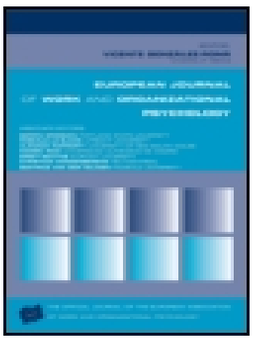

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Unravelling leadership potential: conceptual and measurement issues

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ABSTRACT

The status quo of the leadership potential literature is best represented as a "hot mess" of conceptual and measurement issues. In our view, the prior literature tends to conflate different constructs (i.e., predictor constructs, job-related leader behaviours, and organizational outcomes) that need to be unravelled in order to lay the foundation for future leadership potential research. To advance the field, we conduct a systematic literature review and apply a personnel selection lens to recent (35 years; 62 studies in 31 journals) leadership potential research. Our study contributes to the literature by (a) disentangling various constructs related to leadership potential and (b) proposing a guiding framework to classify and select constructs and measures for future research. Drawing on a construct and criterion validation framework widely used in personnel selection, we identify six core themes that link to construct-based theory development and disentangle various constructs in the predictor and criterion domains related to leadership potential. Specifically, our framework proposes that leadership potential is a referential concept rather than a stand-alone construct. Therefore, leadership potential research should focus on the measurement of valid predictor constructs that relate to future growth in leadership effectiveness.

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Considering the significant impact leaders have on their subordinates' well-being and performance (Hogan & Kaiser, 2005), as well as on overall organizational performance (Nohria et al., 2003), the selection and development of effective leaders is a crucial topic for Industrial-Organizational psychology practitioners and consulting psychologists in organizations (Church & Conger, 2018a; Church & Rotolo, 2013, 2016; Rotolo et al., 2018). To select future leaders, organizations seem to have a growing interest in the identification and assessment of leadership potential. In fact, in May 2019 a Google search of the search terms leadership and potential yielded 692.000.000 entries. However, an important question that remains to be answered is "how do we identify, measure, or predict leadership potential?" (Silzer & Church, 2009a, p. 381). Currently, there is no consensus regarding the definition and assessment of leadership potential (Church & Silzer, 2014; Silzer & Church, 2009a). Considering the popularity of this construct in practice, there is an urgent need for a clear conceptualization to enable research and theory building (Cooper & Schindler, 2011).

Selecting for leadership potential implies selecting on predictors that facilitate the development of future leadership effectiveness (i.e., leadership effectiveness is a repertoire of behaviours related to leaders' success; Caligiuri & Tarique, 2012), and therefore implies a focus on predictors of leadership behaviours that have to be (further) developed over time. As potential comprises a time delay, leadership potential cannot be solely ascertained by investigating what *current* leaders do or what is characteristic of them *now*. Thus, leadership potential by definition can only be uncovered over time. Prior narrative reviews of the leadership potential literature already steered the scholarly discussion from short-term selection to long-term prediction, and restructured various predictor and criterion constructs into "better" (Silzer & Church, 2009a, p. 399) or more "comprehensive" (Dries & Pepermans, 2012, p. 362) models of leadership potential. Short-term selection implies matching an individual's skills and abilities to the obvious requirements of a specific job position, whereas long-term prediction implies matching an individual's skills and abilities to undefined or even unknown future roles (Silzer & Church, 2009a). Although these prior reviews (and other studies; see also Finkelstein et al., 2017; Yost & Chang, 2009) do hint at individual growth as an important element of potential, leadership potential research has not yet incorporated the crucial role of time.

Apart from the role of individual growth, a cursory overview of the scholarly literature reveals that there are several other unresolved theoretical and measurement issues (e.g., Dries & Pepermans, 2012; Rotolo et al., 2018; Silzer & Church, 2009a, 2009b). Most importantly, the conceptual distinction between constructs relevant to leadership potential is fuzzy. Potential is seen as a broad construct in terms of leadership capability and organizational roles (Church & Silzer, 2014) and, hence, numerous constructs have been linked to leadership potential. In order to reorganize the "laundry list" of leadership potential components, Silzer and Church (2009a) suggested a "new" (p. 399) leadership potential model including foundational dimensions (stable predictors such as intelligence and personality),

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career dimensions (career specific predictors such as technical skills and knowledge), and growth dimensions as intervening variables that facilitate or inhibit learning (such as learning orientation and openness to feedback). However, the stability versus malleability of these dimensions, and thereby the usefulness of this model for personnel selection contexts, remains unclear. Second, potential is often "indirectly" measured by inferring or predicting it "by proxy", that is by using various other individual differences such as intelligence, personality, and learning agility (Church et al., 2015; Finkelstein et al., 2017). However, within this research stream, predictor and criterion variables are often conflated. For instance, conceptual thinking (derived from intelligence as a predictor construct) is conceived as either a predictor construct (e.g., Church & Silzer, 2014; Silzer & Church, 2009a) or a criterion variable (e.g., Bartram, 2005). Additionally, learning agility is considered as either a predictor construct (e.g., DeRue et al., 2012a; McCall, 2004) or a criterion variable (e.g., Eichinger, 2018; De Meuse, 2017). Third, potential is confused with current leadership performance (Dries & Pepermans, 2012; Church & Conger, 2018b; Church & Silzer, 2014). Indeed, most leadership potential research has investigated which current attributes (e.g., social competence, cognitive abilities, personality; Finkelstein et al., 2017; Teodorescu et al., 2017) are predictive of *concurrent* leadership effectiveness rather than examining which predictors lead to (the development of) future leadership effectiveness (e.g., Day & Dragoni, 2015; McCall, 2010a, 2010b).

The goal of the present study is to shed light on the ambiguity that is challenging current leadership potential research and to inform practice down the line. To this aim, we conducted a systematic literature review of longitudinal leadership potential research, guided by the overall research question: how is leadership potential conceptualized in the leadership potential literature? With our "construct clean-up study" we contribute to the existing body of knowledge on leadership potential by disentangling various concepts and by proposing a guiding framework to classify and select constructs and measures in future research. In our review, we systematically apply a personnel selection framework to previous leadership potential studies and propose an alternative approach towards the examination of leadership potential to stimulate both scholars and practitioners to rethink and adapt current assessment practices.

Current study lens

We focus on psychological constructs linked to the development of leadership effectiveness, as opposed to situational factors (i.e., job characteristics) that are outside of the leader and merely provide a context for development to occur (McCauley et al., 1994; McKenna et al., 2007). In order to distinguish between the various concepts that have been used in prior leadership potential research, we applied a personnel selection framework as our current study lens (Figure 1) in which psychological constructs are linked to operational measures of those constructs (Binning & Barrett, 1989; Cronbach & Meehl, 1955; Guion, 1987; Messick, 1981). Although frequently and interchangeably used in prior research, concepts and constructs have a different meaning. Concepts are general ideas serving as a fundament for human communication, whereas

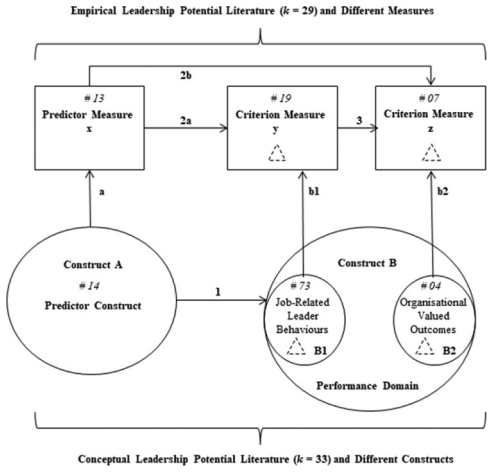

Figure 1. Organizing framework for systematic review: leadership potential as a referential concept versus a stand-alone construct. Current study lens applied to prior leadership potential research approaches[1], and extended study lens2 to steer successive research in which potential is considered a referential concept (and not a stand-alone construct) with at least two elements: predictor construct A and an increase in a related criterion construct B1 and/or B2. [1]Numbers (#) indicate the frequency of constructs and measures included in prior research, dotted delta lines indicate the absence of the measurement of individual growth in prior empirical research approaches.[2]Adapted from "Validity of personnel decisions: A conceptual analysis of the inferential and evidential bases," by J. F. Binning and G. V. Barrett, 1989, *Journal of Applied Psychology, 74*, p. 480, 485. Copyright 1989 by the American Psychological Association.

constructs are ideas that are specifically embedded in theoretical networks, serving as a fundament for subsequent measurement (Cooper & Schindler, 2011).

Following Binning and Barrett (1989), we distinguished between predictors (i.e., psychological traits referring to some theory explaining regularities in human behaviour; such as intelligence) and criteria in the performance domain which refer to (the development of) leadership effectiveness. In the performance domain, we distinguished between (a) job-related leader criteria (e.g., task behaviours, i.e. what is done to accomplish specific goals; such as monitoring others) and (b) organizational valued outcomes (i.e., what is accomplished, or what is a leader's economic worth; such as financial turnover). Distinguishing between leader behaviours and outcomes in the performance domain is important: Behaviours are the means to specific valued outcomes and therefore depending on the type of outcome. We expect our lens to function as a guiding framework to classify and select constructs and measures in future research. Additionally, our framework enables growth oriented leadership potential research in which predictive and thus longitudinal designs are used.

Method

In order to shed light on the ambiguity that is challenging current leadership potential research we trawled the totality of recent studies, and we added a specific angle to incorporate the aspect of growth in leadership effectiveness. We conducted a systematic literature review in which several basic principles apply such as transparency, focus, comprehensive coverage, synthesis, and the appraisal of relevant studies according to predefined criteria (Thorpe et al., 2005; Weed, 2005). Our review

does entail a systematic organization of the studies, however, we did not quantitatively meta-analyse predictor-criterion relationships due to the heterogeneous nature of the data.

