have more past leadership experience than their peers, and are confident in their own leadership abilities (i.e., have high self-efficacy)". This is supported by empirical evidence. However, other empirical findings suggest that individualism is a stronger predictor of affective MTL than collectivism, with vertical individualism—the extent to which individuals strive to be different and value special status (Sigelis et al., 1995)—being the most relevant cultural value (Badura et al., 2020). Individualistic values, prevalent in Western countries, emphasize independence and self-interest. Collectivistic values, found in most Asian countries, emphasize collective values and contributions to society (Fatehi et al., 2020). Singelis et al. (1995) note that individual cultural values are never pure and stable but a mixture of both, resulting in different cultural profiles at the individual level.

It has been shown that agentic personality traits, specifically extraversion and openness to experience, significantly influence affective MTL. Among these traits, extraversion has a stronger impact than openness (Badura et al., 2020; Chan & Drasgow, 2001; Kennedy et al., 2021; Tanaka et al., 2024). Individuals high in openness to experience are typically curious, imaginative, and creative, while those low in this trait prefer routines, are more cautious, and may be perceived closed minded (Du et al., 2019; Costa & McCrae, 2017; Ickles, 2009). Conversely, individuals high in extraversion tend to derive positive emotions from social interactions and may be regarded as people-oriented, outgoing, and energetic (Ashton et al., 2002; Ickles, 2009). Affective MTL serves as a significant mediator between these personality traits and leader emergence, as well as between other aspects related to leadership such as leadership

practices and outcomes (Badura et al., 2020; Stiehl et al., 2015). This is of particular interest with regard to school leadership as research suggests that leader personality traits play a role in school outcomes, with openness having a stronger effect on the implementation of transformational leadership compared with extraversion (Zadok et al., 2024). And furthermore, principals with extremely high extraversion scores may impede innovation in schools by dominating social interaction (Benolie, 2021).

Leader self-efficacy is a key factor in MTL. Several studies have shown that leaders' self-efficacy is an important antecedent, particularly for affective MTL (Badura et al., 2020; Chan et al., 2000; Hendricks & Payne, 2007), suggesting that in order to want to lead, an individual must feel capable of leading (Schyns et al., 2020). Additionally, there are strong correlations with traits like openness and extraversion (Badura, 2020) as well as cultural values (Chan & Drasgow, 2001). Leaders' self-efficacy heavily relies on previous positive leadership experiences (Badura et al., 2020; Bandura, 1997; Lent et al., 1994; Syvertsen et al., 2024). This creates a mutually reinforcing spiral between leaders' self-efficacy and leadership effectiveness (Lindsley et al., 1995; Machida & Schaubroeck, 2011). Bandura (1997) introduced the concept of self-efficacy, which is a belief in one's ability to handle challenges. It has proven to be a significant characteristic for motivation and performance in numerous studies. Self-efficacy expectations can be differentiated with regard to various domains, i.e. challenging situations in different activity areas. The construct of leaders' self-efficacy has become established for coping with leadership tasks, which Hannah et al. (2008, p. 670) summarizes as the belief of leaders in their capabilities to "organize the positive psychological capabilities, motivation, means, collective resources, and courses of action required to attain effective, sustainable performance across their various leadership roles, demands, and contexts".

Longitudinal research suggests that leadership experiences can impact affective MTL directly, with low affective MTL individuals benefiting the most, and leader self-efficacy playing a major role in this relationship (Kwok et al., 2021). Gender differences are also noteworthy, as women tend to have lower affective MTL than men, partly influenced by traditional gender role beliefs, limited same-sex role models, and lack of awareness regarding gender inequality (Elprana et al., 2015).

### 2.2.3. The outcomes

In terms of impact, affective MTL was found to have the strongest effect on leader emergence, transformational leadership (leadership for change), and leadership effectiveness among the three MTL dimensions (Badura et al., 2020). Badura et al. (2020) justify this by arguing that this aspect of MTL is closely associated with agency because individuals scoring high in this dimension have an intrinsic interest in leadership and tend to identify with a role that is prototypically agentic. On the other hand, the other two facets of MTL are more associated with leading out of necessity or selflessness. As a result, affective MTL is more strongly linked to intrinsically motivated behavior compared with the other two MTL dimensions (Guillén et al., 2015). According to Badura et al.'s (2020) meta-analysis, the correlations of affective MTL with leader emergence are  $r = 0.22$ , with transformational leadership  $r = 0.30$ , and with leadership effectiveness  $r = 0.23$ . Regarding mediating effects, the results are inconclusive. Although several studies suggest that affective MTL acts as a mediator variable (e.g., mediating between leader self-efficacy and leader emergence and effectiveness), such a relationship is not found in Badura et al.'s (2020) meta-analysis. Nevertheless, more recently, Kennedy et al. (2021) demonstrated that affective MTL significantly mediates the relationship between personality and an individual's leadership intentions. However, this study did not consider the aspect of leader self-efficacy.

### 2.3. Conceptual framework and research hypotheses

Based on the literature review, we constructed the conceptual model shown in Fig. 1 and tested the following hypotheses:

H1: Teacher personality directly affects their leader self-efficacy.

