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Integrating leadership: The leadership circumplex

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The present study aims to integrate leadership conceptualizations into one overarching model, using a “leadership circumplex”. Two studies describe the construction and examine the psychometric characteristics of an operationalization of the leadership circumplex, the Circumplex Leadership Scan (CLS). Results showed that the CLS complies with the criteria of a true circumplex. Furthermore, scales, representing leadership styles, showed reasonable to high reliability. A third study confirmed the stability of the CLS structure and additionally explored the circumplex structure of subordinates’ ratings of their leaders, which were found to have the same underlying circumplex structure. A fourth study was conducted to assess the convergent validity with other leadership styles from the existing leadership literature, the predictive validity of the styles, as well as the test–retest reliability. A fifth study confirmed the predictive validity results observed in Study 4 using different-source ratings of leadership outcomes. Finally, a sixth study explored the possibility of creating a short version of the CLS.

Keywords: Leadership; Circumplex; Integration; Leadership styles.

The leadership literature is replete with models and instruments, describing different leadership styles that are deemed to be important (e.g., full range of leadership paradigm; Avolio & Bass, 1991; servant leadership, Ehrhart, 2004). However, recently there has been quite some debate about the content of these models and the need to integrate them (Avolio, 2007; DeRue, Nahrgang, Wellman, & Humphrey, 2011; Yukl, Gordon, & Taber, 2002). Many of the most commonly used models focus on one or two aspects within leadership, neglecting to study other aspects, although some exceptions can be found (DeRue et al., 2011; Yukl et al., 2002). Furthermore, most of the existing models focus on the more positive side of leadership. Specifically, they tend to study leadership styles that are related to positive leadership outcome, although the dark side of leadership is more intensively studied nowadays (e.g., despotic leadership; De Hoogh & Den Hartog, 2008; Hogan & Hogan, 2001).

A second issue with existing leadership models is the psychometric quality of their operationalizations. In the past decades, more and more studies have been done reporting the unreliability of the scales and unstable factor structures of the measures most commonly used in our field (e.g., Antonakis, Avolio, & Sivasubramaniam, 2003; Schriesheim, Powers, Scandura, Gardiner, & Lankau, 1993). For example, one of the most widely used leadership questionnaires, the Multifactor Leadership Questionnaire (MLQ; Avolio, Bass, & Jung, 1999) has often been criticized for its reliability and validity (e.g., Heinitz, Liepmann, & Felfe, 2005; Hinkin & Schriesheim, 2008; Vinkenbun, Van Engen, Eagly, & Johannesen-Schmidt, 2011). The need for more psychometrically sound leadership instruments is mentioned regularly (e.g., Hunter, Bedell-Avers, & Mumford, 2007).

A third issue is a theoretical one. We believe that it is possible to ground leadership research more strongly

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in theoretical notions regarding interpersonal behaviours. Almost all definitions of leadership refer to leadership as the process of influencing others (Vroom & Jago, 2007; Yukl, 2002). Influencing others presupposes interpersonal interaction between leader and led (cf. De Vries, 2008). Furthermore, most items in leadership questionnaires focus on the interpersonal behaviours of leaders vis-à-vis their subordinates. Interpersonal interactions have long been of considerable interest to personality researchers. Today, there is widespread consensus among scholars that interpersonal interactions (i.e., behaviours between two persons) are best summarized by two main dimensions, which have been named communion (or: affiliation/love) and agency (or: control/dominance) (Freedman, Leary, Ossorio, & Coffey, 1951; Kiesler, 1983; Leary, 1957; Trapnell & Wiggins, 1990; Wiggins, 2003). The interpersonal interaction theory is best known by its conceptualization, the interpersonal circumplex (or interpersonal circle) (Acton & Revelle, 2002; Gurtman, 1992; LaForge & Sucek, 1955; Wiggins, Phillips, & Trapnell, 1989). Consequently, a circular conceptualization of leadership, in line with the interpersonal circumplex, may provide justice to the interpersonal nature of leadership.

Therefore, in the present study, we propose an integrative, comprehensive model describing leadership behaviours. To arrive at a continuous representation of leadership behaviours, the present study will explore the interpersonal circumplex and the interpersonal nature of leadership and describe the possible integration of known leadership styles into the leadership circumplex, discussing its nature and content. Subsequently, with a set of six studies it will then present the results of a first attempt to operationalize the leadership circumplex, the possible usability of this instrument as a 360° measure, and, finally, the results of studies on the validity and reliability of this operationalization.

CIRCUMPLEX

The first researcher to discuss circumplex structures was Guttman (1954). He referred to a circumplex when variables are located on the circumference of a circle, by calculating the strength of associations between these variables. More recently, debate on conceptual and methodological issues in testing circumplex structures has resulted in some more clearly stated conceptual and structural assumptions of a circumplex structure. These assumptions encompass that a circumplex structure has two main underlying dimensions and a circular ordering of variables characterized by equal spacing between variables (or: equal vector angles), and equal vector lengths measured from the origin of the circle (Fabrigar, Visser, & Browne, 1997). That is, in a

circumplex, variables are located on the circumference of a circular model spanned by two orthogonal dimensions. Each variable in its unique location on the circle is to some extent related to both dimensions, making it a continuous model of variables. The relation between variables decreases as the distance between those variables increases. Thus, variables on opposite poles of one axis are negatively related, while variables on orthogonal poles are unrelated.

One of the most well-known circumplex structures, which conforms to the criteria mentioned earlier, is the interpersonal circumplex (Acton & Revelle, 2002; Browne & Cudeck, 1992; Fabrigar et al., 1997; Gurtman, 1993; Schmidt, Wagner, & Kiesler, 1999; Wiggins et al., 1989). The interpersonal circumplex is used to map the interpersonal behaviours of interacting persons. Two dimensions, agency (or: control/dominance) and communion (or: affiliation/love), span the circular ordering of variables. Wiggins (2003) describes “agency” as the condition of being a differentiated individual, which is manifested in strivings for mastery and power, whereas communion is described as the condition of being part of a larger social or spiritual entity, which is manifested in striving for intimacy, union, and solidarity within that larger entity.

In the interpersonal circumplex, interpersonal behaviours are often conceptualized using eight scales, called octants, which are obtained by dividing the circle into eight equal pieces, and which are thus spaced evenly along the circumference of a circle. Ideally, each octant of the interpersonal circumplex has a 45° angle with its neighbouring octant. Operationalizing the octants of the interpersonal circumplex has posed great challenges for scholars. Nonetheless, a successful operationalization has been accomplished quite a number of times (e.g., the Interpersonal Adjectives Scale—IAS, Wiggins, 1979; the Interpersonal Check List—ICL, LaForge & Sucek, 1955; Leary, 1957; the Inventory of Interpersonal Problems—IIP, Horowitz, Rosenberg, Baer, Ureño, & Villaseñor, 1988; the Impact Message Inventory—IMI, Perkins et al., 1979).

THE LEADERSHIP CIRCUMPLEX

To what extent can leadership be integrated in a circumplex?¹ We hypothesize that leadership can also be summarized by two main dimensions. We expect those dimensions to resemble the interpersonal dimensions “agency” and “communion”. Although not conceptualized as actual leadership styles or

¹The Competing Values Framework of Quinn and Rohrbaugh (1983) is referred to as a circumplex. Although this is a circular model, it does not comply with the psychometric criteria for a circumplex.

leadership dimensions, many leadership models stress the importance of agency and communion (Judge, Piccolo, & Kosalka, 2009), especially in studies on gender differences in leadership (e.g., Deaux & Kite, 1993; Eagly, Johannesssen-Schmidt, & Van Engen, 2003). In the latter, feminine leadership is often described to be more communal, whereas masculine leadership is perceived to be more agentic. Moreover, especially early theories have conceptualized leadership by using two main independent leadership dimensions. These two dimensions have been called consideration and initiating structure (Fleishman, 1953; Judge, Piccolo, & Ilies, 2004), employee- and production-centred leadership² (Kahn & Katz, 1953), or human- and task-oriented leadership (Blake & Mouton, 1964).

Newer theories, in which leadership might not always be conceptualized as two dimensional, might also be captured by the same two dimensions. For instance, the full range leadership model (Avolio & Bass, 1991) contains a facet of transformational leadership which is called individualized consideration. Studies looking at the relations between transformational or charismatic leadership, as operationalized using items from the Multifactor Leadership Questionnaire (MLQ; Avolio et al., 1999), have established moderate to strong correlations between transformational or charismatic leadership and both consideration and initiating structure (De Vries, Roe, & Taillieu, 1999, 2002; Seltzer & Bass, 1990). Transformational leadership has been found to have the strongest correlation with both extraversion and agreeableness (Judge & Bono, 2000), the two interpersonal Big Five factors which have been found to be most closely aligned to the two circumplex dimensions agency/control and communion/affiliation (Trapnell & Wiggins, 1990; Wiggins, 2003).

Another relatively new, but widely discussed, notion of leadership is “servant leadership”. Servant leaders put other people’s interests, needs, and aspirations above their own. The servant leader’s choice is to serve first. The servant leader feels morally responsible not only for the organizational outcome, but also for his/her subordinates (Ehrhart, 2004; Greenleaf, 1977; Sendjaya & Sarros, 2002). We expect those behaviours to be closely related to the communal behaviours in the circumplex and negatively related to the agentic behaviours, and thus these behaviours are probably located at the quadrant formed by the positive pole of the communion axis and the negative pole of the agency axis.