Literature search strategy

To find relevant studies we used computerized and manual searches as main search methods. Initially, we focused on leadership potential identification, consistent with prior key leadership potential research (e.g., Church & Silzer, 2014; Finkelstein et al., 2017; Silzer & Church, 2009a). In total, we used six distinct searches.

First, we ran computerized searches in both the *EBSCOHost* platform database (i.e., *Academic Search Premier, Business Source Premier, PsycARTICLES, PsycINFO*, and *PsycTESTS*) and the *Web of Science (WoS)* database (i.e., *All Databases*). We searched the literature for the years 1950–2019. We used the search terms (a) *leadership & potential & identification* and (b) *leadership & potential & assessment*. This first search resulted in 1.104 readings: (a) … *& identification* resulted in 34 readings in the *EBSCOHost* database, and 255 readings in the *WoS* database; and (b) … *& assessment* resulted in 40 readings in the *EBSCOHost* database, and 775 readings in the *WoS* database. In this computerized databases search method the search term *assessment* clearly resulted in more hits than the term *identification*, and therefore we used the search terms *leadership & potential & assessment* in our next searches.

Second, we ran a computerized doctoral dissertation abstracts search in the *Proquest Dissertations and Theses A&I* database. We searched the dissertations literature for the years 1950–2019 and filtered on *Subject: Occupational Psychology; Index Term: Leader(ship), (Work)place, Job (Performance), Management, Managers*, *Organization(s), (Organizational) Behaviour, Personnel Selection, Career, Executives*; and *Language: English*, which resulted in 1.742 dissertation abstracts.

Third, we manually searched (a) high impact (i.e., SJR 2018) I-O Psychology journals (*Personnel Psychology, Journal of Applied Psychology, Journal of Organizational Behaviour, The Leadership Quarterly, Human Resource Management*); (b) the journals *Journal of Management, Academy of Management Journal;* and (c) the *American Psychological Association* journals special issues represented by subject (i.e., *Flexible and Adaptive Leadership, Leadership Development, Learning Agility*). This manual search resulted in 33 additional articles.

Fourth, we reviewed the reference lists of key leadership potential articles (i.e., backtracking method) and we added articles if we considered it as necessary for our interpretation of a specific subject (e.g., constructive-developmental psychology; McCauley et al., 2006 in Helsing & Howell, 2014). Furthermore, we added an article if we considered it as possibly relevant and relating to the context in which the subject of leadership potential is embedded – such as the talent management field (e.g., Dries, 2013b). This manual search resulted in 22 additional articles.

Fifth, in the *Wiley Online Library* database we did a forward citation search of the seminal leadership potential article of Silzer and Church (2009a) and we added possible relevant articles based on the same premises we previously described when using the backtracking method. This final manual search resulted in 29 additional articles.

To date, key authors have considered leadership development and leadership potential as separate fields (Silzer & Church, 2009a), though potential and development constructs are closely related (Meuser et al., 2016; online supplement). Thus, to be able to take into account a long-term prediction focus (Silzer & Church, 2009a), and to incorporate as many possible relevant studies in our review, we extended our computerized literature search with a sixth search (same databases and search years as previously described), entailing four extra search strategies. In addition to the search terms *leadership & potential & … we* used the search terms (a) … *development*; (b) … *training*; (c) … *education*; and (d) … *career & success*. This final search resulted in 5.839 readings: (a) … *& development* resulted in 236 readings in the *EBSCOHost* database, and 2.546 readings in the *WoS* database; (b) … *& training* resulted in 52 readings in the *EBSCOHost* database, and 1.147 readings in the *WoS* database; (c) … *& education* resulted in 42 readings in the *EBSCOHost* database, and 1.735 readings in the *WoS* database; and (d) … *& career & success* resulted in 8 readings in the *EBSCOHost* database, and 73 readings in the *WoS* database. In total, our six main searches led to 7.027 articles and 1.742 dissertation abstracts as possible relevant readings (see Figure 1 in the online supplemental material).

Literature review and selection strategy

Data set selection before coding

As a first step, we read the titles and abstracts of all possible relevant readings (we only read an abstract if a title included our search terms *and* referred to leadership potential as related terms). Based on this title and abstract reading, we selected an initial data set of 172 readings. We used three inclusion and exclusion criteria. First, due to our particular focus on leadership potential identification in corporate organizations we included all studies referring to the following combined terms: (a) leadership potential, (b) managerial potential, or (c) high potential to enable a broad literature base. In addition, we included leader development studies that described constructs related to individual development. We hereby extended the selection focus (of identifying potential) in prior key studies (i.e., Dries & Pepermans, 2012; Silzer & Church, 2009a, 2009b). Third, we largely excluded studies relating to leadership potential or development in specific organizations such as schools or healthcare institutions due to their narrower study interest in that specific niche (e.g., Humphreys et al., 2018; H. Lee et al., 2010; Kotlyar, 2018). However, when a niche study more specifically referred to leadership potential, we did include that study (e.g., Lawrence et al., 2018).

Data set selection after coding

Our nine coding scheme categories were (1) *Authors*, (2) *Publication Year*, (3) *Study Title*, (4) *Journal Name*, (5) *Definition Leadership Potential*, (6) *Conceptual Literature (Predictor Construct/Performance Construct [i.e., Job-Related Leader Behaviour/Organizational Valued Outcome])*, (7) *Empirical Literature (Predictor Measure/Criterion Measure)*, (8) *Proposed Measurement Approach/Measure Type*, and (9) *Theory Tested/*

Growth Measured. We based coding categories 6 (i.e., *Conceptual Literature*) and 7 (i.e., *Empirical Literature*) on the framework of Binning and Barrett (1989).

As a second step, we read the full-texts of the 172 readings and used our coding scheme to select a final dataset of 62 articles based on their relative importance regarding our subject. Based on a fourth and final exclusion criterion we differentiated between studies that specifically focused on leadership potential and studies in which scholars more widely referred to the subject. The 110 excluded articles mostly related to the context in which the subject of leadership potential is embedded (e.g., Church & Rotolo, 2016; Gallardo-Gallardo et al., 2013; Rotolo et al., 2018) and therefore were less relevant for our review. Our final dataset of 62 articles included 33 conceptual studies and 29 empirical studies.

Extended coding of empirical articles

To determine the feasibility of performing meta-analytic techniques (e.g., validity generalization; Pearlman et al., 1980) to summarize the validity coefficients in our empirical articles, we coded the main defining terms (i.e., predictor, criterion, and sample) of the reported validity coefficients. Specifically, we used five additional coding categories for the empirical articles (10) *Theoretical Framework*, (11) *Type of Sample*, (12) *Sample Size*, (13) *Predictor Constructs, Criterion Measures*, and (14) *Observed Effect Sizes*. We examined if the validity coefficients in the empirical studies (k = 29) referred to similar predictor-criterion relationships and (meta-) constructs (Algera et al., 1984) and categorized four meta-categories of predictor constructs. Table 1 shows our coding of the empirical studies with effect sizes interpreted following the guidelines of Cohen (1988).

Our first meta-category (k = 6) included three articles in which the predictor-criterion relationship between personality and (officer) performance was examined. Additionally, two articles examined specific personality profiles, one related to a Korean national context, and one related high potential personality traits to career success. Another article examined how personality traits were valued differently by different assessors when rating one's leadership potential. Two (out of 5) articles referred to Big Five personality traits as a theoretical base.

Our second meta-category (k = 7) included articles examining the predictor-criterion relationship between learning from experience/learning agility and various criteria, ranging from leader performance, leadership competence, on-the-job learning, promotion rates, to leadership potential identification. Five (out of 7) articles referred to a seminal text of Lombardo and Eichinger (2000) as a theoretical base on the subject of learning agility. However, this learning agility research niche comprised five practitioner-oriented articles in which a thorough description of research methods is lacking (i.e., Dai et al., 2013; De Meuse et al., 2010, 2012; Eichinger & Lombardo, 2004; Lombardo & Eichinger, 2000), thus raising questions about data interpretation.

Our third meta-category (k = 3) included two articles in which the predictor-criterion relationship between dealing with ambiguity/flexibility and different criteria was examined, ranging from leadership effectiveness to the ability to deal with change and the potential to advance. Another article examined predictor scores of two different participant groups.

Our fourth meta-category (k = 13) included articles focused on diverse predictor-criterion relationships. Seven articles were mainly descriptive or qualitative and did not report any effect sizes. These articles did not refer to a common theoretical base.

Additionally, all studies within the four meta-categories used study specific criterion measures, referring to different criterion constructs. Thus, none of the articles used similar meta-categories of leadership potential predictor constructs *and* performance constructs and hence represent a non-homogeneous collection of data (Algera et al., 1984). Consequently, we opted for a systematic literature review rather than a quantitative meta-analysis.

Results

We first present a general outline of the published studies in our dataset. Then we discuss the conceptual foundations (i.e., theoretical framework, construct contamination, predictor constructs in the nomological net, and definitions) in prior leadership potential research, based on the 33 conceptual studies in our final dataset. Finally, we describe measurement as the primary methodological focus in the empirical articles and the impact of prior measures (i.e., relevance, contamination, and deficiency).

