

Leading Followers and Teams in Innovation Processes:
An Empirical Investigation and Extension of Ambidextrous Leadership



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Zusammenfassung

Führungskräfte müssen die Innovationskraft ihrer Mitarbeiter und Teams fördern, um ihrer Organisation einen langfristigen Wettbewerbsvorteil zu verschaffen. Rosing, Frese und Bausch (2011) schlugen vor, dass Mitarbeiter- und Teaminnovation durch *Ambidextrous Leadership* (AL) gefördert werden können. AL besteht aus den Führungsverhaltensweisen (1) *Opening Leader Behaviour* (OLB), welches Ideengenerierung fördert, (2) *Closing Leader Behaviour* (CLB), welches die Umsetzung von Ideen fördert und (3) *Temporal Flexibility* – der Fähigkeit, zwischen OLB und CLB flexibel zu wechseln, so wie es der Innovationsprozess erfordert.

Diese Doktorarbeit möchte dazu beitragen, das Konzept von AL weiter zu validieren und zu zeigen, ob und wie genau AL mit Mitarbeiter- und Teaminnovation zusammenhängt. Dabei adressiert die Arbeit folgende Forschungslücken, die sich aus der bestehenden Literatur ergeben: Erstens haben Studien zwar Skalen für OLB und CLB zur Messung von AL kombiniert, jedoch nicht die dritte Teilkomponente *Temporal Flexibility* spezifiziert oder gemessen. Zweitens wurde noch nicht umfassend gezeigt, inwiefern AL von existierenden Führungskonstrukten unterscheidbar ist und über diese hinaus Innovation vorhersagt. Drittens gibt es in der bisherigen Forschung kaum Befunde über den positiven Zusammenhang von AL und Teaminnovation sowie über dahinter liegende Mechanismen, obwohl Innovationsarbeit meist in Teams geschieht.

Diese Arbeit besteht aus vier empirischen Studien, die diese Forschungslücken behandeln. In Studie 1 wurde mithilfe von qualitativen Interviews konkretes Führungsverhalten exploriert, in welchem sich *Temporal Flexibility* manifestiert (*Temporal Flexibility Behaviour*, TFB). Darauf aufbauend wurde in Studie 2 eine TFB-Skala mithilfe von Querschnittsdaten von Angestellten entwickelt und mit existierenden Skalen für OLB und CLB kombiniert, um ein vollständiges Messinstrument für AL zu bilden. In Studie 3 wurde anschließend und auf Basis neuer

Querschnittsdaten von Angestellten untersucht, ob AL von etablierten Führungskonstrukten unterscheidbar ist und inkrementelle Validität in Bezug auf Mitarbeiterinnovation besitzt. Zu zeigen galt dabei ebenso, ob das Hinzufügen von TFB zu OLB und CLB die Vorhersagekraft des AL-Messinstruments erhöht. Studie 4 testete dann mithilfe von Querschnittsdaten aus Arbeitsteams, ob AL ebenso mit Teaminnovation positiv zusammenhängt und die Hinzunahme von TFB die Vorhersagekraft des Messinstruments wiederum erhöht. Darüber hinaus testete die Studie, ob ein *Teamklima für Innovation* (West, 1990) den Zusammenhang zwischen AL und Teaminnovation mediiert.

Die Ergebnisse von Studie 1 zeigten, dass TFB in Form von spezifischen Verhaltensweisen beobachtbar ist, mit welchen Führungskräfte das Wechseln zwischen Phasen der Ideengenerierung und -umsetzung orchestrieren und stimulieren. Studie 2 resultierte in einer reliablen 6-Item Skala für TFB. Studie 3 zeigte dann, dass AL (gemessen mit und ohne TFB) in Relation zu den Führungskonstrukten *transformationale Führung*, *Contingent Rewards*, *Leader-Member-Exchange*, *Consideration*, und *Initiating Structure* konvergente und diskriminante Validität besitzt. Die Kombination von OLB und CLB als Maß für AL sagte Mitarbeiterinnovation über diese Konstrukte hinaus vorher. Die Hinzunahme von TFB zu OLB und CLB führte jedoch nicht in allen Analysen zu einem Zugewinn an Vorhersagekraft. Die Ergebnisse von Studie 4 zeigten hingegen, dass AL positiv mit Teaminnovation (eingeschätzt durch die Teammitglieder) zusammenhängt und dabei die Hinzunahme von TFB zu OLB und CLB die Vorhersagekraft des AL-Messinstruments erhöhte, was die Bedeutung von TFB betont. Darüber hinaus vermittelte das Teamklima für Innovation – insbesondere die wahrgenommene Unterstützung für Innovation – den positiven Zusammenhang zwischen AL und Teaminnovation. Diese Doktorarbeit ermöglicht damit eine Erweiterung der Messung von AL und liefert neue Evidenz für die Relevanz und Wirkmechanismen von AL im Innovationskontext.

Abstract

Leaders must support their followers' and teams' innovation to maintain the competitive advantage of their organisation. Rosing, Frese, and Bausch (2011) proposed that leaders can facilitate follower and team innovation through *Ambidextrous Leadership* (AL), which consists of the following subcomponents: *Opening Leader Behaviour* (OLB) for the support of idea generation, *Closing Leader Behaviour* (CLB) for the support of idea implementation, and *temporal flexibility*, that is, the leader's ability to flexibly switch between OLB and CLB as situationally required in innovation processes. This thesis aims to contribute to the study of AL by further validating the concept and showing if and how exactly AL relates to different measures of follower and team innovation. In particular, the thesis addresses the following research needs that arise from the AL literature. First, existing studies have measured AL as the combination of OLB and CLB but have not yet specified nor measured temporal flexibility. Second, AL must yet prove that it is distinguishable from existing leadership constructs and that it predicts innovation outcomes beyond these. Third, although innovation work is often carried out by teams, evidence for the positive relationship of AL with team innovation is insufficient and mediators, which explain this relationship, remain unclear.

This thesis consists of four empirical studies that address these shortcomings. In Study 1, I explored manifestations of temporal flexibility in the form of the observable *Temporal Flexibility Behaviour* (TFB) using data from qualitative interviews. The interviews revealed manifestations of TFB through which leaders orchestrate and stimulate followers' switching between idea generation and implementation. In Study 2, I used these findings and cross-sectional data from employees to develop a reliable 6-item TFB scale, which I then combined with existing scales for OLB and CLB to introduce a conceptually complete AL

measure for questionnaire-based research. In Study 3, I used new cross-sectional data from employees to investigate the convergent, discriminant, and incremental validity of AL in relation to established leadership constructs and to test whether adding TFB to OLB and CLB increased the predictive power of the AL measure with regard to follower innovation outcomes. Results indicated that AL, measured with and without TFB, has convergent and discriminant validity in relation to *transformational leadership*, *contingent rewards*, *Leader-Member-Exchange*, *consideration*, and *initiating structure*. The incomplete measure of AL (combination of OLB and CLB) predicted follower innovation outcomes beyond the established leadership constructs. However, adding TFB to OLB and CLB did not consistently increase the predictive power of AL. In Study 4, I used cross-sectional data from work teams to test if AL also positively relates to team innovation and whether adding TFB to OLB and CLB increases the predictive power of the AL measure for team innovation. I found that AL was positively related to team innovation (as rated by team members) and that adding TFB increased the predictive power of the AL measure, which shows the relevance of TFB. *Team Climate for Innovation* (perceived support for innovation in particular) mediated the relationship. In sum, the thesis provides an extension of existing AL measures and new evidence for the validity of AL in its proposed domain of application, that is, follower and team innovation.

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List of Abbreviations

AL	Ambidextrous Leadership
cf.	Compare with
CLB	Closing Leader Behaviour
e.g.	For example
F	Follower
FSLB	Follower satisfaction with leader behaviour for guiding idea generation and implementation
i.e.	That is
L	Leader
LMX	Leader-Member-Exchange
n.a.	Not available
OLB	Opening Leader Behaviour
TCI	Team Climate for Innovation
TFB	Temporal Flexibility Behaviour
TLI	Transformational Leadership Inventory

1. Chapter: General Introduction

There is no doubt that innovation, that is, the generation of novel ideas and implementation of these in the form of new or improved products, services, or work routines, has become a key success factor for organisations (Anderson, Potočnik, & Zhou, 2014; Hughes, Lee, Tian, Newman, & Legood, 2018). The COVID-19 virus epidemic in 2020 provides an example for the importance of innovations (cf. Frontiers, 2020). Far-reaching safety regulations and an economic shutdown caused by the epidemic have forced organisations across the globe to innovate, which means that they had to identify, develop, and exploit novel products, services, and work routines in a very short time as the existing ones could not be further exploited. This situation reminded organisations of how important innovation is to survive and succeed in the world of today.

Organisations depend on their individual employees and teams to innovate. Employees and teams develop novel ideas and bring together individual resources to effectively implement ideas in the form of innovations. It is thus not surprising that a vast amount of empirical and theoretical work has been published on the predictors of individual and team innovation at the workplace (for reviews, see Anderson et al., 2014; Hammond, Neff, Farr, Schwall, & Zhao, 2011; Huelshager, Anderson, & Salgado, 2009; Van Knippenberg, 2017). Among these predictors, leadership has proven to be an important factor and has therefore been considered in many research studies. However, the question of which leadership behaviour is best at facilitating the two seemingly opposing activities of the innovation process – the creative generation *and* effective implementation of ideas – is crucial and yet remains to be answered in more detail (Anderson et al., 2014; Hughes et al., 2018).

To explain how leaders facilitate innovation among their followers and whole teams, a leadership theory is required that addresses the dialectic nature and dynamic requirements of innovation. Rosing and colleagues offer such an innovation-specific leadership concept, namely *Ambidextrous Leadership* (AL), which is based on the notion that different leadership behaviours must be combined to increase follower and team innovation (Rosing, Frese, & Bausch, 2011; Rosing, Rosenbusch, & Frese, 2010). AL supports follower and team innovation through the combination of *Opening Leader Behaviour* (OLB), which primarily fosters idea generation, *Closing Leader Behaviour* (CLB), which primarily fosters idea implementation, and the leader's *temporal flexibility* to situationally switch between OLB and CLB and match changing requirements of innovation work. In support of this concept, studies have shown that AL is related to different follower and team innovation outcomes (e.g., Luu, 2017a; Ma, Zhou, Chen, & Dong, 2019; Zacher, Robinson, & Rosing, 2014; Zacher & Rosing, 2015; Zacher & Wilden, 2014).

In my dissertation, I focus on the relationship of AL with follower and team innovation. The overarching research topic of this dissertation is if and how exactly AL (as proposed by Rosing et al., 2011) relates to different follower and team innovation outcomes. I found that existing research on this topic is still fragmented and has several theoretical shortcomings that need to be addressed.

First, existing measures of AL include OLB and CLB but do not incorporate the third subcomponent temporal flexibility, which is, however, of major importance because it describes the critical and situationally adequate switching between idea generation and implementation. Having a “complete” measure that also includes temporal flexibility would, on the one hand, allow to draw conclusions about the nature and validity of AL as a whole, whereas incomplete measures do not because they do not cover all aspects of the theoretical construct. On the other

hand, a complete measure that includes a measure for temporal flexibility is expected to be more suitable to investigate and find the theoretically proposed relationship of AL with different follower and team innovation outcomes.

Second, AL still has to demonstrate its uniqueness and predictive power for innovation-specific outcomes compared to established leadership constructs. This is important to avoid the emerging problem of construct proliferation among leadership constructs (see DeRue, Nahrgang, Wellman, & Humphrey, 2011; Shaffer, DeGeest, & Li, 2016) and to validate that AL is valuable for its proposed domain of application.

Third, the relationship between AL and team innovation received only little attention in existing research although innovations are often developed and implemented by teams. In particular, it remains largely unclear if and how AL predicts team innovation. Understanding team-level mediators that explain how AL fosters team innovation would be important to further validate AL and help practitioners to apply the concept in team contexts.

To overcome the shortcomings of the literature and advance the study of AL, I conducted four empirical studies. An updated measure of AL that incorporates temporal flexibility as a third subcomponent besides OLB and CLB was needed first. To this end, I qualitatively explored manifestations of temporal flexibility in the form of leaders' observable *Temporal Flexibility Behaviour* (TFB) in Study 1 and made it measurable in Study 2. I formed a single variable for AL, consisting of OLB, CLB, and TFB, which can be applied in questionnaire-based research. In Study 3, I then aimed at investigating the convergent, discriminant, and incremental validity of the AL measure with regard to follower innovation outcomes in relation to commonly used but incomplete measures of AL and established leadership constructs. Finally, Study 4 shifts the focus to teams and aimed to test if AL, consisting of OLB, CLB, and TFB, also predicts team

innovation outcomes beyond incomplete AL measures and show if a *Team Climate for Innovation* (TCI, West, 1990) mediates the relationship between AL and team innovation.

The thesis is structured as follows: In the following parts of Chapter 1, I will provide a theoretical framework including definitions of the key concepts, summarise relevant streams of research, highlight unanswered research questions, and elaborate on the need of the studies presented in this thesis. I will then provide an overview of the studies and summarise expected contributions of this thesis. In Chapter 2, I will present the exploration and scale development of TFB, which I then use for the empirical examination of complete and incomplete measures of AL with regard to their convergent, discriminant, and incremental validity. In Chapter 3, I will present the investigation of AL and team innovation. Finally, in Chapter 4, I will discuss the general theoretical contributions of the thesis and point out major implications for research and practice. The chapters are written to stand on their own, having own introductions and short discussions¹.

¹ In the following, I will occasionally use the term “I” when describing and discussing the studies of this thesis. However, I always also refer to my co-authors (Katharina G. Kugler and Felix C. Brodbeck) and contributors of the respective studies.

Theoretical Background of the Thesis

Innovation at the Workplace

Defining innovation. The concept of *innovation* is closely related to the concept of *creativity* and has been defined in different ways in the past (Anderson et al., 2014). To provide conceptual clarity for this thesis, I hereinafter refer to integrative definitions of creativity and innovation, which define innovation as the process and outcomes of the generation of novel ideas (i.e., creativity) and the implementation of these as novel products, services, and work routines (Anderson et al., 2014; Hammond et al., 2011; Hughes et al., 2018). Innovation can occur at any level of analysis (individual, team, organisation, or combinations of the levels; see Anderson et al., 2014).

This thesis focuses on innovation at the individual- and team-level. From a psychological viewpoint, the innovation processes of followers and teams involve two psychologically opposing sub-processes: “Workplace creativity concerns the cognitive and behavioural processes applied when attempting to generate novel ideas. Workplace innovation concerns the processes applied when attempting to implement new ideas” (Hughes et al., 2018, p. 551). The result can be a new or updated technology, product, service, or process and may be an incremental or radical improvement.

Exploration and exploitation. To explain how individuals and teams successfully achieve innovation, Bledow, Frese, Anderson, Erez, and Farr (2009) stated that individuals and teams must simultaneously master and balance two opposing forms of behaviour: *exploration* for the generation of novel ideas and *exploitation* for the implementation of the ideas. Exploration includes follower and team behaviours such as search, variation, play, risk taking, or experimentation, which are especially important for idea generation. In turn, exploitation includes behaviours such as refinement, production, execution, implementation, or working efficiently,

which are especially important for idea implementation (for detailed descriptions of exploration and exploitation, see March, 1991). This concept is based on the notion of *organisational ambidexterity*, which describes an organisation's ability to engage in and master both, exploration and exploitation (e.g., O'Reilly III & Tushman, 2004; Raisch & Birkinshaw, 2008).

Engaging in exploration and exploitation is, however, potentially contradictory, paradoxical, and full of tensions – given that these are opposing and conflicting activities (exploration-exploitation paradox; see Lewis & Smith, 2014). In innovation processes, idea generation and implementation are also intertwined and unfold in a more or less ordered, if not chaotic manner – making it hard to clearly separate phases of exploration and exploitation. Employees, teams, and their leaders must thus actively manage these behaviours and find practicable ways to balance them in time and space in order to innovate (Bledow et al., 2009; Rosing & Zacher, 2017).

Leadership and innovation. Among the antecedents and facilitators of follower and team innovation, leadership has emerged as an important factor (Hughes et al., 2018). Leadership can directly foster innovation and also indirectly foster innovation through different means, for example, creating work climates in which followers and teams can innovate (Mumford, 2000; Newman, Round, Wang, & Mount, 2020). A variety of different leader characteristics and behaviours have been linked to innovation outcomes at the individual- (Hammond et al., 2011) and the team-level (Van Knippenberg, 2017). Among the most frequently investigated leadership constructs are *Leader-Member-Exchange (LMX)*, *transformational leadership*, *transactional leadership (contingent rewards in particular)*, *consideration (or general support)*, and *initiating structure* (see Carnevale, Huang, Crede, Harms, & Uhl-Bien, 2017; Hughes et al., 2018; Rosing et al., 2011).

Despite a vast amount of research on leadership and innovation, it remains unclear which leadership constructs are better in predicting innovation outcomes than others, given that analyses of the relative contribution of different leadership behaviours in predicting innovation are missing and their effects on different innovation outcomes vary enormously across studies (Byron & Khazanchi, 2012; Hughes et al., 2018; Rosing et al., 2011). To solve this issue and increase the understanding of how leadership affects specific follower processes and outcomes, scholars called to focus on specific leadership styles or behaviours instead of broad leadership constructs (Bormann & Rowold, 2018; Hughes et al., 2018).

Ambidextrous Leadership and Innovation

AL is an innovation-specific contingency theory of leadership based on the notion that different leadership behaviours must be combined to increase innovation in organisations (e.g., Bucic, Robinson, & Ramburuth, 2010; Jansen, George, Van den Bosch, & Volberda, 2008; Probst, Raisch, & Tushman, 2011; Rosing et al., 2011; Rosing et al., 2010). The notion of an ambidextrous leadership style that combines conceptually opposing behaviours is not new: Several authors have used the term AL in the past to refer to the combination of transformational and transactional leadership styles to explain how leadership can simultaneously address contradicting demands at work (e.g., Berraies & El Abidine, 2019; Cunha, Fortes, Gomes, Rego, & Rodrigues, 2019; Luo, Zheng, Ji, & Liang, 2018; Vera & Crossan, 2004).

In order to understand how leadership can facilitate follower and team innovation, Rosing et al. (2011) introduced their AL concept on the basis of a meta-analytical examination of the relationship of different leadership behaviours with innovation. Their AL concept is formed by three subcomponents, which in combination maintain ambidexterity (i.e., exploration and exploitation) and thus innovation among followers and teams. First, through OLB leaders increase variance in follower behaviour to foster exploration, which is especially important for

generating novel ideas. Second, through CLB leaders reduce variance in follower behaviour to foster exploitation, which is especially important for implementing ideas. Third, through temporal flexibility, leaders switch between fostering exploration or exploitation depending on the situation in order to match changing requirements of innovation work. Although OLB and CLB were described as concrete leader behaviours, this third subcomponent temporal flexibility was not specified as concrete behaviour but rather described as a leader ability that is grounded in a leader's knowledge about innovation, traits, and abilities – such as cognitive, behavioural, and integrative complexity (Rosing et al., 2011).

The concept of Rosing et al. (2011) implies that follower and team innovation should be highest when leaders combine all three subcomponents of AL. In detail, the authors proposed the following: (1) OLB leads to followers' explorative behaviour, which is especially important for idea generation; (2) CLB leads to followers' exploitative behaviour, which is especially important for idea implementation; (3) OLB and CLB positively interact in predicting innovation; (4) leaders additionally require temporal flexibility to switch between OLB and CLB in order to meet situational requirements of innovation work (Rosing et al., 2011, pp. 967-968). For example, an ambidextrous leader triggers the followers' exploratory action by allowing different ways of accomplishing tasks or motivating to take risks (i.e., OLB) in situations where the task or context requires the generation of novel ideas. In situations where followers should effectively implement ideas, the leader can foster exploitative action through behaviours such as monitoring or taking corrective action (i.e., CLB). The leader also recognises or knows when to shift between OLB and CLB and flexibly shifts between fostering exploration and exploitation (Rosing et al., 2011).

Summary of Existing Research, Limitations, and Unanswered Questions

A number of studies have been conducted based on the concept of Rosing et al. (2011). Table 1 lists exemplary empirical studies from peer-reviewed journals that have been published since 2011 when the concept was introduced. In the following, I will briefly summarise the current research on AL with regard to the foci of this thesis: (1) The conceptualisation and measurement of AL, (2) the predictive validity and usefulness of AL for innovation contexts, and (3) research on AL and team innovation. I will hereby highlight the central research needs for each of these areas. Below, I will start with the conceptualisation and measurement of AL because this topic is critical to all other endeavours which aim to investigate the construct.

Conceptualisation and measurement. Zacher and Rosing (2015) suggested a measure for AL based on Rosing et al. (2011) that consists of two short scales for OLB and CLB. Researchers used these scales to assess OLB and CLB as independent variables (e.g., Zacher & Wilden, 2014), study their proposed interaction (e.g., Zacher & Rosing, 2015; Zacher & Wilden, 2014), or calculate a single AL variable (e.g., Luu, 2017a; Ma et al., 2019). It is noticeable that the use of these existing AL measures is inconsistent and does not incorporate a measure of the third subcomponent temporal flexibility, which makes the measures conceptually incomplete.

I criticise that if studies solely rely on the assessment of OLB and CLB, it will remain unclear if and how leaders switched between fostering exploration and exploitation in a situationally adequate manner – which is basically the third subcomponent, temporal flexibility. Rosing et al. (2011) only vaguely defined this subcomponent as leader ability (see above) but did not explain concrete manifestations explaining how exactly leaders directly express temporal flexibility (except for the proposition that it should methodologically result in a mutual and positive moderation of OLB and CLB on innovation) – making it hard for researchers to operationalise this third subcomponent.

Table 1

Exemplary Empirical Studies on Ambidextrous Leadership (2011 - 2020)

Reference	AL Measure	Moderators and Mediators	Key DVs	Method	N
Ma et al. (2019)	OLB CLB composite	Follower harmonious passion (ME), follower obsessive passion (ME), follower work significance (MO)	Follower work crafting	Multi-source survey	69 (G) 290 (I)
Luu, Viet, Masli, and Rajendran (2019)	OLB CLB composite	CSR (MO), job crafting (ME)	OCB, service recovery performance	Single-source survey	n.a.
Luu, Dinh, and Qian (2019)	OLB CLB composite	Follower entrepreneurial orientation (ME), organisational social exchange (MO)	Follower job crafting	Multi-source survey	427 (dyads)
Alghamdi (2018)	OLB × CLB	–	Follower ambidextrous behaviour, follower innovative performance	Single-source survey	147 (I)
Luu (2017a)	OLB CLB composite	Entrepreneurial orientation (ME), trust (MO), goal congruence (MO)	Organisation's operational performance	Single-source survey	427 (I)
Luu (2017b)	OLB CLB composite	Role breadth self-efficacy (MO), public service motivation (MO)	Organisational reform	Multi-source survey	186 (G) 531 (I)
Zacher and Rosing (2015)	OLB × CLB	Transformational leadership (MO), general team success (MO)	Team innovation	Multi-source survey	33 (G) 90 (I)
Zacher and Wilden (2014)	OLB × CLB	–	Follower innovative performance	Diary study	113 (I)
(Zacher et al., 2014)	OLB CLB	Exploration behaviour (ME), Exploitation behaviour (ME)	Follower innovative performance	Single-source survey	388 (I)

Note. AL = Ambidextrous Leadership. ME = mediator. MO = moderator. DV = dependent variable. I = individual-level. G = group-level. The table lists empirical studies on Ambidextrous Leadership that were based on Rosing et al. (2011) and were published in peer-reviewed academic journals between 2011 and 2020.