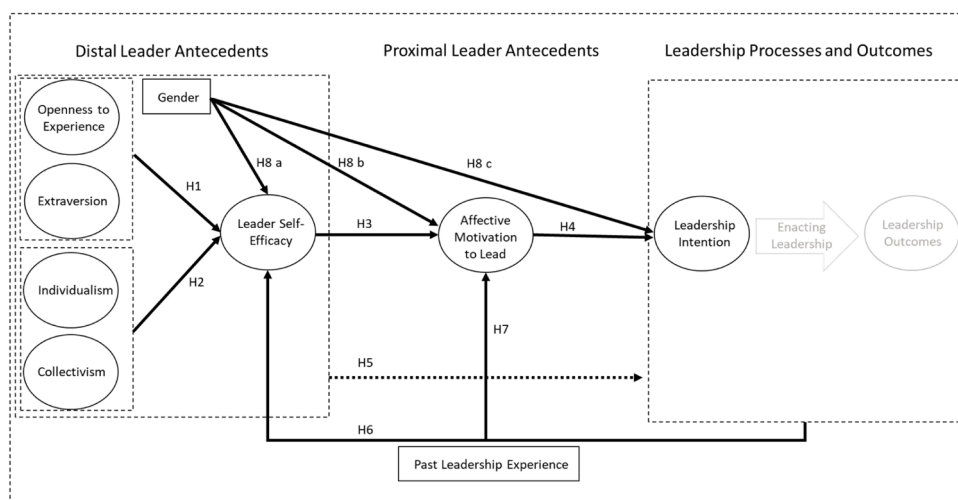


Fig. 1. Conceptual model of teacher leader development.

H2: Teacher personal cultural values directly affect their leader self-efficacy.

H3: Leader self-efficacy affects affective MTL.

H4: Teacher affective MTL affects their leadership intention.

H5: Leadership antecedents, that is, personality, cultural values, gender, and leader self-efficacy, affect leadership intention mediated by affective MTL.

H6: Past leadership experience, that is, leadership roles to date, affects leader self-efficacy.

H7: Past leadership experience, that is, leadership roles to date, affects affective MTL.

H8a, b, c: Gender affects (a) leader self-efficacy, (b) affective MTL, and (c) leadership intention.

### 3. Methods

#### 3.1. Context

In our study, we use teacher data collected in November 2023 across Germany. Based on Hofstede's cultural dimensions, Germany is characterized by low power distance and indulgence, moderate levels of masculinity, uncertainty avoidance, and long-term orientation, as well as a high degree of individualism (Hofstede et al., 2010). Accordingly, both society in general and the workplace are primarily characterised by attributes such as agency, freedom of speech, and high autonomy (Croucher et al., 2014). It is notable that, with regard to the self-assessment of personal agency, no differences can be found between men and women in Germany (Kosakowska-Berezecka et al., 2023). However, the European Gender Equality Index (European Institute for Gender Equality, 2025) shows that, with a maximum score of 100, Germany only reaches 70 points. The main weaknesses lie in areas such as knowledge, power, and time. Hence, there is a noticeable gender-based segregation in education and training, political and economic decision-making power, as well as in the allocation of time spent on care, domestic work, and social activities. This phenomenon is also evident in the context of teachers and teacher education (Cramer et al., 2021; Tulowitzki et al., 2023): While the majority of teachers are women, a disproportionate number of leadership positions in schools are held by men, particularly in secondary schools where salaries are higher than in primary schools.

This must be considered against the background, that, in Germany, principals and other school leaders are typically teachers who possess basic pedagogical qualifications (Tulowitzki & Kruse, 2020). These individuals are not specifically trained for responsibilities beyond their regular teaching duties. Moreover, there are no national standards to professionalise school leaders. As a result, a comprehensive, standardised, and systematic qualification and professionalisation programme for school leaders does not currently exist (Pietsch et al., 2025b). In principle, there is a lack of systematic programmes for teachers without formal leadership roles who wish to take on leadership responsibilities or aspire to become principals (Johannmeyer & Cramer, 2023). Although most federal states have implemented mandatory measures for prospective school leaders (Tulowitzki et al., 2019), a significant proportion of school leaders have not undergone basic, systematic, and specific training for the role before assuming their position. Currently, fewer than 60 per cent of all acting principals in Germany have received any official preparation for their position, with most programmes lasting fewer than 20 days (Tulowitzki et al., 2019). Of these 60 per cent, only about one in eight principals has completed a university-level qualification, typically pursued part-time (Tulowitzki et al., 2023). All other principals in Germany have either been trained exclusively at state institutes or have received no qualification at all.

#### 3.2. Sample

The participants of our study were recruited ad-hoc through panel providers Bilendi and Norstat—both of which comply with ESOMAR's codes and guidelines for online access panels—and given personalized access to an online questionnaire. Both panels are nationally representative with regard to the resident population in Germany, starting from the age of 18. The study was conducted with informed consent and in accordance with the applicable rights under the general data protection regulation. All participants were informed that participation was voluntary and that their anonymized data would be protected in accordance with the legal requirements. A small financial incentive was provided through the field service providers upon questionnaire completion. A total of  $N = 1144$  teachers were identified and invited to participate, of whom  $N = 652$  completed the questionnaires (completion rate: 57 %).

Of our sample, 61.7 % of the teachers were female. The mean age was 44.5 years, with a standard deviation of 11.9 years. On average, they have been in the teaching profession for 15 years ( $SD=10.8$ ). Here, 41.6 % of the teachers had a functional position in their school. Further, 22.4 % worked in private schools and 77.6 % in public schools. Regarding educational levels according to the International Standard Classification of Education (ISCED; UNESCO Institute for Statistics, 2012), 25.5 % worked in ISCED 1 schools (primary level), while 74.5 % worked in secondary, postsecondary, or special education schools (nonprimary level). The sample is, thus, almost representative of the population of teachers in Germany in the 2023/2024 school year, with the proportion of teachers working at private schools being overrepresented (DESTATIS, 2024a, 2024b).

Of these schools, 12.1 % were located in rural areas (population <5000); 22.7 % in a small town (population 5000 to approximately 20,000); 25.8 % in a small city (population 20,000 to approximately 100,000); and 29.4 % in a large city (population 100,000 to approximately 1 million); for 11.3 %, location data were missing. On average, 592 students were enrolled in the participants' schools, with a standard deviation of 629 and a 5 to 95th percentile range of 60 to 1635 students. In 21.8 % of the schools, >50 % of the students came from socially disadvantaged families; and in 23.9 % of the schools, more than half of the students had a migrant background.