The negative or dark side of leadership is also more intensively studied nowadays. Schaubroeck, Walumbwa, Ganster, and Kepes (2007) mention

hostility as a construct central in the study of destructive leadership. Hostility is inversely related to communion and unrelated to dominance, which corresponds with the negative pole of the communion axis (Ruiz, Smith, & Rhodewalt, 2001). Also, despotic leadership (De Hoogh & Den Hartog, 2008), which is described as being based on personal dominance and authoritarian behaviour serving the self-interest of the leader, may logically be positively related to agency and negatively to communion, and consequently be located in the quadrant formed by the negative pole of the communion axis and the positive pole of the agency axis. Subsequently, De Hoogh and Den Hartog (2008) describe a leadership style, “powersharing”, as being oppositely related to despotic leadership. We expect this style, which is part of the leadership scales named as ethical leadership, to be represented by the styles close to the positive pole of the communion axis.

Many leadership models also distinguish leadership styles that are characterized by the absence of a leader. The styles described by the full range leadership model (Avolio & Bass, 1991) as “management-by-exception” and “laissez-faire”, form a good example of these styles. The leaders using these styles are mostly absent, their rare presence often due only to the development of problems. The absence of the leader suggests a negative relation to agentic traits. Furthermore, restricting presence to arising problems suggests a negative relation of these styles to the communion axis.

Consequently, theoretically, it appears that both older and newer notions of leadership have a lot in common with concepts derived from the interpersonal circumplex. Many leadership models appear to be captured by the two dimensions or the quadrants of a leadership circumplex. Therefore, conceptualizing leadership using the interpersonal circumplex may help to integrate an important part of the leadership literature into one framework.

THE CONCEPTUALIZATION OF THE LEADERSHIP CIRCUMPLEX

The leadership circumplex might enable a broader spectrum of leadership styles to be housed in one model. One of the major benefits of this proposed model is the continuous ordering of the leadership behaviours. A circumplex model enables the measurement, not only of the behaviours that are either agentic or communal, but also of all those behaviours that are a combination of these two dimensions. By operationalizing the leadership circumplex, it may be possible to measure this broader spectrum with one questionnaire. Furthermore, this instrument can be used not only to measure self-ratings of leadership behaviours, but may also be used to measure other

²Although at first employee- and production-centred leadership was seen as two opposite poles on one continuous dimension, it was later regarded as two separate dimensions.

ratings, such as subordinate, peer, and supervisor ratings, providing 360° feedback. Ultimately, such an operationalization may provide an opportunity to more accurately measure individual differences in leadership styles from different informant perspectives.

THE PRESENT STUDY

The present set of studies serves several purposes. Study 1 and Study 2 aim to demonstrate that leadership behaviours are best captured by a circumplex model. In order to show this, Study 1 examines the dimensionality of leadership behaviours. We expect that a two-dimensional structure is sufficient to organize a comprehensive set of leadership behaviours. Subsequently, Study 2 aims to further improve the operationalization of the leadership circumplex in which leadership styles emerge as eight octants in a circular structure that complies with the criteria of a true circumplex. We expect that the items and octant scales of this questionnaire meet the standard psychometric criteria and exhibit the required structural characteristics of circumplex measures. A third study is conducted to examine the possibility to use the questionnaire as a 360° measurement instrument. Study 3 investigates and compares the circumplex structure of both leader self-ratings and subordinate ratings. Finally, a fourth and fifth study are conducted to investigate the reliability and validity of the content of the dimensions and octants of the questionnaire. Study 4 measures its convergent validity with existing leadership questionnaires. Furthermore, it examines the test-retest reliability and the predictive validity of the questionnaire. Study 5 examines the predictive validity of the questionnaire with both self- and other-rated leadership styles and other-rated leadership outcomes. Study 6 explores the possibility to create a short version of the questionnaire.

All studies examine leadership behaviours; however, there is some debate about the distinction between leaders and managers (e.g., Bedeian & Hunt, 2006; Hunter et al., 2007). Although we acknowledge the distinction, in accordance with common practice, we chose to use the general term leader for a person in a supervisory position.

STUDY 1

Method

Participants

The sample consisted of 203 participants from different companies in Belgium (134 male [66%], 69 female). All participants were part of the network of a consultancy organization. They were contacted by

this organization with the request to participate in this study. Age ranged from 24 to 64 years ($M = 46.4$, $SD = 8.53$; one unknown). All participants occupied a supervisory position at their company. Although respondents were not paid for their participation, they could win a prize (a coupon to buy books) and they received a feedback report on their leadership styles.

Procedure

Item selection. A group of five practitioners (average age = 44.8, average experience = 15 years), specialized in leadership consultancy and familiar with the interpersonal circumplex, generated the items. In individual brainstorm sessions they were provided with the following set of instructions: (1) to generate as many as possible behaviourally descriptive leadership items to represent the scales known from the interpersonal circumplex; (2) to generate as many as possible other leadership items, derived from the literature and their own experience as consultants; (3) to generate items that described both effective and ineffective leadership behaviours; and (4) to include not more than one behaviour per item. Each practitioner wrote the items individually; however, the practitioners had three meetings in which they discussed each other's items. Discussion was solely based on checking whether each item contained one behaviour and was clearly written. No items were excluded in this process; however, some items were split into two items, because they contained more than one behaviour. Finally, 442 Dutch items formulated as statements in the third person singular were created.³

There are several reasons to write items in the third person singular. First, Hofstee (1994) strongly recommends using the third person singular, because self-ratings in the first person singular might be more biased by, for instance, social desirability. Second, using the third person singular persuades participants to look at themselves as an "objective" other. This creates a form of meta-perception, which has been shown to be a more valuable perception than self-perception (Kenny & DePaulo, 1993). Third, writing items in the third person allows the researcher to use the exact same test for both self- and other-ratings (see Studies 3 and 5). Items were scored on a 5-point Likert scale, with 1 = "never", 2 = "seldom", 3 = "sometimes", 4 = "often", and 5 = "always".

Data collection. Respondents were contacted by email. This email included a link with which they

³Items were translated in both English and French by professional linguists; however, all studies in this article are based on the Dutch items.

could start a Web-based survey presenting the item pool. Participants were requested to provide self-descriptions on the 442 leadership descriptive items. They were assured that their answers would be treated confidentially. Afterwards they were thanked for their participation and were sent a feedback report on their answers.

Data analysis

Multidimensional Scaling (MDS) was used to analyse the data. MDS uses a matrix of similarity ratings between all pairs of items entered in the analysis. These similarity ratings are transformed into distances represented in a multidimensional space, meaning that the distance between items in a multidimensional space increases when similarity of items decreases. Locations of items based on these distances are then plotted in a multidimensional space (Fabrigar et al., 1997).

To arrive at the number of dimensions that best summarizes the data, one- to six-dimensional solutions were calculated. Because of the initial length of the questionnaire, instead of the absolute level of the Kruskal's Stress I criterion, we used a scree plot of the Kruskal's Stress I values as a basis to determine the optimal MDS solution. That is, in the present study, the best solution to summarize the data is defined as the solution that resulted in the largest drop of Kruskal's Stress I.

Results

The first conceptual assumption of a circumplex representation is that the nature of the relationships between items can be best summarized by two dimensions (Fabrigar et al., 1997). Using MDS, Kruskal's Stress I values were calculated for one-, two-, three-, four-, five-, and six-dimensional solutions, and were respectively 0.48, 0.32, 0.24, 0.20, 0.17, and 0.15, with the following DAF values: 0.77, 0.90, 0.94, 0.96, 0.97, and 0.98. The two-dimensional solution resulted in the largest absolute drop of Kruskal's Stress I (Kruskal's Stress of one-dimensional solution [0.48] – Kruskal's Stress of two-dimensional solution [0.32] = 0.16 vs. 0.08, 0.04, 0.03, and 0.02 for the other absolute drop values), and the largest relative drop of Kruskal's Stress, calculated by dividing the Kruskal's Stress of a one-dimensional solution by the Kruskal's Stress of a two-dimensional solution ($0.48/0.32 = 1.50$ vs. 1.33, 1.20, 1.18, and 1.13 for the other relative drop values).

The second conceptual assumption of a circumplex structure is that items should be ordered along the circumference of the circle. Thus, the vector angle and the vector length were calculated for each item,

using the coordinates from the two-dimensional MDS solution. Vector angle was conceptualized as the angular position of an item in relation to the horizontal axis of the two-dimensional solution, using the intersection of the two dimensions as the middle point as the centre. Vector length was calculated as the square root of the sum of strength of the relation with both dimensions. Both vector angle and vector length were used to locate items in the circular space created by the two dimensions.

A second goal of Study 1 was to reduce the number of items in the questionnaire, to increase the usability of the questionnaire without losing the circumplex structure of leadership items. To reduce the number of items for subsequent studies, 197 items were selected through an iterative process using vector angles and vector lengths. A scatterplot of the selected items is shown in Figure 1. A larger vector length indicated a stronger relation to both dimensions and, therefore, selection of items in this stage was primarily based on vector lengths. Examples of items that were not selected, based on short vector length, are “dares to ask for time for reflection” (vector length = 0.03) and “avoids useless conflicts” (vector length = 0.05).