Given that temporal flexibility is just as important as OLB and CLB (Rosing et al., 2011) but has not been made measurable yet, I argue that temporal flexibility must be further specified, measured, and added to the assessment of AL in the form of concrete and observable *Temporal Flexibility Behaviour* (TFB) instead of abstract traits, abilities, or competencies that are hard to observe. TFB, as a behavioural reflection of temporal flexibility, then complements OLB and CLB as subcomponents of AL. Figure 1 illustrates the model of AL with OLB, CLB, and TFB as formative subcomponents.

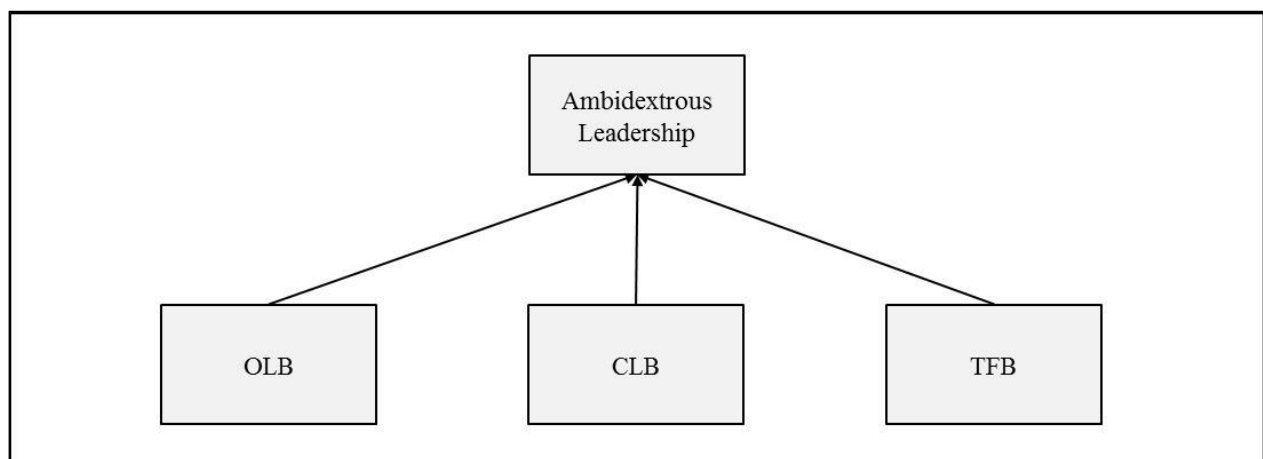


Figure 1. Formative model of Ambidextrous Leadership. OLB = Opening Leader Behaviour. CLB = Closing Leader Behaviour. TFB = Temporal Flexibility Behaviour.

However, existing work on behaviours that might reflect temporal flexibility is sparse and only points at the importance of this subcomponent without providing concrete manifestations. For example, a qualitative case study highlighted that in order to maintain ambidexterity, leaders must balance pragmatic, efficiency-oriented and visionary, innovation-oriented roles by temporarily switching between these different roles as the situation requires (Probst et al., 2011). A qualitative study by Havermans, Den Hartog, Keegan, and Uhl-Bien (2015) further pointed out that leaders switch between explorative and exploitative foci by interacting with the environment, recognising environmental stimuli, and responding to them, which indicates that TFB may be

manifested in the form of additional and observable forms of interaction that are not included in OLB and CLB.

As such yet undescribed leader behaviour should explain how leaders express temporal flexibility and how leaders successfully manage their followers' necessary switching between exploration and exploitation, it should increase the predictive power of AL measures for follower and team innovation outcomes when added to OLB and CLB.

Research Question 1: How can temporal flexibility be measured in the form of leader behaviour beyond OLB and CLB (i.e., TFB)?

Research Question 2: Does an AL measure that consists of OLB, CLB, and TFB predict innovation outcomes beyond measures of AL that consist of OLB and CLB?

Predictive validity of ambidextrous leadership. Besides the conceptually complete measurement of AL, it is also important to generally prove whether AL predicts innovation-related outcomes as proposed by theory. Towards this end, studies showed that AL was positively related to follower job crafting (Luu, Dinh, et al., 2019), follower ambidextrous behaviour (Alghamdi, 2018), and follower innovative behaviour (Alghamdi, 2018; Zacher et al., 2014; Zacher & Wilden, 2014). AL in team contexts positively related to team members' job crafting (Ma et al., 2019), ambidextrous behaviour of top-management teams (Luo et al., 2018), and team innovation (Zacher & Rosing, 2015). Researchers have also started to investigate negative effects of AL, such as work-related stress and anxiety on side of the followers – suggesting that the effects of AL on followers are complex and require further investigation (Schreiner, 2017). However, the systematic comparison of AL with other leadership constructs with regard to its distinctiveness and relative predictive power for different innovation outcomes is yet missing.

To establish AL for innovation contexts, research must show that AL outperforms leadership constructs that have been shown to positively relate to innovation but do not

specifically account for the dialectic affordances of innovation work (whereas AL does, see Rosing et al., 2011). To date, only few researchers reported whether AL is distinguishable from other leadership constructs and whether it predicts innovation outcomes beyond these; three studies could show that AL predicted follower and team innovation even after controlling for specific transactional and transformational leadership behaviours (Zacher et al., 2014; Zacher & Rosing, 2015; Zacher & Wilden, 2014). It remains unclear though if AL as a whole construct is distinguishable and has incremental validity.²

Research Question 3: Does AL predict innovation outcomes beyond established general leadership constructs?

Ambidextrous leadership and team innovation. As shown above, research has started to generate knowledge about the relationship between AL and different innovation outcomes, showing some mediators and moderators which help to understand how and under which circumstances AL influences innovation at different levels (see Table 1). For example, researchers found that both, OLB and CLB, increase follower innovation through follower exploration and exploitation as proposed in the concept (Zacher & Wilden, 2014). Others investigated the positive relationship between AL and follower job crafting through entrepreneurial orientation (Luu, Dinh, et al., 2019) or through followers' passion (Ma et al., 2019).

Despite increasing interest in AL, existing research does not provide satisfactory answers to if and how AL facilitates the team-level construct of innovation as an outcome, which, however, would be important because most organisations rely on teams to innovate – making the

² Note that comparing just subcomponents of AL with other constructs would not be sufficient to validate AL as a whole construct because omitting one or more subcomponents in AL measures can dramatically change the meaning of the construct and may cause incompleteness.

topic of team leadership a priority in innovation contexts (Barczak, Griffin, & Kahn, 2009). I came across one study only that investigated the relationship of AL with a team innovation outcome (see Zacher & Rosing, 2015). To the best of my knowledge, no study has yet further examined *how* exactly AL may increase team innovation. Leadership behaviour is, however, often argued to influence team innovation *indirectly* through shaping team innovation climates (e.g., Eisenbeiss, van Knippenberg, & Boerner, 2008; Mascareño, Rietzschel, & Wisse, 2019; West et al., 2003). Studying if AL also relates to innovation-supportive team climates and see if such team climates mediate the relationship between AL and team innovation outcomes would thus be insightful for both, research and practice. Interestingly, no empirical or theoretical work on AL has yet provided insights into such mediating team climate mechanisms. To address this shortcoming, I suggest to draw on the *Team Climate for Innovation* concept (TCI, West, 1990) since the TCI integrates different facets of a team climate that positively relate to idea generation and implementation in teams (for a meta-analysis, see Huelshager et al., 2009). The TCI has already been used in the past to theoretically explain how leadership behaviours affect team innovation outcomes (for a review, see Van Knippenberg, 2017).

Research Question 4: Does AL positively relate to team innovation outcomes and how is the relationship mediated?

Overview of the Thesis

Overview of Studies

I found that (1) AL has been assessed incompletely in existing studies because a measure of the subcomponent TFB has been missing, (2) the convergent, discriminant, and incremental validity of AL is not established in the literature, and (3) research on the positive relationship of AL with team innovation and team-level mediators is sparse. To address these shortcomings and answer the general research questions highlighted in the previous section, I conducted a series of four empirical studies. The overarching topic underlying these studies was if and how exactly AL predicts innovation among followers and teams. Table 2 provides an overview of these four studies.

In Study 1 and Study 2, I focused on Research Question 1, which points at the exploration and measurement of behavioural manifestations of temporal flexibility beyond OLB and CLB as part of AL (i.e., TFB). The goal was to complete the measure of AL by adding TFB as a subscale before moving on to investigate the relationship of AL with other constructs. Towards this end, Study 1 focused on the qualitative exploration and categorisation of manifestations of TFB on the basis of data from qualitative interviews. Study 2 focused on the subsequent development of a short TFB scale that can be combined it with existing OLB and CLB scales to form a complete AL measure for questionnaire-based research. This AL measure was then used in the subsequent studies to test whether AL positively relates to different innovation outcomes and whether adding TFB to OLB and CLB increases its predictive power.

Study 3 first focused on Research Question 2 and tested if the new AL measure, which consists of OLB, CLB, and *TFB*, predicts individual-level follower innovation beyond commonly used but incomplete measures of AL that only consist of OLB and CLB but not TFB (e.g., Luu, 2017a; Luu, Dinh, et al., 2019; Ma et al., 2019). Study 3 further aimed to test if AL (measured

with and without TFB) is empirically related to but distinguishable from general leadership constructs (e.g., transformational or contingent rewards leadership) and to answer Research Question 3 by showing if AL predicts follower innovation beyond general leadership constructs.

Drawing on data from work teams, Study 4 finally focused on Research Question 2 and Research Question 4: As for follower innovation, the study first aimed to test if AL positively relates to the team-level construct of innovation while adding TFB to OLB and CLB increases the predictive power of AL. The study thereby also intended to shed light on underlying team-level mediators of this relationship. In particular, I proposed that AL also positively relates to *Team Climate for Innovation* (TCI, West, 1990) and that the TCI mediates the proposed positive relationship of AL with team innovation because leaders can support their teams' innovation endeavours by creating and managing an innovation-friendly team climate.

Table 2

Overview of the Studies of this Thesis

Chapter	Study	Research goal	Object / Outcomes	Methodology	Sample
2	1	Exploration of manifestations of TFB	Individual leader behaviour	Qualitative interviews	13 employees
	2	Development of a TFB subscale to complete AL	Follower innovative performance	Quantitative field survey	168 employees
	3	Test of, convergent, discriminant, criterion-based, and incremental validity of AL for follower innovation	Follower innovation, follower satisfaction with leader behaviour for guiding idea generation and implementation	Quantitative field survey	152 employees
3	4	Test of criterion-based validity of AL for team innovation; investigation of TCI as team-level mediator	TCI, team innovation (as rated by team members and leader)	Quantitative field study	60 work teams

Note. AL = Ambidextrous Leadership. TFB = Temporal Flexibility Behaviour. TCI = Team Climate for Innovation.

Expected Contributions

With the studies presented in this thesis, I aim to advance theory, research, and practice in the field of AL and innovation in several ways. First, this thesis is, to my knowledge, the only work that offers a conceptually complete measure for AL that also includes a measure for temporal flexibility. At this stage, having such a measure is important for researchers because an incomplete measurement of the construct would make future empirical research endeavours questionable. This thesis thereby also questions if TFB, as a reflection of Rosing et al.'s (2011) temporal flexibility, is a valuable subcomponent that improves the predictive power of AL. Second, by comparing AL with established leadership constructs and testing its relative contribution in predicting follower innovation outcomes, this thesis empirically challenges the validity of the AL concept and helps researchers to gain further conceptual clarity and avoid construct proliferation. Third, this thesis theoretically connects AL with the team innovation climate literature and thereby provides a team climate perspective on mediating mechanisms that explain how AL may increase team innovation.

For practitioners, this thesis should provide concrete evidence for the usefulness of AL in innovation contexts. It also aims to show leadership behaviours which enable leaders to better handle the opposing processes and requirements of innovation work and to balance their followers' and teams' need of "being creative" and "getting things done". The thesis also aims to highlight how AL can support innovation in teams, which is especially valuable for leadership development and team development in innovation contexts (e.g., research and development teams).

2. Chapter: Extension and Test of Ambidextrous Leadership in Predicting Follower Innovation Outcomes

In the continuing endeavour to understand how leaders can foster follower innovation, Rosing and colleagues introduced their concept of *Ambidextrous Leadership* (AL; Rosing et al., 2011; Rosing et al., 2010). According to the concept, leaders must flexibly support followers' exploration and exploitation (i.e., the two necessary behaviours for innovation) through opposing but complementary leader behaviours: *Opening Leader Behaviour* (OLB), which fosters exploration, and *Closing Leader Behaviour* (CLB), which fosters exploitation. Ambidextrous leaders must also show *temporal flexibility*, that is, the leaders' ability to flexibly switch between fostering follower exploration and exploitation according to the given situational requirements (Rosing et al., 2011).

Thus far, research has focused on the combination of OLB and CLB to measure AL and predict follower innovation outcomes (e.g., Luo et al., 2018; Luu, 2017a; Ma et al., 2019; Zacher et al., 2014; Zacher & Wilden, 2014). No study has yet systematically proven the predictive power of AL, consisting of all of its subcomponents, beyond established leadership constructs, such as transformational leadership or initiating structure. Testing the incremental validity of AL in relation to other leadership constructs would thus be an important step to establish the construct. However, existing AL measures only consist of scales for OLB and CLB (Zacher & Rosing, 2015) but not the third subcomponent temporal flexibility – which is just as important and goes beyond the combination of OLB and CLB. For example, a leader may show high levels of both, OLB and CLB, towards the followers over time but these leader behaviours may not be in line with the requirements of the given situation. It remains unclear through which additional

behaviours leaders ensure that their followers switch between exploration and exploitation in a way that changing situational requirements of innovation work are continuously met.

Given this situation, the purpose of the work presented in this chapter was to (1) first, introduce an updated measure for AL that incorporates OLB, CLB, and a measure for temporal flexibility and then (2) test the convergent, discriminant, and incremental validity of AL (with and without the update) in relation to established leadership constructs. In detail, we first aimed to explore *Temporal Flexibility Behaviour* (TFB) as a reflection of temporal flexibility and bundle of in situ leader behaviours on the basis of qualitative interviews in Study 1 because leader behaviours are more salient, observable, and proximal to followers compared to abstract leader abilities. On this basis, we aimed to develop a scale for TFB in Study 2, which we combined with existing OLB and CLB scales to form a more complete AL measure. In Study 3, we then aimed to systematically test the updated AL measure (consisting of OLB, CLB, and TFB) versus incomplete AL measures (consisting of OLB and CLB) regarding their convergent and discriminant validity as well as predictive power towards follower innovation in relation to established leadership constructs.

Theoretical Background

Ambidextrous Leadership and Follower Innovation

Innovation, which comprises the generation and implementation of novel ideas (see Anderson et al., 2014), requires followers to engage in the two fundamentally different and dialectic activities exploration and exploitation. Exploration (behaviours such as searching, risk taking, or experimentation) is especially important for the generation of novel ideas; exploitation (behaviours such as refinement, production, or selection) is important for the implementation (Bledow et al., 2009). When employees work on innovations, they have to go through non-linear and hardly plannable sequences of idea generation and implementation and must flexibly display exploration and exploitation. Given that these activities are often conflicting but necessary for innovation, organisational leaders and their followers must find practical ways to balance them in time and space (Bledow et al., 2009; Rosing & Zacher, 2017).

Rosing et al. (2011) suggested that leaders foster individual followers' exploration, exploitation, and flexible switching between exploration and exploitation through the combination of specific leadership behaviours, which should lead to increased follower innovation performance. According to their concept, AL is formed by the following subcomponents: (1) OLB that increases variance in follower behaviour to foster exploration (e.g., allowing followers to take risks), (2) CLB that reduces variance in follower behaviour to foster exploitation (e.g., controlling behaviour), and (3) temporal flexibility, that is, the leaders' ability to flexibly switch between OLB and CLB depending on situational requirements. For example, on the one hand, an ambidextrous leader triggers follower exploration by allowing risks and different ways of accomplishing tasks in situations where creative ideas are needed. On

the other hand, in situations where followers should effectively implement ideas, the leader fosters exploitation through monitoring and correcting the followers' work (Rosing et al., 2011).

AL is specific for innovation contexts and should predict follower innovation outcomes beyond leadership constructs that do not reflect the dialectic nature of innovation. Context-specific leadership styles – like AL for innovation contexts – should generally outperform general leadership constructs in predicting context-specific outcomes such as follower innovation (see Bormann & Rowold, 2018). Empirical research has shown that combinations of OLB and CLB predict different follower innovation outcomes (e.g., Luu, 2017a; Zacher et al., 2014; Zacher & Rosing, 2015; Zacher & Wilden, 2014) but only few of these studies tested if AL predicts innovation outcomes beyond other leadership constructs (for studies that controlled for transformational and transactional leadership, see Zacher et al., 2014; Zacher & Rosing, 2015). To date, it remains unclear whether AL as a whole – which also not only consists of leaders' OLB and CLB but also temporal flexibility – has incremental validity, which means that the construct demonstrates predictive power for specific criteria beyond existing alternate measures.

The Need to Add Temporal Flexibility Behaviour as a Third Component

To further validate AL, we argue that its measure must incorporate all of its subcomponents – including temporal flexibility. As Rosing et al. (2011) proposed, simply combining OLB and CLB is not sufficient but leaders must also display temporal flexibility, which is the ability to support their followers' flexible switching between exploration and exploitation (through the leaders' switching between OLB and CLB) in a way that the changing situational requirements of innovation work are met. This ability may be rooted, for example, in high levels of behavioural, cognitive, and integrative complexity, sensitivity to the environment, and the knowledge of situations that require exploration or exploitation (Rosing et al., 2011).

However, despite its importance, temporal flexibility has not been further specified as a distinct, observable, and measurable subcomponent of AL. Given this situation, we suggest on the basis of the following implications from the existing literature that temporal flexibility should be explored, specified, and added to the measure of AL in the form of the specific TFB.

First, follower ratings of leaders' OLB and CLB (e.g., Luu, 2017a; Ma et al., 2019; Zacher et al., 2014; Zacher & Rosing, 2015; Zacher & Wilden, 2014) or transactional and transformational leadership behaviours (Jansen, Vera, & Crossan, 2009; Luo et al., 2018; Tung, 2016) as an indication of AL are not sufficient as they do not tell *if* such leader behaviours were shown according to situational requirements nor do they include behaviours reflecting *how* leaders manage the critical situations in which followers switch between exploration and exploitation. A qualitative study by Havermans et al. (2015) indicated that ambidextrous leaders rely on their perception of environmental stimuli in order to flexibly switch between exploration and exploitation and align their followers' responses with the given context while also maintaining a concurrent focus on exploration and exploitation. Thus, it is likely that ambidextrous leaders display yet undescribed behaviours in addition to OLB and CLB through which they assess the context, decide when switching is necessary, and support the followers' awareness and understanding for the tensions inherent to shifting back and forth between exploration and exploitation.

Second, assessing temporal flexibility as daily leader behaviour is superior compared to assessing underlying leadership traits or abilities because concrete leader behaviours are more salient, observable, and the central mean through which leader traits affect follower outcomes (see Antonakis, Day, & Schyns, 2012; Tuncdogan, Acar, & Stam, 2017; Zaccaro, 2007). Accordingly, researchers have argued before that leader flexibility should be conceptualised as

leader behaviour rather than as a disposition, motivation, or cognition (Denison, Hooijberg, & Quinn, 1995; Kaiser, Lindberg, & Craig, 2007).

Third, describing and measuring temporal flexibility as behaviour allows effective training and feedback interventions for leaders in practice because feedback on concrete behaviour has been shown to outperform feedback that is directed to the abstract leader's self (Kluger & DeNisi, 1996). Temporal flexibility measured in the form of TFB could also be easily combined with the OLB and CLB scales, which describe leader behaviours as well (see Zacher & Rosing, 2015) and are used in questionnaire-based research.

Given that measures of temporal flexibility are missing and the completeness of the measure of AL is not yet guaranteed, it seemed mandatory to raise and answer the questions: Which leader behaviours reflect temporal flexibility that are not yet reflected in OLB and CLB (i.e., TFB)? How can TFB be measured? These questions need to be answered before we move forward to measure and evaluate the convergent, discriminant, and incremental validity of AL.

In the following, we will present the interview-based exploration of manifestations of TFB (Study 1), followed by the subsequent development of a questionnaire-based measure of TFB (Study 2). We will then introduce an updated measure for AL that consists of the subscales OLB, CLB, and the newly developed TFB, and present hypotheses and tests for its convergent, discriminant, and incremental validity in relation to incomplete AL measures and existing leadership constructs (Study 3).

Study 1: Qualitative Examination of Temporal Flexibility Behaviour³

The goal of Study 1 was to explore and categorize leader behaviours that reflect temporal flexibility and are not yet reflected in OLB and CLB (i.e., TFB). In keeping with the exploratory nature of this goal, we applied an inductive, theory-independent approach that is capable of exploring in-situ manifestations of TFB and conducted qualitative interviews with people experienced in innovation work.

Method

Procedure. To gain in-depth descriptions of TFB, we conducted semi-structured and audio-recorded interviews (face-to-face: 62%, telephone: 38%) with leaders, followers, and consultants from Germany and Austria who worked in different innovation contexts and companies. We recruited the sample through personal contacts and social media channels and offered a study report as an incentive for participation. Each participant received information on the study background, including the privacy policies, and signed a consent form prior to participation. We ensured that the participants could talk openly and freely during the interviews and we treated personal data as strictly confidential throughout the whole research process. The interviewers were research-experienced master's students who we trained in interviewing beforehand.

The interviews were based on the *Critical Incident Technique* (see Chell, 1998; Flanagan, 1954), which is a valid approach for the exploration of behaviours that are critical for successfully handling specific situations (Andersson & Nilsson, 1964). The interview guide can

³ Parts of Study 1 originated from a student research project at LMU Munich under the supervision of Professor Felix C. Brodbeck, Dr. Katharina G. Kugler, and myself. Study 1 was presented at the 11th congress of the Industrial and Organisational Psychology section of the German Psychological Society (DGPs), 2019, Braunschweig, Germany.

be found in Appendix A. At the beginning of the interview, each participant was introduced to the concept of AL using a figure (see Appendix A) depicting a simplified model of the concept of Rosing et al. (2011, p. 967). In the main part, participants were asked to report on a concrete positive and negative critical incident where switching between exploration and exploitation occurred and to describe the respective leadership behaviours they experienced as critical for switching. The key question was: “Think of any situation where you/your leader did /not/ successfully manage/d to switch between promoting idea generation and implementation. Please tell me more about this situation.”⁴ Through further questioning, concrete descriptions of TFB for each incident were elaborated and complemented by any relevant comments participants made. Finally, participants answered sociodemographic questions (e.g., age, gender, or experience in company).

Participants. Out of 16 invited participants, three did not report any critical incidents, which led to a final sample of $N = 13$ interviews (5 leaders, 6 followers, 2 consultants). Such a sample size was found to be useful to obtain saturated results from interview data (Guest, Bunce, & Johnson, 2006). The sample was predominantly male (77%) and the average age was 35.6 years ($SD = 8.45$). The participants worked in different companies and held different roles associated with innovation work (e.g., research & development, marketing, or consulting), which enabled us to gain diverse insights on our topic. Further details on the sample are provided in Appendix A.