Published studies

Within the most recent 35 years of research, we found 62 relevant leadership potential studies, resulting in an average of 1.8 studies per year. We saw an increase in selected studies in the years 2009 and 2010 because of three special issues in two different journals. The *Industrial and Organizational Psychology* journal published a special issue on leadership potential in 2009, and a special issue on leadership development in 2010. In addition, the *Consulting Psychology Journal: Practice and Research* published a special issue on flexible and adaptive leadership in 2010. Figure 2 shows a bibliometric curve of our final selected studies. Most probably due to our long-term prediction focus, our final dataset excluded any studies written before the year 1984. Only after 1984, researchers started to investigate long-term leadership potential (Silzer & Church, 2009a). The increased number of studies in recent years (2014, 2015, and 2017) reflects increased interest in leadership potential research (and the relatively novel focus of leadership potential researchers).

Conceptual foundation

Theoretical framework

To frame the research on leadership potential we briefly review the conceptual angles that prior studies used to ground their research. In contrast to broad leadership research, the literature on leadership potential generally does not build on widely used leadership theories (e.g., transformational leadership, leader-member exchange; Meuser et al., 2016). Roughly half of the 33 conceptual studies (i.e., 51.5%) referred to talent management (practices). Regarding the other half, studies referred to

Table 1. The leadership potential empirical articles (k = 29) coded by theoretical framework, sample, predictor constructs, criterion measures, and observed effect sizes.

Nr	Author(s), Year	Theoretical Framework/Sample	N	Predictor Construct	Criterion Measure[a]	Effect Size 2
Predictor Category: Personality (*k* = 6)						
1	Gough (1984)	California Psychological Inventory/U.S. Military Officers (100% male)	143	Personality	Managerial competence (composite officer performance criterion)	S/M*
2	Hirschfeld et al. (2008)	Leadership emergence & Big 5 Personality research/Officer development programme within the U.S. Air Force (82% male)	472	Team-leader personality profile	Observed leadership potential, after 5 weeks of solid officer performance (t0 predictor, t1 criterion)	S/M***
3	S. Lee et al. (2015)	Korean and international literature related to leadership and leadership scales/Korean undergraduate students (44% male)	310	Personality (in Korean context)	Leadership Skill Inventory (Korean version) Leadership Skill Scale for Korean Youth	>L*** >L***
4	Stricker and Rock (1998)	Empirical personality research/ Midshipmen at the U.S. Naval Academy (91% male)	143	Personality	Early Promotion Recommendation, in 4 years after graduation (t0 predictor, t1 criterion)	S/M
5	Teodorescu et al. (2017)	High potential personality traits and career success/Working professionals from international organizations (53% male)	383	1. Adjustment 2. Curiosity 3. Ambiguity Acceptance 4. Conscientiousness 5. Competitiveness 6. Courage	a. Success with promotions b. Time since last promotion	1a S/M** 1b N/S 2a S/M** 2b (-)N/S 3a N/S 3b N/S 4a S/M** 4b N/S 5a S/M** 5b (-)S/M 6a S/M** 6b N/S
6	Thomason et al. (2011)	Employees ratings research & B5 Personality research/Assistant store managers in a Fortune 500 Retail organization (64% male)	114	Personality (*t*1)	Peer and Supervisory ratings of overall managerial potential, measured 1–4 months before predictor (t0)	b b
Predictor Category: Learning from Experience/Learning Agility (*k* = 7)						
7a	Dai et al. (2013) [study 1]	Learning agility and Executive leadership/ Managers from a U.S. large, multinational consumer products company (62% male)	101[c]	Learning agility [between-individuals]	a. Leadership competence b. CEO proximity c. Annual compensation	a S/M** b S/M* c M/L**
7b	Dai et al. (2013) [study 2]	Learning agility and Executive leadership/ District sales managers at a U.S. global pharmaceutical Company (73% male)	83[c]	Learning agility [within-individuals]	d. Promotion rates e. Salary increases (t0 predictor, t1 criterion)	d M/L** e S/M*
8	De Meuse et al. (2010)	High potentials/No information	-	Learning agility	-	- N/A
9a	De Meuse et al. (2012) [empirical evidence 1a, 1b]	Learning agility, learning ability/Global Fortune 100 pharmaceutical company (% male; no info) *no detailed method description*	$1a_1$) 6,730 $1a_2$) 1,733 $1b_1$) 110 $1b_2$) 76	Learning agility	Potential ratings	1a1 M/L** 1a2 M/L** 1b1 L** 1b2 M/L**
9b	De Meuse et al. (2012) [empirical evidence 2]	Learning agility, learning ability/ Managers and executives in a global Fortune 500 consumer products company (% male; no info) *no detailed method description*	101[c]	Learning agility [between-individuals]	a. Leadership competence b. CEO proximity c. Annual compensation	a S/M** b S/M* c M/L**
9 c	De Meuse et al. (2012) [empirical evidence 3]	Learning agility, learning ability/Sales managers in a different global Fortune 500 pharmaceutical company (% male; no info) *no detailed method description*	83[c]	Learning agility [within-individuals]	d. Promotion rates e. Salary increases (t0 predictor, t1 criterion)	d M/L** e M/L**
10	Dries et al. (2012)	High potentials (HiPos), career variety, and employee adaptability/HiPos' supervisors of 7 best practice organizations (81% male)	62	Learning agility	Identification as a high potential	M/L***
11	Eichinger and Lombardo (2004)	Prior self-developed measure/Managers and individual contributors from 3 firms (% male; no info) *no detailed method description*	140	Learning agility	Formal performance ratings, 1–2 years after t0 (t0 predictor, t1 criterion)	M/L***

(*Continued*)

Table 1. (Continued).

Nr	Author(s), Year	Theoretical Framework/Sample	N	Predictor Construct	Criterion Measure[a]	Effect Size 2
12	Lombardo and Eichinger (2000)	Centre for Creative Leadership Studies/ High potential employees (% male; no info) *no detailed method description*	216	Learning from experience	a. Performance-potential continuum b. Style 'staying out of trouble'	a M*** b M***
13a	Spreitzer et al. (1997) [2nd validity analysis]	International executive potential and success/Amalgam of managers in different countries & industries (% male; no info)	823	Learning from experience	Identified as a high potential *(reported effect size is not an improvement over the baseline prediction function)*	>L***
13b$_i$	Spreitzer et al. (1997) [3rd validity analysis, primary sample]	International executive potential and success/Amalgam of managers in different countries & industries (~74% male)	761	Learning from experience [6 learning dimensions] 1. Seeks Feedback 2. Uses Feedback 3. Is Culturally Adventurous 4. Seeks Learning Opportunities 5. Is Open to Criticism 6. Is Flexible	a. Job content learning *(1 item)* b. Behavioural skill learning *(1 item)*	a1 N/S a2 no/ trivial a3 S/ a4 M*** a5 N/S a6 (-)N/ b1 S* b2 N/S b3 S/ b4 M** b5 N/S** b6 N/S N/S* N/S N/S
13b$_{ii}$	Spreitzer et al. (1997) [3rd validity analysis, Company 5]	International executive potential and success/Managers from a British service firm (% male; no info)	51	Learning from experience [6 learning dimensions] 1. Seeks Feedback 2. Uses Feedback 3. Is Culturally Adventurous 4. Seeks Learning Opportunities 5. Is Open to Criticism 6. Is Flexible	a. Job content learning *(1 item)* b. Behavioural skill learning *(1 item)*	a1 (-)S/M a2 (-)N/S a3 M/L a4 N/S a5 (-)S/ a6 M b1 S b2 (-)N/S b3 S b4 S/M b5 S/M* b6 S/M (-)N/S
13b$_{iii}$	Spreitzer et al. (1997) [3rd validity analysis, Company 2]	International executive potential and success/Managers of an Australian financial services firm (% male; no info)	60	Learning from experience [6 learning dimensions] 1. Seeks Feedback 2. Uses Feedback 3. Is Culturally Adventurous 4. Seeks Learning Opportunities 5. Is Open to Criticism 6. Is Flexible	a. Technical Skills b. Interpersonal Skills	a1 (-)N/S a2 N/S a3 (-)S/ a4 M a5 (-)S a6 S/M b1 (-)S/ b2 M b3 M/L b4 (-)S/ b5 M b6 N/S S/M S/M (-)M/ L
13c	Spreitzer et al. (1997) [5th validity analysis]	International executive potential and success/Managers from a British service firm (% male; no info)	56	Learning from experience [6 learning dimensions]	External Performance Appraisal data, after several months (t0 predictor, t1 criterion)	N/S
Predictor Category: Dealing with Ambiguity/Flexibility (k = 3)						
14	Kaiser and Overfield (2010)	Flexible Leadership: Complexity theories of organizations and leader behaviour/ Executives from a variety of mostly U.S.-based firms (% male; no info)	484	Flexible leadership [2 meta-dimensions] 1. Forceful-Enabling Versatility 2. Strategic-Operational Versatility	a. Peer-rated effectiveness b. Subordinate-rated team vitality c. Superior-rated team productivity	a1 M*** a2 M/ b1 L*** b2 M/ c1 L*** c2 S/M* (-)N/S M/ L***
15	Sherrill (2001)	Tolerance of ambiguity research in healthcare/Dual-degree medical students (MD/MBA) compared with control group of traditional medical students (MD only) (% male; no info)	74–80	Tolerance of ambiguity	None (composite predictor scores of 2 groups were compared using T-test)	- N/A

(*Continued*)

Table 1. (Continued).