### 3.3. Measures

**Affective MTL** (MTL,  $\omega = 0.901$ ). Four items from Chan and Drasgows' (2001) affective MTL were used to measure the extent to which teachers enjoyed leadership roles and saw themselves as leaders (Badura et al., 2020). Items were answered on a 4-point scale (1 = does not apply to 4 = applies). Example items are: "I usually want to be a leader in the groups that I work in."; "I am seldom reluctant to be the leader of a group."

**Personality Traits.** Chan and Drasgow (2001) have assumed that a person's big five traits influence their MTL. Following Badura et al.'s (2020) meta-analysis, especially a person's openness to experience and extraversion affect their affective MTL. Accordingly, we surveyed these two dimensions using items from the German (extra) short-version of the Big Five Inventory (BFI-(X)S, Rammstedt et al., 2025; Rammstedt & John, 2005).

- **Openness to Experience** (OP-E,  $\omega = 0.691$ ). Four items were used to assess the extent to which teachers are open-minded, curious and creative thinkers (Du et al., 2019). Items were answered on a 4-point scale (1 = does not apply to 4 = applies). Example item: "I am curious about many different things."
- **Extraversion** (EXTR,  $\omega = 0.738$ ). Four items were used to measure teachers' assertiveness and tendency to experience positive emotions through increased sociability and enjoyment of social interactions (Ashton et al., 2002). Items were answered on a 4-point scale (1 = does not apply to 4 = applies). Example item: "I am outgoing, sociable."

**Cultural Values.** Theory posits that individualized cultural values influence ones' MTL, with individualism and collectivism being the only issues in the discussion (Badura et al., 2020). Originally, a one-dimensional construct with two opposite ends of a continuum (individualism to collectivism), measurement models have increasingly differentiated, first into two (individualism vs. collectivism), then four (horizontal individualism vs. vertical individualism vs. horizontal collectivism vs. vertical collectivism) dimensions (Fatehi et al., 2020). We followed the two-dimensional approach as proposed by Singelis (1994), using items that assess cultural values in the workplaces developed by Singelis et al. (1995).

- **Individualism** (INDI,  $\omega = 0.644$ ). Three items were used to assess the cultural value where teachers see themselves as independent (Badura et al., 2020). The scale combines one item for horizontal individualism (H-I) and two for vertical individualism (V-I). Hence, high scores tend to indicate that prestige and hierarchy are important to respondents. Items were answered on a 4-point scale (1 = does not apply to 4 = applies). Example items are: "It is important that I do my job better than others" (V-I); "When I succeed, it is because of my abilities" (H-I).
- **Collectivism** (COLL,  $\omega = 0.626$ ). Three items were used to assess the cultural value where teachers see themselves as part of a collective (Badura et al., 2020). The scale combines two items for horizontal collectivism (H-C) and one for vertical collectivism (V-C). Hence, high scores tend to indicate that respondents value sociability and collaboration. Items were answered on a 4-point scale (1 = does not apply to 4 = applies). Example items are: "I feel good when I cooperate with others" (H-C); "I usually sacrifice my self-interest for the benefit of my group" (V-C).

**Leader self-efficacy** (L\_SE,  $\omega = 0.796$ ). To measure leader self-efficacy, we adopted the approach outlined by Hannah et al. (2008) and Ugwuanyi and Pietsch (2024). Accordingly, we developed a composite measure that incorporates items reflecting both leader action self-efficacy and leader self-regulatory self-efficacy. Consequently, two items from Chemers et al.'s (2000) and one from Hoyt et al.'s (2003) leader self-efficacy scales were adapted to measure a teacher's belief that they are capable of being successful in a leadership role. Items were answered on a 4-point scale (1 = does not apply to 4 = applies). An example item for leader action self-efficacy is: "Even in the most difficult situations, I am able to encourage other teachers to do their best."; An example item for leader self-regulatory self-efficacy is: "I am confident in my ability to effectively lead a group of teachers at any given time."

**Leadership Intention** (L\_IN,  $\omega = 0.949$ ). To measure teachers' leadership intentions, we followed the concept of Fritz and von Knippenberg (2017). Therefore, two items from Gray and O'Brien's (2007) career aspirations scale and two from Fritz and van Knippenberg's (2018) leadership aspirations scale were used to measure teachers' intention to apply for a (higher) leadership position (Gray & O'Brien, 2007) and, thus, their career-related interests and goals (Rojewski, 2005) and striving for potential leadership roles (Fritz & van Knippenberg, 2018). Items were answered on a 4-point scale (1 = does not apply to 4 = applies). Example items are: "I would like to obtain a (higher) leadership position in the school (system)."; "I would like to be in a position of greater responsibility and influence in the school (system)."

As Becker (2005) have previously demonstrated, control variables should be carefully discussed and authors need to justify their validity based on prior theory. According to Badura et al. (2020), two demographic characteristics are relevant antecedents of leader self-efficacy and MTL: leadership experience and gender. Moreover, gender directly influences leader self-efficacy (Dwyer, 2019), MTL (Badura et al., 2020), and leadership aspirations (Fritz & van Knippenberg, 2020). Hence, we controlled for these variables. Gender was modeled using a binary-coded item (0=female, 1=male). We measured leadership experience by using one binary-coded (0=no, 1=yes) item: "Do you have a functional position in your school (technical and organizational leadership of a specific area within the school or coordination of an entire subject or school area)?" Here, 41.6 % of the teachers indicated that they had relevant leadership experience, while 58.4 % indicated that they did not. Following the discussion of Becker (2005) as well as Hünermund and Louw (2023, p. 146), we refrain from using additional non-theory-driven control variables, "since accounting for all influence factors of the outcome might be unrealistic in many contexts, and control variables are therefore likely to be endogenous. Interpreting their effect sizes in light of theory is potentially dangerous."