Finally, including only the 197 selected items in the analysis, the two-dimensional MDS solution generated a Kruskal's Stress I value of 0.27 with a DAF value of 0.92. Again, Kruskal's Stress I values were calculated for one-, two-, three-, four-, five-, and six-dimensional solutions, and were respectively 0.45, 0.27, 0.20, 0.16, 0.13, and 0.11, with the following DAF values: 0.80, 0.92, 0.96, 0.97, 0.98, and 0.99. The two-dimensional solution resulted in both the largest absolute drop of Kruskal's Stress I (Kruskal's Stress of one-dimensional solution [0.45] – Kruskal's

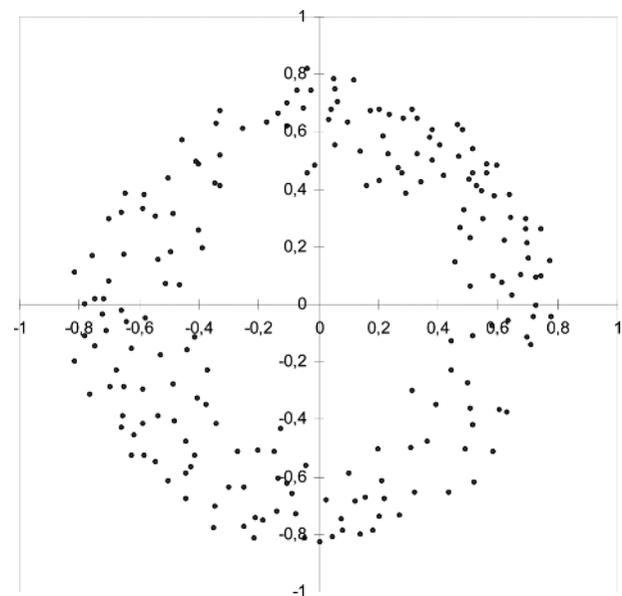


Figure 1. Scatterplot of 197 items.

Stress of two-dimensional solution $[0.27] = 0.18$) and the largest relative drop of Kruskal's Stress, calculated by dividing the Kruskal's Stress of a one-dimensional solution by the Kruskal's Stress of a two-dimensional solution ($0.45/0.27 = 1.67$).

Discussion

The main goal of Study 1 was to examine the number of dimensions that would best summarize the leadership descriptive items. The two-dimensional solution appears to sufficiently summarize the items. The following study is conducted to (1) further test the circumplex nature of the items, (2) study the possibility to create scales and examine the content of these possible scales, and (3) explore the possible similarities between the leadership dimensions and the dimension of the interpersonal circumplex.

STUDY 2

Method

Participants

Respondents were 224 participants from companies in Belgium and The Netherlands (152 male [68%], 69 female, three unknown). All respondents occupied a supervisory position within their company. Age ranged from 23 years to 63 years ($M = 42.20$, $SD = 9.01$, three unknown). Respondents worked for the same employee for 13.7 years on average ($SD = 9.51$) and 4.9 years in the present function ($SD = 4.21$). On a 4-point scale, in which 1 represented the lowest level of the organization and 4 represented the highest level, respondents indicated to be working at level 2.67 on average ($SD = 0.69$). Although respondents were not paid for their participation, they could win a prize (coupon for a restaurant) and could receive a feedback report on their leadership styles upon request.

Procedure

Item selection. The 197 items selected in Study 1 served as a basis for the present study. Due to the limited number of items in some parts of the circular ordering, we decided to complement the item set with 13 of the previously—nonselected—items that were rewritten, resulting in a total of 210 items to be administered.

Data collection. Respondents were sent an email to ask for their participation, including a link to complete the questionnaire. Respondents were asked to provide self-ratings on the 210 leadership descriptive items on a 5-point Likert scale ranging

from 1 = “never” to 5 = “always”. Afterwards respondents were thanked and were sent a feedback report upon request.

Data analysis

Although Multidimensional Scaling has many positive features to exploratively measure circumplex models it has some limitations as well. The fit indices used in Multidimensional Scaling examine the goodness of fit of the dimensionality of the solution. However, it is limited when trying to assess whether the items are located on the circumference of the circle, which is the second conceptual assumption of an adequate circumplex model. Thus, the goodness of fit solution of Multidimensional Scaling can be excellent even though the data do not have circumplex structure (Fabrigar et al., 1997). Therefore, scales (see “octants” for explanation of formation of scales) were further analysed by using a confirmatory test, CIRCUM (Browne & Cudeck, 1992). CIRCUM is a covariance structuring technique and was developed specifically to evaluate circumplex correlation models (Gurtman & Pincus, 2000). This approach assesses whether the underlying structure of the correlation matrix has a circumplex nature (Fabrigar et al., 1997). To assess the model fit, we calculated the root mean square error of approximation (RMSEA), which is a badness-of-fit index. A lower value indicates a better fit of the model.

Browne and Cudeck (1992) and Fabrigar et al. (1997) have suggested that RMSEA values greater than 0.10 constitute poor model fit. RMSEA in circumplex studies is a relatively conservative fit measure and thus, sometimes, RMSEA values higher than 0.10 have been deemed as acceptable (Yik, 2009). The present study will accept the model as a circumplex when the RMSEA value is smaller than 0.10.

Results

All data on the 210 leadership descriptive items were entered in MDS. Vector lengths and vector angles were calculated using XLStat. The two-dimensional solution adequately summarized the data. The MDS analysis generated a Kruskal's Stress I of 0.26 and DAF value of 0.93.

To further reduce the number of items, without losing the circumplex structure, final items were selected through an iterative procedure using MDS, vector lengths, and vector angles. As in Study 1, selection of items was mainly based on vector lengths. However, in Study 2 items were also selected based on vector angle. One hundred and sixteen items were selected as final items for the questionnaire. The MDS solution for these 116 items generated a Kruskal's Stress I value of 0.23 and a DAF value of 0.93.

Dimensions. In this study, as in Study 1, two dimensions appeared to be sufficient to summarize the data. When rotated—with the positive pole of the vertical axis set in between the items “dares to dismiss staff members if justified” and “is self-confident”—these two dimensions showed face resemblance with the interpersonal dimensions “agency” and “communion”. Example items around the positive pole of the horizontal axis are “involves staff members in the organization of the work” and “is interested in feelings of staff members”, suggesting high levels of communion. Example items close to the negative pole of the horizontal axis are “is more interested in technical than in human aspects” and “holds back important information”, suggesting low levels of communion. Example items close to the positive pole of the vertical axis are “is self-confident” and “supervises the work of the staff members”, suggesting high levels of agency. Items close to the negative pole of the vertical axis are “hesitates to express his/her

preference” and “stays in the background”, suggesting low levels of agency.

Octants. Scales were created by dividing the circumplex into octants. Octants were created by calculating the vector angle of each item. Table 1 shows the proposed definitions and example items for each of the octant scales. The first octant contains items with a vector angle between 0° and 45° , with 0° set at the positive pole of the horizontal axis. Items in this scale were summarized as “the coaching leadership style” (number of items [k] = 15). Items with a vector angle between 45° and 90° were summarized as “the inspirational leadership style” ($k = 15$). The third octant, in which items have vector angles between 90° and 135° , was summarized as “the directive leadership style” ($k = 12$). The following octant (135° – 180°) was named “the authoritarian leadership style” ($k = 15$). Items between 180° and 225° were summarized as “the distrustful leadership style” ($k = 15$). Between 225° and 270° are items that

TABLE 1
CLS scales, definitions, and exemplar items

<i>Octant</i>	<i>Definition</i>	<i>Item</i>
Coaching	Persons with a coaching leadership style tend to show their appreciation for their subordinates and let them know how important they are; they tend to stimulate their subordinates through positive communication and to listen to the opinion of their subordinates	“shows that staff members are important to him/her”, “gives support to staff members”, “asks for the staff’s opinion”
Inspirational	Persons with an inspirational leadership style tend to stimulate and persuade subordinates through a clear vision, tend to act decisively when performance and/or organizational problems arise, and to motivate subordinates to perform optimally	“indicates clearly his/her role in the personal development of staff members”, “acts firmly in situations of crisis”, “sets clear objectives for the staff”
Directive	Persons with a directive leadership style tend to try to reach success competitively, tend to actively monitor and correct subordinates, and to behave strictly towards subordinates	“supervises the work of the staff members carefully”, “has severe judgements about staff members”, “is competitive”
Authoritarian	Persons with an authoritarian leadership style tend to force subordinates to obey them, tend to be harsh on subordinates, and to not accept criticism	“avoids friendly relationships”, “sets one-sidedly the expected performance level of the staff”, “gives orders in a compulsory way”
Distrustful	Persons with a distrustful leadership style tend to be suspicious of the motives of subordinates, tend to be quick and negative in their judgement, and stay distant from their subordinates	“is suspicious”, “judges too quickly”, “does not allow staff members to organize their work themselves”
Withdrawn	Persons with a withdrawn leadership style tend to be personally and professionally absent, tend to avoid confrontations and responsibilities, and to act too late when problems arise	“delays decisions”, “does not take responsibility”, “does not set the expected performance level”
Yielding	Persons with a yielding leadership style tend to be very flexible when interacting with subordinates and to be hesitant to provide guidance; they tend to put the subordinates’ interest above the company’s interest, and to avoid being the centre of attention	“is inconspicuous”, “wants to please everybody”, “is able to subordinate the company’s interests to the staff’s interests”
Participative	Persons with a participative leadership style tend to include subordinates in all processes; they tend to easily accept and incorporate subordinates’ propositions, and to show their understanding of the feelings and emotions of their subordinates	“makes certain decisions together with the staff”, “is tolerant”, “allows staff members to do their work their own way”

were summarized as “the withdrawn leadership style” ($k = 15$). Items with vector angles between 270° and 315° could be summarized as “the yielding leadership style” ($k = 15$). Finally, items between 315° and 360° could be summarized as “the participative leadership style” ($k = 14$). To visualize the proposed structure, Figure 2 provides a graphical representation of the conceptualization of the leadership circumplex.⁴

To examine the internal consistencies of the eight scales, we calculated Cronbach’s alpha coefficients for the octants, which ranged between 0.77 and 0.91 (see Table 2). To examine dimensionality of these octants, the eight scales were entered in an MDS analysis. The two-dimensional solution generated a Kruskal’s Stress I value of 0.02 and a DAF value of 1.00.