Nr	Author(s), Year	Theoretical Framework/Sample	N	Predictor Construct	Criterion Measure[a]	Effect Size 2
16	White and Shullman (2010)	Ambiguity & Leadership/Managers (% male; no info) *no detailed method description*	25/156/310	Aptitude for ambiguity	a. Ability to deal with change b. Potential to advance	a M/L** b S/M**
Predictor Category: Other (*k* = 13)						
17	Berman-Gorvine (2015)	-/EU/U.S. companies	134	Learning agility, Ambition, Near-term mobility, Values	Leadership potential	- N/A
18	Chan and Drasgow (2001)	Individual differences and leader behaviours/Singapore military recruits (100% male)	a) 1,313 b) 1,502	Motivation to Lead [3 factors] 1. Affective-identity 2. Non-calculative 3. Social-normative	a. Assessment centre ratings of leadership potential b. End-of-Basic Military Training rating of leadership potential, after 3 months (t0 predictor, t1 criterion)	a1 S/M*** a2 N/S** a3 (-)N/S b1 S/M*** b2 N/S* b3 no/trivial
19	Church and Rotolo (2013)	Current practice of High potential and executive assessment in large organizations/U.S. large organizations	84	-	-	- N/A
20	Church et al. (2015)	High-potential/senior executive talent programmes/assessment practices/Top leadership development companies	80	-	-	- N/A
21	Helsing and Howell (2014)	Constructive-developmental theory and leadership/Participants in a leadership development fellowship at the World Economic Forum (% male; no info)	11	Developmental capacity	Cognitive development stage (t0, t1), Leadership performance and potential	- N/A
22	Knipfer et al. (2017)	Women leadership development in the academic context/German women holding a postdoc position or a position equivalent to an assistant professor position	8–12	Leader identity, motivation to lead, leadership self-efficacy	Training effectiveness	- N/A
23	Lawrence et al. (2018)	Approaches towards teaching leadership/MBA students	67–504	Self-awareness, Reflection	Leadership development	- N/A
24	Marshall-Mies et al. (2000)	Managerial complex social problem solving/Senior officers at the U.S. National Defence University (91% male)	86	Military cognitive problem solving skills *[2 meta-dimensions]* 1. Metacognitive Processing 2. Solution Construction	a. Distinguished Graduate point average, after year 1 (t0 predictor, t1 criterion)	a1 M/L** a2 M**
25	Maurer et al. (2017)	Error management culture, leadership motivation, and career development/U.S. respondents (34% male) and their supervisors, recruited via StudyResponse (51% male)	151 pairs	1. Error management culture 2. Error aversion culture 3. Affective-identity motivation to lead (MTL) 4. Non-calculative MTL 5. Social-normative MTL 6. motivation to develop leadership skills (MTDL)	a. Leadership capacity b. Promotion c. Leadership responsibilities d. Pay increase (t0 predictor, t1 criterion)	b b
26	Slan-Jerusalim and Hausdorf (2007)	High potential identification practices and organizational justice/Canadian Managers attending a leadership conference (51% male), representing 13 organizations	123	High potential (HiPo) identification programmes [6 variables] 1. Full-time employees 2. Input into HiPo process 3. Communication strategy 4. HiPo process evaluation 5. Committee review 6. Identified as HiPo	a. Procedural justice b. Distributive justice	a1 N/S a2 S/M** a3 S/M* a4 S/M* a5 S/M b1 N/S b6 N/S
27	Steele and Day (2018)	Leader development and self-attention /Adult project managers (~58% male)	68	1. Reflective self-attention (t0) 2. Ruminative self-attention (t0)	a. Leader self-efficacy (t0, t1, t2) *[total study time was ~11 months; tracking leader development over time via linear trend]*	a1 (-)S/M a2 (-)N/S
28	Tillema	Assessment centre (AC) research/Dutch HRM senior-executives (representing 20 organizations)	20	AC usage	Willingness to transfer AC to development centre usage	- N/A
29	Troth and Gyetvey (2014)	Leadership potential identification/Large Australian governmental organization (~44% male)	166–149	General mental ability, problem solving skill, emotional intelligence, employee engagement, career aspiration	Leadership potential self-ratings and boss ratings	b b

[a]We reported criterion measures of leadership *potential* (e.g., identified as a high potential, on-the-job learning in Spreitzer et al., 1997) in Table 1, rather than for instance, measures of rank, or leader position (e.g., Stricker & Rock, 1998), or current performance, or international criteria (e.g., Spreitzer et al., 1997; White & Shullman, 2010).

[2]We used Cohen's (1988) guidelines to interpret effect sizes of observed correlations: no/trivial (.00), S = small (.10), M = medium (.30), and L = large (.50) effects, and *p<.05, **p<.01, ***p<.001. N/A = not available (i.e., not reported in the specific study). N/S = an effect size between no/trivial and small (i.e., between.00 and.10), S/M = an effect size between small and medium (i.e., between.10 and.30), M/L = an effect size between medium and large (i.e., between.30 and.50), >L = an effect size greater than.50. Effect sizes are positive, unless indicated by (-).

[b]Multiple effect sizes are reported in these articles, describing different predictor-criterion relationships (i.e., to indicate how different predictors are valued differently by different assessors when rating one's leadership potential in Thomason et al., 2011; Troth & Gyetvey, 2014, and to describe correlations between error management culture, leadership motivation, and career development in; Maurer et al., 2017).

[c]Based on sample sizes, demographics, predictors, and criteria, the data in the studies of De Meuse et al. (2012) and Dai et al. (2013) appear to be similar.

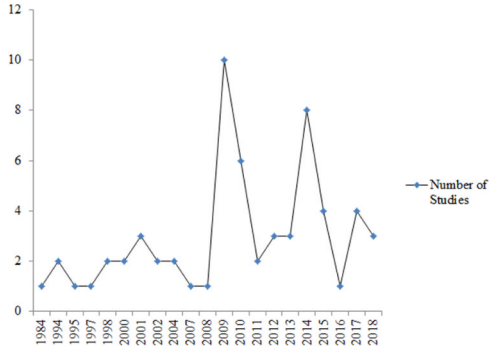

Figure 2. Bibliometric curve of final selected leadership potential studies (n = 62) in the years 1984–2018. We excluded 2019 studies from Figure 3, given that studies were "in the pipeline" from March – December.

specific psychological constructs (18.2%), rater perspectives (6.1%), leadership potential (6.1%), or leader development (9.1%).

In fact, the research on leadership potential appears to be primarily based on practitioner views (e.g., Church & Conger, 2018b; Handfield-Jones et al., 2001; McCall, 1994), or current assessment practices (e.g., Silzer & Church, 2009a, 2009b; Silzer et al., 2016). Indeed, almost 79% of the conceptual studies were written by Industrial-Organizational psychologists, working (as consultants) in organizations who "do not have publication as their top priority" (De Meuse et al., 2012, p. 284). Previous researchers already noted that leadership potential research has been largely absent in the academic literature (e.g., Church & Silzer, 2014; Silzer & Church, 2009a). Consequently, these weak theoretical foundations might hinder the advancement of new insights and grounded hypotheses that can ultimately be tested empirically (Okhuysen & Bonardi, 2011).

Construct contamination

Our study lens distinguishes between predictor constructs (i.e., psychological traits referring to some theory explaining regularities in human behaviour) and performance constructs (i.e., clusters of job-related leader behaviours, or organizational valued outcomes) as distinct behavioural domains (Binning & Barrett, 1989). From predictor constructs, we infer probable behaviour, or predispositions to behave in certain ways. In contrast, performance constructs focus on meaningful samples of actual behaviour and can be considered as factual evidence of specific predispositions.

Contamination of constructs occurs when there is no explicit differentiation between these behavioural domains. For example, dealing with ambiguity (linked to leadership potential; Church & Silzer, 2014) can be conceived as either a stable personality trait (Church & Silzer, 2014; Sherrill, 2001) and thus as a t0 predictor construct, or as more malleable behaviour (White & Shullman, 2010) and thus as a t1 performance construct. These two approaches seem contradictory, however, in validity research the two approaches should be explicitly differentiated and combined to enable valid decision making (Binning & Barrett, 1989).

In order to distinguish among current research approaches, we applied our lens to prior studies and categorized some leadership potential constructs slightly differently from the categorization in earlier models. For example we consider social competence (Finkelstein et al., 2017) as a means to grow in performance and therefore as job-related leader behaviour (i.e., performance construct), rather than a more general predictor construct. Overall, the conceptual studies included 14 predictor constructs, and 77 performance constructs: 73 job-related leader behaviours and four organizational valued outcomes (see Table 1 in the online supplemental material).

Predictor constructs in the nomological net

A construct is defined by a network of associations with other constructs and is reflected in test performance (i.e., nomological net; Cronbach & Meehl, 1955). Predictor constructs, as opposed to performance constructs, are key in psychological theory building (Binning & Barrett, 1989) and therefore we examined suggested predictor constructs (and not performance constructs) in prior conceptual studies.

More traditional constructs predicting leadership potential were intelligence (or GMA; Schmidt & Hunter, 2004), (Church & Silzer, 2014; Meyers et al., 2013), specific cognitive abilities (i.e., narrower aptitudes than GMA such as numerical ability; Schmidt & Hunter, 2004), (Church & Silzer, 2014; Finkelstein et al., 2017; Silzer & Church, 2009a, 2009b), personality (i.e., both bright – and dark side; Dalal & Nolan, 2009; Day et al., 2014; Finkelstein et al., 2017; Hogan, 1994), and specific personality facets such as achievement orientation (Church & Silzer, 2014; Silzer & Church, 2009a, 2009b), sociability, and emotional stability (Silzer & Church, 2009a, 2009b).

Additionally, Nijs et al. (2014) posited that innate abilities, systematic development (ability components), motivation to invest, and interests (affective components) are crucial elements of one's potential. Novel predictor constructs were the ability to learn from experience (McCall, 1994), and learning agility (i.e., to effectively learn and to apply prior learnings) (Finkelstein et al., 2017; Swisher, 2014).

Definitions implicitly signal individual growth

Psychological constructs are abstract ideas, clustering co-varying behaviours (Binning & Barrett, 1989; Guion, 1987).