⁴ This interview question was translated from German. The original interview guide (including all questions) can be found in Appendix A.

Data analysis. We obtained 24 critical incidents (13 positive and 11 negative) from the 13 interviews, which we transcribed and analysed by following a step-by-step analysis for inductive categorisation (Huberman & Miles, 1983; Miles, Huberman, & Saldana, 2013).

At the pre-coding stage, we trained our coders in formal coding. Coders were the same master's students who interviewed the participants. They independently coded some interviews according to the coding rules (see Miles et al., 2013) and then discussed the results to improve their understanding and coding consistency.

At the formal coding stage, the coders identified units of content within the transcripts that contained descriptions of leader behaviours which interviewees associated with the (un)successful switching between exploration and exploitation. Units that contained descriptions of OLB and CLB (see Rosing et al., 2011; Zacher & Rosing, 2015) were not considered for coding. The coders identified, paraphrased, and abstracted 132 relevant coding units and then elaborated categories for TFB through bundling paraphrases that contained similar concepts. For example, paraphrases such as “leader communicates that not every idea can be implemented” and “leader creates awareness for the ups and downs of the innovation process” were bundled under the category “Giving realistic previews on innovation work”. After further refining, we obtained 12 categories (see Table 3).

Finally, instructed independent research assistants re-coded the coding units a second time through assigning them to categories based on category definitions. Discrepancies between the initial coding and re-coding were successfully dissolved in a discussion, resulting in an agreement rate of 93.8%, which was above the recommended minimum of 85% and indicated intersubjective replicability (Miles et al., 2013).

Results

Results of Study 1 are presented in Table 3, which shows a category system with 12 categories that describe manifestations of TFB. To better overview these categories, we further grouped them in three higher-order categories on the basis of the similarity of their content.

Preparation and guidance for innovation. Categories 1, 2, and 3 describe specific structuring and planning behaviours that helped the leaders preparing their followers for potential setbacks and navigating them through phases of exploration and exploitation. They communicated realistic previews (Category 1), structures (Category 2), and requirements of innovation work (Category 3). For example, Interviewee 8 stated that it is “important to create awareness and prepare followers that things following an idea are not always going easy”.

Initiation of switching between exploration and exploitation. Categories 4 to 9 describe communication behaviours through which leaders situationally supported the followers’ flexible switching when it appeared necessary. Leaders initiated followers to take the perspective of stakeholders (Category 4) and critically assess ideas (Category 5); they also provided own know-how (Category 6), involved stakeholders (Category 7), exchanged project information with followers (Category 8), and established feedback (Category 9) when switching was necessary. For example, Interviewee 1 reported: “Okay, we have so many good ideas, now we need to check [...] which are realistically doable and with which priority”.

General support. Categories 10, 11, and 12 describe supportive leader behaviours including support of the whole project (Category 10), permanent individual support (Category 11), and appreciation of performance at all stages of innovation work (Category 12). For example, Interviewee 12 stated: “[the leader] was always ready to talk. I could always talk to her, so that we discussed project steps and she was here as a contact person”.

Table 3

Category System (Study 1)

Higher-order Category	Category	Definition	<i>n</i>	<i>% (i)</i>
<i>Categories describing specific behavioural manifestations of temporal flexibility</i>				
Preparation and guidance for innovation	1. Giving realistic previews on innovation work	Leader gives a realistic preview on ups and downs of the innovation process (including exploration and exploitation) and thus prepares the followers for setbacks.	7	38 (5)
	2. Structuring innovation work	Leader provides temporal structure for the innovation process through planning small steps, setting short-term goals, and setting fixed dates for temporal phases of exploration and exploitation.	10	54 (7)
	3. Specifying and communicating requirements	Leader specifies and communicates requirements and expectations to initiate follower switching between exploration and exploitation (e.g., names customer requirements or goal of the innovation project).	14	54 (7)
Initiation of switching between exploration and exploitation	4. Initiating perspective taking when switching is required	Leader triggers switching between exploration and exploitation through initiating perspective taking (e.g., encouraging followers to take the perspective of other stakeholders or think about the situation in a different way).	7	23 (3)
	5. Triggering assessment of the feasibility of ideas	Leader triggers switching between exploration and exploitation through initiating a critical assessment of the feasibility, implementation, or value of ideas.	12	46 (6)
	6. Providing knowledge for transitions	Leader provides own know-how or mobilises know-how for the innovation work when temporal switching between exploration and exploitation is required.	3	15 (2)
	7. Temporarily involving all stakeholders	Leader includes all involved persons into decision making to achieve successful temporal switching (e.g., asking members which idea should be further elaborated).	11	62 (8)
	8. Regularly exchanging project information with followers	Leader regularly and intensively exchanges information with followers regarding status quo, progress and how to proceed in order to successfully initiate temporal switching between exploration and exploitation when needed.	11	46 (6)
	9. Establishing feedback circles with followers	Leader establishes temporal feedback circles with followers to reflect exploration and exploitation results (e.g., by considering follower ideas and giving feedback).	11	31 (4)
<i>Categories describing general leader behaviours</i>				
General support	10. Standing behind the whole project	Leader gives the followers the feeling that he or she stands behind the whole project (e.g., by showing support and defending the project externally).	11	38 (5)
	11. Offering permanent individual support	Leader permanently provides individual support for followers and considers follower thoughts and ideas (e.g., making time for followers).	5	31 (4)
	12. Appreciating followers' performance	Leader expresses appreciation and respect for followers' engagement and efforts during all phases of innovation work.	9	31 (4)

Note. *n* = total number of codings of each category. % = frequency of categories across the total of 13 interviews. *i* = number of interviews in which a category was coded.

Discussion

The qualitative findings of Study 1 show that TFB is, on the one hand, manifested in the form of specific preparing and guiding behaviours, which indicate that ambidextrous leaders know the dynamics of exploration and exploitation (see Rosing et al., 2011), prepare the innovation work accordingly, and provide appropriate structures in which their followers can switch back and forth between exploration and exploitation. The Path-Goal Theory helps to understand how such leader behaviours support followers' innovation work: According to the theory, leader behaviour that initiates structure for followers provides psychological stability, manages expectations, and reduces followers' ambiguity (House, 1971, 1996). The behaviours found in this study are, however, required for supporting the specific dynamics of innovation work and are much narrower than the more general form of task-oriented leader behaviour that is often called *initiating structure*.

On the other hand, TFB is also manifested in behaviours through which leaders gather contextual information and motivate followers to continuously assess and flexibly respond to changing requirements. According to the Path-Goal Theory, such questioning of the situation and of own behaviours maintains the followers' motivation to adapt functional behaviours over time (see House, 1971). It also helps leaders and followers to recognise relevant shifts in environmental stimuli, which is important to balance exploration and exploitation (see Havermans et al., 2015). For whole teams, we speculate that these leader behaviours described in the TFB categories may particularly help team members to monitor their work, anticipate changes, and plan their activities – which are important team processes through which teams facilitate their goal achievement (see Marks, Mathieu, & Zaccaro, 2001).

Categories 10, 11, and 12 describe leader behaviours that are not specific to innovation but are known from other leadership concepts such as *leader consideration* of the Path-Goal Theory (House, 1971) or *providing individualized support* as part of transformational leadership (Podsakoff, MacKenzie, Moorman, & Fetter, 1990). Although such behaviours are valuable to maintain followers' motivation and goal acceptance in general (see House, 1971), they do not explain how leaders manage ambidexterity among followers. Thus, we do not consider these categories as manifestations of TFB in the following.

In sum, we could qualitatively explore several concrete manifestations of TFB on the basis of data from real-life critical incidents, which gave us an in-depth understanding of leaders' temporal flexibility. However, the completeness of the list of categories that reflect TFB is not fully guaranteed. Although we found that our categories reached theoretical saturation after having coded all critical incidents – which means that additional coding cycles did not reveal new relevant behaviours (cf. Guest et al., 2006) – we think that the results cannot be seen as fully complete nor can they be generalised for other contexts without limitations (e.g., work contexts where innovation is not a key outcome).

Study 2: Development of a Scale for Temporal Flexibility Behaviour⁵

Having explored manifestations of TFB in Study 1, the goal of Study 2 was to use these findings and develop a scale for TFB that can be combined with existing OLB and CLB scales (Zacher & Rosing, 2015) to form an extended AL measure that incorporates all of its subcomponents. We also aimed to use the study sample for testing the relationship of TFB with OLB, CLB, and follower-rated innovation for the first time.

The concept of Rosing et al. (2011) implies that TFB is important to facilitate follower innovation outcomes. As found in Study 1, TFB provides guidance and know-how for followers who work on innovations and encourages them to reflect on the ongoing progress, outcomes, and stakeholder perspectives with respect to the generation of novel ideas and their implementation. Followers should then better recognize changing situational requirements of innovation work and adapt their own behaviour respectively. Thus, we expect that TFB positively relates to followers' individual innovation performance.

Hypothesis 1: Leaders' TFB is positively related to follower innovation.

Method

Procedure. To develop a scale for TFB, we first generated a pool of 64 items on the basis of the categories from Study 1. For example, item 2 “My manager makes it clear that an innovation project includes changing requirements (e.g., idea generation, idea implementation, etc.)” was formulated based on coding examples from category 1 (see Table 3). We then selected only items that were clearly formulated and positively worded because such items better fitted the existing, positively worded OLB and CLB items (see Zacher & Rosing, 2015) and helped

⁵ The data collection for Study 2 took place within a larger research project that included the master's theses of Irina Bachsleitner, Sarah Eichmann, and Jula Kaes (LMU Munich). The questionnaire included additional scales, which I did not consider as relevant for this thesis (e.g., individual perceptions of team and environmental variables).

avoiding systematic errors in the measure (see Jackson, Wall, Martin, & Davids, 1993). Then, to retain the most content valid items for TFB, we instructed 20 experienced students and researchers (see Hinkin & Schriesheim, 1989) with a background in organisation psychology to rate if each of the items is representative for a respective TFB category from Study 1 (note that 70% of the experts reported to be familiar with AL). After this step, we retained 17 items for further scale development (items are shown in Table 4).

Given the heterogeneity of the TFB categories from Study 1, we assumed that TFB may have latent factors and therefore conducted an exploratory factor analysis (EFA, principal axis factoring, promax) in a third step to explore the factor structure with the remaining 17 items. For this, we distributed the items to working people via an anonymous online survey, who we recruited via social media channels and personal contacts. Note that all participants received detailed information on the background and privacy terms of the study before they participated and were offered a research report as an incentive for participation. We used the data to calculate factor loadings, item communalities, and item-to-total correlations to select items that were most representative for TFB and build a practical TFB scale.

Participants. The final sample of $N = 152$ employees was mostly balanced in terms of gender (53.3% were male) and the average age was 37.4 years ($SD = 11.58$) with a range from 21 to 62 years. The participants mostly worked in innovation contexts (e.g., research & development, product development, innovation, or consulting) in Germany-based companies. Note that we removed 20 data sets due to unrealistically short answering times or missing values of the study variables beforehand (which was roughly 12% of the data sets we initially obtained).

Measures. The participants rated their leaders' TFB on the 17 retained items (see Table 4) and OLB and CLB on two 7-item scales (Zacher & Rosing, 2015), which were all answered

on 5-point scales (1 = not at all, 5 = frequently, if not always). The participants further rated their innovative job performance with 9 items (Janssen, 2001) on a 5-point scale (1 = never, 5 = frequently, if not always). Scales only available in English were translated using the translation and re-translation procedure, which means that native speakers (German and English) translated the original items from English to German, then retranslated them, and finally revised discrepancies. Reliabilities of the scales are shown in Table 5. The original German items for OLB, CLB, TFB, and follower innovative job performance can be found in Appendix B.

Results

Exploratory factor analysis. Items, factor loadings, item communalities, and factor statistics are shown in Table 4. The EFA with the 17 TFB items resulted in three distinguishable factors (Eigenvalue > 1), which explained 61.48% of the variance. Six items mostly loaded on the first factor named TFB-stimulation, reflecting behaviours through which a leader stimulates the followers' flexibility to switch between exploration and exploitation. Six further items loaded on the second factor named TFB-communication, reflecting communication by which a leader exchanges information with followers to handle the switching. The five remaining items loaded on the third factor named TFB-orchestration, reflecting behaviours through which leaders structure innovation work. These three factors were positively related to each other with correlations ranging from .50 to .75. Factor loadings of all items were higher than the recommended minimum of .40 (Hinkin, 1998) and item communalities did also not fall below the recommended minimum of .40 (Costello & Osborne, 2005). Only item 17 showed ambiguous factor loadings (i.e., difference between factor loadings is .20 or lower; Ferguson & Cox, 1993) and was thus not further considered.

Table 4

Items and Factor Statistics from Exploratory Factor Analysis (Study 2)

TFB items (My manager...)	F1	F2	F3	<i>h</i> ²
<i>11 encourages looking at an idea or a problem from different angles.</i>	.89	.10	-.28	.72
<i>2 makes it clear that an innovation project includes changing requirements (e.g. idea generation, idea implementation, etc.).</i>	.80	-.16	.14	.58
10 encourages thinking about new ways to approach a problem.	.77	.03	.03	.65
9 encourages taking the perspectives of other people or positions [...].	.73	-.02	-.05	.48
3 prepares me for the fact that innovation projects do not always go according to plan.	.50	.05	.21	.45
12 encourages a general assessment or review of an idea.	.50	.14	.08	.43
<i>14 provides his/her know-how.</i>	.00	.97	-.20	.74
<i>16 includes all involved persons when making decisions (e.g. regarding further action, which ideas will continue to be worked on, etc.).</i>	-.13	.73	.08	.48
20 introduces ideas and alternative approaches through his/her feedback in order to discuss them further.	.25	.61	-.04	.62
19 repeatedly gives me feedback on ideas that have been developed.	.16	.51	.10	.50
15 contributes personal experiences (e.g. through practical examples).	.19	.47	.13	.50
17 regularly communicates with me about the content of our work.	.12	.41	.22	.43
<i>5 sets a structure for the innovation project.</i>	-.05	.04	.79	.62
6 specifies fixed dates within the innovation project.	-.10	-.16	.76	.41
<i>4 divides the innovation project into substeps or subgoals.</i>	.18	-.06	.66	.52
7 communicates the specific requirements of the innovation project (e.g. customer requirements).	-.06	.29	.56	.53
8 makes the objective of the innovation project clear.	.09	.23	.46	.46
Eigenvalue	7.64	1.79	1.02	
Percentage variance	44.96	10.54	5.98	
Percentage variance (cumulated)	44.96	55.50	61.48	
Factor correlation matrix				
Factor 1	1			
Factor 2	.75	1		
Factor 3	.50	.62	1	

Note. *N* = 152. TFB = Temporal Flexibility Behaviour. F = factor. Factor loadings $\geq .40$ appear in bold.

To emphasise the structure of the factors, items are sorted by factor loadings. Items retained for the final 6-item TFB scale are set in italic.

Scale refinement. In the interest of practicability and completeness of the TFB scale, we retained two of the highest loading items per factor to build a short 6-item scale. For TFB-stimulation, we selected the highest loading items 11 and 2. For TFB-communication, we selected items 14 and 16 accordingly. For TFB-orchestration, we selected items 5 and 4. Although item 6 showed a higher loading on this factor compared to item 4, we decided to select the latter because the behaviour described in item 6 appeared too specific and might have been difficult to answer by people who do not work with fixed dates. The resulting 6-item TFB scale demonstrated a good Alpha reliability ($\alpha = .79$) and the corrected item-to-total correlations ranged from .49 to .61, which is above the recommended minimum of .40 (Nunnally, 1978).

Analyses with the new TFB scale. Means, standard deviations, correlations, and Alpha reliabilities of the variables from Study 2 are shown in Table 5. In support of Hypothesis 1, we found a positive and significant correlation between TFB and followers' self-reported innovative job performance. TFB was also positively correlated with OLB and CLB. OLB and CLB were not significantly correlated with each other.

Table 5

Means, Standard Deviations, Correlations, and Reliabilities of Variables (Study 2)

Variable	<i>M</i>	<i>SD</i>	1	2	3	4
1. TFB	3.41	.76	(.79)			
2. OLB	3.77	.76	.70***	(.87)		
3. CLB	3.18	.71	.55***	.12	(.77)	
4. Follower innovative job performance	3.57	.58	.23**	.24**	.13	(.82)

Note. $N = 152$. Pearson correlations are shown. TFB = Temporal Flexibility Behaviour. OLB = Opening Leader Behaviour. CLB = Closing Leader Behaviour.

** $p < .01$. *** $p < .001$.

Discussion

In Study 2 we developed a short 6-item TFB scale on the basis of categories from Study 1. The positive correlations of TFB with OLB and CLB were below .90, which indicates that the subcomponents are related but not redundant (John & Benet-Martinez, 2000; Shaffer et al., 2016). The missing correlation between OLB and CLB is in line with findings from Zacher and Rosing (2015), whereas others reported small and positive correlations of OLB and CLB (Zacher et al., 2014; Zacher & Wilden, 2014). Note that OLB, CLB, and TFB are not required to correlate with each other because the subcomponents are formative, non-redundant indicators, which together form the theoretical construct of AL. The correlations among the three subcomponents were actually very imbalanced. Accordingly, common EFA and confirmatory factor analyses with the three subcomponents may be insufficient to further test the factorial validity of AL (for a detailed examination of composite latent constructs with formative indicators, see MacKenzie, Podsakoff, & Jarvis, 2005). TFB is now meant to be combined with OLB and CLB to measure and further validate AL comprehensively.

Introduction of an updated Ambidextrous Leadership Measure

Based on Study 1 and Study 2 we hereinafter suggest an extension of the existing measurement of AL. To be able to assess and validate AL as a whole construct, its measure should incorporate all theoretical subcomponents. The concept of Rosing et al. (2011) and our empirical findings imply that AL is *formed* by OLB, CLB, and TFB – where the latter is a reflection of the third subcomponent temporal flexibility. OLB, CLB, and TFB describe different leader behaviours that correspond to different follower behaviours necessary for innovation (i.e., exploration, exploitation, and flexible shifting between exploration and exploitation to match situational requirements). When one of the subcomponents is dropped, the empirical meaning of

the construct would be dramatically changed, which could potentially damage the validity of its measure (MacKenzie et al., 2005, p. 712). Imagine a leader who predominantly displays OLB at any time – he or she would not be considered as ambidextrous, because the leader misses to foster exploitation as well, which is also necessary to achieve innovation. Now imagine a leader who shows OLB and CLB but does thereby not promote the situational behaviour of employees as actually required for innovation; this leader would also not be considered as ambidextrous, because he does not express temporal flexibility (see Rosing et al., 2011). Thus, OLB, CLB, and TFB must be combined to capture all relevant facets of AL.

We argue that one way to measure AL comprehensively is to form a single AL variable with the scales for OLB, CLB, and TFB (by calculating the grand mean). Such a measure incorporates all theoretical subcomponents of AL, which is not the case with only OLB, only CLB, the product term of OLB and CLB (e.g., Zacher & Rosing, 2015), or the grand mean of OLB and CLB (e.g., Luu, 2017a). To establish and validate such a measure of AL – which we see as a *composite latent construct with formative indicators* – we focus on its relationships with other conceptually related constructs, processes, and outcomes in Study 3 and Study 4.

MacKenzie et al. (2005) argue that such analyses are more sufficient for the validation of the whole formative construct compared to common reliability and factorial validity tests as often applied for latent constructs with reflective components.

Study 3: Testing Different Ambidextrous Leadership Measures Using Follower Innovation Outcomes

The goal of Study 3 was to test AL regarding its relationship with established leadership constructs (i.e., convergent and discriminant validity) and usefulness for predicting follower innovation beyond these (i.e., criterion-based and incremental validity). Towards this end, we used an extended and new AL measure that consists of OLB, CLB, and TFB and a commonly used but incomplete AL measure which consists of OLB and CLB (but does not include TFB). We also tested if the new AL measure predicts follower innovation beyond the incomplete AL measure. The rationale and hypotheses for Study 3 are as follows.

Rationale and Hypotheses

Convergent and discriminant validity. It is important to examine the empirical relationship between conceptually similar constructs to avoid construct proliferation (DeRue et al., 2011; Shaffer et al., 2016). We have therefore tested whether the innovation-specific construct AL is related to but distinguishable from the following general and broad leadership constructs that have already been well investigated in the innovation literature (for a categorization of broad versus narrow leadership constructs, see Bormann & Rowold, 2018).

First, *transformational leadership*, which is based on the idea that leaders transform followers in a way that they are willing to perform beyond regular expectations (e.g., Bass, 1985; House, 1977; Podsakoff et al., 1990), was shown to display a wide range of positive correlations with follower innovation outcomes (Hughes et al., 2018; Ng, 2017; Rosing et al., 2011). Second, *contingent rewards*, which describes that leaders exchange rewards in return for follower performance, was constantly found to relate to follower innovation outcomes (Hughes et al., 2018). Third, *LMX* – describing the formation of high-quality relationships between leaders and

followers – is a predictor of different follower innovation outcomes as well (Carnevale et al., 2017; Gottfredson & Aguinis, 2017; Hughes et al., 2018; Ng, 2017). Fourth, *consideration*, which describes relations-oriented leader behaviours, and fifth, *initiating structure*, which describes task-oriented leader behaviours, are beneficial in stressful, ambiguous environments (House, 1971) and have also been shown to relate to some follower innovation outcomes (Rosing et al., 2011).

Incremental validity. The general proposition of the AL concept is that, when leaders display OLB, CLB and temporal flexibility (which is manifested in TFB), follower innovation should be maximized because these behaviours stimulate the necessary exploration, exploitation, and situational switching between exploration and exploitation as needed in innovation processes (Rosing et al., 2011). Thus, an AL measure that incorporates all three subcomponents should better predict follower innovation outcomes than incomplete measures of AL that miss the third subcomponent TFB, which is just as important.

Hypothesis 2: An AL measure that consists of OLB, CLB, and TFB predicts follower innovation outcomes beyond OLB alone (Hypothesis 2a), CLB alone (Hypothesis 2b), and the combination of OLB and CLB (Hypothesis 2c).

As outlined above, transformational leadership, contingent rewards, LMX, consideration, and initiating structure were shown to positively relate to follower innovation; however, these constructs do not include specific leader behaviours that are necessary for handling the dialectic nature of innovation processes, whereas AL does. Thus, following the proposition that specific leadership styles outperform general leadership styles in predicting specific outcomes (Bormann & Rowold, 2018), we propose that in general, AL predicts follower innovation outcomes beyond general leadership constructs.

Hypothesis 3: AL predicts follower innovation outcomes beyond transformational leadership (Hypothesis 3a), contingent rewards (Hypothesis 3b), LMX (Hypothesis 3c), consideration (Hypothesis 3d), and initiating structure (Hypothesis 3e).

Method⁶

Procedure. We conducted an online survey with people from Germany who mainly worked in innovation contexts. As in Study 2, we recruited the participants via online platforms as well as personal contacts and offered a study report as an incentive for participation. All participants received detailed information on the background and privacy terms of the study before they participated.