### 3.4. Data analyses

To test our hypotheses, we estimated structural equation models in MPLUS 8.5 (Muthén & Muthén, 2017) using a maximum likelihood (ML) estimator. First, we investigated the factorial structure of all measurement models by applying confirmatory factor analysis (CFA) and ascertain their model fit. Next, we investigated the assumed relations between our model variables. In both cases, a root mean square error of approximation (RMSEA) of  $< 0.08$ , a standardized root mean square residual (SRMR) of  $< 0.08$  and a comparative fit index (CFI) of  $> 0.90$  indicate acceptable fit (Hu & Bentler, 1999). In light of the fact that the RMSEA is susceptible to the methodology employed in estimating model parameters and demonstrates inferior performance with ordinal indicators (Shi & Maydeu-Olivares, 2020), we adhere to the recommendation of Hu and Bentler (1999) that for larger samples ( $n > 250$ ), conclusions regarding model fit should be based on a combination of CFI and SRMR. In a third step, we estimated an indirect path model, that is, a model containing mediator variables. Accordingly, we tested robustness of mediation effects by applying a bootstrapped mediation analysis, providing 95 % bias-corrected bootstrap confidence intervals with 1000 bootstrap replications (Hayes, 2018; Preacher & Hayes, 2008). Estimates of indirect effects can be viewed as statistically significant if the 95 % confidence intervals (CIs) do not contain zero (Hayes, 2018). Because fewer than 0.1 % of the data were missing, we used a full information maximum likelihood estimator (FIML) to address missing data.

## 4. Results

### 4.1. Descriptives and measurement models

Table 1 shows the means ( $M$ ), standard deviations ( $SD$ ), and fit indices of our measurement models. The fit of all measurement models was good (CFI  $> 0.90$ , RMSEA  $< 0.08$ , SRMR  $< 0.08$ ). However, two things should be noted: First, two items of the MTL scale showed high correlations of item residuals in a preliminary analysis (“I usually want to be the leader in the groups that I work in” and “I have a tendency to take charge in most groups or teams that I work in”), so we correlated these residuals in the measurement model; second, the scales for determining cultural values and leader self-efficacy each consisted of three items, so they were identified and accordingly show a perfect fit. The model fit of the joint, two-dimensional cultural values model was acceptable (CFI = 0.94, RMSEA = 0.08, SRMR = 0.04).

In general, the respondents saw themselves as open to experience ( $M = 3.19$ ), extraverted ( $M = 3.08$ ), and predominantly valuing collectivism ( $M = 3.05$ ). Their leadership intention ( $M = 2.31$ ) was not strong, nor was their affective MTL ( $M = 2.53$ ). They provided slightly higher ratings of leadership self-efficacy ( $M = 2.84$ ). In addition, on average, they did not seem particularly concerned with their personal independence, that is, individualism ( $M = 2.43$ ).

As presented in Table 2, there was a notable high correlation between openness to experience and extraversion ( $r = 0.810$ ) and, as expected, a low correlation between individualism and collectivism ( $r = 0.142$ ). All other correlations of the latent variables were in the range of  $r = 0.233$  and  $r = 0.703$ . The manifest variable leadership experience correlated significantly positive ( $p < .01$ ) with all other variables, but not with openness. Male teachers showed a slightly higher leadership experience ( $r = 0.161$ ), affective MTL ( $r = 0.112$ ), and intention to lead ( $r = 0.125$ ), along with lower values of openness ( $r = -0.129$ ) and collectivism ( $r = -0.102$ ).

#### 4.1.1. Structural equation model

To test H1, H2, H3, H4, H6, H7, and H8a to H8c, we conducted structural equation modeling. Because our data came from a single instrument, we examined common variance by loading all items used in the analyses on a single unrotated factor (Harmann, 1960). If the value determined was  $< 50\%$ , it would be unlikely that method bias in model estimates because of common variance would be expected (Lance et al., 2010). In our data, the common variance was 34.4 %, well below this threshold, indicating that the correlations in the data cannot be explained by a single common factor. Accordingly, we proceeded to estimate a structural equation model that followed our conceptual model (see Fig. 1) while allowing for correlations among the antecedents. Furthermore, in order to investigate the potential presence of multicollinearity, the latent variables leadership intentions, MTL, and leader self-efficacy were predicted with the independent and mediating variables in a linear regression model. The variance inflation factor values (VIF) for all relationships were lower than 1.70, which is considered excellent (Grewal et al., 2004; Kline, 2016).

The structural equation model showed acceptable fit with the data (CFI = 0.93, RMSEA = 0.06, SRMR = 0.07). An analysis of the

**Table 1**

Means, standard deviations, and fit indices of measurement models.

	$M$	$SD$	CFI	RMSEA	SRMR
Affective Motivation to lead	2.53	0.75	.999	.036	.004
Openness	3.19	0.53	.991	.055	.016
Extraversion	3.08	0.54	.989	.069	.017
Individualism*	2.43	0.57	1.000	.000	.000
Collectivism*	3.05	0.51	1.000	.000	.000
Leader self-efficacy*	2.84	0.60	1.000	.000	.000
Leadership intention	2.31	0.95	1.000	.000	.002

Note:

\* Just identified model, therefore perfect fit.

**Table 2**  
Correlations of the latent variables and manifest indicators.

	1	2	3	4	5	6	7	8
1 Affective motivation to lead								
2 Openness	0.381***							
3 Extraversion	0.451***	0.810***						
4 Individualism	0.510***	0.233***	0.393***					
5 Collectivism	0.233***	0.527***	0.487***	0.142*				
6 Leader self-efficacy	0.639***	0.567***	0.703***	0.511***	0.578***			
7 Leadership intention	0.702***	0.254***	0.404***	0.534***	0.272***	0.586***		
8 Leadership experience: yes	0.278***	0.057	0.137**	0.273***	0.145**	0.354***	0.365***	
9 Gender: male	0.112**	-0.129**	-0.050	0.078	-0.102*	0.003	0.125**	0.161***

Note:.