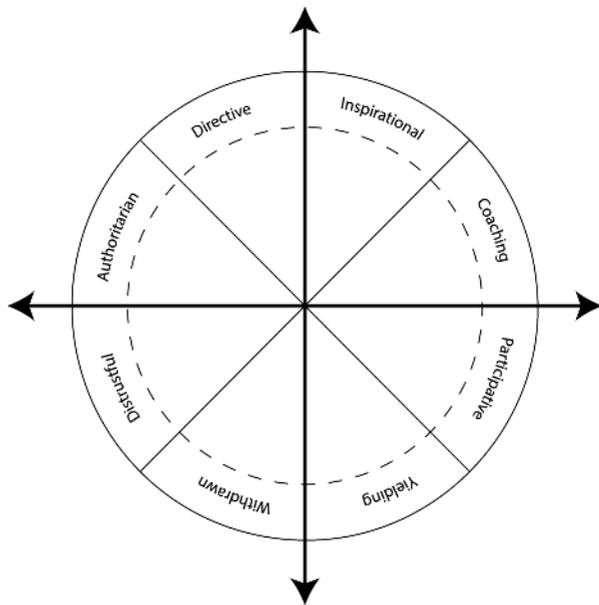


Figure 2. The leadership circumplex.

TABLE 2
Octant characteristics in Study 2

Octant	α	Vector angle	Vector length	M	SD
Coaching	.91	18.88	0.67	4.16	0.40
Inspirational	.89	57.49	0.66	4.02	0.41
Directive	.77	100.83	0.62	3.27	0.45
Authoritarian	.85	158.44	0.66	2.32	0.47
Distrustful	.82	193.63	0.68	1.91	0.36
Withdrawn	.86	241.30	0.70	1.94	0.40
Yielding	.82	280.99	0.65	2.56	0.42
Participative	.81	340.41	0.65	3.71	0.35

⁴The Leary (1957) conceptualization chose a different rotation of octants than shown in the conceptualization of the leadership circumplex. This rotation was chosen to obtain a more comprehensive link to the existing literature. Rotation of octants influences the content of each scale, but it does not influence the content or structural characteristics of the circumplex.

Vector lengths ranged from 0.62 to 0.70, indicating that all octants were located close to the circumference of a circle. Results from CIRCUM resulted in an RMSEA of 0.09. Although this is at the upper level of an acceptable RMSEA, given the complexity of arriving at a satisfactory circumplex structure and the conservativeness of the CIRCUM test, we deemed it acceptable for our leadership circumplex. Therefore, we accepted the model as a circumplex structure.

Discussion

Studies 1 and 2 resulted in a leadership questionnaire with an acceptable circumplex structure. The eight scales, which are created by dividing the circumplex into octants, are highly reliable. We decided to name this questionnaire the Circumplex Leadership Scan, or shortly the CLS.^{5,6} A third study is conducted to investigate the stability of the circumplex structure of the CLS. This study will explore the underlying structure of subordinates’ ratings about their leader. We hypothesize that the subordinate’s ratings of the leader’s leadership style will have the same underlying circumplex structure. Study 3 will compute the congruence between these structures. By examining this, it will explore the adequacy to use the CLS as a 360° feedback instrument.

STUDY 3

Method

Participants

Respondents were 194 participants from different companies in The Netherlands. Data were collected from dyads, each dyad containing one person occupying a supervisory position and the other one being one of the supervisor’s subordinates. Data were collected from 93 leaders (61 male, 32 female) and 101 subordinates (48 male, 53 female).⁷ Respondents’ age ranged from 18 years to 62 years (leaders: $M = 35.63$, $SD = 12.39$; subordinates: $M = 30.86$, $SD = 9.46$; one unknown). On average leaders supervised 17.6 people ($SD = 36.48$). Leaders

⁵The Circumplex Leadership Scan was originally constructed as a 360° feedback instrument. It was originally named Circumplex Leadership Scan 360° (CLS360). However, in this article we do not measure 360° feedback. Therefore, for the purpose of this article, we chose to name the scan “Circumplex Leadership Scan” (CLS).

⁶The CLS is open to use for research purposes. A full list of items can be requested from the fourth author, Patrick Vermeren (patrick.vermeren@perco.be).

⁷For one leader more than one subordinate completed the questionnaire. Answers for these subordinates were therefore aggregated for further analysis.

worked at their present employer for 5.89 years ($SD = 6.73$) and 3.72 years in the present function ($SD = 5.02$). Subordinates worked at their present employer for 4.48 years ($SD = 5.82$) and 2.88 years in the same function ($SD = 4.19$). On a 4-point scale, in which 1 represented the lowest level of the organization and 4 represented the highest level, leaders indicated to be working at level $M = 3.04$ ($SD = 0.88$) (subordinates worked at a lower level: $M = 2.22$, $SD = 0.80$).

Procedure

The CLS consisted of the 116 items that resulted from Studies 1 and 2. The 93 leaders were sent an email to ask for their participation, including a link to complete the questionnaire. They were asked to complete a self-rating of the CLS themselves and to ask one of their subordinates to complete an other-rating of the CLS with the leader as the target person. Afterwards all respondents were thanked and the leaders were sent a feedback report on their self-ratings upon request.

Data analysis

Study 3 used MDS and CIRCUM to analyse the data. Furthermore, Procrustes analysis was used to test the congruence between the structure of the self- and other-ratings. Procrustes analysis compares the underlying structure of two datasets. It converts the two datasets towards each other by a set of transformations. First, the more conventional transformations, for instance rotation of the dimensions, are used. Then, more unconventional transformations follow, for instance, by adding a weight to one of the dimensions. Congruence measures are calculated. Several cutoff values of congruence are mentioned in the literature, i.e., .80 (Barrett, 1986), .85 (Haven & ten Berge, 1977), and .90 (Mulaik, 1972). The present study will accept the similarity of the dimensions when the congruence measure exceeds the most conservative cutoff value: .90.

Results

Leaders' self-rating. To assess the circumplex properties of the CLS, the eight octants, containing the self-ratings of the leaders, were entered in an MDS analysis. The two-dimensional solution generated a Kruskal's Stress value of 0.02, and a DAF value of 1.00. Entering the eight scales in CIRCUM resulted in an RMSEA value of 0.00, indicating an approximately perfect fit.

Polar angles, calculated with the coordinates from the MDS analysis, are shown in Table 3. All octants were located at approximately their expected

position, except for the octant "participative leadership". This octant should be ideally located at approximately 335.5° ; however, in contrast to findings in Study 2, it was located at 5.29° . Table 3 also shows the Cronbach's alphas from the octant scales, which ranged from $\alpha = .72$ to $\alpha = .88$, indicating reasonably to highly reliable scales.

Subordinates' ratings. To test the circumplex structure in the subordinates' ratings, scales were entered in an MDS analysis. The two-dimensional solution generated a Kruskal's Stress I of 0.01 and a DAF value of 1.00. Data was also entered in CIRCUM, resulting in an RMSEA value of 0.06, indicating a reasonable fit of the model. Table 4 shows the polar angles calculated with the coordinates from the MDS analysis, the means and standard deviations, and the vector lengths of the eight scales.

A Procrustes analysis was used to evaluate the congruence between the MDS solution of leaders' self-ratings and the MDS solution of the subordinates' ratings of their leader. The locations of the octant scales in the maximally congruent Procrustes solution are shown in Figure 3. The overall solution congruence was 0.995, indicating that leaders' self-ratings and subordinates' ratings of their leaders show the same underlying circumplex structure.

TABLE 3
Leaders' octant characteristics for Study 3

Octant	α	Vector angle	Vector length	M	SD
Coaching	.88	22.26	0.68	4.05	0.47
Inspirational	.83	56.87	0.63	3.83	0.43
Directive	.72	113.45	0.56	3.28	0.45
Authoritarian	.84	163.68	0.62	2.50	0.55
Distrustful	.83	202.91	0.68	2.12	0.50
Withdrawn	.81	239.29	0.72	2.18	0.47
Yielding	.73	281.95	0.67	2.58	0.40
Participative	.84	5.29	0.71	3.74	0.46

TABLE 4
Subordinates' octant characteristics for Study 3

Octant	α	Vector angle	Vector length	M	SD
Coaching	.91	20.99	0.68	3.83	0.55
Inspirational	.89	57.99	0.63	3.65	0.56
Directive	.84	108.95	0.58	3.20	0.58
Authoritarian	.91	159.13	0.64	2.40	0.63
Distrustful	.89	192.35	0.64	2.16	0.54
Withdrawn	.88	245.89	0.73	2.37	0.57
Yielding	.81	274.87	0.69	2.61	0.46
Participative	.86	354.11	0.69	3.55	0.48

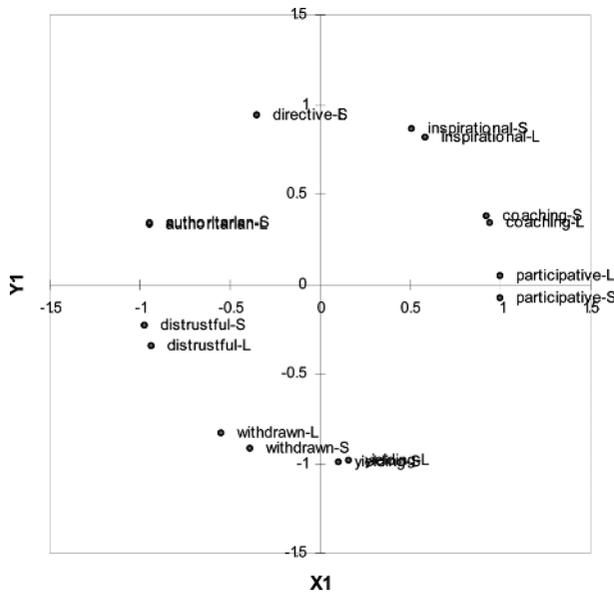


Figure 3. Procrustes rotation of leaders' self-ratings and subordinates' ratings of their leader.