Participants. We obtained a final sample of $N = 186$ employees after we had removed 67 data sets due to unrealistically short answering times, missing values of the study variables, or missing work experience with innovations (which was roughly 26% of the data sets we initially obtained). Similar to Study 2, the participants mostly stemmed from contexts associated with innovation work (e.g., research & development, product development, or consulting). The sample was again well represented across gender (54.3% were male) and the average age was 32.5 years ($SD = 9.69$) with a range from 17 to 66 years.

Measures. The participants rated their leaders' OLB and CLB on two 7-item scales (Zacher & Rosing, 2015) and TFB on the 6-item scale from Study 2 (see Table 4). To form a single variable for AL, we calculated the grand mean of OLB, CLB, and TFB. Transformational leadership was measured using the German version of the Transformational Leadership Inventory (TLI; Podsakoff, MacKenzie, & Bommer, 1996; Podsakoff et al., 1990) developed by

⁶ The data collection for Study 3 took place within a larger research project that included the master's theses of Irina Bachsleitner, Sarah Eichmann, and Jula Kaes (LMU Munich). The questionnaire included additional scales, which I did not consider as relevant for this thesis (e.g., individual perceptions of team and environmental variables).

Heinitz and Rowold (2007). We averaged the TLI facets (*articulating a vision, providing an appropriate model, fostering the acceptance of group goals, high performance expectations, individualized support, and intellectual stimulation*) to build a single variable for transformational leadership. Contingent reward was measured using four items from the German version of the contingent reward scale (Heinitz & Rowold, 2007), which is based on Podsakoff et al. (1990). LMX was measured using the German version of the 7-item LMX7 scale (Schyns, 2002), which is based on Graen and Uhl-Bien (1995). To measure leader consideration and initiating structure, we adapted two 6-item scales (Halpin, 1957).

The participants further self-rated follower innovation on a 4-item scale (Welbourne, Johnson, & Erez, 1998). They also answered a single item that captured their overall satisfaction with their leader's behaviours for guiding idea generation and implementation (FSLB) as an additional innovation-specific outcome: "In general, how satisfied are you with your leader's behaviour in terms of guiding generation and implementation of ideas?". Note that such single-item measures achieve acceptable reliability without overstressing the length of the questionnaire (for a meta-analysis, see Wanous, Reichers, & Hudy, 1997).

All scales were rated on a 5-point scale (1 = never, 5 = frequently, if not always) and displayed acceptable to very good Alpha reliabilities (see Table 6). Study 3 was again conducted in German. If possible, we used validated German versions of the scales; if only English versions were available, we conducted a translation adaptation process as described in Study 2. The original German items of the AL and follower innovation scales are shown in Appendix B.

Table 6

Means, Standard Deviations, Correlations, and Reliabilities of Variables (Study 3)

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9	10	11	12
1. AL	3.64	0.53	(.85)											
2. Incomplete AL	3.67	0.48	.94***	(.73)										
3. OLB	3.99	0.74	.68***	.67***	(.88)									
4. CLB	3.36	0.71	.55***	.63***	-.14 [†]	(.81)								
5. TFB	3.56	0.76	.91***	.72***	.59***	.35***	(.79)							
6. Transformational leadership	3.64	0.69	.75***	.65***	.71***	.13*	.74***	(.93)						
7. Contingent reward	3.78	0.89	.53***	.46***	.62***	-.03	.54***	.70***	(.84)					
8. Leader-Member-Exchange	3.83	0.80	.69***	.61***	.71***	.08	.67***	.80***	.72***	(.90)				
9. Consideration	3.79	0.89	.62***	.54***	.67***	.03	.62***	.76***	.68***	.70***	(.89)			
10. Initiating structure	3.48	0.82	.57***	.52***	.02	.68***	.53***	.43***	.15*	.30***	.26***	(.87)		
11. FSLB	3.80	1.13	.71***	.63***	.77***	.04	.69***	.77***	.59***	.80***	.68***	.26***	(-)	
12. Follower innovation	3.82	0.61	.26***	.28***	.28***	.09	.18*	.23**	.16*	.25**	.11	.08	.20**	(.70)

Note. $N = 186$. Pearson correlations are shown. Cronbach alpha coefficients for each scale are on the diagonal in parentheses. AL = Ambidextrous Leadership. OLB = Opening Leader Behaviour. CLB = Closing Leader Behaviour. TFB = Temporal Flexibility Behaviour. FSLB = follower satisfaction with leader behaviour for guiding idea generation and implementation (single item). AL was calculated as the grand mean of OLB, CLB, and TFB. Incomplete AL was calculated as the grand mean of OLB and CLB.

[†] $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

Results

Descriptive statistics and correlations. Means, standard deviations, correlations, and Alpha reliabilities of the variables from Study 3 are shown in Table 6. As in Study 2, TFB was positively correlated with self-rated follower innovation, which provides further support for Hypothesis 1 from Study 2. TFB was also positively correlated with OLB and CLB. OLB and CLB were again not significantly correlated. The commonly used AL measure (consisting of OLB and CLB) and the extended AL measure (consisting of OLB, CLB, and TFB) were positively correlated with follower innovation and FSLB.

Convergent and discriminant validity. The updated AL measure (consisting of OLB, CLB, and TFB) was positively correlated with all general leadership variables, ranging from moderate (with LMX, consideration, initiating structure, and contingent rewards) to high correlations (with transformational leadership). The commonly used AL measure (consisting of OLB and CLB) had moderate correlations with all general leadership variables. With regard to the AL subcomponents, TFB positively correlated with all general leadership variables. OLB was significantly and positively correlated with the general leadership variables except for initiating structure. In Turn, CLB was significantly and positively correlated only with initiating structure. These results fit the findings of others who found positive correlations of OLB and CLB with transactional and transformational leadership (Zacher et al., 2014; Zacher & Rosing, 2015; Zacher & Wilden, 2014).

Incremental validity. We conducted a so-called *usefulness analysis* (see Judge, Erez, Bono, & Thoresen, 2003) to test the incremental validity of AL. Such analyses have been used by others to test whether a leadership construct significantly contributes to predicting outcomes beyond other leadership constructs (e.g., Zhang, Waldman, Han, & Li, 2015). The analytical procedure was as follows (cf. Judge et al., 2003): First, we entered an alternate leadership

variable into a hierarchical regression to predict the dependent variable (i.e., follower innovation or FSLB). In a second step, we added the tested AL measure to the regression to test for significant change in variance accounted for. After this, we reversed the order of the predictors entered: The AL measure was entered in a first step and the alternate leadership variable was entered in a second step. Through this procedure we were able to compare significant changes in multiple correlations (multiple R) of the predictors with the dependent variable as an indicator of whether the dependent variable was predicted better when an additional variable was entered.

We first conducted a usefulness analysis where we tested the new AL measure (grand mean of OLB, CLB, and TFB) in predicting follower innovation outcomes in relation to (1) only OLB, (2) only CLB, and (3) a commonly used but incomplete AL measure (grand mean of OLB and CLB; e.g., Luu, 2017a; Ma et al., 2019). We then tested the incomplete AL measure and the new AL measure against the general leadership constructs in two further analyses.

Table 7 shows the results of the usefulness analysis with the new AL measure versus OLB alone, CLB alone, and the incomplete AL measure. In support of Hypothesis 2c, the new AL measure predicted follower innovation beyond CLB. However, against the Hypotheses 2a and 2c, it did not predict follower innovation beyond OLB and the incomplete AL measure. However, the new AL measure predicted FSLB beyond OLB, CLB, and the incomplete AL measure, which partly supports the Hypotheses 2a, 2b, and 2c.

Table 8 shows the results of the usefulness analysis with the conceptually incomplete AL measure (consisting of OLB and CLB) versus general leadership constructs. The incomplete AL measure significantly contributed to the prediction of both outcomes beyond all general leadership constructs, which indicates incremental validity of this AL measure.

Table 9 finally shows the results of the usefulness analysis with the new AL measure (consisting of OLB, CLB, and TFB) versus the general leadership constructs. AL significantly

contributed to the prediction of both outcomes beyond the general leadership constructs except for two cases: When transformational leadership or LMX was entered first, AL did not significantly contribute to the prediction of self-rated follower innovation. Transformational leadership and LMX did also not contribute to the prediction of the outcomes beyond AL. These results support the Hypotheses 3b, 3d, 3e but only partly support the Hypotheses 3a and 3c.

Table 7

Usefulness Analysis of Ambidextrous Leadership Variables (Study 3)

	Self-reported follower innovation	Self-reported FSLB
1. OLB	.28***	.77***
2. AL	.01	.04***
1. AL	.26***	.71***
2. OLB	.04*	.10***
1. CLB	.09	.04
2. AL	.18***	.78***
1. AL	.26***	.71***
2. CLB	.01	.11***
1. Incomplete AL	.28***	.63***
2. AL	.00	.09***
1. AL	.26***	.71***
2. Incomplete AL	.03 [†]	.01*

Note. $N = 186$. AL = Ambidextrous Leadership. OLB = Opening Leader Behaviour. CLB = Closing Leader Behaviour. TFB = Temporal Flexibility Behaviour. FSLB = Follower satisfaction with leader behaviour for guiding idea generation and implementation (single item). Numbers in first stage are multiple correlations (multiple R). Numbers in second stage are change in multiple correlations (delta R). AL was calculated as the grand mean of OLB, CLB, and TFB. Incomplete AL was calculated as the grand mean of OLB and CLB.

[†] $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 8

Usefulness Analysis of Ambidextrous Leadership with OLB and CLB (Study 3)

	Self-reported follower innovation	Self-reported FSLB
1. Transformational leadership	.23**	.77***
2. Incomplete AL	.06*	.02**
1. Incomplete AL	.28***	.63***
2. Transformational leadership	.01	.16***
1. Contingent rewards	.16*	.59***
2. Incomplete AL	.13**	.12***
1. Incomplete AL	.28***	.63***
2. Contingent rewards	.00	.09***
1. Leader-Member-Exchange	.25**	.80***
2. Incomplete AL	.05*	.02***
1. Incomplete AL	.28***	.63***
2. Leader-Member-Exchange	.02	.19***
1. Leader consideration	.11	.68***
2. Incomplete AL	.18***	.07***
1. Incomplete AL	.28***	.63***
2. Leader consideration	.01	.12***
1. Initiating structure	.08	.26***
2. Incomplete AL	.22***	.37***
1. Incomplete AL	.28***	.63***
2. Initiating structure	.01	.01

Note. $N = 186$. AL = Ambidextrous Leadership. OLB = Opening Leader Behaviour. CLB = Closing Leader Behaviour. FSLB = follower satisfaction with leader behaviour for guiding idea generation and implementation (single item). Numbers in first stage are multiple correlations (multiple R). Numbers in second stage are change in multiple correlations (delta R). Incomplete AL was calculated as the grand mean of OLB and CLB.

$^{\dagger}p < .10$. $*p < .05$. $**p < .01$. $***p < .001$.

Table 9

Usefulness Analysis of Ambidextrous Leadership with OLB, CLB, and TFB (Study 3)

	Self-reported follower innovation	Self-reported FSLB
1. Transformational leadership	.23**	.77***
2. AL	.04 [†]	.02***
1. AL	.26***	.71***
2. Transformational leadership	.01	.09***
1. Contingent rewards	.16*	.59***
2. AL	.10**	.16***
1. AL	.26***	.71***
2. Contingent rewards	.00	.05***
1. LMX	.25**	.80***
2. AL	.03	.03***
1. AL	.26***	.71***
2. LMX	.02	.12***
1. Leader consideration	.11	.68***
2. AL	.15**	.09***
1. AL	.26***	.71***
2. Leader consideration	.01	.06***
1. Initiating structure	.08	.26***
2. AL	.19***	.45***
1. AL	.26***	.71***
2. Initiating structure	.01	.02**

Note. $N = 186$. AL = Ambidextrous Leadership. OLB = Opening Leader Behaviour. CLB = Closing Leader Behaviour. TFB = Temporal Flexibility Behaviour. LMX = Leader-Member-Exchange. FSLB = Follower satisfaction with leader behaviour for guiding idea generation and implementation (single item). Numbers in first stage are multiple correlations (multiple R). Numbers in second stage are change in multiple correlations (delta R). Ambidextrous leadership was calculated as the grand mean of OLB, CLB, and TFB.

[†] $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

Discussion

In Study 3, we tested the criterion-based, convergent, discriminant, and incremental validity of AL by using a new and conceptually complete measure for AL (that consists of OLB, CLB, and TFB) and a commonly used but incomplete measure of AL (that consists of only OLB and CLB). The moderate to high correlations of the AL measures with general leadership variables indicated convergent validity but were still below .80, which is also in favour of discriminant validity of AL (John & Benet-Martinez, 2000; Shaffer et al., 2016). However, high correlations could still indicate redundancy of the new leadership construct (Bormann & Rowold, 2018; Shaffer et al., 2016). To respond to this concern, we argue that the magnitude of the correlations may be partly explained by common method and common source effects and are likely to be smaller when assessed with different methods (see Bormann & Rowold, 2018).

Study 3 mostly supported the criterion-based and incremental validity of the conceptually incomplete as well as the new AL measure (where TFB was added to OLB and CLB) with respect to self-reported follower innovation and FSLB. The incomplete AL measure displayed incremental validity beyond all general leadership variables. Incremental validity of the new AL measure was given beyond CLB, contingent rewards, leader consideration, and initiating structure but was not given beyond OLB and the incomplete AL measure, which is most likely caused by the high correlations and multicollinearity among these variables. Moreover, the new AL measure did also not predict one of the outcomes, follower innovation, beyond transformational leadership and LMX, which may be caused by the high correlations and multicollinearity among these variables as well. I hereinafter provide some theoretical and methodological explanations for this finding.

With regard to LMX, I suggest that LMX may be rather seen as a mediator between AL and follower innovation as the quality of leader-follower relationships was found to *explain* the

effects of leader behaviours on follower outcomes (Dulebohn, Bommer, Liden, Brouer, & Ferris, 2012). In a similar vein, Hughes et al. (2018) argued that LMX is rather a proximal outcome of leader behaviour: “because LMX refers to a rating of relationship quality between leader and follower, it is technically speaking the outcome of a leader behaviour-follower reaction process.”(p. 554). Moreover, whereas AL is meant to equally promote both idea generation and implementation, a meta-analysis found that LMX is more strongly related to the idea generation part of innovation (Carnevale et al., 2017). I speculate that the follower innovation scale used in Study 3 has over-emphasised the idea generation part of innovation (note that only one out of four items has a clear emphasis on idea implementation; see Appendix B), which in turn may have unfavourably strengthened the relationship of the LMX scale with the outcome and thus undermined the relative predictive power of AL.

With regard to transformational leadership, I argue that the updated AL measure (that includes TFB) has partial overlaps with facets of transformational leadership, explaining why the constructs correlated strongly with each other and incremental validity could not be found for the updated AL measure (or in any direction, as transformational leadership did also not significantly predict follower innovation beyond the AL measure). In particular, *intellectual stimulation* and *individualised support* (see Podsakoff et al., 1990) – facets of transformational leadership that were shown to predict idea generation and implementation (Hughes et al., 2018) – are partly similar to TFB as they include leadership behaviours that aim at supporting and stimulating followers’ intellectual work. Thus, future studies will need alternate methods to empirically examine the true differences and the incremental validity of these leadership constructs.

General Discussion of Studies 1, 2, and 3

With the Studies, 1, 2, and 3, we provided and tested a conceptually more complete measure of AL that incorporates TFB besides OLB and CLB. We tested whether adding TFB to OLB and CLB is valuable for the predictive power of AL measures and whether AL (measured with and without TFB) has convergent, discriminant, and incremental validity. For this purpose, we first explored manifestations of TFB in Study 1 and developed a short and reliable subscale for TFB in Study 2, which we combined with existing OLB and CLB scales to build a more complete measure for AL. Findings indicated that in general, AL (measured with and without TFB) is positively related to follower innovation outcomes and has convergent and discriminant validity. Incremental validity was supported for the AL measure that only consists of OLB and CLB but was only partly supported for the new measure that also included TFB, which requires further investigation.

Theoretical Contributions

This work makes two key contributions to the field of innovation and AL research. First, by exploring and measuring TFB, we specified leaders' specific behavioural strategies for handling temporal transition points within the exploration-exploitation paradox, which has been a blind spot in the AL and paradox research literature (see Chung & Beamish, 2010; Poole & van de Ven, 1989). Our qualitative findings can help researchers and practitioners to understand how ambidextrous leaders support their followers in their daily practice to better overcome the paradoxes and tensions of switching back-and-forth between opposing behaviours.

Second, our results largely supported the convergent, discriminant, and incremental validity of AL measures in comparison to several general leadership constructs, which underpins the proposition that specific leadership constructs are related to, but should outperform general leadership constructs in predicting specific outcomes (see Bormann & Rowold, 2018). Given that

construct proliferation is often seen as a threat to development in leadership research (DeRue et al., 2011; Shaffer et al., 2016), we hope that our work has successfully demonstrated that AL is potentially unique and valuable for the context of innovation. However, our extended measure for AL did not clearly predict follower innovation beyond conceptually incomplete measures of AL (OLB alone and the combination of OLB and CLB). We think that this was mainly caused by multicollinearity among the variables and by the fact that the scales used to measure follower innovation over-emphasised the idea generation part of innovation, which could have undermined the role of the AL subcomponents CLB and TFB.

Limitations and Future Research

First, the data from Study 2 and Study 3 stemmed from followers' self-rated perceptions of their leaders' behaviours and follower innovation outcomes. Thus, common method variance may have inflated correlations between the different leadership variables and innovation outcomes. Future research can avoid this issue by, for example, applying multitrait-multimethod approaches for analysing the convergent, discriminant, and criterion-based validity of AL (see Bormann & Rowold, 2018).

Second, the cross-sectional design of Study 2 and Study 3 does not allow drawing conclusions on causal effects of AL on follower innovation outcomes. Our findings should therefore be replicated in studies that are capable of testing causality (e.g., longitudinal and experimental designs). In this regard, researchers should also clarify and test the relative predictive contribution of each of the different AL subcomponents for different follower innovation behaviours and outcomes (i.e., exploration, exploitation, behavioural flexibility).

Third, to further establish the validity of AL, commonly used procedures for testing reliability and validity (e.g., Cronbach's alpha, CFA for latent models) may be insufficient, because the formative subcomponents of AL are not required to be correlated. Instead, the

nomological validity of the whole construct may be more informative (see MacKenzie et al., 2005). Studies should be designed to test whether proposed underlying leader characteristics, such as cognitive complexity or integrative thinking (see Rosing et al., 2011), positively relate to AL. AL (and TFB in particular) should also be empirically distinguished from *leader behavioural flexibility*, which is a more complex conceptualisation of leader flexibility reflecting if a leader adequately masters opposite but complementary behaviours (e.g., being decisive and participative; Kaiser et al., 2007). Future studies may also test AL against contemporary and conceptually related leadership constructs that have been argued to predict innovation, for example, *paradoxical leader behaviours in people management* (Zhang et al., 2015).

We finally encourage researchers to study AL in teams because innovation work is often carried out by whole teams. However, research on AL in teams must consider that different team members may share or split innovation tasks and team processes may mediate or moderate the influence of AL on innovation outcomes. Some team processes may even substitute AL (Rosing et al., 2011). Thus, researchers should adapt and evaluate AL measures for team contexts and study the underlying mechanisms of AL in teams.

Practical Implications

Our work can be used to assess, train, and feedback leadership behaviour in contexts where innovation is a key outcome. The qualitative results indicate that leaders should learn and find ways to exchange context information and feedback with followers (e.g., regarding changing customer needs or progress), develop know-how for dealing with the flexibility of innovation processes, and spend time on planning their innovation projects. The use of agile project management methods (e.g., SCRUM) may complement AL because such methods provide additional structures for innovation work and promote flexibility. To overall foster innovation in

organisations, decision makers responsible for leadership development and innovation should design and implement leadership training interventions to develop their leaders' AL behaviour.

Conclusion

Leaders who aim to promote their employees' innovation should display specific leadership behaviours that support idea generation and implementation endeavours as required by the situation. The concept of AL as proposed by Rosing et al. (2011) is unique to the extent that it clarifies and combines such concrete behaviours. The studies presented in this chapter showed that AL is valuable for contexts where follower innovation is a key outcome. It also extended the understanding and measure of AL and highlighted some new behavioural manifestations of AL that may help leaders to navigate followers through the inconsistent and permanently changing requirements of innovation work.

Linking Chapter 2 and Chapter 3

Chapter 2 focused on the introduction and test of an extended measure of AL that includes, for the first time, TFB besides OLB and CLB as a reflection of temporal flexibility. The quantitative examinations presented in this chapter solely focused on the criterion-based and incremental validity of AL with respect to individual-level follower innovation outcomes. The presented findings are novel, methodologically limited, and partly inconsistent with existing theory and research, which implies that further research is needed to test the predictive power of the new AL measure.

In Chapter 3, I will present Study 4, which builds on the theory and findings from Chapter 2 but focuses on the relationship of AL with the team-level construct of innovation for several reasons. On the one hand, the novel but limited results from the previous studies require further investigation with alternate methods. On the other hand, innovation work is often carried out by teams, which makes it important to understand how leaders can support team innovation. However, the findings from the previous studies cannot be applied to team-level innovation without limitations because the previous studies solely focused on individual-level innovation outcomes. Thus, it seemed necessary and consequent to shed light on the relationship of AL and team innovation outcomes in a fourth study and again examine the predictive power of the extended AL measure. Towards this end, I will draw on new data from working teams. Study 4 will also shed light on *Team Climate for Innovation* (West, 1990) as an additional and proximal team-level outcome of AL and mediator of the relationship between AL and team innovation, which should further advance the understanding of AL.

3. Chapter:

Test of Ambidextrous Leadership in Predicting Team Innovation Outcomes

Team innovation, that is, the generation and implementation of novelty by teams, has become an important topic in research and practice (Van Knippenberg, 2017). Team innovation requires teams to flexibly generate novel ideas and also effectively implement these, which is a complex and ambiguous task (Bledow et al., 2009; Thayer, Petruzzelli, & McClurg, 2018). Researchers suggested that *Ambidextrous Leadership* (AL) can support teams to overcome the challenges of this task and facilitate team innovation (Rosing et al., 2011; Rosing et al., 2010). However, little is known about AL in teams. Study 4 aims to contribute to this field by investigating if and how exactly AL positively relates to team innovation.

Rosing et al. (2011) proposed that AL facilitates team innovation through the combination of three subcomponents. (1) *Opening Leader Behaviour* (OLB; e.g., allowing followers to take risks or to experiment) fosters the generation of novel ideas. (2) *Closing Leader Behaviour* (CLB; e.g., controlling or monitoring work progress) fosters the effective implementation of ideas. (3) *Temporal flexibility* ensures that leaders situationally switch between fostering idea generation and implementation in a way that the often changing requirements of innovation work are met by the team. The concept implies that leaders increase team innovation outcomes most when they display all these three AL subcomponents towards the team (Rosing et al., 2011).

Empirical evidence for the proposed positive relationship between AL and team innovation is yet sparse (for an exception, see Zacher & Rosing, 2015) and mediating mechanisms that further explain *how* AL positively relates to team innovation remain largely unclear from both conceptual and empirical viewpoints – although researchers have considered AL as important determinant of team innovation (e.g., Rosing et al., 2011; Thayer et al., 2018;

Zacher & Rosing, 2015). We think that the AL literature has not connected enough with the team innovation literature to shed light on such mediating mechanisms. To address this shortcoming, we focused on the *Team Climate for Innovation* (TCI; Anderson & West, 1998; West, 1990) and proposed it as a team-level mediator because it explains how idea generation and implementation in teams is supported through four well-investigated team climate facets that can be shaped through leadership (Newman et al., 2020; Van Knippenberg, 2017) and that reliably predict team innovation outcomes (for a meta-analysis, see Huelsheger et al., 2009).