- \*\*\* =  $p < .001$ ;
- \*\* =  $p < .01$ ;
- \* =  $p < .05$ .

modification indices revealed an additional relevant and unmodeled direct relationship between leadership experience and both individualism and leadership intention as well as between individualism and leadership aspiration (for a discussion on modification indices, see Whittaker, 2012). Adding these parameters slightly increased the model fit (CFI = 0.93, RMSEA = 0.05, SRMR = 0.06). However, because this was not consistent with our conceptual model, we did not include these parameters in our analyses. Table 3 reports the standardized effects for the first model, that is, the model without additionally added parameters or paths.

Results show, that the leader development model suggested by Chan and Drasgow (2001) is also applicable to teachers. Both cultural value orientations significantly affect leader self-efficacy ( $\beta_{Individualism} = .282, SE = .048, p < .001$ ;  $\beta_{Collectivism} = .258, SE = .053, p < .001$ ). Of the personal traits, however, we only found a demonstrable but strong effect of extraversion ( $\beta_{Extraversion} = .513, SE = .101, p < .001$ ); for openness to experience, on the other hand, we could not demonstrate a statistically significant effect on leader self-efficacy ( $\beta_{Openness\ to\ Experience} = -0.040, SE = .102, p = .696$ ). A positive effect of leadership experience can be revealed. If a teacher had such an experience, it has a positive impact on their own leadership self-efficacy ( $\beta_{Past\ Leadership\ Experience} = .226, SE = .035, p < .001$ ). Gender, on the other hand, does not play a role in determining whether a teacher believes they are capable of successfully leading other teachers ( $\beta_{Gender} = .001, SE = .035, p = .982$ ).

Because we discovered a relevant positive correlation between openness to experience and leader self-efficacy when extraversion was not controlled for (see Table 2), and because this effect was negative below zero in our SEM, we examined possible multicollinearity or suppression effects by following various best practice recommendations (Maassen & Bakker, 2001; Preacher & Hayes, 2008; Thompson et al., 2017). At a cut-off of 5 (Grewal et al., 2004; Kline, 2016), the variance inflation factor (VIF) was 1.4, and the bootstrapped 95 % confidence interval (CI) of the direct effect of openness on leader self-efficacy included zero (CI [-0.391, 0.226],  $p > .10$ ). Accordingly, we found no suppression effects, which was also confirmed by applying Congers' rule ( $k$  was greater than  $2k/(k^2+1)$ ).

The extent to which teachers enjoy leadership roles and see themselves as leaders, that is, affective MTL, depended on gender. Men had a significantly higher level of MTL others than women ( $\beta_{Gender} = .113, SE = .035, p = .001$ ). In particular, leader self-efficacy was a relevant and strong predictor in this regard ( $\beta_{Leader\ Self-Efficacy} = .678, SE = .031, p < .001$ ). However, contrary to what was assumed in the model and shown in other studies, previous leadership experience did not influence teachers' affective MTL directly ( $\beta_{Past\ Leadership\ Experience} = .039, SE = .038, p = .309$ ). There were also no gender differences observable regarding leadership intention ( $\beta_{Gender} = .036, SE = .030, p = .229$ ). However, as expected, there was a strong influence of affective MTL on this important prerequisite for taking on

**Table 3**  
Results for the standardized direct effects of the structural equation model.

	$\beta$	SE	p	R <sup>2</sup>
<i>Direct Effects on Leader Self-Efficacy</i>				
Openness to Experience → Leader Self-Efficacy	-.040	.102	.696	.677
Extraversion → Leader Self-Efficacy	.513	.101	<0.001	
Individualism → Leader Self-Efficacy	.282	.048	<0.001	
Collectivism → Leader Self-Efficacy	.258	.053	<0.001	
Past Leadership Experience* → Leader Self-Efficacy	.226	.035	<0.001	
Gender+ → Leader Self-Efficacy	.001	.035	.982	
<i>Direct Effects on Affective Motivation to Lead</i>				
Leader Self-Efficacy → Affective Motivation to Lead	.678	.031	<0.001	.493
Past Leadership Experience* → Affective Motivation to Lead	.039	.038	.309	
Gender+ → Affective Motivation to Lead	.113	.035	<0.001	
<i>Direct Effects on Leadership Intention</i>				
Affective Motivation to Lead → Leadership Intention	.727	.022	<0.001	.537
Gender+ → Leadership Intention	.036	.030	.229	

Note:.

- \* reference category: no leadership experience; +reference category: female.

(further) leadership positions ( $\beta_{Affective\ Motivation\ to\ Lead} = .727, SE = .022, p < .001$ ).

Overall, the model variables explained a large amount of variance in the variables examined. The model accounted for 54 % of the between-teacher variance in leadership intention, 49 % of the variance in teachers' affective MTL, and 68 % of the variance in their leader self-efficacy. Regarding our hypotheses the results showed that H2, H3, H4, H6, and H8a were fully supported. H1 was only partially confirmed because we could not prove any effect of openness to experience on self-efficacy. The same was true for H8b and H8c because we did not find a direct relationship between gender and both leadership self-efficacy and leadership intention. H7, in turn, must be rejected: For the teachers in our sample, leadership experience did not directly influence whether or not one was motivated to lead other teachers.

#### 4.2. Mediation analysis

To examine H5, we re-estimated the structural equation model using a bootstrapping procedure with 1000 replications and calculated the total indirect effects—that is, the sum of all indirect effects for a specific variable (Preacher & Hayes, 2008). Here, effect estimates can be considered statistically significant if the 95 % CIs do not include zero (Hayes, 2018). The analyses demonstrated a relevant total indirect effect of teachers' extraversion ( $\beta_{Extraversion} = .348, CI [.273, 0.804], p < .001$ ) and both cultural values ( $\beta_{Individualism} = .192, CI [.225, 0.587], p < .001; \beta_{Collectivism} = .175, CI [.092, 0.351], p < .001$ ) on their leadership intention. These effects were fully and exclusively mediated by the relationship between leader self-efficacy via affective MTL on leader intention (Table 4).