Discussion

Study 3 again underscores the stability of the circumplex properties of the CLS, including the internal consistency of the different octants. Furthermore, Study 3 shows that data from both leaders' self-rating and subordinates' ratings on their leader both comply with a true circumplex. The underlying circumplex structure of the self- and other-ratings appear highly congruent. In Study 2 we provided labels for the resulting CLS scales based on an interpretation of their content. However, to inspect the validity of our interpretation of the CLS scales, a fourth study was conducted. Study 4 will examine the construct and predictive validity of the questionnaire and its test-retest reliability.

STUDY 4

Method

Participants

Participants were 112 leaders from companies in Belgium and The Netherlands. Out of 112 participants, 38 were female (34%), and one participant did not indicate gender. The average age of participants was 44.39 ($SD = 8.64$). When asked to indicate on which level they worked in their organization (in which 1 was the highest level and 4 was the lowest), participants indicated to work at level 2.88 on average ($SD = 0.73$). Participants worked for the same employer for 9.88 years ($SD = 8.20$) and 6.05 years in the current position ($SD = 6.79$). The number of subordinates that were led by the

participants ranged from 1 to 500 ($M = 26.01$, $SD = 57.07$; three participants indicated that they had no subordinates at the moment of completing the questionnaire).

Parallel to this study, the test-retest reliability was examined. Out of 112 participants, 80 participants (29 female [26%]) were also part of the test-retest study.

Procedure

Different companies were approached to participate in this study. The companies themselves selected the participants. In return, participants received a full report on their leadership styles. Completion of the first questionnaire, the CLS, was considered the start of the study for each participant. The CLS was completed on an online test platform. Two to five days after completion, participants received an email with an invitation for the second questionnaire (see Materials section).

To study the test-retest reliability, participants were asked to complete the CLS again 4–6 weeks after completion of the first questionnaire. The latter was also completed on the same online test platform.

Materials

CLS. As a first questionnaire, the CLS questionnaire, which was constructed in Studies 1 and 2, was used. The CLS contains 116 leadership descriptive items, measuring eight leadership styles. Scales and example items can be found in Table 1. Cronbach's alphas of the CLS octant scales in the present study were: coaching ($k = 15$, $\alpha = .84$), inspirational ($k = 15$, $\alpha = .87$), directive ($k = 12$, $\alpha = .81$), authoritarian ($k = 15$, $\alpha = .79$), distrustful ($k = 15$, $\alpha = .78$), withdrawn ($k = 15$, $\alpha = .83$), yielding ($k = 15$, $\alpha = .80$), and participative ($k = 14$, $\alpha = .75$).

Leadership styles. With a second questionnaire, 16 leadership styles were measured with different (parts of) leadership questionnaires. Although the coefficient alpha scale reliabilities of some leadership styles were relatively low (see later), we chose to use the original factor structure of each questionnaire to enable comparison between the CLS and the other leadership models. The official Dutch MLQ Form 5X (Mindgarden, 2002) was used to measure "idealized influence; attributed" ($k = 4$, $\alpha = .52$), "idealized influence; behaviour" ($k = 4$, $\alpha = .60$), "inspirational motivation" ($k = 4$, $\alpha = .64$), "intellectual stimulation" ($k = 4$, $\alpha = .65$), "individualized consideration" ($k = 4$, $\alpha = .57$), "contingent reward" ($k = 4$, $\alpha = .41$), "management-by-exception; active" ($k = 4$,

$\alpha = .55$), “management-by-exception; passive” ($k = 4$, $\alpha = .66$), and “laissez-faire” ($k = 4$, $\alpha = .72$). Although, the coefficient alpha reliabilities are not high, these results are comparable with the results of other studies using the MLQ (e.g., Vinkenburg et al., 2011). Two scales by Syroit (1979) were used to measure “human-oriented leadership” ($k = 8$, $\alpha = .59$) and “task-oriented leadership” ($k = 8$, $\alpha = .76$). “Servant leadership” ($k = 14$, $\alpha = .75$) was measured by a scale from Ehrhart (2004). We measured “participative leadership” ($k = 6$, $\alpha = .57$) with a scale from the GLOBE study (De Vries, Pathak, & Paquin, 2011; based on the MCLQ; Hanges & Dickson, 2004). One scale of the CLIO (De Hoogh, Koopman, & Den Hartog, 2004) was used to measure “charismatic leadership” ($k = 8$, $\alpha = .78$). Finally, “despotic leadership” ($k = 6$, $\alpha = .43$) and “power sharing” ($k = 6$, $\alpha = .53$) were measured by two scales from De Hoogh and Den Hartog (2008).

Effectiveness. Also part of the second questionnaire were two scales used to measure the effectiveness of the leader, conceptualized as “effort” ($k = 9$, $\alpha = .77$; example item: “is willing to put in extra effort for the department to be successful”) and “performance” ($k = 6$, $\alpha = .83$; example item: “is very effective in his/her role as a leader”). The correlation between “performance” and “effort” was relatively high, $r = .48$, $p < .01$.

Data analysis

In the predictive validity analysis, relative weight analysis was used to examine the variance explained by each of the CLS styles and the other leadership styles. Relative weight analysis (Johnson, 2000; LeBreton & Tonidandel, 2008) is used to determine the explained variance of each independent variable when multiple, collinear, independent variables are used to explain a dependent variable. Specifically, relative weight analysis redistributes the variance shared by k independent variables which all load on k latent factors by regressing the dependent variables on these k latent factors, and by obtaining for each of the independent variables the sum of the squared loadings times the squared regression coefficients (i.e., comparable to the total indirect effects of the independent variables). The use of relative weights is especially recommended when new measures are used, as is the case in this study. Although new measures may have relative low levels of incremental validity compared to the level of variance already explained by existing variables, new measures may actually be relatively more important than the existing variables (LeBreton, Hargis, Griepentrog, Oswald, & Ployhart, 2007). Relative

weight analysis investigates the relative importance of new variables compared to existing variables by comparing the overall contribution each of the variables make in the prediction of a criterion. Results of both univariate and multivariate analyses are reported. A relative large contribution of the CLS styles compared to existing leadership measures may thus indicate that the CLS is a viable alternative to—or may be used in conjunction with—existing measures.

Results

Table 5 shows the correlations of the CLS leadership styles with the 16 leadership styles measured.

Correlations between the CLS and the MLQ. Table 5 shows the correlations of the eight CLS scales with the leadership styles of the MLQ, described by nine subscales. Transformational leadership, described by five subscales, was highly positively correlated with the leadership styles in the upper-right quadrant of the CLS. Individualized consideration was positively correlated with participative leadership as well. Idealized influence (attributed and behavioural), inspirational motivation, and intellectual stimulation showed significant correlations with directive leadership. The transformational styles were all negatively related to the leadership styles around the negative pole of the agency axis, namely withdrawn and yielding leadership.

The transactional styles “contingent reward” and “management-by-exception active” showed high convergence with CLS styles that are high in agentic behaviours, namely inspirational and directive leadership. Contingent reward was negatively correlated to withdrawn and yielding leadership. Management-by-exception active was negatively correlated with withdrawn leadership.

Management-by-exception passive showed opposite results. This style was positively correlated with the leadership styles low in agentic behaviours: distrustful, withdrawn, and yielding leadership and it was negatively related to inspirational and directive leadership. A similar pattern was shown by laissez-faire leadership. Laissez-faire was highly positively correlated to withdrawn and yielding leadership, and moderately positive to participative. This style also showed highly negative correlations with inspirational and directive leadership.

Correlations between CLS and human- and task-oriented leadership. Human-oriented leadership was positively related to the CLS styles high in communion, coaching and participative leadership.

TABLE 5
Correlations between CLS and other leadership styles

	CLS							
	<i>Coaching</i>	<i>Inspirational</i>	<i>Directive</i>	<i>Authoritarian</i>	<i>Distrustful</i>	<i>Withdrawn</i>	<i>Yielding</i>	<i>Participative</i>
MLQ (Mindgarden, 2002)								
Idealized Influence attributed	.26**	.45**	.42**	.22*	-.05	-.36**	-.35**	.017
Idealized Influence behaviour	.53**	.59**	.31**	.06	-.22*	-.46**	-.30**	.18
Inspirational Motivation	.38**	.52**	.34**	.16	-.16	-.42**	-.42**	-.00
Intellectual Stimulation	.21*	.46**	.25**	.14	-.00	-.34**	-.27**	-.02
Individualized Consideration	.43**	.49**	.15	-.14	-.30**	-.35**	-.21*	.30**
Contingent Reward	.24**	.37**	.23*	.11	-.01	-.33**	-.34**	.01
Management by Exception Active	.18	.32**	.44**	.16	.03	-.28**	-.16	-.12
Management by Exception Passive	-.28**	-.43**	-.31**	.01	.29**	.64**	.41**	.12
Laissez-Faire	-.31**	-.55**	-.41**	-.18	.12	.71**	.58**	.19*
Syriot (1979)								
Human-oriented	.53**	.33**	-.05	-.33**	-.44**	-.27**	.01	.47**
Task-oriented	.21*	.59**	.62**	.42**	.06	-.49**	-.48**	-.15
Ehrhart (2004)								
Servant	.43**	.39**	.03	-.16	-.18	-.27**	-.15	.32**
De Vries, Pathak, & Paquin (2011); Based on the MCLQ: Hanges and Dickson (2004)								
Participative	.33**	.23*	-.14	-.17	-.22*	-.16	-.15	.30**
De Hoogh et al. (2004); De Hoogh & Den Hartog (2008)								
Charismatic	.38**	.64**	.38**	.23*	-.08	-.54**	-.61**	-.10
Despotic	-.33**	-.13	.32**	.48**	.48**	.12	-.05	-.36**
Powersharing	.19*	.17	-.02	-.06	-.08	-.12	-.09	.27**
Effectiveness								
Effort	.41**	.40**	.18	-.08	-.36**	-.43**	-.36**	.04
Performance	.32**	.52**	.40**	.11	-.12	-.61**	-.59**	.00

* $p < .05$, ** $p < .01$. Highest row-wise correlations are in bold, lowest are in italics.