To investigate if and how AL positively relates to team innovation, we first needed a conceptually complete measure of AL that includes all of its three subcomponents. However, existing measures consist only of OLB and CLB scales (e.g., Luu, 2017a; Ma et al., 2019; Zacher & Rosing, 2015) but do not include the third subcomponent temporal flexibility, which was made measurable for the first time in the form of *Temporal Flexibility Behaviour* (TFB) in Study 1 and Study 2 and combined with OLB and CLB to measure AL more completely in Study 3. Thus, it appeared necessary to assess the relationship between team innovation and AL in this updated form with OLB, CLB, and TFB and test the incremental predictive value of the new measure (that includes TFB) in relation to existing measures (that do not include TFB) before we continued to further investigate the proposed mediation.

Towards this end, we collected data in a cross-sectional study with work teams from companies. We first tested whether AL, consisting of OLB, CLB, and TFB, positively relates to team innovation as independently rated by followers and leaders. We thereby also tested whether adding TFB as a subcomponent to the two commonly used subcomponents OLB and CLB increased the predictive power of the AL measure and whether the three subcomponents jointly predicted the highest levels of team innovation. We finally tested if AL also positively relates to TCI and TCI mediates the relationship between AL and team innovation.

Theoretical Background

Ambidextrous Leadership and Team Innovation

Team innovation requires teams to flexibly show exploration for the generation of novel ideas and exploitation for the effective implementation of ideas (Bledow et al., 2009; Thayer et al., 2018). Teams must also switch between these two opposing activities as innovation processes are driven by dynamically changing requirements and alternating sequences of idea generation and implementation (Anderson et al., 2014; West, 2002). AL stimulates the teams' necessary exploration, exploitation, and situational switching between exploration and exploitation (Rosing et al., 2011). In particular, OLB fosters team innovation because it stimulates the team members' exploration, which is especially necessary for situations where teams must come up with new ideas for processes, products, or services (e.g., a leader allows team members different ways of accomplishing the task or gives room for ideas to stimulate followers' searching, playing, or experimenting with creative ideas). CLB additionally fosters team innovation because it stimulates team members' exploitation, which is necessary when teams must transform creative ideas into implemented results (e.g., a leader monitors the progress of the team to make it refine and implement ideas). In addition, leaders must display TFB, which reflects that the leader fosters exploration and exploitation in a flexible manner to ensure that the team members' exploratory and exploitative actions meet changing situational requirements – such as changing customer needs or availability of resources. Taken together, the concept proposes that OLB, CLB, and TFB together form AL, which should positively relate to team innovation outcomes (Rosing et al., 2011).

Hypothesis 1: AL, consisting of OLB, CLB, and TFB, is positively related to team innovation.

Supporting the concept, studies found positive relationships of AL with different innovation outcomes such as follower innovative performance, (e.g., Zacher et al., 2014; Zacher & Wilden, 2014), followers' job crafting (Luu, Dinh, et al., 2019; Ma et al., 2019), or entrepreneurial orientation and operational performance of organisations (Luu, 2017a). With regard to the relationship between AL and team-level innovation, we found only one study showing that the combination of OLB and CLB positively relates to team innovation (Zacher & Rosing, 2015).

Existing research on AL is, however, limited because AL measures used in the studies included only OLB and CLB but not the third subcomponent TFB – making the assessment of AL conceptually incomplete. We have therefore developed a measure for TFB that can be combined with existing OLB and CLB scales to measure AL in Study 1 and Study 2 (see Chapter 2). The TFB scale describes leaders' observable behaviour beyond OLB and CLB through which leaders provide guidance and realistic previews on the ups and downs of innovation work and exchange information with the followers to handle situations where requirements may change. This should help teams to flexibly adapt and switch between idea generation and implementation according to changing requirements. However, although Study 3 could show that AL measured with TFB positively relates to follower innovation outcomes, the added value of TFB requires further investigation.

Given this situation, it appeared necessary to assess if adding TFB to the measure of AL increases the predictive power towards team innovation (analogous to Study 3 where we focused on follower innovation). We argue that the AL measure, consisting of OLB, CLB, and TFB, predicts team innovation positive and beyond the combination of OLB and CLB because TFB is just as important as OLB and CLB to support team innovation. As each of the AL subcomponents contributes to different stages of innovation work in teams, team innovation should be highest

when leaders show high levels of OLB, CLB, and TFB – whereas team innovation should be significantly lower when one of the subcomponents is shown less (cf. Rosing et al., 2011). Figure 2 visualises this proposed interaction of OLB, CLB and TFB on team innovation.

Hypothesis 1a: AL, measured with OLB, CLB, and TFB, predicts team innovation beyond the combination of OLB and CLB.

Hypothesis 1b: Team innovation is highest when leaders show high levels of OLB, CLB, and TFB towards the team.

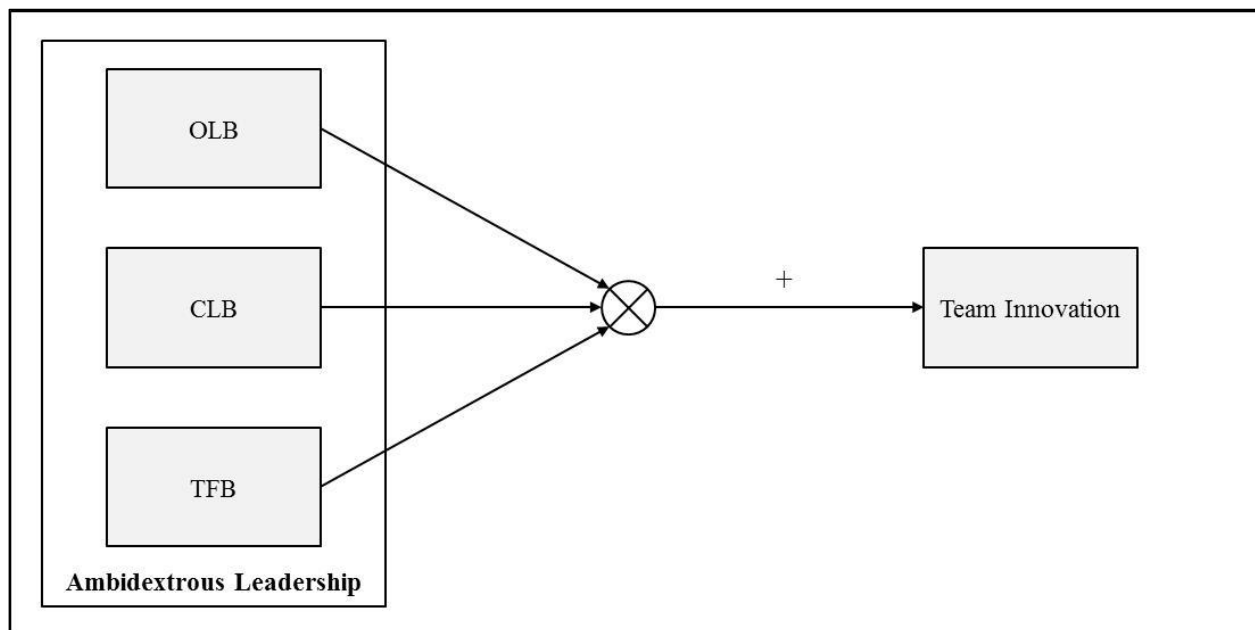


Figure 2. Conceptual interaction model (Study 4). OLB = Opening Leader Behaviour. CLB = Closing Leader Behaviour. TFB = Temporal Flexibility Behaviour.

Team Climate for Innovation as a Mediator

Above all, after having clarified the relationship between AL and team innovation, this study aims to explain mediating mechanisms of this relationship. The *Team Climate for Innovation* (TCI, West, 1990) concept has been particularly valuable in the past to understand how leaders and their teams increase team innovation outcomes (for reviews, see Newman et al., 2020; Van Knippenberg, 2017). The TCI captures a team's perception of innovation-specific practices, procedures, and rewards along which the team members operate. It consists of the following four distinct team climate facets that support the collective efforts to turn exploratory and exploitative actions into innovation: *vision*, *task orientation*, *participative safety*, and *support for innovation* (for detailed descriptions of the facets, see Anderson & West, 1998; West, 1990). A meta-analysis indicated that all TCI facets reliably and positively relate to team innovation (Huelsheger et al., 2009).

Hypothesis 2: TCI is positively related to team innovation.

In the following, we explain how AL stimulates the TCI, which in turn increases team innovation. Studies have already indicated that facets of a TCI mediate the relationship between different leadership behaviours and team innovation outcomes, for example, transformational leadership (Eisenbeiss et al., 2008), LMX (Scott & Bruce, 1994) and providing clarity (West et al., 2003). Similarly, AL may wield influence on the teams' innovation endeavours through creating an innovation-supportive team climate, which consists of a vision, task orientation, participative safety, and support for innovation.

First, AL provides guidance and realistic previews for the innovation tasks for the team, which should increase the team members' understanding of the team goals. AL also includes the monitoring of goal attainment as part of exploitation stages, which emphasises the overarching goal to develop and deliver an innovative product, service, or work routine. As a consequence,

team members align their understanding and commitment towards the goal of generating novel ideas and implementing them in the form of innovations, which characterises the TCI facet *vision*. Such a team's vision, in turn, increases the focus and motivation of the team members to execute their innovation tasks (Anderson & West, 1998; West & Anderson, 1996).

Second, ambidextrous leaders share information, encourage their team members to interact, elaborate ideas, and allow taking risks or trying out things in situations where novel ideas are needed. AL thereby gives a role model for open interaction and exchange of ideas, which should create a non-threatening and trustworthy environment that is called *team participative safety*. In such an environment, team members are likely to participate, interact, and openly share knowledge themselves for both the creation and implementation of new things, which further supports team innovation (Anderson & West, 1998).

Third, AL encourages the team members to reflect on situational requirements and goal attainment of their work in recurring patterns. The team thereby learns to cyclically evaluate and adapt its actions and maximise goal attainment. This is likely to result in the team's increased *task orientation*, that is, a shared understanding and concern among team members for what is required to excel at (innovation) work, which is especially important for the quality of innovations (West, 1990, p. 311).

Fourth, AL provides specific support, know-how, and guidance for all stages of innovation work, which should increase the team's perception of *support for innovation*, that is, the expectations, approval, and practical support for innovation work in the team environment (see West, 1990). AL signals the followers that they get time and backing for the development of novel ideas. At the same time, AL provides structure, control, and support for (switching to) idea implementation. These forms of enacted and active support may stimulate mutual support for innovation among team members and are important determinants of team innovation (Anderson

& West, 1998; West, 1990; West & Anderson, 1996). Figure 3 visualises this proposed mediation, where AL positively stimulates TCI facets, which in turn increase team innovation.

Hypothesis 3: AL is positively related to a team's TCI.

Hypothesis 4: TCI mediates the positive relationship between AL and team innovation.

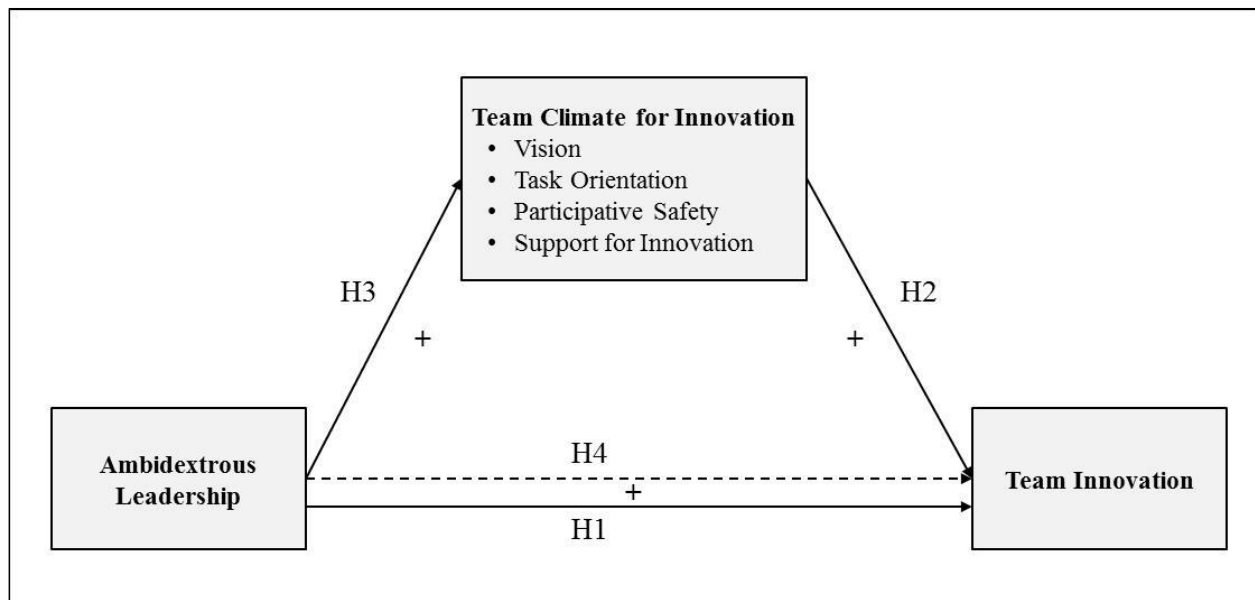


Figure 3. Conceptual mediation model (Study 4). H = hypothesis. The dotted line visualises the proposed indirect effect of ambidextrous leadership on team innovation through a team climate for innovation.

Study 4: Ambidextrous Leadership, Team Innovation Climate, and Team Innovation – An Empirical Examination with Data from Work Teams⁷

To test our proposed models and hypotheses with regard to the relationship of AL with TCI and team innovation, we conducted Study 4. We present the methods and results of the study in the following and finally discuss the findings.

Method

Procedure. We collected cross-sectional data from work teams (leaders and team members) in Germany via an anonymous online survey. We focused on teams from different companies and different functional backgrounds where innovation is a key outcome of interest (e.g., research and development, innovation management, consulting, or software development) and contacted members of such teams via social media and personal contacts. To promote participation, we offered a research report as an incentive.

We invited team leaders and their followers of each team in order to obtain two independent ratings of the dependent variable (i.e., team innovation). All participants received an invitation e-mail with a team-specific code, instructions, and a web link to the survey. The codes allowed us to match individual datasets to a respective team without losing anonymity. We further instructed the participants to forward their invitation e-mail only to members of their own team (i.e., the team in which they were working, interacting, sharing a common goal, see Anderson & West, 1998) and to refer only to this team when answering the questionnaire.

⁷The data collection for Study 4 took place within a larger research project that included the bachelor's theses of Hannah Bruelke, Amelie Hinrichs, Gundula Rauch, and Sonja Schlegl at LMU Munich, which I supervised myself. Parts of the results of this study were presented at the 19th Congress of the European Association of Work and Organisational Psychology, 2019, Turin, Italy.

The questionnaire comprised an (1) instruction section including quantitative and qualitative questions on the team (team size, team task, and own experience in team), (2) a main part with the scales for the study variables, and (3) questions on sociodemographic data (e.g., age, gender, and company size). To distinguish leaders from followers, a filter variable was also included.

Participants. We attained a final sample of $N = 60$ work teams (58 team leaders and 177 followers) for the analysis. The team leader's rating of the dependent variable was attained for 53 out of these 60 teams, whereas follower-ratings of the dependent variable were attained for all teams. Note that we removed incomplete individual datasets (more than 50% of data missing) and datasets from teams with less than two follower responses per team beforehand.

The number of follower responses per team was 2.95 on average ($SD = 1.42$) and ranged from 2 to 9. The average reported team size (including members that did not participate in the study) was 9.44 ($SD = 8.23$) with a minimum of 2 and a maximum of 40 members. The mean age across all participants (including leaders and followers) was 36.79 years ($SD = 11.29$) and the sample was largely balanced in terms of gender (54.3% male, 42.7% female, 3% no answer). Across all team leaders, the average leadership experience with the respective team was 4.28 years ($SD = 3.95$). Participants reported that their company, in which the team was located, had less than 50 (17.2%), 51 to 500 (35.3%), 501 to 5,000 (11.3%), 5,001 to 50,000 (22.8%) or over 50,000 employees (13.4%), respectively.

Measures. The followers reported their team leaders' OLB and CLB on two 7-item scales (Zacher & Rosing, 2015) and TFB on the 6-item scale from Study 2 (see Table 2), ranging from 1 (*not at all*) to 5 (*totally*). They were instructed to rate how their team leader generally behaves *towards the whole team*. For building an AL variable, we calculated the grand mean of OLB, CLB, and TFB.

The TCI was rated by followers of each team using the German version of the TCI inventory (Brodbeck & Maier, 2001), which is based on Anderson and West (1998). Vision (11 items) was assessed on a 5-point scale ranging from 1 (*not at all*) to 5 (*totally*). Participative safety (12 items) was rated on a 5-point scale ranging from 1 (*to a very low extent*) to 5 (*to a very great extent*). Task orientation (7 items) and support for innovation (8 items) were rated on a 5-point scale ranging from 1 (*does not apply*) to 5 (*does totally apply*). To build a single TCI variable, we calculated the grand mean of the four facets (cf. West et al., 2003).

Team leaders and followers independently reported perceived team innovation on a 4-item scale (De Dreu, 2002), which was again rated on a 5-point scale ranging from 1 (*never*) to 5 (*frequently, if not always*).

Alpha reliabilities of all study variables were acceptable and are shown in Table 10. As the study was carried out in German, we translated the scales of which no validated German versions were available; native German and English speakers translated the original English items to German, then retranslated them, and finally revised discrepancies. The original German items of the AL and team innovation scales are shown in Appendix B.

Data aggregation and analysis.⁸ Because we were interested in team-level effects of AL, we aimed to aggregate the followers' perceptions of the team leader's AL shown towards the team, TCI, and team innovation – as it is common in team climate and leadership research (e.g., Hoegl & Parboteeah, 2006; West et al., 2003; Ye, Wang, & Guo, 2019; Zacher & Rosing, 2015).

⁸ Although we expected that only one team leader existed per team, we attained data from five teams where two team leaders reported on perceived team innovation. We aggregated their ratings and included them in the analysis because we believed that having these ratings of dependent variables is valuable, given that the sample size was relatively small. The average uniform $\text{rwg}_{(j)}$ for leader-rated team innovation of these five teams was .66 and did undercut the recommended cut-off value of .70 (LeBreton & Senter, 2008) but not in a substantial way.

To justify data aggregation, we calculated the $r_{wg(j)}$ (James, Demaree, & Wolf, 1993) as an estimate of the within-group interrater agreement among followers of each team. The averaged uniform $r_{wg(j)}$ values of the scales ranged from .81 to .97 across teams and were above the established cut-off value of .70 (LeBreton & Senter, 2008). As it is recommended in the literature, we additionally calculated the ICC(1) to see if team membership affected the ratings and the ICC(2) as an indicator of the reliability of the team-level means (Biemann, Cole, & Voelpel, 2012; Bliese, 2000). The ICC(1) (ranging from .17 to .34) and ICC(2) values (ranging from .37 to .67) were statistically significant (note that scales as used in this study may underestimate the ICC values, see Beal & Dawson, 2007). Given that interrater-agreement among followers was indicated and the tests suggested that team membership had a significant effect on follower ratings, we continued to aggregate the data at the team-level by building the mean of the individual ratings for teams with two or more follower responses.

Before we conducted our analyses, we also checked the qualitative descriptions of the team task (which we gathered at the beginning of the questionnaire) to see if the perception of the team task was consistent across all followers and the leader of each team. Inconsistencies would have indicated that the data was mismatched or individual members of a team may have had substantially deviating perceptions of what the team does; however, we found no contradictory or inconsistent descriptions.

Results

The means, standard deviations, Alpha reliabilities, and correlations of the study variables are summarised in Table 10⁹. AL, the TCI, and three of the four TCI facets significantly and

⁹ Note that the correlations of TFB with OLB and CLB were below .70, which indicates some degree of distinctiveness (John & Benet-Martinez, 2000; Shaffer et al., 2016). OLB and CLB were not significantly related, which is acceptable for formative indicators of a composite latent construct (MacKenzie et al., 2005).

positively correlated with follower-rated team innovation but not with leader-rated team innovation. Only the TCI facet support for innovation was positively correlated with team innovation as independently rated by both, team leaders and followers. These findings support Hypothesis 1 (positive relationship between AL and team innovation) and Hypothesis 2 (positive relationship between TCI and team innovation) only for team innovation as rated by followers but not as rated by leaders. Providing support for Hypothesis 3, AL was positively correlated with the TCI and its facets. Note that the follower- and leader-ratings of team innovation correlated positively but moderately, indicating potential differences between the perceptions of followers and leaders.

Analyses of Ambidextrous Leadership and team innovation. Before we continued to test the TCI as mediator of the positive relationship between AL and team innovation, we first tested the predictive power of the AL measure with the subcomponents OLB, CLB, and the newly added TFB versus an incomplete measure that only consists of OLB and CLB.

Usefulness analysis. Hypothesis 1a proposed that the AL measure that consists of OLB, CLB, and TFB predicts team innovation beyond the combination of only OLB and CLB. To test this hypothesis, we conducted a so called *usefulness analysis* (see Judge et al., 2003), which is used to determine significant changes in multiple correlations (multiple R) as an indication of whether a variable significantly contributes to the prediction of outcomes beyond other variables (e.g., Zhang et al., 2015). In a first step, we entered OLB and CLB into a hierarchical regression with team innovation as the dependent variable. In a second step, we added TFB to test for significant change in variance accounted for. This procedure was then repeated with the grand mean of OLB and CLB (as used by others, e.g., Luu, 2017a; Luu, Dinh, et al., 2019; Ma et al., 2019) versus the grand mean of OLB, CLB and TFB (conceptually complete measure of AL used in this study).

Table 10

Means, Standard Deviations, Correlations, and Reliabilities of Variables (Study 4)

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9	10	11	12
1. AL (F)	3.89	0.37	(.88)											
2. Incomplete AL (F)	3.84	0.36	.95***	(.82)										
3. OLB (F)	4.20	0.50	.74***	.68***	(.90)									
4. CLB (F)	3.48	0.52	.57***	.71***	-.04	(.80)								
5. TFB (F)	3.99	0.48	.88***	.67***	.69***	.26*	(.78)							
6. TCI (F)	4.02	0.40	.66***	.57***	.64***	.16	.65***	(.96)						
7. Vision (F)	4.05	0.40	.45***	.44***	.34**	.27*	.36**	.76***	(.85)					
8. Task Orientation (F)	4.02	0.49	.57***	.50***	.52***	.18	.55***	.90***	.66***	(.87)				
9. Participative Safety (F)	4.22	0.46	.63***	.56***	.61***	.17	.60***	.87***	.49***	.75***	(.92)			
10. Support for Innovation (F)	3.78	0.53	.57***	.45***	.66***	-.03	.64***	.85***	.49***	.65***	.68***	(.92)		
11. Team Innovation (F)	3.55	0.64	.31*	.18	.47***	-.20	.44***	.63***	.43**	.55***	.45***	.69***	(.74)	
12. Team Innovation (L)	3.77	0.66	.16	.15	.27†	-.06	.14	.25†	.08	.17	.18	.38**	.43**	(.69)

Note. $N = 60$ for follower-rated variables. $N = 53$ for leader-rated variables. (F) = follower-rated variable. (L) = leader-rated variable. AL = Ambidextrous Leadership. OLB = Opening Leader Behaviour. CLB = Closing Leader Behaviour. TFB = Temporal Flexibility Behaviour. AL was calculated as the grand mean of OLB, CLB, and TFB. Incomplete AL was calculated as the grand mean of OLB and CLB. Alpha-reliabilities were calculated at the individual and are shown in parentheses on the diagonal level (with a N of 58 for the leader-rated variable and a N ranging between 168 and 177 for follower-rated variables).