The indirect effect of leadership self-efficacy on leadership intention, as mediated by teachers' affective MTL, was  $\beta_{Leader\ Self-Efficacy} = .493 (CI [.429, 0.573], p < .001)$ . We did not see a relevant indirect effect of openness to experience on the leadership intention of teachers ( $\beta_{Openness\ E\ to\ Experience} = -0.020, CI [-0.134, 0.083], p = .731$ ). Finally, we discovered specific indirect effects of both leadership experience and gender on teachers' leadership aspiration: here, leadership experience, on the one hand, affected teacher's aspiration and intention to apply for a (higher) leadership position via leader self-efficacy and MTL ( $\beta_{Leadership\ Experience} = .112, CI [.077, 0.152], p < .001$ ). Consistent with this, we observed a statically significant indirect effect of past leadership experience on MTL mediated by leader self-efficacy ( $\beta_{Leadership\ Experience} = .153, CI [.107, 0.206], p < .001$ ). The empirically verifiable chain of effects of gender on leadership intention, on the other hand, began directly with their affective MTL ( $\beta_{Gender} = .082, CI [.027, 0.133], p = .003$ ). Consequently, hypothesis H5 was confirmed for extraversion, individualism, collectivism, and leader self-efficacy but must be rejected for openness to experience. In addition, the effects of gender and leadership experience on teachers' leadership intentions were indirect effects, both mediated by teachers' affective MTL.

Finally, an analysis of percent explained—the proportion of explained variance in each dependent variable that is attributable to specific model variables (Preacher & Kelley, 2011)—revealed that affective MTL directly accounted for 34.1 % (CI [20.6, 47.3],  $p < .001$ ) of the variance explained by the model regarding teachers' leadership intentions, that 13.7 % (CI [4.8, 20.5],  $p < .001$ ) of this variables' variance was explained because of the fact that gender directly influences MTL, and that 47.6 % (CI [41.6, 52.1],  $p < .001$ ) of the explained variance was because of indirect effects mediated by leadership self-efficacy and by teachers' leadership self-efficacy itself. An additional 4.6 % of the variance was explained by the direct, nonsignificant ( $p > .10$ ) effect of gender on leadership intention. Accordingly, our results overall suggested that most of the explained variance in teachers' aspirations and intentions to seek (higher)

**Table 4**  
Results for the standardized indirect effects and 95 % CIs of the structural equation model.

	$\beta$	SE	p	95 %CI
<i>Indirect Effects on Affective Motivation to Lead</i>				
OPENNESS TO EXPERIENCE → LEADER SELF-EFFICACY → MOTIVATION TO LEAD	-0.027	.079	.731	[-0.188, 0.115]
EXTRAVERSION → LEADER SELF-EFFICACY → MOTIVATION TO LEAD	.348	.088	<0.001	[.189, 0.544]
INDIVIDUALISM → LEADER SELF-EFFICACY → MOTIVATION TO LEAD	.192	.043	<0.001	[.109, 0.277]
COLL → LEADER SELF-EFFICACY → MOTIVATION TO LEAD	.175	.047	<0.001	[.071, 0.256]
PAST LEADERSHIP EXPERIENCE* → LEADER SELF-EFFICACY → MOTIVATION TO LEAD	.153	.026	<0.001	[.107, 0.206]
Gender <sup>+</sup> → LEADER SELF-EFFICACY → MOTIVATION TO LEAD	.001	.024	.982	[-0.051, 0.047]
<i>Indirect Effects on Leadership Intention</i>				
OPENNESS TO EXPERIENCE → LEADER SELF-EFFICACY → MOTIVATION TO LEAD → LEADERSHIP INTENTION	-0.020	.057	.731	[-0.134, 0.083]
EXTRAVERSION → LEADER SELF-EFFICACY → MOTIVATION TO LEAD → LEADERSHIP INTENTION	.253	.064	<0.001	[.139, 0.391]
INDIVIDUALISM → LEADER SELF-EFFICACY → MOTIVATION TO LEAD → LEADERSHIP INTENTION	.139	.032	<0.001	[.081, 0.207]
COLL → LEADER SELF-EFFICACY → MOTIVATION TO LEAD → LEADERSHIP INTENTION	.127	.035	<0.001	[.052, 0.188]
PAST LEADERSHIP EXPERIENCE* → LEADER SELF-EFFICACY → MOTIVATION TO LEAD → LEADERSHIP INTENTION	.112	.019	<0.001	[.077, 0.152]
GENDER <sup>+</sup> → LEADER SELF-EFFICACY → MOTIVATION TO LEAD → LEADERSHIP INTENTION	.000	.018	.983	[-0.037, 0.035]
LEADER SELF-EFFICACY → MOTIVATION TO LEAD → LEADERSHIP INTENTION	.493	.035	<0.001	[.429, 0.573]
PAST LEADERSHIP EXPERIENCE* → MOTIVATION TO LEAD → LEADERSHIP INTENTION	.028	.029	.327	[-0.024, 0.090]
GENDER <sup>+</sup> → MOTIVATION TO LEAD → LEADERSHIP INTENTION	.082	.027	.003	[.027, 0.133]

Note:  
\* reference category: no leadership experience; +reference category: female.

leadership positions in their careers was because of distal antecedents, that is, personality, values, demographic characteristics, and self-efficacy, with affective MTL playing a critical role as both a mediator and unique source of influence.

## 5. Discussion and implications

In summary, our study has shown that understanding teacher leadership and leader development in the context of the ongoing development of adult individuals provides a new perspective for studying teacher leader development and leadership in schools. The relevance of affective MTL and leader self-efficacy is evident. However, both of these variables are part of a network of individual characteristics and experiences. Teachers who intend to take on school leadership roles tend to be outgoing, value prestige and collaboration, have more past leadership experience, are confident in their own leadership abilities, and demonstrate a high affective MTL.