It was negatively related to the CLS styles on the opposite sites of the horizontal axis, authoritarian and distrustful leadership.

CLS styles high in agency, directive and inspirational leadership, were positively related to task-oriented leadership. Task-oriented leadership was negatively correlated to the styles low in agency, yielding and withdrawn leadership.

Correlations between CLS and servant, participative, despotic, powersharing, and charismatic leadership. Both participative and servant leadership showed high convergence with the CLS styles high in communion: inspirational, coaching, and participative leadership. Participative leadership was negatively related to distrustful leadership, and servant leadership was negatively related to withdrawn leadership. Despotic leadership shows high convergence with the CLS styles in the left half of the circumplex, indicating it was correlated with behaviours low in communion. Powersharing and the styles high in communion were positively related. Charismatic leadership was positively correlated to all the CLS styles on the upper half of the circumplex. It was negatively related to the styles low in agentic behaviours.

Predictive validity. The predictive validity of the CLS was measured by adding two leadership effectiveness scales to the questionnaire, effort and performance. Regression analysis, with the eight leadership styles of the CLS as the independent variables and effort as the dependent variable, resulted in an R^2 of .28. Correlations (Table 5) showed that coaching and inspirational leadership were positively related to effort and distrustful, withdrawn and yielding leadership were negatively related to the leadership effectiveness measure, effort. Regression analysis, with the eight leadership styles of the CLS as the independent variables and performance as the dependent variable, resulted in an R^2 of .48. Performance was positively related to styles high in communion, coaching, inspirational, and participative leadership. It was negatively related to withdrawn and yielding leadership.

Regression analysis, with the CLS styles and all other leadership styles as the independent variables and performance as the dependent variable, resulted in an R^2 of .62. The eight CLS scales showed incremental validity when entered after all other (non-CLS) leadership scales, $\Delta R^2 = .09$, $F(8, 87) = 2.54$, $p = .02$. Univariate relative weight analysis showed that the CLS accounted for 39% of the

TABLE 6
Relative weight analyses of CLS and other leadership styles

	<i>Performance relative weight (%)</i>	<i>Cumulative (%)</i>	<i>Effort relative weight (%)</i>	<i>Cumulative (%)</i>	<i>Multivariate relative weight (%)</i>	<i>Cumulative (%)</i>
Circumplex Leadership Scan						
Coaching	1.5		6.2		3.9	
Inspirational	4.4		2.9		3.7	
Directive	4.6		1.4		4.2	
Authoritarian	1.3		2.7		2.6	
Distrustful	0.8		12.1		7.8	
Withdrawn	10.1		4.1		7.6	
Yielding	14.5		7.9		9.8	
Participative	1.8	39.0	1.7	39.0	2.1	41.7
MLQ (Mindgarden, 2002)						
Idealized Influence Att.	10.0		5.4		6.8	
Idealized Influence Beh.	1.9		6.7		4.4	
Inspirational Motivation	4.0		2.0		2.9	
Intellectual Stimulation	2.7		1.6		2.0	
Individualized Consideration	2.0		2.9		2.0	
Contingent Reward	4.9		1.0		4.4	
Management-by-exception Act.	0.8		4.4		2.4	
Management-by-exception Pas.	5.6		2.6		4.0	
Laissez-faire	6.3	38.2	11.3	37.9	6.9	35.8
Syrroit (1979)						
Human-oriented	1.6		3.3		2.2	
Task-oriented	1.6		5.9		4.3	
Ehrhart (2004)						
Servant	9.9		7.9		7.2	
De Vries, Pathak, & Paquin (2011); Based on the MCLQ:						
Hanges and Dickson (2004)						
Participative	0.9		1.6		1.4	
De Hoogh et al. (2004); De Hoogh & Den Hartog (2008)						
Despotic	1.4		1.1		1.5	
Powersharing	1.1		0.9		1.3	
Charismatic	6.2	22.7	2.3	23.0	4.7	22.6

variance, the MLQ for 38.2%, and all the other styles together for 22.7%. The same regression analysis with effort as the dependent variable resulted in an R^2 of .46. The eight CLS scales showed incremental validity when entered after all other (non-CLS) leadership scales, $\Delta R^2 = .11$, $F(8, 87) = 2.11$, $p = .04$. Again, we conducted a univariate relative weights analysis with all CLS scales and all leadership styles. The CLS styles accounted for 39% of the variance, the MLQ styles 37.9%, and the remaining scales for 23% (see Table 6 for relative weights for each separate scale). Since the correlation between performance and effort is reasonably high, $r = .48$, $p < .01$, we also conducted a multivariate relative weight analysis. The CLS accounted for 41.7% of the variance, the MLQ styles for 35.8%, and the remaining scales for 22.6%.⁸ It should be noted that the CLS was

measured at a different time than the other leadership styles and effectiveness scales, while the latter two were measured at the same time. Thus, the analysis is a more conservative test for the CLS styles compared to the styles that were measured at the same time as the effectiveness scales.

Test-retest reliability. Correlations were computed between each of the CLS scales at Time 1 and Time 2 (Table 7). Correlations between the same scales at Time 1 and Time 2 (for instance, coaching at Time 1 and coaching at Time 2) ranged from .75 to .87, indicating high test-retest reliability. As can be seen in Table 7, correlations between neighbouring scales at Time 1 and Time 2 (for instance coaching at Time 1 and inspirational at Time 2) are relatively high. This is in line with the conceptualization of a circumplex. Styles that are closer together on the circumplex will also be more strongly related to each

⁸Because some of the MLQ and other leadership scales were highly unreliable, we conducted a Principal Component Analysis on all non-CLS items to find out whether the results held with fewer—but more reliable—scales. Generally, the relative weight results of the CLS, displayed in Table 6, were highly similar to the

results with more reliable scales. Results from the analysis can be obtained through the first author.

TABLE 7
Correlations between CLS leadership styles at Times 1 and 2

Time 2	Time 1							
	Coaching	Inspirational	Directive	Authoritarian	Distrustful	Withdrawn	Yielding	Participative
Coaching	.78**	.59**	-.03	-.22*	-.49**	-.45**	-.27*	.37**
Inspirational	.61**	.87**	.36**	.05	-.30**	-.68**	-.58**	.10
Directive	.04	.46**	.84**	.55**	.22	-.41**	-.50**	-.34**
Authoritarian	-.43**	-.03	.59**	.83**	.63**	.15	-.11	-.46**
Distrustful	-.64**	-.46**	.27*	.57**	.75**	.53**	.21	-.46**
Withdrawn	-.47**	-.75**	-.31**	.01	.32**	.85**	.68**	.03
Yielding	-.14	-.52**	-.36**	-.23*	-.02	.61**	.82**	.31**
Participative	.41**	.15	-.29**	-.33**	-.40**	.00	.15	.76**

* $p < .05$, ** $p < .01$. Correlations between the same scales at time 1 and time 2 are boldprinted.

other, whereas styles that are further apart will be less strongly related or even negatively related.

Discussion

Study 4 indicated a high convergence of the CLS leadership styles with other—more commonly used—leadership styles. Moreover, it showed that the scores of the respondents remained relatively stable over time. Styles both high in communion and high in agency were positively related to leadership effectiveness. Styles opposite in the circumplex, and particularly styles low in agency, were negatively related to effectiveness. However, Study 4 measured both leadership styles and leadership outcome using leaders' self-rating. To more fully explore the predictive validity of the CLS leadership styles, we conducted a fifth study. Study 5 will examine the relationship between self- and subordinate-rated leadership styles and different subordinate-rated leadership outcome scales.

STUDY 5

Method

Participants

Participants were 188 individuals from different companies in The Netherlands. Out of 188 participants, 94 occupied a leadership position (63 male, 31 female) and 94 were direct subordinates of the leaders (43 male, 50 female, one unknown). The average age of leaders was 43.47 ($SD = 8.40$), and of subordinates 38.18 ($SD = 11.49$). When asked to indicate on which level they worked in their organization (in which 1 was the highest level and 4 was the lowest), leaders indicated to work at level 2.99 on average ($SD = 0.81$) and subordinates at 2.36 ($SD = 0.63$). Leaders worked for the same employer for 10.08 years ($SD = 8.76$) and 6.33 years in the current

position ($SD = 7.00$). Subordinates worked for the same employer for 7.65 years ($SD = 8.29$), and 6.55 years in the current position ($SD = 8.68$).

Procedure

Several companies in The Netherlands were approached to participate in this study. The companies could select the participants themselves. In addition, leaders and subordinates were approached personally as well, through the network of the researcher and research assistants. In return, leaders received a full report on their self-reported leadership styles. The CLS was completed on an online test platform.