† $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

Results of the usefulness analysis are summarised in Table 11. We found a significant change in explained variance for follower-rated team innovation when TFB was added to OLB and CLB as a third predictor, $\Delta R^2 = .07$, $\Delta F (df = 1, 56) = 5.62$, $p = .021$. Similarly, the grand mean of OLB, CLB, and TFB significantly predicted follower-rated team innovation beyond the grand mean of OLB and CLB, $\Delta R^2 = .19$, $\Delta F (df = 1, 57) = 13.77$, $p < .001$. The grand mean of OLB and CLB had no positive correlation with the dependent variable. However, against our expectations, no significant effects were found for leader-rated team innovation. Hypothesis 1a was thus supported for team innovation as rated by followers but not as rated by team leaders.

Table 11

Usefulness Analysis of Ambidextrous Leadership Measures (Study 4)

Step and variables	Follower-rated team innovation ($N = 60$ teams)	Leader-rated team innovation ($N = 53$ teams)
AL subcomponents		
1. OLB and CLB (2 variables)	.50***	.27
2. OLB, CLB, and TFB (3 variables)	.06*	.00
Incomplete and complete AL measures		
1. Grand mean of OLB and CLB	.18	.15
2. Grand mean of OLB, CLB, and TFB	.29***	.01

Note. AL = Ambidextrous Leadership. OLB = Opening Leader Behaviour. CLB = Closing Leader Behaviour. TFB = Temporal Flexibility Behaviour. Numbers in first step are multiple correlations (multiple R). Numbers in second step are change in multiple correlations (delta R).

† $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

Three-way interaction analysis. Hypothesis 1b proposed that team innovation is highest when team leaders show high levels of OLB, CLB, and TFB towards the team. To test this hypothesis, we computed a *three-way interaction analysis* using PROCESS (Hayes, 2017). This procedure allowed us to account for conditional effects of the predictors on the outcome and use heteroscedasticity-corrected standard error estimates (Hinkley correction), which is

recommended to avoid biases (Hayes & Cai, 2007). As recommended for such analyses, the predictor variables were mean centred before testing the interactions (Hayes, 2017).

Table 12 summarises the regression results. The regression with follower-rated team innovation as the dependent variable and OLB, CLB, TFB, and their respective interaction terms as predictors was significant, $R^2 = .50$, $F(df = 7, 52) = 10.11$, $p < .001$. As expected, the interaction term of OLB, CLB, and TFB significantly and positively related to follower-rated innovation. An analogous regression for leader-rated team innovation was marginally significant and did not reveal a significant and interpretable three-way interaction term, $R^2 = .21$, $F(df = 7, 45) = 2.23$, $p = .050$.

To see if the direction of the significant three-way interaction of OLB, CLB, and TFB for follower-rated team innovation supports Hypothesis 1b, we conducted a simple slope analysis and visualised the conditional effects of OLB at low and high values of CLB and TFB ($\pm 1 SD$). *Figure 4* visualises the results of the simple slope analysis.

The relationship between OLB and follower-rated team innovation was negative when CLB was high and TFB was low ($B = -.79$, 95% CI [-1.56, -0.02], $t = -2.05$, $p = .046$). OLB and CLB significantly and negatively interacted at low levels of TFB ($B = -1.49$, $F(df) = 9.41$ (1, 52), $p = .003$). Against Hypothesis 1b, the relationship between OLB and follower-rated team innovation was significant and strong when leaders showed *low* levels of CLB and TFB ($B = .76$, 95% CI [0.24, 1.29], $t = 2.93$, $p = .005$). When CLB and TFB were high, OLB was positively related to follower-rated innovation but the effect was only marginally significant ($B = .55$, 95% CI [-0.10, 1.21], $t = 1.70$, $p = .096$). On this basis, we conclude that Hypothesis 1b could not be clearly supported in our data. However, the results indicate that high levels of TFB were important for supporting team innovation especially when leaders displayed high levels of both, OLB and CLB.

Table 12

Test of the Interaction of Ambidextrous Leadership Subcomponents (Study 4)

Predictor variable	Follower-rated team innovation (<i>N</i> = 60 teams)					Leader-rated team innovation (<i>N</i> = 53 teams)				
	<i>B</i>	95% CI	β	<i>t</i>	<i>p</i>	<i>B</i>	95% CI	β	<i>t</i>	<i>p</i>
(Intercept)	3.43	[3.25, 3.60]	–	39.48	.000	3.56	[3.33, 3.80]	–	30.29	.000
OLB	0.20	[-0.20, 0.59]	.16	1.01	.318	0.42	[-0.25, 1.09]	.32	1.27	.212
CLB	-0.79	[-1.17, -0.40]	-.64	-4.09	.000	-0.17	[-0.64, 0.30]	-.14	-0.73	.470
OLB×CLB	-0.60	[-1.45, 0.24]	-.25	-1.43	.159	-1.37	[-2.53, -0.22]	-.55	-2.39	.021
TFB	0.71	[0.28, 1.14]	.60	3.34	.002	0.07	[-0.41, 0.56]	-.06	0.30	.768
TFB×OLB	0.44	[-0.04, 0.91]	.19	1.84	.071	0.71	[0.06, 1.35]	.29	2.21	.032
TFB×CLB	0.87	[0.03, 1.71]	.39	2.09	.042	1.21	[0.25, 2.17]	.52	2.54	.015
TFB×OLB×CLB	1.83	[0.88, 2.77]	.41	3.89	.000	-0.07	[-1.67, 1.53]	-.02	-0.09	.930

Note. $R^2 = .50$ ($N = 60$, $F = 10.11$, $p < .001$) for follower-rated team innovation. $R^2 = .21$ ($N = 53$, $F = 2.23$, $p = .050$) for leader-rated team innovation.

OLB = Opening Leader Behaviour. CLB = Closing Leader Behaviour. TFB = Temporal Flexibility Behaviour. CI = confidence interval for *B*. *F* statistics are based on heteroscedasticity-consistent interference (HC1, Hinkley).

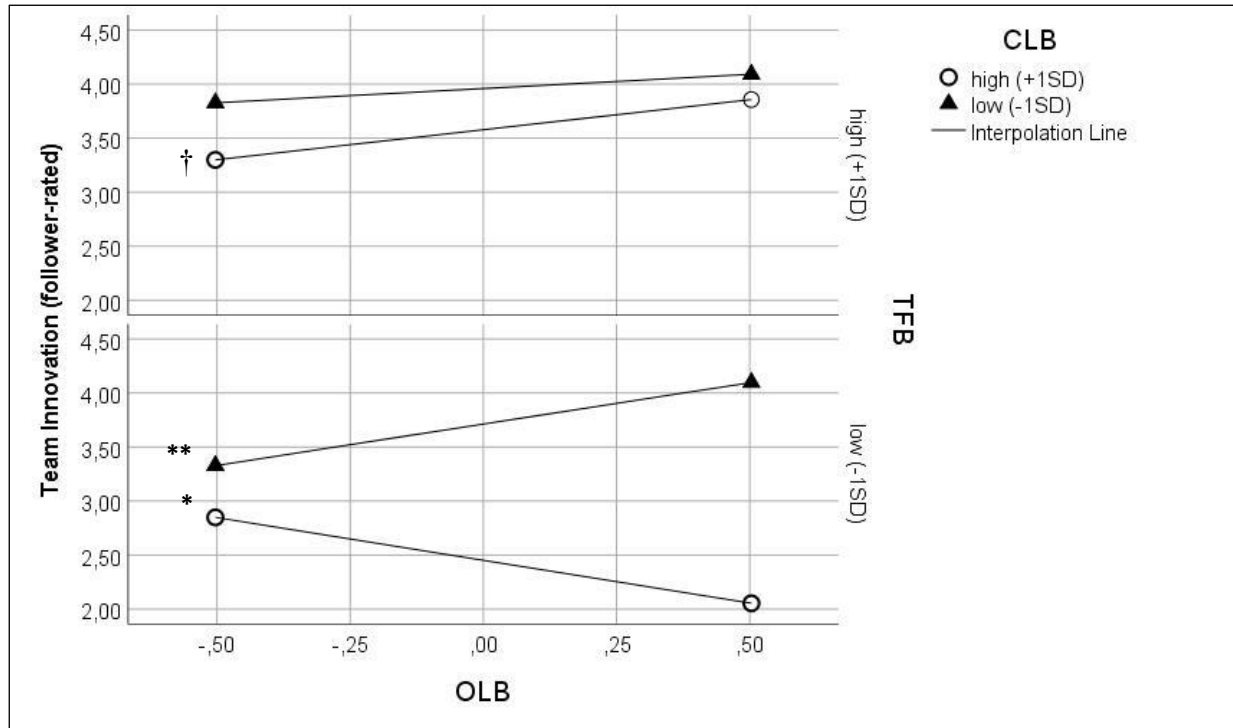


Figure 4. Three-way interaction of Ambidextrous Leadership behaviours (Study 4). The figure shows a simple slope analysis of the relationship between OLB and follower-rated team innovation at different levels of CLB and TFB (+/- 1SD). OLB = Opening Leader Behaviour. CLB = Closing Leader Behaviour. TFB = Temporal Flexibility Behaviour.

† $p < .10$. * $p < .05$. ** $p < .01$.

Mediation Analysis. Hypothesis 4 proposed that TCI mediates the positive relationship of AL with team innovation. To test this hypothesised indirect effect, we conducted a mediation analysis using the software PROCESS Version 3.3 in SPSS with 10,000 bootstrapping iterations (Hayes, 2017). The results are summarised in Table 13, which shows a significant indirect effect of AL on follower-rated team innovation through TCI. However, no significant indirect effect was found when the dependent variable was leader-rated team innovation (95% CIs included zero). Hypothesis 4 was thus only supported for follower-rated team innovation.

We additionally computed a mediation analysis that included the four facets of the TCI as parallel mediators because this allowed us to account for the shared variance between them and further explore if any of the TCI facets drives the mediation more (i.e., parallel mediation, see

Hayes, 2017). The indirect effects for the facets are shown in Table 13. The analyses revealed a significant indirect effect for the TCI facet support for innovation as mediator of the relationship between AL and team innovation as independently rated by both, followers and leaders. Vision, task orientation, and participative safety had no significant indirect effects (95% CIs included zero). We conclude that our data partly supported Hypothesis 4.

Table 13

Summary of Mediation Analyses for Team Climate for Innovation (Study 4)

Mediators	Dependent variable	
	Follower-rated team innovation (<i>N</i> = 60 teams)	Leader-rated team innovation (<i>N</i> = 53 teams)
<i>Simple mediation model</i>		
TCI	.50 [.11, .71]	.20 [-.05, .44]
<i>Mediation model with multiple mediators</i>		
Vision	.03 [-.10, .16]	-.05 [-.36, .21]
Task orientation	.15 [-.04, .37]	-.04 [-.45, .28]
Participative safety	-.08 [-.43, .11]	-.08 [-.51, .26]
Support for innovation	.39 [.21, .60]	.33 [.09, .66]
Total	.48 [.21, .69]	.17 [-.19, .44]

Note. TCI = Team Climate for Innovation (grand mean of vision, task orientation, participative safety, and support for innovation). The table shows indirect standardized effects including 95% CIs for Ambidextrous Leadership on different team innovation outcomes via the mediators shown in the rows of the table. The results are based on bootstrapping (10,000 iterations).

Discussion

Study 4 aimed to show if and how AL positively relates to team innovation. AL, consisting of OLB, CLB, and TFB, correlated positively with TCI and team innovation as rated by followers. An incomplete measure of AL, which consisted of OLB and CLB but which did not include TFB, correlated positively with TCI but not with team innovation. Adding TFB to the measure increased the predictive power of AL for follower-rated team innovation. Further, OLB, CLB, and TFB had a significant three-way interaction effect on follower-rated team innovation. Unexpectedly, the interaction pattern did not reveal that team innovation was highest when leaders showed high levels of OLB, CLB, and TFB. Team innovation increased significantly only at increasing levels of OLB combined with low levels of CLB and TFB. Team innovation was decreased when OLB and CLB were high and TFB was low. These findings indicate that TFB is important for team innovation when leaders show OLB *and* CLB towards teams. Further, AL had an indirect and positive effect on follower-rated team innovation through TCI. More detailed analyses revealed that the team members' perceived support for innovation mediated the relationship of AL with team innovation as rated by both, followers and leaders.

Theoretical contributions. Study 4 contributes to AL theory and research in several ways. First, our work validates that an AL measure which consists of OLB, CLB, and TFB predicts team-level innovation beyond a measure that only consists of OLB and CLB. However, some findings in our data challenge our propositions and the concept of Rosing et al. (2011): Teams that perceived high levels of leader's OLB but low levels of CLB and TFB reported to be more innovative – which speaks against the need to combine all three subcomponents. This finding might be caused by the team innovation measure used in the study, which may have had over-emphasised the idea generation part of innovation (that only requires OLB). Further, we think that OLB may be important at idea generation and implementation stages because teams

must also find creative ways to solve problems when implementing ideas (e.g., due to a lack of resources for implementation). However, it is unlikely that leaders of innovation teams can focus solely on promoting the idea generation part of innovation because implementation is equally important for achieving team innovation – which speaks for the combination of the three subcomponents.

High levels of TFB seemed to avoid negative effects of the combination of OLB and CLB on team innovation. Contrary to studies that reported increasing levels of follower and team innovation at high levels of OLB and CLB (e.g., Zacher et al., 2014; Zacher & Rosing, 2015; Zacher & Wilden, 2014), the combination of OLB and CLB related negatively to follower-rated team innovation in our data when leaders showed low levels of TFB but not when leaders showed high levels of TFB (in the latter case, we found a marginally significant and positive effect). We speculate that when leaders show low levels of TFB, they more likely to miss important situational requirements, resulting in their OLB and CLB not matching the situation. As a consequence, the leader's high levels of OLB and CLB may then be seen as situationally inappropriate and contradicting from the viewpoint of the team members, which can cause the experience of ambiguity and decrease performance (see also Lewis, 2000; Sawyer, 1992; Schreiner, 2017). This implies that if leaders need to promote idea generation *and* implementation in teams, OLB and CLB should be complemented by TFB – which helps teams to anticipate and understand the leaders' switching between phases of idea generation and implementation, to adapt their team actions, and to better organise their team work.

Second, we linked AL with a team climate perspective, showing that the principles of the TCI (West, 1990) can help to understand how AL facilitates team innovation. Our findings are consistent with studies on TCI, which report that support for innovation mediates the relationship between leadership behaviour and follower innovation (e.g., Eisenbeiss et al., 2008; Scott &

Bruce, 1994). It was also meta-analytically shown that support for innovation is a stronger predictor of team innovation in comparison to other team processes and facets of the TCI (Huelsheger et al., 2009), which may explain why vision, participative safety, and task orientation did not significantly contribute to the mediation.

Limitations and future research. Readers should consider the following limitations and implications for future research. First, our team sample size was relatively small, which made it difficult to add additional variables and test more complex models. For example, testing a comprehensive moderated mediation model with OLB, CLB, and TFB as predictors, the TCI facets as mediators, and different team innovation outcomes as dependent variables would only work with a considerably larger sample size. The small sample size of Study 4 may also have undermined statistical power, which could be the reason why we found several effects that were marginally significant (e.g., correlation between support for innovation and leader-rated team innovation). Researchers should thus acquire larger samples to replicate our findings and to test more detailed models in the future.

New studies may also include moderators of the relationship of AL with team innovation. For example, the job-relevant diversity within a team was shown to positively correlate with team innovation (see Huelsheger et al., 2009) and may reinforce the positive relationship of AL with team innovation because the leader and the team can draw on more diverse resources for idea generation and implementation when team members have diverse backgrounds. Similarly, the combination of different versus similar cognitive styles among team members can influence if a team successfully deals with the innovation paradox (see Miron-Spektor, Erez, & Naveh, 2011). For example, having a team that consists of creative *and* conformist members may reinforce the positive relationship of AL with team innovation, whereas teams that consist only of creative

thinkers may be less able to follow a leader's necessary switching from idea generation to implementation, which could undermine the positive effect of AL.

Second, the results of Study 4 may be biased due to common source and method effects (see Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). The moderate to high correlations among our predictor and dependent variables might be partly caused by such effects. For example, the true partial correlations of the TCI facets as mediators between AL and team innovation could have been distorted, which might explain insignificant mediation paths for vision, task orientation, and participative safety (see Hayes, 2017). We tried to account for common source effects by assessing the dependent variable with leaders and followers as two separate sources and by aggregating the individual responses at the team-level. Interestingly, the follower- and leader-rated team innovation measures correlated moderately but did not equally support our hypotheses. The differences might be due to the fact that leaders most likely apply slightly different standards when rating team innovation compared to their followers because leaders must consider organisation-level aspects and additional information that followers might not consider.

Third, due to the cross-sectional study design, the findings of Study 4 do not allow causal conclusions. We cannot finally conclude that TCI (and support for innovation in particular) mediates a positive causal effect of AL on team innovation. Following contemporary innovation climate research (for a review, see Newman et al., 2020), we think that it is more plausible to assume that AL is an antecedent of TCI, which in turn increases team innovation. However, longitudinal and experimental study designs should be used in the future to investigate causal effects and explore how temporal sequences of the AL subcomponents predict TCI facets and influence idea generation and idea implementation stages over time.

Practical implications. Our results can be used by organisations to evaluate and train their team leaders' innovation-supportive behaviour. Leaders should motivate their teams to develop and share ideas in any situation where creative solutions are needed. In addition, leaders should carefully display controlling and directive behaviour only when teams must effectively implement existing ideas or execute routines. To know in which situation the team should focus on exploration or exploitation, a team leader must realistically prepare, establish feedback, and communicate with his or her team members to reflect on changing situational demands. A leader should thereby set an example for active mutual support and provide knowledge, routines, and practices which support the team at all stages of innovation work.

Conclusion. In modern organisations, innovation is often the result of teamwork. To support their teams to be innovative, leaders have the important task to create a team climate in which the team members feel actively supported for the generation and implementation of ideas. With AL, leaders of team-based organisations can create such an environment and can thereby unleash the innovative potential of their teams.

4. Chapter: General Discussion

This thesis aims to advance research in the field of *Ambidextrous Leadership* (AL) and innovation. Drawing on the concept of AL (Rosing et al., 2011), which proposes that AL increases follower and team innovation through the combination of *Opening Leader Behaviour* (OLB), *Closing Leader Behaviour* (CLB), and *Temporal Flexibility Behaviour* (TFB), I wanted to investigate if and how exactly AL is related to different follower and team innovation outcomes. After having presented four empirical studies that address this general question from different angles and with different methods, I hereinafter provide a general discussion of the findings. Whereas I have already provided a narrow discussion of each of the four studies in Chapter 2 and Chapter 3, I will now focus on a more general view.

I will start with an overview of the study goals and hypotheses and discuss the key findings of the respective studies. Second, on this basis I will summarise the main theoretical contributions of the whole thesis and show how it helps to advance different strands of research. Third, I will summarise general limitations, highlight unanswered questions, and suggest some directions for future research. Fourth, I will outline some major implications for practitioners. Finally, I will conclude with some last thoughts on AL and innovation.

Summary of Study Goals and Hypotheses

The work presented in this thesis is grounded in the proposition that AL, consisting of OLB, CLB, and TFB, flexibly supports the necessary idea generation and implementation stages of innovation work, which should increase follower and team innovation (Rosing et al., 2011). As existing work has not yet provided a measure for the subcomponent TFB, which implies that AL measures have been incomplete from a conceptual viewpoint, I first aimed to answer the general Research Question 1 being how temporal flexibility can be measured in the form of leader behaviour beyond OLB and CLB (i.e., TFB). Towards this end, I first conducted Study 1, which explored and categorised manifestations of TFB on the basis of data from qualitative interviews. I then aimed to develop a scale for TFB in Study 2 to combine it with existing OLB and CLB scales for the formation of a more complete questionnaire-measure of AL. Having an AL measure that includes all theoretical subcomponents appeared necessary before continuing to study the relationship of AL with other constructs.

In Study 3, I aimed to answer the general Research Question 2 being whether an updated AL measure, consisting of OLB, CLB, and *TFB*, has incremental validity beyond commonly used measures of AL that only consist of OLB and CLB but do not include TFB. In particular, I hypothesised that the extended AL measure that also included TFB predicts individual-level follower innovation outcomes beyond the incomplete measures (as used by others; e.g., Luu, 2017a; Luu, Dinh, et al., 2019; Ma et al., 2019). Study 3 further aimed to answer the general Research Question 3, examining if AL has incremental validity for innovation outcomes beyond established general leadership constructs. I hypothesised that AL predicts individual-level follower innovation outcomes beyond general leadership constructs (e.g., transformational or contingent rewards leadership) that have already been established as predictors of innovation but that do not specifically account for the dialectic nature of innovation work, whereas AL does. I

also intended to show that AL is empirically related to but distinguishable from these general leadership constructs (i.e., convergent and discriminant validity) in order to avoid the problem of construct proliferation.

In Study 4, I focused on the relationship of AL and the team-level construct of innovation because innovation work is often carried out by teams but yet little is known about if and how AL is related to team innovation. As in Study 3 for follower innovation, I again intended to answer the general Research Question 2 with a new sample and outcome – testing if the extended AL measure, consisting of OLB, CLB, and TFB, positively relates to team innovation beyond AL measures that consist of only OLB and CLB. Drawing on the propositions of Rosing et al. (2011), I further hypothesised that team innovation should be highest when leaders display all three subcomponents of AL towards their team because each of the subcomponents fosters specific and necessary aspects of innovation work in teams (i.e., idea generation, idea implementation, and switching between idea generation and implementation as the situation requires). Furthermore, Study 4 aimed to answer the general Research Question 4, which was not only if AL is positively related to team innovation but also *how* this relationship is mediated. Towards this end, I focused on team climate mechanisms explaining how AL facilitates team innovation because leader behaviour can influence team innovation through creating and managing an innovation-supportive team climate. I hypothesised that AL is positively related to team innovation through *Team Climate for Innovation* (TCI, West, 1990), which means that AL is positively related to TCI, which in turn mediates the relationship of AL with team innovation.

Summary and Discussion of the Findings

Summary and Discussion of Study 1 and Study 2

In Study 1, I conducted interviews with leaders, followers, and consultants to explore and categorise descriptions of behavioural manifestations of temporal flexibility (i.e., TFB) as shown by leaders in real innovation contexts. The interviewees reported concrete incidents and specific leader behaviours by which leaders unsuccessfully or successfully managed to switch between fostering their followers' idea generation and idea implementation work (exploration and exploitation, respectively) and which are not described in the existing OLB and CLB scales from Zacher and Rosing (2015).