The extent to which a teacher is motivated to lead also depends on gender: male teachers show a higher affective MTL than female teachers, which is indirectly reflected in stronger leadership intentions. The findings are consistent with studies on MTL in other disciplines (Badura et al., 2020; Chan & Drasgow, 2001; Kennedy et al., 2021). In the German context, it is important to consider that the German welfare state continues to imply a rather traditional conception of gender roles: women predominantly take care of children, single-earner families in which men provide the family income are still tax-advantaged (breadwinner model), and as a result, professional careers remain more feasible for men (Böhmer & Schinnenburg, 2018). Support for working mothers remains limited (e. g., limited access to childcare), often pushing them into part-time roles that, in turn, hinder their career advancement. Empirical evidence (i.e., Heinrichs & Sonnabend, 2023) highlights a “leaky pipeline,” where the proportion of women decreases as leadership responsibility increases.

Beyond this contextual embedding of the findings, three things stand out in our study in a narrower sense: First, previous leadership experience directly influences leader self-efficacy, but affective MTL only indirectly (through leader self-efficacy). This finding aligns with self-efficacy theory (Bandura, 1977), which states that own personal success experiences (mastery experiences) have a strong impact on self-efficacy (Schunk & DiBenedetto, 2016). With regard to professional development this means that lateral leadership practices in schools and leadership preparation programs should provide teachers with important leadership experience, increasing leadership self-efficacy, MTL, and leadership intentions (Harris & Townsend, 2007; Versland, 2016). Second, gender does not directly influence leader self-efficacy or leadership intentions. This suggests that women’s underrepresentation in school leadership positions compared with men may not be because of their beliefs about their own leadership skills or intentions, but rather to lower motivation among female teachers to pursue such positions. To close this gender gap in school principalship (Martínez et al., 2021), women may need higher levels of leader self-efficacy to demonstrate the same affective MTL as male peers in order to apply for school leadership positions. Therefore, professional development for female teacher leaders should focus on motivational aspects, i.e. by utilizing expectancy-value framework-based interventions (Eccles & Wigfield, 2002; Rosenzweig et al., 2022), as gaining leadership mastery experience alone is insufficient. This is all the more important given that a recent systematic review (Akosah-Twumasi et al., 2018) shows that in individualistic cultures, intrinsic motivation is particularly relevant in career choice. This may also explain why our model demonstrates a relatively high explained variance, as career choices in individualistic cultural settings are mainly “influenced by a combination of intrinsic factors (personal interest, personality traits, self-efficacy), extrinsic factors (job security, high salaries), and, to a lesser extent, interpersonal factors (parental guidance), all of which encourage individuals to make their own career decisions” (Akosah-Twumasi et al., 2018, p. 12). Third, teachers’ openness to experience does not seem to play a role in their leadership intentions. This contradicts findings from other studies that found small positive relationships between openness to experience, affective MTL, and leadership intentions amongst employees and students across disciplines (Kennedy et al., 2021; Stiehl et al., 2015). In addition, it is not in line with research finding that transformational and highly effective leaders typically demonstrate openness to experience and that it may be essential for transformational leadership emergence (Deinert et al., 2015; Zadok et al., 2024). Our contradictory findings raise the question if teaching specifically demand different aspects of personality compared to corporate leadership roles. Considering the social frame of school, extraversion and openness to experience may both be important for the role as a school leader. Extraversion through, for example, setting direction and being expressive of opinions. And openness to experience through, for instance, having an open mindset that enables inclusiveness in school (Deinert et al., 2015). Even though both these traits may be valuable for a successful leader, they may not be as important for motivation to lead in school. Openness to experience may contribute to transformative and innovative changes in school but does not necessarily motivate someone to take on a school leadership position. To elaborate on this point, it may be possible that people with high openness to experience want to develop new ideas and educational models, but at the same time does not enjoy leading a school. That being said, one study shows that the majority of school leaders in Germany enter leading positions to develop and try new ideas, which should align with the trait openness to experience (Cramer et al., 2021). In comparison, extraversion could work as a stronger predictor for affective MTL as it describes someone who enjoys and feel energized by social interactions which may naturally lead to taking on a leadership role. In this respect, extraversion has been related to dominance (Depue & Collins, 1999), which may connect to leadership tendencies but that also may in certain cases enable outdoing others which hinder school improvement and change, particularly when there is interaction between vertical individualism and extraversion (Benliol, 2021). Leader and leadership development programs should address this discrepancy by incorporating longer-term personal development activities into teachers’ daily work lives, which have shown effectiveness in this regard (Woods et al., 2020).

Regarding the studied antecedents, it is striking that teachers intending to become school leaders showed a combination of high extraversion, individualism and collectivism. Agentic characteristics, such as individualism and extraversion, differentiate the self from others and protect individuality (Wiggins, 1991). This does not apply to collectivism, where the relationship to the group plays an

important role. Affective MTL should be associated more strongly with agentic characteristics, according to [Badura et al. \(2020\)](#). This supports our finding of extraversion and individualism as distal predictors of affective MTL, consistent with previous findings from other disciplines. In the German context, it is important to consider that teachers are predominantly civil servants, meaning that career advancement is not necessarily required for professional improvement ([Cramer et al., 2021](#)). While transitioning into school leadership represents the only common formal career step, remaining a teacher still ensures a stable career path with salary increases based on years of service. This high level of job security and stability may explain the relatively low career aspirations of teachers regarding school leadership positions (e.g., low collectivism). However, both extraversion and collectivism involve functioning well in groups and are inherently group-oriented traits ([Burton et al., 2021](#)), which explains their importance in leader and leadership development. As a result, our findings align broadly with [Badura et al.'s \(2020\)](#) meta-analysis, where extraversion had significantly greater effects on affective MTL than openness, and individualism and collectivism predicted affective MTL to a nearly similar extent. It does not, however, explain why openness to experience, another agentic characteristic, was not a relevant distal predictor of MTL in our study. Further investigation is needed in future studies to explore this, as personal traits are multifaceted and include both adaptive and maladaptive aspects, as noted by [Judge et al. \(2009\)](#).