Materials

CLS. The CLS questionnaire, which was constructed in Studies 1 and 2, was used. Both leaders and subordinates completed the exact same questionnaire. Questions were presented to both leaders and subordinates in third person singular. Cronbach's alphas of the CLS octant scales in the present study were for leaders: coaching ($k = 15$, $\alpha = .83$), inspirational ($k = 15$, $\alpha = .89$), directive ($k = 12$, $\alpha = .74$), authoritarian ($k = 15$, $\alpha = .86$), distrustful ($k = 15$, $\alpha = .80$), withdrawn ($k = 15$, $\alpha = .81$), yielding ($k = 15$, $\alpha = .77$), and participative ($k = 14$, $\alpha = .81$); and for subordinates: coaching ($\alpha = .93$), inspirational ($\alpha = .90$), directive ($\alpha = .78$), authoritarian ($\alpha = .92$), distrustful ($\alpha = .90$), withdrawn ($\alpha = .88$), yielding ($\alpha = .73$), and participative ($\alpha = .89$). Correlations between leader- and subordinate-ratings on the scales ranged from .26 for coaching leadership ($p < .01$) to .50 for directive leadership ($p < .01$), which compares favourably with the amount of self-other agreement found in other studies (e.g., De Vries, 2012).

Leadership outcome. Leadership outcomes were measured using other-ratings, that is, using

subordinate ratings of his/her leader. Three scales were used to measure leadership outcomes. The first scale measured commitment (example item: "I am proud of my employer"; $k = 6$, $\alpha = .72$), the second measured identification with the organization (example item: "When I talk about the organization that I work for, I generally talk about 'we' and not about 'they'"; $k = 6$, $\alpha = .77$), and the last scale measured effectiveness (example item: "My supervisor is successful within the organization"; $k = 9$, $\alpha = .91$).

Results

Table 8 shows the correlations of the CLS leadership styles with the three leadership outcome scales.

Correlations between CLS and commitment. Commitment was positively related to self-rated inspirational leadership and negatively to self-rated withdrawn leadership. It was also positively related to subordinate-rated participative, coaching, and inspirational leadership and negatively to subordinate-rated authoritarian, distrustful, and withdrawn leadership.

TABLE 8
Correlations between leadership style and leadership outcomes

	<i>Leadership outcome scales (subordinate-rated)</i>		
	<i>Commitment</i>	<i>Identification</i>	<i>Effectiveness</i>
Coaching			
Self-rated	.12	.07	.24*
Subordinate-rated	.38**	.34**	.82**
Inspirational			
Self-rated	.28**	.22*	.33**
Subordinate-rated	.35**	.34**	.74**
Directive			
Self-rated	.03	.08	.10
Subordinate-rated	-.05	.08	.07
Authoritarian			
Self-rated	-.08	-.01	-.07
Subordinate-rated	-.22*	-.09	-.51**
Distrustful			
Self-rated	-.18	-.06	-.24*
Subordinate-rated	-.35**	-.20*	-.75**
Withdrawn			
Self-rated	-.26*	-.21*	-.27**
Subordinate-rated	-.38**	-.25*	-.72**
Yielding			
Self-rated	-.14	-.21*	-.08
Subordinate-rated	-.16	-.19	-.08
Participative			
Self-rated	.09	.00	.19
Subordinate-rated	.30**	.20*	.67**

* $p < .05$, ** $p < .01$.

Correlations between CLS and identification with the organization. Identification with the organization was positively related to self-rated inspirational leadership. It was negatively related to self-rated withdrawn and yielding leadership. Furthermore, identification with the organization was positively related to subordinate-rated participative, coaching, and inspirational leadership and negatively to subordinate-rated withdrawn and distrustful leadership.

Correlations between CLS and effectiveness. Positive significant correlations were found for leadership effectiveness and both self-rated coaching and inspirational leadership. There was a negative relationship between self-rated distrustful and withdrawn leadership and leadership effectiveness. Subordinate-rated participative, coaching, and inspirational leadership was positively correlated with effectiveness. Effectiveness was negatively related to subordinate-rated authoritarian, distrustful, and withdrawn leadership.

Discussion

Similar to the findings from Study 4, Study 5 showed that, in general, styles high in both communal and agentic behaviours are perceived as more effective, whereas the styles low in both communion and agency are perceived as less effective. Styles high in communion and agency are also positively related to other leadership outcome variables, identification with the organization and commitment.

Studies 1 to 5 resulted in a psychometrically sound leadership questionnaire, the CLS. However, compared to other leadership questionnaires, the CLS is somewhat lengthy. Therefore, the aim of Study 6 is to investigate the possibility of creating a short form of the CLS.

STUDY 6

Method

Participants and procedure

To select items for a short form of the questionnaire, data of Studies 3, 4, and 5 were used. Self-ratings of leaders on the CLS from these three studies were merged into one dataset. This resulted in a dataset with 299 leaders (see Participants sections in Studies 3, 4, and 5).

Furthermore, to test the circumplex criteria of the resulting short forms, a second dataset was used. This dataset consisted of self-ratings on the CLS behaviours of 220 leaders working at organizations in The Netherlands and Belgium (157 male, 63 female). Average age of leaders was 45.67 ($SD = 8.84$). All

leaders took part in a training programme organized by one and the same consultancy organization. As part of the training, leaders were asked to complete the CLS.

Material

CLS. The CLS questionnaire constructed in Studies 1 and 2 was used. All leaders were asked to complete the 116 items (see Materials sections in Studies 3, 4, and 5 for the reliabilities of the complete scales for the dataset used for item selection). Reliabilities of the complete leadership scales of the second—new—dataset, used for testing the circumplex properties of the short form of the questionnaire were: coaching ($k = 15$, $\alpha = .94$), inspirational ($k = 15$, $\alpha = .93$), directive ($k = 12$, $\alpha = .89$), authoritarian ($k = 15$, $\alpha = .92$), distrustful ($k = 15$, $\alpha = .93$), withdrawn ($k = 15$, $\alpha = .93$), yielding ($k = 15$, $\alpha = .91$), and participative ($k = 14$, $\alpha = .93$).

Item selection procedure

Self-ratings of leaders of Studies 3, 4, and 5 were merged into one dataset. Multidimensional Scaling was used to calculate the location of all items in the two-dimensional solution. XLStat was used to calculate the vector angles for each item. Based on the vector angles, three different short forms of the questionnaire were created. First, a short form was made named “uneven items”. Items in this short form were selected by going clockwise on the circumplex and selecting, based on the vector angle, the first, third, fifth, etc. items of a scale. This resulted in eight scales similar to the existing scales of the complete version; however, now each scale consisted of eight items. Second, a short form was made, that was named “even items”. Again, selection was based on vector angles of the items. This time, the second, fourth, sixth, etc. items were selected. This resulted in eight scales, each containing seven items. For these first two short forms an exception was formed by the scale “directive leadership”. The original scale of directive leadership consisted of 12 items. Therefore, only one short scale was created containing eight of the original 12 items. Finally, a third selection method was applied, named “average items”. The average vector angle of each scale was calculated for each of the scales by adding the vector angles of items in that scale divided by the number of items in that scale. Then, the eight items with vector angles closest to the average vector angle of each scale were selected for the short form. This resulted in eight scales, each containing eight items.

In order to test the circumplex properties of the three short forms of the questionnaire a second

dataset was used containing self-rating of 220 leaders on all CLS items. Each of the short scales were created and entered in Multidimensional Scaling analysis as well as CIRCUM.

Results

Table 9 shows the Cronbach’s alphas and the number of items for each scale in the three short forms of the CLS.

Uneven items. Cronbach’s alphas for the eight scales ranged from .62 to .80. Scales were entered in MDS, which generated a Kruskal’s Stress value of 0.02, and a DAF value of 1.00. Entering the eight short scales in CIRCUM resulted in an RMSEA value of 0.09, indicating a moderate fit.

Even items. The eight scales of the even items scales had Cronbach’s alpha values ranging from .60 to .75. Entering the eight scales in MDS resulted in a Kruskal’s Stress value of 0.03, and a DAF value of 1.00. Entering the scales in CIRCUM generated an RMSEA value of 0.08. This indicated a moderate fit.

Average items. Finally, the eight “average items” scales were created. Cronbach’s alphas for these scales ranged from .70 to .83. The two-dimensional MDS solution generated a Kruskal’s Stress value of 0.04 and a DAF value of 1.00. Entering the scales into CIRCUM resulted in an RMSEA of 0.05. This indicates that the solution is a good fit.

Discussion

Study 6 resulted in three possible short forms of the CLS. Each short form was tested for the internal reliability of each of the scales and the circumplex properties of the specific short form. The short form,

TABLE 9
Cronbach’s alphas and number of items (k) for short forms of Study 6

	<i>Uneven items</i>		<i>Even items</i>		<i>Average items</i>	
	k	α	k	α	k	α
<i>Octant</i>						
Coaching	8	.73	7	.65	8	.73
Inspirational	8	.80	7	.75	8	.80
Directive*	8	.71	8	.71	8	.78
Authoritarian	8	.73	7	.69	8	.83
Distrustful	8	.67	7	.63	8	.71
Withdrawn	8	.75	7	.70	8	.76
Yielding	8	.70	7	.63	8	.70
Participative	8	.62	7	.60	8	.71

*The scales “uneven items” and “even items” of directive leadership are the same.

which was named “average items”, generated the highest internal reliabilities. Each scale of this form generated a Cronbach’s alpha higher than .70. Furthermore, MDS analysis showed that a two-dimensional solution was suitable to summarize the eight scales. Finally, CIRCUM analysis showed the goodness of fit of this version of the CLS as a circumplex.