A construct definition clarifies its scientific meaning and enhances clarity in scholarly discussions (Cooper & Schindler, 2011, p. 38). In the current literature (i.e., in 33 studies), we found at least seven distinct definitions of *potential*. Although widely used in combined terms in prior research, as for example in the following title: *"Identifying leadership potential in future international executives: Developing a concept"* (McCall, 1994), we only found one conceptual definition of *leadership potential* (Silzer et al., 2016). Moreover, one study described a leadership potential model without any definition at all (Dries & Pepermans, 2012). Table 2 provides a brief overview of prior conceptualizations.

Following our model in Figure 1, we link the core elements of prior definitions to either (a) a probable increase in performance from t0 to t1, or (b) a predictor of leadership effectiveness at t1. Four definitions of potential incorporated the idea of growth (t0 to t1): "the possibility that individuals can become something more than what they currently are" (Silzer & Church, 2009a, p. 379); "something that has not yet been realized" (Yost & Chang, 2009, p. 443); "a hypothetical construct that requires an empirical demonstration of its predictive power in the future" (Graen, 2009, pp. 437–438); and "the probable upper bound trajectory of what individuals may achieve during their careers" (Finkelstein et al., 2017, p. 2).

In contrast, three definitions of (leadership) potential referred to a t1 predictor of leadership effectiveness: "the ability to take advantage of the developmental experiences that will be offered" (McCall, 1994, p. 49); "those individuals early in their careers who demonstrate the abilities, skills, characteristics and behaviours that are reliable predictors of later leadership" (Silzer et al., 2016, p. 816); and "the capacity to step into a role that is two levels or more above the one that is currently hold" (Church & Conger, 2018b, p. 18). From a different standpoint, one study described potential as an interactive entity: "a more emergent and interactive entity as opposed to understanding it as something that only resides within a person" (Dominick & Gabriel, 2009, p. 430). Due to their seminal article, Silzer and Church (2009a) definition seems to be the one most widely referred to in the literature (e.g., Church et al., 2015; Church & Silzer, 2014; Meyers et al., 2013; Nijs et al., 2014; Troth & Gyetvey, 2014) and although this article steered the discussion towards long-term prediction, the concept of individual growth was only implicitly incorporated and therefore the conceptual discussion needs further refinement.

Table 2. Key definitions of (leadership) potential in the existing literature[a] (in Chronological Order).

Conceptual Definition of (Leadership) Potential	Reference (Year)
"Potential is the ability to take advantage of the developmental experiences that will be offered" (p. 49)	McCall (1994)
"Potential is the possibility that individuals can become something more than what they currently are" (p. 379)	Silzer and Church (2009a)
"Potential is something that has not yet been realized" (p. 443)	Yost and Chang (2009)
"Potential is a more emergent and interactive entity as opposed to understanding it as something that only resides within a person" (p. 430)	Dominick and Gabriel (2009)
"Potential is a hypothetical construct that requires an empirical demonstration of its predictive power in the future" (p. 437–438)	Graen (2009)
"Individuals with *leadership potential* are those individuals early in their careers who demonstrate the abilities, skills, characteristics and behaviours that are reliable predictors of later leadership" (p. 816)	Silzer et al. (2016)
"Potential is the probable upper bound trajectory of what individuals may achieve during their career" (p. 2)	Finkelstein et al. (2017)
"Potential is the capacity to step into a role that is two levels or more above the one that an individual currently holds" (p. 18)	Church and Conger (2018b)

[a]Literature review final dataset, conceptual studies ($k = 33$) in which the authors theorize about (components of) leadership potential.

Leadership potential is a referential concept

Leadership potential has often been defined in terms of its (desirable) outcomes. As Van Knippenberg and Sitkin (2013) stated, "defining [effective] leadership in terms of the (attributed) achievement of such effects is problematic for the study of leadership effectiveness because such leadership is literally by definition effective" (p. 14). Thus, in order to move the field forward, a clear conceptualization of leadership potential is needed.

The *concept* of leadership potential exists only in relation to specific predictors and criteria (i.e., psychological constructs). More importantly, there should be a time lag between the measurement of these psychological constructs and the criteria should indicate growth in leadership effectiveness. Specifically, we consider leadership potential as a *referential* concept (McNally & Boleda, 2017; Suddaby, 2010): Person X has leadership potential if Person X possesses construct A, which is a predictor of (future growth in) leadership effectiveness (*related* criterion construct B), repeatedly measured in a longitudinal research design. For example, Person X has leadership potential at t0, if he/she scores high on intelligence, and intelligence predicts future growth in *related* leadership criteria (e.g., strategic thinking), measured at t1 and t2.

Our view of what leadership potential conceptually means, bears a resemblance to leader development theory. For instance, leader development is defined as "the expansion of the capacity of individuals to be effective in leadership roles and processes" (Day & Dragoni, 2015, p. 134). Inherent in this conceptual (and developmental) standpoint is that leadership potential can neither be defined as a stand-alone construct, nor defined without including (growth in) a criterion (indeed, prior leadership potential and leader development definitions included criteria). Consequently, following the reasoning of Van Knippenberg and Sitkin (2013), one *cannot* define or assess leadership potential as a stand-alone construct. Leadership potential is a referential *concept* as exhibited in Figure 1.

Measurement focus

Constructs should be measured by means of a valid and reliable scale. Without such measures, psychological constructs remain abstract ideas (Messick, 1981). In order to disentangle prior measurement approaches we applied our study lens to prior research and examined to which behavioural domain (i.e., either psychological predictor constructs or performance constructs) a specific measure (i.e., either predictor measure or criterion measure) referred (Binning & Barrett, 1989).

Approximately half of the empirical leadership potential studies (i.e., 44.8%) used measures of psychological predictor constructs as predictors at t0, signalling a possible performance increase at t1. Regarding the other half, 44.8% of the studies included measures of job-related leader behaviour at t1 and 17.2% of the studies comprised organizational valued outcomes as criterion measures at t1 (the percentages add up to more than a 100%, due to two studies that included both types of criterion measures; Dries et al., 2012; Maurer et al., 2017). Rather than pointing to one behavioural domain as being most preferable when measuring leadership potential, we emphasize the need for a clear conceptual distinction and a priori theorizing of psychological constructs prior to measuring those specific constructs (Guttman & Greenbaum, 1998). Due to our observation that former leadership potential studies lack a clear conceptual distinction, we expect construct validity and/or criterion-related validity issues in prior measures. Therefore, we will evaluate the impact of prior measures by examining their relevance, contamination, and deficiency.

Measure relevance

Measure relevance is reflected by the amount of overlap between a theoretical construct and its measure (Schmitt & Chan, 1998, p. 187), often determined by a content expert. In the predictor measurement studies, nearly all scholars used self-developed (i.e., except for Helsing & Howell, 2014) measures of specific predictor constructs that they related to leadership potential. Assessed predictor constructs were learning agility (Dai et al., 2013; De Meuse et al., 2010, 2012; Eichinger & Lombardo, 2004), learning from experience (Lombardo & Eichinger, 2000; Spreitzer et al., 1997), military cognitive problem solving skills (Marshall-Mies et al., 2000), personality (Gough, 1984; S. Lee et al., 2015; Stricker & Rock, 1998; Teodorescu et al., 2017), tolerance of ambiguity (conceived as a personality trait; Sherrill, 2001), and developmental capacity (Helsing & Howell, 2014). Compared with our conceptual study findings, the type of measured predictor constructs broadly overlap with suggested key t0 predictors (i.e., intelligence, personality, and learning agility) signalling future leadership effectiveness (i.e., outcome) at t1. In the predictor measurement studies, however, some of the intelligence and personality scales were adapted to specific organizations (Marshall-Mies et al., 2000; Stricker & Rock, 1998), groups of employees (Teodorescu et al., 2017), or national contexts (S. Lee et al., 2015).

The criterion measurement studies included either study-specific developed measures of job-related leader behaviour, linked to leadership potential (Chan & Drasgow, 2001; Dries et al., 2012; Hirschfeld et al., 2008; Kaiser & Overfield, 2010; Knipfer et al., 2017; Lawrence et al., 2018; Maurer et al., 2017; Steele & Day, 2018; Thomason et al., 2011; White & Shullman, 2010), or organizational valued outcomes to assess leadership potential (Dries et al., 2012; Maurer et al., 2017; Slan-Jerusalim & Hausdorf, 2007; Troth & Gyetvey, 2014) to support specific research goals. For instance, Troth and Gyetvey (2014) examined some of the factors that predict employees' ratings of leadership potential (at t1). In addition, Chan and Drasgow (2001) studied the antecedents of a new construct (i.e., the motivation to lead) as a more proximal predictor of effective leader performance (i.e., at t1; operationalized as behavioural indicators of leadership potential) compared with more distal antecedents (i.e., at t0; personality, intelligence) of leader performance (at t1). Other studies described organizational practices in assessing leadership potential (Berman-Gorvine, 2015; Church et al., 2015; Church & Rotolo, 2013; Tillema, 1998). In sum, different criterion studies aimed to explain different facets of leadership per se rather than focusing on conceptually understanding, and accordingly measuring leadership potential.

We derive from the findings above that the development of specific measures (as a primary goal) to explain some linkage with leadership has most probably been the focus of these previous studies. However, there was no fundamental conceptual lens or model to look at leadership potential. Therefore, it appears that prior measures lack sufficient overlap with the theoretical concept of leadership potential, increasing the risk of trivial research outcomes (Wacker, 2004).