From a theoretical perspective, the findings suggest that the development of school leaders is a complex and complicated process that transcends the application of a single leadership theory and the acquisition of related behaviours through episodic programme-based training. Instead, becoming a leader in school emerges from a complex interplay of various antecedents accumulated and shaped throughout an individual's life in diverse contexts. Regarding school leader preparation, the findings underscore challenges that are characterized by a dual nature: they are highly complex, marked by uncertainty and emergent dynamics, and highly complicated, involving a multitude of interrelated elements ([Byrne & Callaghan, 2022](#); [Rogers, 2008](#)). This insight necessitates a shift from a mechanistic to a contextual and organic world hypothesis regarding leadership and leader preparation ([Rosenhead et al., 2019](#)). As posited by [Moss \(2022\)](#), the adoption of best practices alone, thus, is inadequate, as it neglects to acknowledge teachers as adaptive experts who are informed, competent, and capable of perpetually refining their professional knowledge and competencies. Consequently, both research on leadership and training for leadership must consider the bottom-up process that gives rise to both behavior and micro-dynamics, as well as the interactions between them ([Schneider & Somers, 2006](#)). In accordance with the principles outlined by [Koh et al. \(2023\)](#) with regard to the preparation of school leaders, it, thus, appears to be imperative to shift the focus from narrow end-stage outcomes to plan and analyse how programmes contribute to the positive transformation of all components influencing the development of prospective school leaders. Ultimately, this underscores the necessity of adopting holistic development approaches and moving away from episodic, programme-based training and piecemeal thinking ([Day & Dannhäuser, 2024](#)) in teacher leader development.

There are several desiderata for future research: Generally, such a complexity leadership perspective requires to conceptually distinguish between leadership and leaders ([Uhl-Bien et al., 2007](#)). This also requires different research designs to study the development of intraindividual (leader) and collective (leadership) competence, as well as the dynamic interplay between the person of the leader and leadership in social situations ([Day et al., 2014](#); [Liu et al., 2021](#)). Additionally, it is important to examine these developments in an integrative manner, rather than in a detached manner ([Day et al., 2021](#)). Specifically, the question of how teacher leader identities are formed over time has hardly yet been empirically investigated; hence, it seems relevant to adopt and pursue the distinction between leader and leadership development ([Day, 2000](#); [Wallace et al., 2021](#)). Although our model shows promise as a framework, we have only generated initial empirical findings. Therefore, it is important to extend the research to include other dimensions of MTL, examine personality traits in a more nuanced way, explore teachers' cultural values and their impact on professional development and school leadership, and investigate how the interplay of these factors affects the emergence of school leaders, school leadership enactment, and ultimately, school outcomes. Furthermore, the reasons for the reported gender effects need to be investigated in more detail and it is necessary to find out why women report a lower MTL than men

## 6. Limitations

Our study is one of the first to apply [Chan and Drasgow's \(2001\)](#) model to teacher leader development. However, there are some key limitations. First, this study only uses cross-sectional data, so no causal attributions can be made. Longitudinal studies could, for example, examine the extent to which a positive change in leader self-efficacy over time is associated with an increase in affective MTL or leadership intention and thus allow more causal conclusions to be drawn. In addition, they should investigate the extent to which leadership experiences, leader self-efficacy, MTL, the actual takeover of leadership tasks and responsibilities, and resulting positive leadership effects occur over a longer period. Second, the findings may not be generalizable and transferable to school systems in other countries ([Pietsch et al., 2023](#)). Thus, in view of the results presented and the limitations reported, further research on this topic, especially longitudinal studies, seems important. Finally, it would be useful to carry out cross-cultural studies on the topic in order to find out to what extent the findings can be generalized.

## 7. Conclusion

Especially in individualistic cultures, where personal agency is highly valued, intrinsic motivation plays a central role in career choice ([Akosah-Twumasi et al., 2018](#)). We found that the decision to pursue the role of a school leader in Germany is contingent upon a corresponding affective MTL. The findings of this study, thus, emphasize the necessity for teacher and school leader preparation programs to address the motivational aspects of leadership development. This must be viewed in the context that, on the one hand, a dearth of both teachers and school leaders ([Gorard et al., 2024](#); [Montecinos et al., 2022](#); [Seeliger & Håkansson Lindqvist, 2023](#);

Tulowitzki et al., 2018) as well as a gender gap in school principalship (Martínez et al., 2021) is evident. In the context of the German education system, it seems relevant to address issues of school leadership early on in initial teacher education, in order to attract and raise awareness among potential candidates, as well as to implement leadership programs specifically targeted at women in order to better utilize their potential. On the other hand, it is well known that only a small number of school leaders are adequately prepared for their roles and positions, with many programs overlooking the specific school context and focusing on isolated aspects (MacBeath, 2009; Brauckmann et al., 2023; Daniëls et al., 2019). In our view, for educational policy makers and educational administration this calls for a comprehensive approach to addressing these aspects, i.e. dynamic leadership qualification system. As Day and Dannhäuser (2024) highlight, such systems should include continuous feedback, the use of technology, and a focus on intangible skills. Addressing these challenges, further, requires meta-reflexive teacher education approaches (Cramer et al., 2023) that integrate reflections with a view to the challenges mentioned and about potential leadership tasks and skills into daily work and foster lifelong professional development.

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### CRediT authorship contribution statement

**Marcus Pietsch:** Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Sebastian Röhl:** Writing – review & editing, Writing – original draft, Methodology. **Ida Malini Syvertsen:** Writing – review & editing, Writing – original draft. **Colin Cramer:** Writing – review & editing, Writing – original draft, Resources.

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