It should be noted, however, that the circumplex properties of the short versions were tested with a dataset containing all the CLS items, instead of testing the specific short versions separately. Therefore, future studies may benefit from testing the short form separately. Nevertheless, this study showed promising results to also create a short version of the questionnaire.

GENERAL DISCUSSION

Integration

The aim of this study was to provide an integrative model of leadership, theorized and operationalized as the leadership circumplex. In the introduction we argued that leadership is interpersonal by nature (e.g., Vroom & Jago, 2007; Yukl, 2002), leadership can be captured by two main dimensions (e.g., Kahn & Katz, 1953), and that these two dimensions strongly resemble the interpersonal circumplex (e.g., Ruiz et al., 2001). With a set of five studies we demonstrated that the leadership circumplex is indeed a valid and reliable framework for leadership behaviours. It was shown that it provides an integrative, comprehensive, and continuous model of leadership styles.

CLS

Specifically, we confirmed that a two-dimensional structure sufficiently describes leadership behaviours and that these two dimensions show a recognizable resemblance to the interpersonal dimensions “agency” and “communion”. Study 2 demonstrated that the structural characteristics of this proposed leadership circumplex comply with the criteria of a true circumplex. Items were equally spaced on the circumference of a circle, with equal vector lengths measured from the origin of the circle.

Octants

Eight scales, representing eight different leadership styles, were created by dividing the circumplex into octants. As was the case with the items, these octants complied with the criteria of an almost perfect circumplex. That is, the octants were best summarized by two dimensions and were located equally

spaced on the circumference of a circle. Based on the content, these octants were named the coaching leadership style, the inspirational leadership style, the directive leadership style, the authoritarian leadership style, the distrustful leadership style, the withdrawn leadership style, the yielding leadership style, and the participative leadership style. Each leadership style showed high reliability coefficients.

Leader and subordinate

Study 3 demonstrated that subordinates’ ratings of their leaders showed the same circumplex structure as the leaders’ self-ratings. This study examined the congruence between the structure of the leaders’ self-ratings and the subordinates’ other-ratings. The underlying structures appeared to be highly congruent, meaning that the structural model of the leaders’ ratings on their leadership styles is almost exactly the same as the structural model of the subordinate’s ratings. It is often of great value to individually compare self- and other-ratings. The high congruence indicates that individual comparison between self- and other-ratings is possible and that there is potential for the CLS to be used as a 360° measurement instrument. However, the present study only examined the congruence between leaders’ self-ratings and ratings of their subordinates. More studies, investigating the congruence between self- and peer-rating and self- and supervisor-ratings, are needed to confirm that the CLS is an adequate instrument to use for 360° feedback.

Convergent and predictive validity

Study 4 showed that the convergent validity of the octant scales with leadership styles from other questionnaires was high. The two dimensions, hypothesized to resemble the interpersonal dimensions agency and communion, showed the expected resemblance to the similar dimensions human- and task-oriented leadership (Syroit, 1979). Furthermore, the octant leadership styles showed high convergence and divergence with the hypothesized styles. The upper-right quadrant was strongly related to for instance charismatic leadership (De Hoogh et al., 2004) and the subscales of transformational leadership (Avolio & Bass, 1991). The lower-left quadrant was represented by the more passive, absent leadership styles like laissez-faire leadership (Avolio & Bass, 1991). The upper-left quadrant is among others characterized by the darker side of leadership, namely despotic leadership (De Hoogh & Den Hartog, 2008). The lower-right quadrant was expected to be related to participative leadership (Hanges & Dickson, 2004). However, participative leadership appeared to be better represented by the upper-right quadrant. A

possible explanation for this discrepancy is the low internal reliability of this scale in our study. However, the CLS scale participative leadership was shown to be relatively unstable in its location in the circumplex (see Study 3) and seems to be somewhat more closely related to the CLS style coaching leadership than to yielding leadership.

Styles high in both communion and agency were positively related to effectiveness, whereas styles low in both communion and agency demonstrated to be ineffective. This is in line with previous research on leadership effectiveness and the convergent validity of the CLS. Previous studies have shown styles represented in the upper-right quadrant, for instance charismatic and transformational leadership, to be highly effective and styles related to the lower-left quadrant, for instance laissez-faire leadership, to be ineffective (e.g., Judge & Piccolo, 2004; Lowe, Kroeck, & Sivasubramaniam, 1996). Compared to the other leadership styles the CLS styles accounted for a relatively large amount of the explained variance of the effectiveness measures. This was especially noteworthy because the CLS was measured at a different time from the other leadership styles, which were measured together with the effectiveness measures. However, it should be noted that the other leadership scales had quite a large range in their Cronbach's alpha values. The predictive validity of the CLS that was examined in Study 4 should be interpreted with caution. Measures of effectiveness (effort and performance) were rated by the leader themselves. Many previous studies have shown that when adequately and reliably wanting to measure leadership effectiveness, one should not rely on self-ratings alone (e.g., Hofstee, 1994). Therefore, a fifth study was conducted that measured different leadership outcome variables and related them to self- and other-rated leadership styles and which confirmed the results of Study 4. Finally, scores on the CLS leadership styles showed high levels of test-retest reliability.

Subordinate

Most leadership theories stress the interpersonal nature of leadership but few actually integrate leadership theory with leadership measurement to arrive at a conceptualization of the interaction between leader and led (Avolio, 2007). A theoretical framework that does consider leader-follower interaction is the transactional or social exchange view of leadership (Hollander, 1964), according to which leadership is a two-way influential process from leader to led and vice versa. The dyadic nature of leadership is also central in the leader-member exchange (LMX) perspective on leadership (Gerstner & Day, 1997). However, these social exchange

perspectives have failed to address the circumplex nature of interpersonal interactions between leaders and followers. The present study showed the strong face resemblance of the CLS with notions from interpersonal theories, specifically the interpersonal circumplex. Interesting for future research would be to not only study the leaders' behaviours but also to examine the subordinates' reactions to these behaviours.

Markey, Funder, and Ozer (2003) and Tracey, Ryan, and Jaschik-Herman (2001) show that when two persons interact their behaviours tend to conform to a circular pattern as predicted by the interpersonal circumplex. More importantly, their study demonstrates that dominant behaviours elicit submissive responses. However, behaviours on the communion axis encourage similar behaviours; thus, friendly behaviour from one person encourages friendly behaviour in the interaction partner. Markey et al. conducted their study with dyads containing two persons that were randomly assigned to each other and thus, most probably, equal in hierarchical ranking. However, when studying leadership behaviour, leader and subordinate are, as the words say, already appointed to a hierarchical position, by function or position in an organization. An indication of the usefulness of a circumplex approach is provided in a study by Glomb and Welsh (2005), who demonstrated that subordinate satisfaction is higher when their supervisor shows complementary behaviours on the personality dimension of control than when he or she shows noncomplementary behaviours on the control dimension. The CLS, by being a circular behavioural model, can help to gain insight in whether certain leadership behaviours invite complemented or mimicked behaviours of the subordinate and vice versa. Combining this with measures of effectiveness might provide useful information to practitioners, which can be put to good use in training, coaching, management development, etc. To be in a position to examine such questions, the CLS should be complemented with a version that is able to measure subordinate behaviours.

Integration

The present set of studies showed the possibility to integrate different leadership models into one overarching leadership circumplex. In a circumplex, two dimensions summarize the variables. A previous attempt to integrate leadership behaviours of DeRue et al. (2011) and Yukl et al. (2002) argued that there is a third dimension of leadership behaviours that is associated with change-oriented behaviours. However, in the present study we did not find an indication for the existence of this third factor.

DeRue et al. categorized transformational, charismatic, and inspirational leadership behaviours under change-oriented behaviours, which are captured by the styles high in agency and communion in the CLS. Derue et al. also mentioned a fourth category named passive leadership, which in the CLS is captured by the styles in the bottom of the circumplex.

Limitations

The present study resulted in a promising questionnaire, the CLS; however, some limitations arise as well, three of which will be mentioned. Altogether, the CLS generally complied with the strict criteria of a circumplex model. Study 3 showed an exception by the vector angle of the octant “participative leadership”. The vector angle of this scale was rotated towards the octant “coaching leadership”. Possibly, this limitation can be solved by future studies by trying to add extra items to this scale. However, this discrepancy might also be due to characteristics of the specific sample or study.

Recently there has been some debate about the use of the term “leader” versus the term “manager” (e.g., Bedeian & Hunt, 2006; Hunter et al., 2007). In the present article, we chose to use the word “leader” for each person in a formal position of authority. However, some scholars may argue that someone occupying a supervisory position does not make that person a leader. It should be noted that wherever we used the word “leader”, we referred to a person occupying a supervisory position.

Study 3 examined the structural congruence between self- and other-ratings. As is commonly done in 360° research, leaders chose their own subordinates. As far as we know, effects of this are unknown. However, this may have resulted in a more similar structure of self- and other-ratings than would have been present with random selection of dyads.

CONCLUSION

Conceptualizing a leadership circumplex may be helpful to integrate the great amount of leadership literature into one framework. The present study demonstrates the theoretical and empirical possibility of this conceptualization. Specifically, in five studies we have shown that leadership can be both theoretically and empirically captured by the leadership circumplex, with its two dimensions similar to the dimensions of the interpersonal circumplex. Furthermore, we have shown that the proposed operationalization of the leadership circumplex, the CLS, is a psychometrically sound instrument. This overarching leadership model may provide an

opportunity to better unite the existing leadership literature, to capture more leadership styles at once in future studies, and to provide a starting point for investigating the dynamic interplay between leaders and led.

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