Measure contamination

Besides construct contamination, as discussed above, measure contamination can occur as well. Measure contamination occurs when other elements than specific construct-related elements influence the measurement of that construct (Schmitt & Chan, 1998, p. 187). Most predictor and criterion measurement studies (i.e., 69%) included past or current performance ratings of leadership effectiveness including behaviourally anchored rating scales as the measurement approach (Berman-Gorvine, 2015; Chan & Drasgow, 2001; Church & Rotolo, 2013; Church et al., 2015; Dai et al., 2013; De Meuse et al., 2010, 2012; Dries et al., 2012; Eichinger & Lombardo, 2004; Gough, 1984; Kaiser & Overfield, 2010; S. Lee et al., 2015; Lombardo & Eichinger, 2000; Sherrill, 2001; Slan-Jerusalim & Hausdorf, 2007; Spreitzer et al., 1997; Teodorescu et al., 2017; Thomason et al., 2011; Troth & Gyetvey, 2014; White & Shullman, 2010), mixing up performance (t1) constructs with predictor (t0) constructs. Performance ratings (at t1) signal one's current (achieved) level on behavioural indicators. However, this current level does not necessarily show one's potential or one's ability to develop specific behaviour in the future. Hence, in these prior measures, leadership potential is confused with achieved performance.

Less commonly used measurement approaches were biodata indicators (Dries et al., 2012; Stricker & Rock, 1998), assessment centre (AC) ratings (Chan & Drasgow, 2001; Tillema, 1998), specific organizational problem solving scenarios (Marshall-Mies et al., 2000), or semi-structured interviews (Helsing & Howell, 2014). Well-developed and cross-validated biodata questionnaires proved valid selection tools in performance research (Schmitt & Chan, 1998, pp. 163–167). Certain biodata indicators of one's developmental patterns (e.g., career variety, Dries et al., 2012) can therefore be linked to leadership potential. An AC measures different individual constructs with a variety of measurement approaches, and AC ratings proved a valid tool for leader performance prediction (e.g., Dilchert & Ones, 2009). However, in predicting potential, AC ratings of leadership potential might be contaminated with measures of current or past leader performance (i.e., demonstrated effectiveness) or leader emergence. Therefore,

when studying leadership potential it seems most valuable to examine those AC studies that include a large time-gap in between measurements from t0 to t1, with repeated measures of similar performance constructs (at least measured at t0 *and* t1).

Measure deficiency

A measure is deficient when crucial elements of a construct are not part of this construct's measure (Schmitt & Chan, 1998, p. 187). With regard to the concept of leadership potential, the increase of individual performance over time (3–10 years; Silzer & Church, 2009a) is crucial. However, the majority of the measurement studies (i.e., 93.1%) did not incorporate the measurement of growth on the same criterion constructs. Clearly, leadership potential research deals with time issues. Although some empirical studies (i.e., 33.3%) did use a time lag in between predictor (t0) and criterion (t1) measurement (Table 1), these studies did not measure an increase in individual performance by repeatedly measuring the same dependent variable at least at t0 *and* t1 (or t1 and t2).

In contrast, two studies did examine temporal effects (Table 1). In a qualitative study, the same respondents were interviewed twice (at t0 and t1), over a three year period, measuring the same criterion construct (Helsing & Howell, 2014). Specifically, this approach focused on the growth in cognitive development of the study respondents (in hindsight), which served as an indicator of one's developmental capacity (predictor at t0). Additionally, the authors examined how cognitive-developmental scores related to leaders' performance and potential scores. Furthermore, Steele and Day (2018) measured the effect of ruminative and reflective self-attention (t0) on self-perceived leader efficacy and leader emergence (as antecedents of leader development) over a one-year period, including three assessment dates (t0, t1, t2). This approach could be considered as a "true longitudinal study" (Day, 2011, p. 563) and serves as an exemplar of future measurement approaches in order to move the field forward.

In addition, two recent studies in the educational field linked leadership potential to the process of leader development. Lawrence et al. (2018) emphasized the importance of self-awareness and reflection in the leader development process of MBA students, qualitatively measured by student reflection papers over a one-year period. Knipfer et al. (2017) developed a training curriculum for women in academia to enhance their leader identity, motivation to lead, and leadership self-efficacy. Training effects were measured before the training, and 10 months after the training. These recent studies show the urge of incorporating leader development viewpoints into leadership selection viewpoints.

Discussion

Main study findings

Our main study objective was to clear up the construct ambiguity in current leadership potential research. We examined how leadership potential was conceptualized and we examined prior measurement approaches. We applied a personnel selection lens to previous studies and distinguished between constructs in the predictor and performance domain. We highlighted conceptual and subsequent measurement issues and pointed at six core themes that prevent the field from moving forward: (1) inadequate conceptualizations, (2) construct contamination, (3) unclear nomological net, (4) insufficient measure relevance, (5) measure contamination, and (6) deficiency in measures. In addition, we aimed to identify key predictor constructs that enable long-term prediction of individual growth in terms of leadership effectiveness. Overall, we found that intelligence, personality, and learning agility were key predictors in prior leadership potential research. In addition, some recent studies pointed at motivational influences regarding the process of leader development (Knipfer et al., 2017; Maurer et al., 2017; Nijs et al., 2014) and its effect on future leadership effectiveness.

To start with, we showed that prior leadership potential studies were generally not grounded in leadership theory – many studies seemed to operate in a theoretical void – or the theoretical foundation(s) were not articulated clearly enough. This finding is in accordance with prior observations of leadership potential research being mainly absent in the academic literature (e.g., Church & Silzer, 2014; Silzer & Church, 2009a). Moreover, in line with prior observations regarding the need to improve our understanding of potential (i.e., rather than studying potential as a stand-alone construct, as mentioned in prior research; Church & Silzer, 2014; Finkelstein et al., 2017; McCall, 2010a; Silzer & Church, 2009a), we showed that the way in which leadership potential concepts have been defined in prior studies, is often conceptually ambiguous. Additionally, prior models do not clearly distinguish between psychological predictor constructs and performance domain constructs and they require a nomological net that links different constructs to enable long-term prediction.

Commonly, scholars referred to leadership potential as a broad construct, (Church & Silzer, 2014; Dries & Pepermans, 2012; Silzer & Church, 2009a, 2009b), and their models mostly included performance constructs (i.e., job-related leader behaviours; one exception is a conceptual study on the subject of talent by Nijs et al., 2014). By conceptualizing leadership potential as a stand-alone construct, as opposed to conceiving it as a referential concept, predictor constructs and (achieved) performance constructs were confused. Consequently, much of the existing consensus about what leadership potential means conceptually rests on the erroneous conflation of different concepts (i.e., predictor constructs, job-related leader behaviours, and outcomes). We consider the efforts of describing leadership potential as a stand-alone construct as a primary root of issues in current research, explaining the breadth and imprecision of prior definitions. These findings show the need for a clearer understanding *and* operationalization of leadership potential to be able to move the field forward. Please note that questions such as "How does *the* construct of leadership potential differ from other constructs?" mirror the difficulties of conceptualization and measurement in current leadership potential research and emphasizes the importance of our review. Our view challenges prior research in which leadership potential (i.e., studied from the perspective of individual

differences) is commonly seen as a stand-alone construct (e.g., Finkelstein et al., 2017; McCall, 2010a; Silzer & Church, 2009a) and we realize that a shift in paradigms might be necessary.

Regarding the measurement of leadership potential, we can only focus on *how* to measure key constructs after having determined *what* to measure (Arthur & Villado, 2008). We showed that in prior studies, scholars developed different measures without referring to a common lens or model to look at leadership potential. Therefore, we question the validity of these previous measures. Our finding contrasts with prior research in which the usage of existing measures was suggested (Dries & Pepermans, 2012), in a multitrait-multimethod approach to assess leadership potential (Church & Rotolo, 2013; Silzer et al., 2016). Moreover, we showed that two main difficulties in prior measurement approaches were the common use of past (i.e., already acquired) performance ratings in cross-sectional study designs and the absence of the measurement of individual growth, which is a key element in the operationalization of potential.

To our knowledge, our study is the first attempt to integrate a personnel selection lens with leadership potential research and with studies examining developmental constructs. We showed that in previous studies theory development (i.e., to explain constructs) was not properly linked to measure development (i.e., to empirically observe construct-related behaviour) and vice versa, whereas combining these two processes is inherent in making valid personnel decisions (Binning & Barrett, 1989; Messick, 1981). Conceptual studies described leadership potential constructs without measuring them, and empirical studies examined different indicators of leadership potential without referring to a broader theoretical lens. Although the field might already accept these basic principles related to construct development to be true, our review showed that the principles are not generally applied in science.

Key leadership potential constructs

Key predictor constructs in prior leadership potential research were intelligence, personality (i.e., traditional predictors), and learning agility (i.e., relatively novel predictor). In the broader literature intelligence is seen as the single best predictor of future job performance (r =.58 for professional-managerial jobs; Schmidt & Hunter, 1998), and future job-knowledge related learning (r = .56 for all job levels studied; Schmidt & Hunter, 1998). The Big Five model is the most widely accepted personality framework in personnel selection nowadays (Schmidt & Hunter, 2004). In general, the study effects for personality predictors are smaller than for intelligence. However, the Big Five personality dimensions Extraversion, Conscientiousness, and Openness to Experience are valid predictors (ρ > .10) for success in both managerial jobs and educational settings (Barrick & Mount, 1991).

Intelligence as a sole predictor might be insufficient when selecting on the capacity of individuals to learn and change their own behaviour regarding non job-knowledge (e.g., social or emotional) components (DeRue et al., 2012b; De Meuse et al., 2012). Recently, learning agility (i.e., to effectively learn and to apply prior learnings) has received increased academic interest, and is assumed to be key in predicting long-term leadership effectiveness (e.g., DeRue et al., 2012a; De Meuse et al., 2010, 2012; Eichinger & Lombardo, 2004). Previous studies positively related learning agility to supervisor rated performance after promotion (r = .25, Eichinger & Lombardo, 2004) and supervisor rated leader performance (r = .28, Dai et al., 2013). However, empirical research that links learning agility to leadership effectiveness is scarce and is highly dependent on commercially developed, and therefore not openly academically accessible, scales (De Meuse, 2017). Additionally, our current study showed that empirical research focusing on individual growth as a criterion is largely missing.