Leaders expressed their temporal flexibility through behaviours that provided guidance for switching between different phases of innovation work and that initiated the followers' flexibility to question and adapt their actions according to the situation. Providing such guidance and questioning the current behaviour with regard to goal achievement can help followers to deal with ambiguities and stay motivated (see Path-Goal Theory of Leadership, House, 1996). These findings complement the qualitative work of Havermans et al. (2015), who reported that leaders rely on their interaction with and perception of the environment to manage the switching between exploration and exploitation but without reporting how exactly the leaders have achieved this. The categories from Study 1 describe such forms of interaction through which leaders recognise and process stimuli from the innovation environment.

In a nutshell, Study 1 could show that ambidextrous leaders have a differentiated repertoire of AL behaviours that goes *beyond* the combination of OLB and CLB. The findings add to the temporal flexibility concept of Rosing et al. (2011). The researchers defined temporal flexibility as the leader's ability to flexibly display both OLB and CLB, which may be rooted in cognitive and behavioural complexity, integrative thinking, sensitivity to the environment, and

knowledge about innovation processes – without describing further concrete and observable manifestations of these cognitive antecedents. The TFB categories found in this study represent additional manifestations of this ability, showing how leaders can effectively adapt their own leadership practices (i.e., OLB and CLB) and followers' activities (i.e., exploration and exploitation) to meet the frequently changing requirements of innovation work.

In Study 2, I drew on the categories from Study 1 to create items for TFB and used cross-sectional data from an online survey with employees to develop a short 6-item TFB scale. The resulting TFB scale displayed a good Alpha reliability and was positively correlated with OLB, CLB, and self-rated follower innovation. As I assumed that AL is a composite latent construct that is formed by OLB, CLB, and TFB, I combined the newly created TFB scale with the OLB and CLB scales from Zacher and Rosing (2015) to form a more complete AL measure (i.e., grand mean of OLB, CLB, and TFB). New study samples were then needed to test whether combining the new TFB scale with existing OLB and CLB scales increases the predictive power of AL.

Summary and Discussion of Study 3

In Study 3, I used cross-sectional data from a new sample of employees to test the convergent, discriminant, criterion-based, and incremental validity of AL with regard to individual-level follower innovation outcomes. I first tested whether AL (measured with and without TFB) was positively related to but distinguishable from the general leadership variables *transformational leadership*, *contingent rewards*, *leader-member-exchange (LMX)*, *consideration*, and *initiating structure*. The correlations of AL and the general leadership variables were moderate to high but were clearly not above .80 or .90, which is in favour of convergent and discriminant validity (John & Benet-Martinez, 2000; Shaffer et al., 2016). Given that this finding stemmed from single-source and cross-sectional data, however, the correlations

were likely to be inflated by common source and common method effects and are likely to be smaller when assessed differently (cf. Bormann & Rowold, 2018).

Showing the criterion-based validity of the construct, AL (measured with and without TFB) was positively correlated with two different innovation-related outcomes: Self-reported *follower innovation* and the *followers' satisfaction with leader behaviour for guiding idea generation and implementation* (FSLB). Contrary to my expectations, however, the extended AL measure (consisting of OLB, CLB, and TFB) did not predict one of the outcomes – follower innovation – beyond the commonly used but incomplete AL measure (consisting of OLB and CLB) and OLB only. I think that this unexpected finding was mainly caused by multicollinearity among the highly correlated AL variables. More robust methods may be necessary in the future which are more capable of determining the relative contribution of TFB (in relation to OLB and CLB) to the prediction of innovation outcomes.

I finally tested whether AL predicts follower innovation outcomes beyond established general leadership constructs. In support of incremental validity, the commonly used measure of AL, consisting of only OLB and CLB, predicted follower innovation and FSLB beyond transformational leadership, contingent rewards, LMX, consideration, and initiating structure. In support of my hypotheses, the new AL measure, consisting of OLB, CLB, and TFB, predicted follower innovation and FSLB beyond contingent rewards, initiating structure, and consideration.

Against my expectations, the new AL measure did not significantly predict follower innovation beyond transformational leadership and LMX. Transformational leadership and LMX did not significantly predict follower innovation beyond the new AL measure either. I assume that the moderate to high correlations of the new AL measure with transformational leadership and LMX increased the problem of multicollinearity among the predictor variables, which can explain why the analysis was not significant in any direction. These findings may also have

conceptual and theoretical reasons. LMX could be seen as a mediator of the relationship of AL and follower outcomes as LMX is rather the outcome of leader behaviour, explaining the effects of leadership behaviour on follower outcomes (cf. Dulebohn et al., 2012; Hughes et al., 2018). Moreover, I speculate that the relative predictive power of LMX was probably over-emphasised with the methods used in this study because the follower innovation measure (see Appendix B) stressed the idea generation part of innovation, which is more strongly predicted by LMX than the idea implementation part (Carnevale et al., 2017). The high correlation of the new AL measure with transformational leadership may be partly explained by conceptual overlaps of the added TFB with facets of transformational leadership, namely *intellectual stimulation* and *individualized support* (see Podsakoff et al., 1990). These facets include generic leader behaviours that should stimulate and support followers' intellectual work, which is somehow similar to the function of TFB (which should stimulate followers' flexibility for innovation work). It would thus be premature to conclude that the new AL measure has no incremental validity in relation to LMX and transformational leadership.

Summary and Discussion of Study 4

Study 4 ties with the propositions and findings from Study 3 but shifts the focus to teams. Analogous to Study 3, which focused on individual-level outcomes, Study 4 first tested the hypothesis that the new AL measure, consisting of OLB, CLB, and TFB, positively relates to team innovation while adding TFB to OLB and CLB was again assumed to increase the predictive power of the AL measure. Drawing on cross-sectional data from work teams (aggregated ratings from team members and leaders), I found that new AL measure (consisting of OLB, CLB, and TFB) positively correlated with team innovation as rated by followers but not as rated by the team leaders. In turn, the commonly used AL measure (consisting of OLB and CLB) did not significantly correlate with follower- or leader-rated team innovation. Supporting my

hypothesis, adding TFB to OLB and CLB increased the predictive power of AL with regard to follower-rated team innovation. This finding underpins the importance of TFB as part of AL measures.

Additional analyses, which aimed to shed further light on the added value of TFB, revealed a positive three-way interaction of OLB, CLB, and TFB on follower-rated team innovation. At increasing levels of all of the three subcomponents, the analysis revealed a positive but not significant effect on follower-rated team innovation, which is likely to be caused by a lack of statistical power (note that $B = .55$, $p = .096$ while $N = 60$). Interestingly, follower-rated team innovation decreased when managers showed more OLB and more CLB but had lower values of TFB, which underpins the importance of TFB as part of AL. This finding contradicts Zacher and Rosing (2015), who found a positive interaction of OLB and CLB on team innovation. My finding seems plausible from a theoretical viewpoint as the additional TFB should help leaders to anticipate in which situation OLB or CLB is needed (exploration or exploitation, respectively). I propose that if a leader does not show TFB, the combination of his or her seemingly contradicting OLB and CLB may rather confuse the followers and cause ambiguity and stress (cf. Schreiner, 2017) because followers may perceive an inconsistency between the actual situational requirements and the leaders' instructions. Thus, TFB seems to be important for followers when their leaders (must) promote both idea generation and implementation, which is usually the case in innovation contexts (cf. Rosing et al., 2011).

Against my expectations, team innovation increased when leaders showed more OLB but had lower values of TFB and CLB, indicating that OLB only is enough to promote team innovation. As already argued in the discussion of Study 4, this finding might be partly caused by the team innovation measure, which could have over-emphasised the idea generation part of team innovation and thereby over-emphasised the role of OLB. From a theoretical viewpoint, OLB

could indeed have positive effects throughout the entire innovation process of teams especially when teams must often find creative ways to deal with limited resources and problems of implementing their ideas. Indeed, Schreiner (2017) found that leaders' OLB supported both, idea generation and idea implementation stages.

Finally, a mediation analysis revealed that TCI mediated the positive relationship between AL and follower-rated team innovation (but not leader-rated team innovation). When the facets of the TCI were treated as parallel mediators, I found an indirect effect of AL on follower- and leader-rated team innovation through the TCI facet *support for innovation*. Interestingly, *vision*, *participative safety*, and *task orientation* did not significantly contribute to the mediation. The true partial correlations of the TCI facets may have been distorted due to common method effects, which can partly explain the insignificant mediation paths for vision, task orientation, and participative safety (see Hayes, 2017). However, the finding (that only the team members' perceived support for innovation significantly drives the mediation) connects to meta-analytical examinations showing that support for innovation is the strongest predictor for team innovation among the TCI facets (Huelsheger et al., 2009). Furthermore, I speculate that AL wields strong influence on team innovation by being a role model of mutual and active support for innovation; according to the general tenets of the *social cognitive theory* (Bandura, 1986), OLB, CLB, and TFB may be role modelling behaviours that encourage all team members to promote each other's ambidextrous behaviour and provide resources and practical support for the introduction of new ideas, which strengthens the perceived support for innovation within the whole team. In sum, Study 4 provided evidence for the positive role of AL for team innovation through shaping a team climate in which teams perceive enacted and active support for their innovation tasks.

Summary of Theoretical Contributions

With the findings presented above, this thesis contributes to the study of AL and innovation on a general basis. In the following, I summarise and discuss these general contributions corresponding to the main research needs which I derived from the existing AL literature (see Chapter 1). I will start with contributions to the conceptualisation and measurement of AL, because it is fundamental for further empirical research. Then I will continue with contributions to the validation of the AL concept. I will finally point out how this thesis helps to advance the study of AL in teams.

Drawing a More Complete Picture of Ambidextrous Leadership

Whereas AL was mostly assessed as the combination of OLB and CLB in the literature, this thesis draws a more complete picture of the whole construct by adding behavioural manifestations of leaders' temporal flexibility in the form of TFB. Adding TFB as a reflection of temporal flexibility deviates from existing work that conceptualises leader flexibility (i.e., the flexibility to display different behaviours) as an *higher-order* construct, which is assessed as the followers' perception of whether a leader actually masters opposing general leadership behaviours (see Denison et al., 1995; Kaiser et al., 2007). Interestingly, existing measures of OLB and CLB were not designed nor adapted to assess whether a leader "masters" the behaviours. I argue that the approach of this thesis is superior because of two reasons. On the one hand, TFB can be observed directly by followers, whereas the aforementioned approaches rather measure the followers' interpretation of whether a leader masters opposing behaviours appropriately, where the result of this interpretation is likely to be co-dependent on characteristics of the context and the individuals involved. On the other hand, TFB can be simply added to OLB and CLB for questionnaire-based research.

Most importantly, this thesis also broadens the temporal flexibility concept of Rosing et al. (2011), who vaguely described temporal flexibility as the *ability* to situationally switch between OLB and CLB, which should lead – from their methodological viewpoint – to a mutual and positive interaction of OLB and CLB in predicting innovation (Rosing et al., 2011). Their definition of temporal flexibility implies that it is only reflected in such a positive interaction of OLB and CLB. Contrary to this view, findings from this thesis imply that temporal flexibility is also reflected in the additional TFB (see Study 1), which even seemed to avoid a *negative* interaction of leaders' OLB and CLB on team innovation (see Study 4). I hereinafter sketch how I think that TFB complements OLB and CLB as subcomponent of AL.

Figure 5 illustrates a conceptual model of AL, showing how OLB, CLB, and TFB jointly influence follower and team innovation performance over time. As Rosing et al. (2011) suggested, OLB fosters explorative behaviour for the creation of novel ideas, whereas CLB fosters exploitative behaviour for the coordinated implementation of these as new or improved products, services, or work routines. OLB and CLB thereby determine *what* the followers, or whole teams, are actually *doing* to achieve the given goal of generating or implementing ideas and *how* they are doing it (aspects of taskwork and teamwork; see Marks et al., 2001).

I propose that TFB additionally stimulates behaviours among followers and teams which help them to recognise and assess changes in situational requirements and to adapt their current work accordingly. In particular, TFB provides the general guidance and information from the leader that is necessary for followers to anticipate changing requirements and follow the back-and-forth-shifting between exploration and exploitation over a longer period of time (see Study 1). Given that OLB and CLB are seemingly contradicting, it is important that followers learn to anticipate in which situations and why a leader shows OLB and CLB to avoid the

experience of ambiguity and stress. The fact that adding TFB to OLB and CLB increased the prediction of TSLB (see Study 3) provides some support for this assumption.

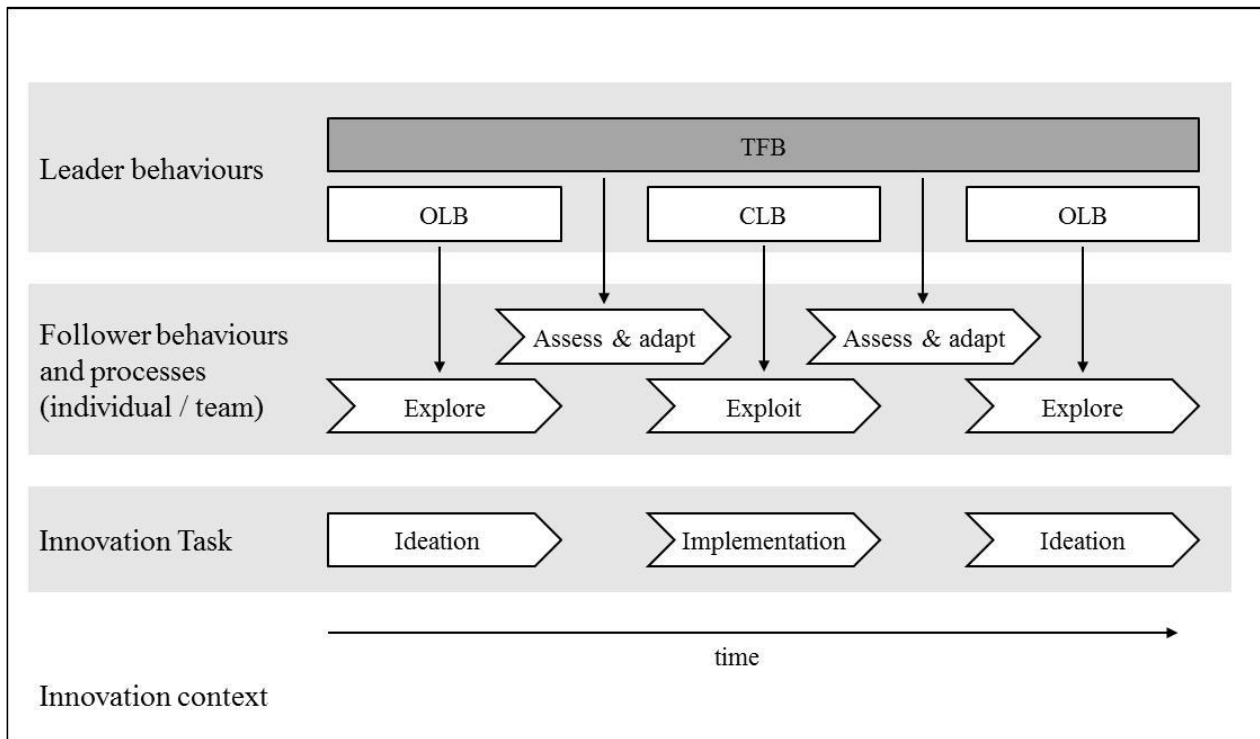


Figure 5. Extended conceptual model of Ambidextrous Leadership in innovation processes. OLB = Opening Leader Behaviour. CLB = Closing Leader Behaviour. TFB = Temporal Flexibility Behaviour.

For teams, I speculate that TFB initiates and maintains some recurring team processes that help teams to better understand and orchestrate sequences of idea generation and implementation on the short and long term. TFB should support *team transition processes* – “periods of time when teams focus primarily on evaluation and/or planning activities to guide their accomplishment of a team goal or objective” (Marks et al., 2001, p. 360). Such phases are important for the team to reassess requirements and adapt actions accordingly, which can be initiated when a leader specifies new requirements for a project or triggers the critical assessment of work results in recurring patterns (see TFB categories from Table 1, Study 1). TFB should also help both, the leader and the team, to constantly monitor and orchestrate the work progress,

which is part of *team action processes* – “periods of time when teams conduct activities leading directly to goal accomplishment” (Marks et al., 2001, p. 366).

Validating Ambidextrous Leadership

To my knowledge, this thesis is the first work that tested different forms of the validity of AL as a whole with different samples and methods. First, the criterion-based validity of a commonly used but conceptually incomplete AL measure (consisting of OLB and CLB) and of a conceptually complete AL measure (consisting of OLB, CLB, and TFB) was tested with two different samples for individual- and team-level innovation outcomes. The findings amplify existing research on the positive relationship of AL with innovation outcomes (e.g., Luu, 2017a; Zacher et al., 2014; Zacher & Rosing, 2015; Zacher & Wilden, 2014).

Second, this thesis provides some first – however limited – evidence for the convergent and discriminant validity of AL in relation to the general leadership constructs transformational leadership, contingent rewards, LMX, consideration, and initiating structure. Given that construct proliferation is a common problem in leadership research (see DeRue et al., 2011; Shaffer et al., 2016), this step appeared mandatory and valuable for research on leadership and innovation.

Third, the thesis provides some evidence for the incremental validity of AL, given that the AL measures used in this study predicted some innovation outcomes beyond general leadership variables. However, I cannot conclude that an extended measure of AL, consisting of OLB, CLB and TFB, is better than commonly used measures that do not include TFB because the latter was superior in the usefulness analyses for individual-level follower innovation, whereas the extended measure had incremental validity for team-level innovation. Taken together, the findings support that AL in general is unique and valuable for innovation contexts. However, its factorial validity and its criterion-based validity for outcomes at different levels (i.e., follower- versus team-level outcomes) require further investigation.

Linking Ambidextrous Leadership and Team Climate

The thesis combines two different strands of research that have not been linked yet: AL and team climate. Showing that the principles of the TCI as suggested by West (1990) can be useful to understand how AL facilitates team innovation, the findings of this thesis imply that AL creates and shapes a team context in which team members feel actively supported to deal with the demanding situations of innovation work (e.g., recurring situations in which a team must reassess the value of its creative ideas and start implementing their ideas). According to Newman et al. (2020), studying such characteristics of the team environment is needed and benefits the study of team innovation.

The findings also remind the reader that leaders have the important task to understand, create, and manage an organisational culture (cf. Schein, 1985). I assume that AL does not only provide instructions, resources, and knowledge for teams but also gives a role model for mutual support for innovation and ambidextrous behaviour among team members. In sum, AL can exert influence on innovation work through establishing and maintaining a supportive climate in which followers and teams learn to support, accept, and handle the dialectic nature of innovation work.

Summary of Limitations and Directions for Future Research

The studies presented in this thesis have limitations and leave unanswered questions that create possibilities for future research. I already discussed detailed methodological and conceptual limitations of each of the four studies in the respective chapters. Against this background, I will hereinafter focus on the main limitations of the whole thesis and propose some general avenues for future research that I consider as interesting and fruitful.

Studying the Subcomponents of Ambidextrous Leadership

Findings of this thesis regarding the relationship of the AL subcomponents with follower and team innovation were methodologically limited, mixed, and partly contradicted findings from other researchers. For example, whereas earlier studies indicated that CLB strengthens the positive relationship of OLB with innovation outcomes (Zacher et al., 2014; Zacher & Rosing, 2015; Zacher & Wilden, 2014), CLB did not or even negatively contributed to the prediction of innovation in studies of this thesis. Thus, to understand these findings and shed further light on the construct validity of AL, future research needs to examine the individual and joint effects of OLB, CLB, and TFB on different innovation outcomes in more detail.

First, I suggest looking at leaders' balancing of OLB, CLB, and TFB to explain how AL fosters different innovation outcomes. According to theory and findings from Rosing and Zacher (2017), innovation performance increases when followers engage in increasingly high and similar levels of exploration and exploitation. The authors reported that innovation performance decreased when there was an *imbalance* of exploration and exploitation towards exploitation. This implies that ambidextrous leaders must carefully balance OLB (follower exploration, respectively) and CLB (follower exploitation, respectively), while too much of a leader's CLB in relation to OLB and TFB could have negative effects (cf. results from Study 4 where team innovation decreased when OLB and CLB were high and TFB was low).

To gain insights into finding the right balance of OLB, CLB, and TFB, future studies may use *polynomial regression* and *response-surface-analysis* (see Edwards, 2002; Edwards & Parry, 1993). Such methods can uncover conditional and non-linear interaction patterns of OLB and CLB in predicting specific follower innovation outcomes and can help to find out if and how TFB contributes to this process. An alternate approach to assess the “right” balance of AL behaviours would be a new scale design that captures if leaders show “too little”, “just the right amount”, or “too much” of OLB, CLB, and TFB (cf. Leadership Versatility Index®; Kaiser et al., 2007; Kaplan & Kaiser, 2002). Such methods may be useful in the future to explore which combination of OLB, CLB, and TFB helps leaders and followers to meet the requirements of innovation work from the viewpoint of followers.

Second, researchers should conduct studies that are capable of testing causal effects of AL and its subcomponents on innovation outcomes because the methods used in this thesis do not allow causal conclusions on the direction of influence. For example, to further validate the findings of this thesis, the following team experiment could be conducted. Small teams, which are instructed to complete standardised innovation tasks (e.g., the Windy City Theatre team exercise, see Hoever, van Knippenberg, van Ginkel, & Barkema, 2012), are assigned to different experimental conditions where AL is manipulated as the independent variable. In these conditions, AL could be manipulated in four different ways: Assigned team leaders of each team would receive leadership training and specific instructions that cover (1) only OLB, (2) only CLB, (3) OLB and CLB, or (4) OLB, CLB, and TFB. According to the findings of this thesis, team innovation the outcome should be highest in teams where leaders received AL training that covered only OLB *or* covered the combination of OLB, CLB, and TFB. Such research designs may also be used to study effects of the AL subcomponents on phase-specific innovation outcomes (e.g., the quality of ideas or the time needed for idea implementation).

Studying Ambidextrous Leadership from a Temporal and Situational Perspective

This thesis does not shed light on situational moderators and temporal contingencies of the relationship of AL and innovation outcomes. However, situational moderators and time would be important variables to study because the concept of AL is based on the notion that the effects of the AL subcomponents are context-specific and limited to specific phases of innovation work (see Rosing et al., 2011). To fully understand and complement the general findings of this thesis, I suggest that future research is needed to find out in detail (1) *when* and *why* leaders express AL and (2) *under which circumstances* AL behaviours facilitate (or hinder) individual- and team-level innovation.

To understand when and why leaders express AL and under which circumstances AL wields positive influence on innovation outcomes on side of followers or teams, interactionist perspectives may be valuable. In particular, the *trait-activation-theory* (Tett & Burnett, 2003; Tett & Guterman, 2000) suggests that situational cues trigger an individual's expression of specific behaviour, which can be traced back to underlying traits and characteristics. The theory implies that the expression of AL in the form of OLB, CLB, and TFB is grounded in some specific leader characteristics (e.g., cognitive and behavioural complexity; see Rosing et al., 2011) but depends on situational cues, such as changes of the task or social relationships. Similarly, the followers' reactions to AL (e.g., exploration or exploitation) may depend on specific cues from the situation and characteristics of the followers. Exploratory, longitudinal studies (e.g., daily diary studies) may be especially useful to find out which situational cues and which personal characteristics of followers and leaders (1) stimulate the expression of AL on the part of the leaders and (2) facilitate innovative behaviour on the part of the followers.