Leader development, or the growth in individual competence to be effective in leadership roles (Day & Dragoni, 2015) is closely related (or might be considered similar) to the subject of leadership potential. The leader development process can be seen as life-long development (Day, 2011) and is facilitated (or hindered) by different malleable constructs or developmental indicators (Day & Dragoni, 2015; Steele & Day, 2018). Studies in our literature review pointed at self-awareness, reflection (Lawrence et al., 2018), leader identity, leadership self-efficacy (Knipfer et al., 2017), motivation to develop leadership skills (Maurer et al., 2017), self-attention (Steele & Day, 2018), and motivation to lead (Knipfer et al., 2017; Maurer et al., 2017) as constructs facilitating one's development. However, leader development research is still in the early phases of scientific development (Day & Dragoni, 2015; Steele & Day, 2018) and therefore research and corresponding well-grounded insights are scarce. Yet, the influence of broader motivational concepts such as systematic development, motivation to invest and interests seem evident in predicting future leadership effectiveness (Nijs et al., 2014).

Proposed lens: potential as a referential concept

Conceptual distinction

Drawing on Binning and Barrett (1989), we consider leadership potential as a referential concept (McNally & Boleda, 2017; Suddaby, 2010): Person X has leadership potential if Person X possesses construct A, which is a predictor of (future growth in) leadership effectiveness (*related* criterion construct B), repeatedly measured in a longitudinal research design. Our standpoint of conceiving leadership potential as a referential *concept* (i.e., we *do not* define leadership potential as a construct) is new to the field. In line with our conceptual view, leadership potential research should focus on valid predictor constructs that relate to future growth in leadership effectiveness. Please note that valid predictor constructs do not need to be "new" to add value to the discussion, what *is* new is conceiving leadership potential as a referential concept.

In the current assessment practice (e.g., in ACs) leadership potential is "measured" by assessing certain predictors (e.g., intelligence, personality) that are *predictive* (based on prior empirical knowledge) of *concurrent* leadership effectiveness. The reasoning is: Effective leaders score high on achievement orientation, so achievement orientation is a predictor of effective leadership. However, there is no research showing that achievement orientation predicts whether one will *develop* into an effective leader *over time*. Thus, the correctness of this

assumption can only be demonstrated in the future (Graen, 2009) when achievement orientation (at t0) has shown to predict growth in leadership effectiveness between t1 and t2.

To steer future research, Figure 1 shows a visual representation of our study lens. Inference 1 indicates a conceptual relation between a predictor construct and increases in performance constructs. Inferences 2a and 2b indicate that predictor measures relate to increases in criterion measures. These criterion measures can either focus on individual leader behaviours (criterion measure y) or on higher level, organizationally valued outcomes (criterion measure z). Inference 3 indicates that these two criterion measures are related, that is because growth in individual leader behaviours are likely to lead to increases in organizationally valued outcomes. Inferences a, b1 and b2 indicate that both predictor and criterion measures are an adequate measurement of the corresponding constructs (i.e., predictor construct A and performance construct B) and therefore reflect the construct validity of the measurement (and cannot be interpreted as measurements of potential).

Thus, within a personal selection context, we propose studying leadership potential following a conceptualization, or lens, with at least two elements: Predictor construct A and an increase in criterion construct B1 and/or B2 (Figure 1). Our basic reasoning is: Construct A enables long-term prediction of individual growth in a second *related* construct B1 (i.e., indicated by specific leader behaviours) that leads to an increase in organizational valued outcomes (i.e., construct B2). For example, if intelligence is a predictor of leadership potential, intelligence should predict individual growth in related leader behaviours (e.g., strategic thinking) that determine an increase in organizational outcomes (e.g., financial turnover).

Our theorizing is built on prior work in which potential was described as purely hypothetical (e.g., Graen, 2009; Yost & Chang, 2009). By using our proposed study lens we can help resolve previous conceptual and measurement issues and build a sound nomological net by carefully categorizing and selecting study variables. For example, self-awareness could be considered either a predictor construct (i.e., the ability to reflect on and accurately assess one's own behaviours and skills; Church, 1997), or a more malleable performance construct (i.e., the depth to which individuals know themselves, recognizing their skills, strengths and weaknesses; De Meuse, 2017), depending on the specific definition. Clearly distinguishing between concepts and constructs is a first step in improving current research.

Proposed measurement approach

Researchers interested in the topic of leadership potential identification and subsequent measurement might consider our proposed lens as a roadmap for future research. We cannot measure potential as a stand-alone construct, though we can measure predictors that relate to growth in leadership effectiveness. This requires careful conceptualizations of predictor (t0) constructs and criterion (t0, t1, t2, etc.) measures.

Consistent with our proposed lens of considering leadership potential as a referential concept, Nijs et al. (2014) operationalized talent (or potential) into an ability and an affective component, with excellent performance as the ultimate criterion (dependent variable). We also agree to the proposition that combining measurements of innate abilities, systematic development, motivation to invest and interests leads to higher predictive power (i.e., propostion 9 in Nijs et al., 2014) rather than identifying potential by only measuring innate ability such as intelligence (Schmidt & Hunter, 2004, 1998), or by measuring such a diversity of broad constructs that, without being carefully studied and organized, those constructs could be considered as a "laundry list" of constructs (Silzer & Church, 2009a). Moreover, systematic development relates to our suggestion to track individual development and thus growth in leadership effectiveness.

The long-term prediction and measurement of individual growth requires a within-subjects research design (Rindfleisch et al., 2008). Interested readers can consult for instance, a recent study of Steele and Day (2018), who analysed longitudinal trajectories of individual development by a statistical approach allowing for random effects in the modelling of developmental outcomes (i.e., random coefficient modelling), rather than assuming equal intercepts and slopes (i.e., least-squares regression) of individual developmental patterns. In our opinion, the field needs to first agree on a clear conceptual view of leadership potential, and then present several empirical studies examining relationships between similar predictor and criterion (meta-) constructs, to enable meta-analytic research techniques in the future.

Implications for theory

Our conceptual view of leadership potential requires a shift in current thinking and it might be helpful to omit terms such as *the assessment of leadership potential* in subsequent work, and replace it with for instance, tracking one's developmental process. Potential means that one has specific predispositions enhancing the chance of showing effective leader behaviour in the future. Moreover, concepts such as leader development and leader emergence closely relate to potential. Leader development is the process of realizing potential, or the influence of specific predispositions on the development of specific leader behaviours that lead to future leadership effectiveness. We consider leader emergence as the realization (proof of development) of specific leader behaviour. Clear theory calls for clear language and especially when studying organizational behaviour, the distinction between behavioural domains and the different constructs within these domains is crucial. Our proposed study lens could serve as a base for successive work to classify and select different constructs and to guide thorough (criterion) measurement approaches.

To move the field of leadership potential forward, future studies should be anchored more strongly in leadership theory (e.g., trait, behavioural, contingency, etc.). For example, consider the distinction between nature versus nurture approaches to leadership potential. How would studies from these opposing perspectives differ in their assumptions, focus, research approach, etc.? Alternatively, how could we identify individual differences that would facilitate constructs such as adaptability, or how could we identify constructs that drive one's ability to benefit from growth opportunities in the environment (e.g., openness to experience, fixed versus growth mindset, etc.)? In

addition, in other research fields (e.g., personality psychology; Funder, 2006, 2009) we see a shift to emphasize the importance of situations (in conjunction with traits) in causing behaviour. So more interactionist approaches may differ from trait approaches to leadership potential by saying that we should look deeply into development and growth opportunities available to leaders in their situation or environment (e.g., challenging job assignments; McCall, 2004, 2010a). To assist the reader with a brief overview of the status quo in leadership potential research juxtaposed against required future research approaches, in Table 3 we summarize the key changes we identified in order to move the leadership potential field forward.

The leadership potential literature closely relates to the Industrial-Organizational psychology-, human resource management- (HRM), and talent management literature, which is predominantly practitioner- or consultancy based (regarding the topics of talent and potential) and therefore lacks clarity in theoretical foundations, concept development (Gallardo-Gallardo et al., 2013; Rotolo et al., 2018) and robust empirical evidence (Dries, 2013b). In order to move the field forward we need a critical study approach and examine current assumptions in the literature rather than trying to support those assumptions with data (Dries, 2013a). We believe that our manuscript contributes to the literature by challenging current beliefs surrounding leadership potential, such as that potential is a stand-alone construct, or that we can *assess one's potential* without measuring growth. Moreover, we hope that our review stimulates other researchers to both acknowledge and critically examine prior research, rather than simply referring to prior leadership potential models (such as the model of Silzer & Church, 2009a, in Finkelstein et al., 2017; Meyers & Van Woerkom, 2014; Meyers et al., 2013; Silzer et al., 2016).

In addition, regarding the long-term predictive validity of different types of leadership constructs, the HRM field needs (more) empirical evidence (Gallardo-Gallardo et al., 2013) of individual development tracks. Moreover, rather than mainly relying on past performance and subjective judgements (e.g., Church et al., 2015; Rotolo et al., 2018; Silzer & Church, 2009a) researchers could consider selecting on prior learning and developmental experiences such as education, specific career experiences, living abroad, or managing certain projects (e.g., Dries et al., 2012; McCauley et al., 1994; Meyers et al., 2013; McCall, 2010a, 2010b).

Table 3. Identified key changes in order to move the leadership potential research field forward.

Status Quo in Leadership Potential Research	Required Future Research Approaches
Conceptualization	
1. Leadership potential is mostly conceived and defined as a stand-alone construct	• Leadership potential is conceived as a referential concept, including a time lag and evidence of the relation between a predictor (t0) and growth in a related leadership criterion (difference between t1 and t2)
2. Leadership potential studies are generally not grounded in leadership theory	• Leadership potential studies are anchored more strongly in leadership theory (e.g., trait, behavioural, contingency, etc.)
3. Conflation of constructs (i.e., predictor constructs, job-related leader behaviours, and outcomes)	• Clearly distinguishing between predictor and (related) criterion constructs
Measurement	
4. A fundamental leadership potential lens to ground empirical research is lacking	• Leadership potential is measured as a referential concept, based on the model of Binning and Barrett (1989) in which predictors and criteria are intertwined
5. Diverse (meta-)categories of leadership potential predictor constructs *and* performance constructs which hinders conducting a meta-analysis	• Similar (meta-)categories of predictor constructs *and* performance constructs referring to the concept of leadership potential to enable meta-analyses
6. Between subjects measurement, concurrent or predictive research designs (no growth measured)	• Within subjects measurement, repeated measurements of the same criterion constructs (at least at two points in time) that are related to meaningful predictor constructs

Implications for practice

The current risk of concept contamination between future- and concurrent leader performance is relevant to practitioners. In the case of specific known organizational competencies, it is probably more convenient to select candidates based on common assessment methods (e.g., ACs, job interviews). However, long-term prediction implicates the usage of constructs that signal individual growth and development and practitioners could centre more on facilitating organizational developmental processes, individual development, and recognizing its indicators (Day & Dragoni, 2015) rather than selecting mainly on achieved performance. Recently, this focus on an agile workforce was described in the literature, resulting in assessing more malleable individual predictor constructs such as learning agility (e.g., Church et al., 2015; De Meuse et al., 2012) and performance constructs such as flexible leadership (e.g., Yukl & Mahsud, 2010) in practice. Also, practitioners could benefit from assessing constructs such as dark-side personality traits to acknowledge derailing characteristics of individuals (Dalal & Nolan, 2009; Spain et al., 2014) and to shape an individual's development (Gaddis & Foster, 2015; Van Velsor & Leslie, 1995).

We expect our proposed study lens to result in a shift to more growth-oriented leadership potential assessment approaches, and therefore a shift to predictive and longitudinal study designs. This is more easily accessible in the age of Big Data, where we can track employees through the full employee life cycle. We also think it will help change the way practitioners measure leadership potential. The growth (or change, delta) approaches to leadership potential are crucial, so psychometric assessment has to change its practice as well. For example, it might suggest a shift to "assess-train-re-assess" approaches to identifying potential, and to look at longer time spans when measuring potential. Therefore, questions about what predicts growth, how do we predict the pace of growth, how do we

predict a "reaction range" of growth become new avenues for thinking, research, and practice.

Future research

Extending our proposed lens

To move the field forward we point at three important implications of our work for future research. Primarily, our proposed lens could be expanded by (a) examining what the specific threshold level for leadership potential should be on a performance measure, (b) differentiating between criterion types (related to meaningful predictor constructs), and (c) examining if there are any ceiling effects of (effective) individual performance improvement. Not all changes on a scale are expected to be equally indicative of potential. For example, if we assess employee performance on a scale from 3 to 5 (difference of +2 on the rating scale), that probably does not indicate the same leadership potential as an employee that increases his performance from a 7 to a 9. Stated differently, where the change occurs on the scale, in terms of relative performance, seems critical; change lower on the scale (or relative to other employees) is likely to be interpreted as indicating lower leadership potential at that specific point in time (and could be improved in the future). A solution could be to relate the threshold level to specific cut-off scores (selection criterion), needed for specific types of leader performance, at a specific point in time (organizational need).

Leader behaviours are the means to specific valued outcomes and therefore depending on the type of outcome, similar behaviours may be valued differently (Binning & Barrett, 1989). Therefore, the type of effective leader behaviour, due to developmental processes (and thus the development of potential) is dependent on the specific criterion measured. Leadership related factors (e.g., strategic insight, dealing with complexity, developing others; Table 1 in the online supplemental material) could vary between organizations, departments, positions, or global locations and it seems important to first identify the specific work context and organizational criteria before measuring leadership potential.

We posit that there are certain boundaries to effective leader performance improvement. The increase in the usage of individual leader behaviours (e.g., initiating structure, delegating) leads to positive outcomes up to a certain inflection point, or ceiling effect, after which further usage of such behaviours can have a negative impact on performance (Pierce & Aguinis, 2013). In other words, the optimal usage amount of leader behaviours is not per se the maximum amount (Yukl, 2012). In addition to these ceiling effects of effective individual performance improvement, we posit that ceiling effects could differ between individuals due to their innate characteristics such as personality or intelligence and influences of their prior development. For example, innate abilities might set a specific range to individual development, in such a way that individuals with greater innate abilities will be able to develop to a higher endpoint, compared to individuals with lower innate abilities and dependent on their developmental experiences (Weiten, 2000).

Different ceiling effects, for different individuals could most probably only be detected over time. If we consistently measure individual growth in performance on the same criterion constructs and ceiling effects do occur, scores would not improve beyond that specific individual level. In addition, we could imagine that practitioners in organizations themselves set specific boundaries, linked to cut-off scores (selection criterion) on specific criteria; beyond a certain performance level it might seem more relevant to select on different valued outcomes rather than trying to improve a performance score from a 9 to a 10 (which might be detrimental in any case; Pierce & Aguinis, 2013).

Measurement of individual growth

Next, long-term prediction implies the measurement of individual growth and therefore it is essential to measure the change in performance within-individuals on key leadership criterion constructs. Moreover, measuring the same respondents, on the same constructs, via the same scales, and at different time intervals is inevitable. This implies the usage of longitudinal research designs, which leads to novel challenges in constructing powerful research designs such as determining what the best time interval will be (Schmitt & Chan, 1998, p. 308) to measure change in performance. Future research could examine what the appropriate time lag for a leadership potential study is; 3–10 years (Silzer & Church, 2009a) leaves quite a lot of variability in longitudinal study designs. We expect that this time lag is reliant on the type of leader performance assessed (the criterion). The development of different types of leader behaviour requires different time lags. For example, the development of written communication skills requires shorter time lags than enhancing interpersonal effectiveness (Jansen & Stoop, 2001). Similarly, we posit that the development of strategic insight requires longer time lags (e.g., 10 years) than improving interpersonal effectiveness (e.g., 2 years). This subject is a topic for a paper in itself and an important gap in current research.

Integrate leader development viewpoints

Finally, future leadership potential research could integrate viewpoints of other areas of leadership inquiry, as these domains are reasonably similar (development) or closely related (learning, training, education) to leadership potential. The field could try to understand long-term developmental processes that lead from specific predispositions (predictor constructs) to realized potential (future leadership effectiveness), consistent with a contemporary trend in leader development studies to conceive development as a longitudinal process rather than mainly studying individual behavioural development through short-term interventions such as training (Day et al., 2014). Studying long-term developmental processes require the examination of proximal outcomes, or developmental indicators (Day & Dragoni, 2015), that indicate that development is indeed taking place. Future research could point at the most relevant developmental indicators, such as self-awareness, (Lawrence et al., 2018), leadership self-efficacy (Knipfer et al., 2017), or motivation to develop leadership skills (Maurer et al., 2017) to extend recent study findings and move the field forward.

In addition, learning theories and processes relate to individual growth; without learning, growth is unlikely to occur. Individual learning goes beyond problem solving: inward

reasoning, cognitive rules, mental models, self-reflection, and the ability to change one's own behaviour are essential within the learning process (Argyris, 1991; Day et al., 2014; Helsing & Howell, 2014; Senge, 1990) and future research could draw on existing learning theories to better describe individual growth. Furthermore, future studies could examine individual learning processes such as leader self-development in which leaders, as active participants, take control over their own learning (Reichard & Johnson, 2011).

Limitations of this study

One limitation of this study is that we, in accordance with prior research (e.g., Church et al., 2015; Dries & Pepermans, 2012; Nijs et al., 2014; Silzer & Church, 2009a), considered future leadership effectiveness as predominantly triggered by individual level psychological constructs, rather than referring to groups of employees, specific organizational processes (e.g., Finkelstein et al., 2017; Oltra & Vivas-López, 2013) or situational factors (McCauley et al., 1994). We do acknowledge existing views on individual development and different powerful influential contexts. Interested readers can consult for instance, research regarding situational influences (e.g., Funder, 2006) or social influence processes (e.g., Dominick & Gabriel, 2009).

Conclusion

Our review aimed to unravel construct ambiguity in leadership potential research by systematically applying a personnel selection lens to prior studies. We discussed key issues regarding the conceptualization and subsequent measurement of leadership potential and contributed to the literature by questioning the status quo (Davis, 1971): Much of the existing consensus about what leadership potential means conceptually is based on the conflation of psychological predictor constructs and performance constructs. In addition, we argued that the quest for grasping leadership potential as a stand-alone construct (i.e., the holy grail of talent management; Church & Silzer, 2014; Rotolo et al., 2018; Silzer & Church, 2009a, 2009b) needs a different approach. Being a referential concept, leadership potential should be considered as an increase in leadership effectiveness over time and therefore it cannot be considered as a stand-alone construct or be defined as such. We hope our study stimulates both scholars and practitioners to rethink and adapt their current assessment practices.

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