Comparing Ambidextrous with Paradoxical Leadership

This thesis compares AL with general leadership constructs that have been well-investigated in the innovation literature but which do not take into account the dialectic nature of innovation. The thesis did not examine how AL relates to leadership constructs that have received less attention in the innovation literature but are conceptually related to AL. In particular, AL is conceptually related to the broader *paradoxical leader behaviours in people management* (Zhang et al., 2015), which also describes leaders' seemingly competing behaviours that are necessary to address contradicting demands of modern work. Paradoxical leader behaviour draws on a holistic approach to general dualities of workplaces and includes the following five dimensions of leader behaviour that integrate general contradictions of leaders' daily work: Self-centeredness and other-centeredness; distance and closeness; uniformity and individualisation; enforcing requirements and flexibility; control and autonomy (Zhang et al., 2015).

Although the construct of paradoxical leader behaviours has a broader scope than AL and does not specifically focus on the integration of exploration and exploitation, Zhang et al. (2015) proposed that it may positively predict innovation outcomes. Given that AL is a specific form of paradox leader behaviour and similar cognitive antecedents were proposed to underlie AL and paradoxical leader behaviours in people management (e.g., integrative thinking or cognitive complexity; see Rosing et al., 2011; Zhang et al., 2015), future research must examine (1) if the constructs are empirically related but distinguishable and (2) if AL predicts innovation outcomes beyond the general paradoxical leader behaviours. Towards this end, researchers may rely on multitrait-multimethod approaches where ratings from leaders and followers are collected because such approaches allow to control for method effects and are more accurate for testing the convergent and discriminant validity of leadership constructs (see Bormann & Rowold, 2018; Rowold & Borgmann, 2013).

Studying Ambidextrous Leadership in Teams

This thesis provides a rather general perspective on how AL is positively related to team innovation through shaping innovation-supportive norms and behavioural standards in teams (i.e., TCI). Despite these new insights, however, the findings are methodologically limited and cannot finally answer why and how the combination of OLB, CLB, and TFB predicts team innovation.

To complement and further validate the findings of this thesis, I suggest investigating how AL (with TFB versus without TFB) affects team-level processes that explain *what* team members are doing to achieve their innovation goals and *how* they are organising their tasks and work processes collectively. As indicated by qualitative interviews from Study 1 (see Chapter 2), the subcomponent TFB in particular may help leaders and their teams to better handle situations where requirements change and to adapt their work accordingly, which could explain why the predictive power of AL towards team innovation was increased when TFB was added. To further underpin this proposition, longitudinal studies with teams could examine if AL – and TFB in particular – stimulates team action and transition processes, which should then lead to increased levels of team innovation. Towards this end, researchers may link the concept of AL with temporally based frameworks of team processes (e.g., Marks et al., 2001; Mathieu, Luciano, D’Innocenzo, Klock, & LePine, 2019) or the *team adaptation* concept, which describes a team’s dynamic process through which it deals with unfamiliar situations (Rosen et al., 2011). Such team processes may be central mediators besides the TCI explaining how AL increases team innovation.

Summary of Practical Implications

In the following, I will suggest some research's implications for practitioners who aim to facilitate innovation in their organisations (e.g., innovation managers, research and development managers, consultants, or leadership trainers). Some implications are directly derived from the findings of this thesis whereas some are extrapolated. I will begin with concrete implications for leadership development in innovation contexts and continue with implications for the management of teams that work on innovations. Finally, I will give advice for managers who want to implement an innovation-friendly culture in their organisations.

Individual Leadership Development

Although causal conclusions would be premature, the findings of this thesis suggest that leaders must learn to show different AL behaviours when they aim to foster follower and team innovation. In particular, OLB and TFB seemed to have positive effects, whereas CLB should be carefully displayed and combined with OLB only when leaders show TFB as well.

To establish AL among leaders, I suggest *behavioural AL training* in combination with *feedback on the job* because interventions which are directed to concrete leader behaviour instead of abstract categories – such as the leaders character – have been shown to be most effective in increasing performance (Kluger & DeNisi, 1996). Specific AL leadership trainings should be developed and implemented which teach leaders how they can use OLB, CLB, and TFB in recurring situations where followers and teams must generate novel ideas, implement ideas, or check reassess requirements and switch between idea generation and implementation. Feedback routines, where followers give feedback to their leaders on whether the daily leadership behaviour is conducive for the given innovation task, may be additionally valuable for leaders to learn how they should combine OLB, CLB, and TFB. Such feedback interventions can generally

help leaders and trainers to reflect whether followers felt sufficiently supported at their daily innovation work and whether the AL training interventions were successful.

In the following, I suggest some exemplary behavioural strategies and approaches that may be incorporated into such training and feedback interventions. First, as Study 1 indicated, leaders must learn to use communication routines, feedback, and project structures that allow them to anticipate and deal with changing requirements of innovation work (i.e., TFB). Based on the findings, I suggest that training interventions should teach leaders how they can realistically plan their innovation processes, exchange project information with followers, and communicate innovation-specific know-how. Agile project management methods (e.g., SCRUM) might be useful to be included in such trainings because they provide adaptive structures for innovation work. Second, the leaders must learn how they can foster creativity among followers and teams when needed (i.e., OLB). Trainings should thus include methods that help leaders to stimulate creative work in situations where new ideas are required, for example, through the use of brainstorming techniques, creative thinking, and design thinking exercises. Third, trainings should also convey that leaders must *carefully* exercise control and corrective action to ensure that their followers' ideas are also implemented without wasting resources or time (i.e., CLB). Towards this end, leaders should be trained to communicate deadlines, rules, and guidelines for implementation work in a way that followers and teams feel supported.

Guidance and Support for Ambidextrous Innovation in Teams

The findings of this thesis suggest that AL positively relates to team innovation by building a team climate in which team members perceive active and enacted support for the whole innovation process. Such a team climate is grounded in the development of shared norms, which give direction for the behaviours of team members (Anderson & West, 1998). I suggest that leaders should display AL and communicate the importance of ambidexterity from the early

stages of team development onwards because the team's norms may be hard to revise once they are established (see MacNeil & Sherif, 1976). Therefore, leaders should give a good example for supportive and innovative behaviour. Agile project management (e.g., SCRUM) and innovation methods (e.g., design thinking) may also complement AL behaviours because such routines and structures can help to maintain a team's flexible mindset for innovation work. Once established, norms, routines, and structures that promote both, idea generation and implementation, should help whole teams to successfully innovate.

Establishing an Ambidextrous Leadership Culture

I finally encourage organisational managers to establish an organisation-wide leadership culture that supports ambidexterity across all levels (individual followers and leaders, teams, and the whole organisation). This suggestion is not directly derived from the findings of this thesis but is rather far-fetched as I did not investigate AL at an organisational level of analysis. Nevertheless, I argue that creating an organisation-wide culture that increases the perceived support for ambidexterity and innovation across all units and levels is probably the most difficult but most important task of leaders who want to foster innovation in the long run. As Schein (1985) pointed out 35 years ago, leaders must learn how they can create, maintain, and, if necessary, destroy their organisation's culture to ensure that the organisation achieves its goals. To establish an innovation-supportive culture, AL may serve as a model and should be established as leadership practice across all managerial levels in order to develop and communicate a mindset for ambidexterity – which includes that the ambiguous and dialectic nature of innovation is accepted by all members of an organisation.

Conclusion

This thesis started with an example of how important it is for organisations to support innovation, that is, the generation and implementation of novel products, services, or work routines.

Although there has never been a doubt that innovation is important for organisational success and survival, innovation work has become even more important in times of the COVID-19 crisis, which forced whole businesses and industries to innovate in a short period of time. This experience has prompted many business and public leaders to ask themselves how they can improve the way they promote innovation work among their individual followers and whole teams. However, supporting follower and team innovation is a challenging task for leaders because innovation requires employees to combine contradicting behaviours for the creation of novel ideas and the implementation of these ideas in an efficient and timely manner.

Drawing on previous work of Rosing et al. (2011), this thesis found new evidence that the concept of AL generally bears unique potential to foster innovation outcomes among followers and teams through the combination of concrete and trainable leadership behaviours. I gained some detailed and new insights on if and how exactly AL behaviours are valuable in contexts where followers and teams must innovate. I hope that the study of ambidextrous leaders' behaviours for the management of the flexible switching between phases of idea generation and implementation (i.e., TFB) will help leaders of any organisation to better understand how they can deal with the challenging nature of innovation. Most importantly, the thesis raises several new questions and points to uncovered routes for future leadership research, which I hope will be answered in the near future.

References

- Alghamdi, F. (2018). Ambidextrous leadership, ambidextrous employee, and the interaction between ambidextrous leadership and employee innovative performance. *Journal of Innovation and Entrepreneurship*, 7(1), 1. doi:10.1186/s13731-018-0081-8
- Anderson, N. R., Potočnik, K., & Zhou, J. (2014). Innovation and creativity in organizations: A state-of-the-science review, prospective commentary, and guiding framework. *Journal of Management*, 40(5), 1297-1333. doi:10.1177/0149206314527128
- Anderson, N. R., & West, M. A. (1998). Measuring climate for work group innovation: Development and validation of the team climate inventory. *Journal of Organizational Behavior*, 19(3), 235-258. doi:10.1002/(SICI)1099-1379(199805)19:3<235::AID-JOB837>3.0.CO;2-C
- Andersson, B.-E., & Nilsson, S.-G. (1964). Studies in the reliability and validity of the critical incident technique. *Journal of Applied Psychology*, 48(6), 398-403. doi:10.1037/h0042025
- Antonakis, J., Day, D. V., & Schyns, B. (2012). Leadership and individual differences: At the cusp of a renaissance. *The Leadership Quarterly*, 23(4), 643-650. doi:10.1016/j.leaqua.2012.05.002
- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, New Jersey Prentice-Hall.
- Barczak, G., Griffin, A., & Kahn, K. B. (2009). Perspective: Trends and drivers of success in NPD practices: Results of the 2003 PDMA best practices study. *Journal of Product Innovation Management*, 26(1), 3-23. doi:10.1111/j.1540-5885.2009.00331.x
- Bass, B. M. (1985). *Leadership and performance beyond expectations*. New York: Free Press.

- Beal, D. J., & Dawson, J. F. (2007). On the use of Likert-type scales in multilevel data: Influence on aggregate variables. *Organizational Research Methods, 10*(4), 657-672.
doi:10.1177/1094428106295492
- Berraies, S., & El Abidine, S. Z. (2019). Do leadership styles promote ambidextrous innovation? Case of knowledge-intensive firms. *Journal of Knowledge Management, 23*(5), 836-859.
doi:10.1108/JKM-09-2018-0566
- Biemann, T., Cole, M. S., & Voelpel, S. (2012). Within-group agreement: On the use (and misuse) of rwg and rwg(j) in leadership research and some best practice guidelines. *The Leadership Quarterly, 23*(1), 66-80. doi:10.1016/j.leaqua.2011.11.006
- Bledow, R., Frese, M., Anderson, N., Erez, M., & Farr, J. (2009). A dialectic perspective on innovation: Conflicting demands, multiple pathways, and ambidexterity. *Industrial and Organizational Psychology: Perspectives on Science and Practice, 2*(3), 305-337.
doi:10.1111/j.1754-9434.2009.01154.x
- Bliese, P. D. (2000). Within-group agreement, non-independence, and reliability: Implications for data aggregation and analysis. In K. J. Klein & S. W. Kozlowski (Eds.), *Multilevel theory, research, and methods in organizations* (pp. 349-381). San Francisco: Jossey-Bass.
- Bormann, K. C., & Rowold, J. (2018). Construct proliferation in leadership style research: Reviewing pro and contra arguments. *Organizational Psychology Review, 8*(2-3), 149-173. doi:10.1177/2041386618794821
- Brodbeck, F. C., & Maier, G. W. (2001). Das Teamklima-Inventar (TKI) für Innovation in Gruppen: Psychometrische Überprüfung an einer deutschen Stichprobe [The Team Climate Inventory (TCI) for innovation A psychometric test on a German sample of work groups]. *Zeitschrift für Arbeits- und Organisationspsychologie, 45*(2), 59-73.
doi:10.1026//0932-4089.45.2.59

- Bucic, T., Robinson, L., & Ramburuth, P. (2010). Effects of leadership style on team learning. *Journal of Workplace Learning, 22*(4), 228-248. doi:10.1108/13665621011040680
- Byron, K., & Khazanchi, S. (2012). Rewards and creative performance: A meta-analytic test of theoretically derived hypotheses. *Psychological Bulletin, 138*(4), 809-830. doi:10.1037/a0027652
- Carnevale, J. B., Huang, L., Crede, M., Harms, P., & Uhl-Bien, M. (2017). Leading to stimulate employees' ideas: A quantitative review of leader-member exchange, employee voice, creativity, and innovative behavior. *Applied Psychology: An International Review, 66*(4), 517-552. doi:10.1111/apps.12102
- Chell, E. (1998). Critical incident technique. In G. Symon, C. Cassell, G. Symon, & C. Cassell (Eds.), *Qualitative methods and analysis in organizational research: A practical guide*. (pp. 51-72). Thousand Oaks, CA: Sage Publications Ltd.
- Chung, C. C., & Beamish, P. W. (2010). The trap of continual ownership change in international equity joint ventures. *Organization Science, 21*(5), 995-1015. doi:10.1287/orsc.1090.0489
- Costello, A. B., & Osborne, J. W. (2005). Best practices in exploratory factor analysis: Four recommendations for getting the most from your analysis. *Practical Assessment Research & Evaluation, 10*(7), 1-9.
- Cunha, M. P. e., Fortes, A., Gomes, E., Rego, A., & Rodrigues, F. (2019). Ambidextrous leadership, paradox and contingency: Evidence from Angola. *The International Journal of Human Resource Management, 30*(4), 702-727. doi:10.1080/09585192.2016.1201125
- De Dreu, C. K. W. (2002). Team innovation and team effectiveness: The importance of minority dissent and reflexivity. *European Journal of Work and Organizational Psychology, 11*(3), 285-298. doi:10.1080/13594320244000175

-
- Denison, D. R., Hooijberg, R., & Quinn, R. E. (1995). Paradox and performance: Toward a theory of behavioral complexity in managerial leadership. *Organization Science*, 6(5), 524-540. doi:10.1287/orsc.6.5.524
- DeRue, D. S., Nahrgang, J. D., Wellman, N., & Humphrey, S. E. (2011). Trait and behavioral theories of leadership: An integration and meta-analytic test of their relative validity. *Personnel Psychology*, 64(1), 7-52. doi:10.1111/j.1744-6570.2010.01201.x
- Dulebohn, J. H., Bommer, W. H., Liden, R. C., Brouer, R. L., & Ferris, G. R. (2012). A meta-analysis of antecedents and consequences of leader-member exchange: Integrating the past with an eye toward the future. *Journal of Management*, 38(6), 1715-1759. doi:10.1177/0149206311415280
- Edwards, J. R. (2002). Alternatives to difference scores: Polynomial regression analysis and response surface methodology. In F. Drasgow & N. W. Schmitt (Eds.), *Advances in measurement and data analysis* (pp. 350-400). San Francisco: Jossey-Bass.
- Edwards, J. R., & Parry, M. E. (1993). On the use of polynomial regression equations as an alternative to difference scores in organizational research. *Academy of Management Journal*, 36(6), 1577-1613. doi:10.2307/256822
- Eisenbeiss, S. A., van Knippenberg, D., & Boerner, S. (2008). Transformational leadership and team innovation: Integrating team climate principles. *Journal of Applied Psychology*, 93(6), 1438-1446. doi:10.1037/a0012716
- Ferguson, E., & Cox, T. (1993). Exploratory factor analysis: A users' guide. *International Journal of Selection and Assessment*, 1(2), 84-94. doi:10.1111/j.1468-2389.1993.tb00090.x
- Flanagan, J. C. (1954). The critical incident technique. *Psychological Bulletin*, 51(4), 327-358. doi:10.1037/h0061470

- Frontiers. (2020). Research topic: Creativity and innovation in times of crisis (COVID-19). Retrieved from <https://www.frontiersin.org/research-topics/13833/creativity-and-innovation-in-times-of-crisis-covid-19#overview>
- Gottfredson, R. K., & Aguinis, H. (2017). Leadership behaviors and follower performance: Deductive and inductive examination of theoretical rationales and underlying mechanisms. *Journal of Organizational Behavior, 38*(4), 558-591. doi:10.1002/job.2152
- Graen, G. B., & Uhl-Bien, M. (1995). Relationship-based approach to leadership: Development of leader-member exchange (LMX) theory of leadership over 25 years: Applying a multi-level multi-domain perspective. *The Leadership Quarterly, 6*(2), 219-247. doi:10.1016/1048-9843(95)90036-5
- Guest, G., Bunce, A., & Johnson, L. (2006). How many interviews are enough? An experiment with data saturation and variability. *Field Methods, 18*(1), 59-82. doi:10.1177/1525822X05279903
- Halpin, A. W. (1957). *Manual for the leader behavior description questionnaire*. Columbus, OH.
- Hammond, M. M., Neff, N. L., Farr, J. L., Schwall, A. R., & Zhao, X. (2011). Predictors of individual-level innovation at work: A meta-analysis. *Psychology of Aesthetics, Creativity, and the Arts, 5*(1), 90-105. doi:10.1037/a0018556
10.1037/a0018556.supp (Supplemental)
- Havermans, L. A., Den Hartog, D. N., Keegan, A., & Uhl-Bien, M. (2015). Exploring the role of leadership in enabling contextual ambidexterity. *Human Resource Management, 54*, 179-200. doi:10.1002/hrm.21764
- Hayes, A. F. (2017). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach* (2 ed.). New York, U.S.A.: Guilford Press.

-
- Hayes, A. F., & Cai, L. (2007). Using heteroskedasticity-consistent standard error estimators in OLS regression: An introduction and software implementation. *Behavior Research Methods, 39*(4), 709-722. doi:10.3758/BF03192961
- Heinitz, K., & Rowold, J. (2007). Gütekriterien einer deutschen Adaptation des Transformational Leadership Inventory (TLI) von Podsakoff [Psychometric properties of a German adaptation of the Transformational Leadership Inventory (TLI) by Podsakoff]. *Zeitschrift für Arbeits- und Organisationspsychologie, 51*(1), 1-15. doi:10.1026/0932-4089.51.1.1
- Hinkin, T. R. (1998). A brief tutorial on the development of measures for use in survey questionnaires. *Organizational Research Methods, 1*(1), 104-121.
doi:10.1177/109442819800100106
- Hinkin, T. R., & Schriesheim, C. A. (1989). Development and application of new scales to measure the French and Raven (1959) bases of social power. *Journal of Applied Psychology, 74*(4), 561–567. doi:10.1037/0021-9010.74.4.561
- Hoegl, M., & Parboteeah, K. P. (2006). Team reflexivity in innovative projects. *R&D Management, 36*(2), 113-125. doi:10.1111/j.1467-9310.2006.00420.x
- Hoever, I. J., van Knippenberg, D., van Ginkel, W. P., & Barkema, H. G. (2012). Fostering team creativity: Perspective taking as key to unlocking diversity's potential. *Journal of Applied Psychology, 97*(5), 982-996. doi:10.1037/a0029159
- House, R. J. (1971). A path goal theory of leader effectiveness. *Administrative Science Quarterly, 16*(3), 321-339. doi:10.2307/2391905
- House, R. J. (1977). A 1976 theory of charismatic leadership. In J. G. Hunt & L. Larson (Eds.), *Leadership: The cutting edge* (pp. 189-207). Carbondale, IL: Southern Illinois University Press.

-
- House, R. J. (1996). Path-goal theory of leadership: Lessons, legacy and a reformulated theory. *The Leadership Quarterly*, 7(3), 323-352. doi:10.1016/S1048-9843(96)90024-7
- Huberman, A. M., & Miles, M. B. (1983). Drawing valid meaning from qualitative data: Some techniques of data reduction and display. *Quality and Quantity*, 17(4), 281-339. doi:10.1007/BF00167541
- Huelsheger, U. R., Anderson, N., & Salgado, J. F. (2009). Team-level predictors of innovation at work: A comprehensive meta-analysis spanning three decades of research. *Journal of Applied Psychology*, 94(5), 1128-1145. doi:10.1037/a0015978
- Hughes, D. J., Lee, A., Tian, A. W., Newman, A., & Legood, A. (2018). Leadership, creativity, and innovation: A critical review and practical recommendations. *The Leadership Quarterly*. doi:10.1016/j.leaqua.2018.03.001
- Jackson, P. R., Wall, T. D., Martin, R., & Davids, K. (1993). New measures of job control, cognitive demand, and production responsibility. *Journal of Applied Psychology*, 78(5), 753-762. doi:10.1037/0021-9010.78.5.753
- James, L. R., Demaree, R. G., & Wolf, G. (1993). rwg: An assessment of within-group interrater agreement. *Journal of Applied Psychology*, 78(2), 306-309. doi:10.1037/0021-9010.78.2.306
- Jansen, J. J. P., George, G., Van den Bosch, F. A. J., & Volberda, H. W. (2008). Senior team attributes and organizational ambidexterity: The moderating role of transformational leadership. *Journal of Management Studies*, 45(5), 982-1007. doi:10.1111/j.1467-6486.2008.00775.x
- Jansen, J. J. P., Vera, D., & Crossan, M. (2009). Strategic leadership for exploration and exploitation: The moderating role of environmental dynamism. *The Leadership Quarterly*, 20(1), 5-18. doi:10.1016/j.leaqua.2008.11.008

-
- Janssen, O. (2001). Fairness perceptions as a moderator in the curvilinear relationships between job demands, and job performance and job dissatisfaction. *Academy of Management Journal*, 44(5), 1039-1050. doi:10.2307/3069447
- John, O. P., & Benet-Martinez, V. (2000). Measurement: Reliability, construct validation, and scale construction. In H. T. Reis & C. M. Judd (Eds.), *Handbook of research methods in social and personality psychology* (pp. 339-369). New York: Cambridge University Press.
- Judge, T. A., Erez, A., Bono, J. E., & Thoresen, C. J. (2003). The Core Self-Evaluations Scale: Development of a measure. *Personnel Psychology*, 56(2), 303-331. doi:10.1111/j.1744-6570.2003.tb00152.x
- Kaiser, R. B., Lindberg, J. T., & Craig, S. B. (2007). Assessing the flexibility of managers: A comparison of methods. *International Journal of Selection and Assessment*, 15(1), 40-55. doi:10.1111/j.1468-2389.2007.00366.x
- Kaplan, R. E., & Kaiser, R. B. (2002). *Leadership Versatility Index®*. Greensboro, NC: Kaplan DeVries Inc.
- Kluger, A. N., & DeNisi, A. (1996). The effects of feedback interventions on performance: A historical review, a meta-analysis, and a preliminary feedback intervention theory. *Psychological Bulletin*, 119(2), 254-284. doi:10.1037/0033-2909.119.2.254
- LeBreton, J. M., & Senter, J. L. (2008). Answers to 20 questions about interrater reliability and interrater agreement. *Organizational Research Methods*, 11(4), 815-852. doi:10.1177/1094428106296642
- Lewis, M. W. (2000). Exploring paradox: Toward a more comprehensive guide. *The Academy of Management Review*, 25(4), 760-776. doi:10.2307/259204

-
- Lewis, M. W., & Smith, W. K. (2014). Paradox as a metatheoretical perspective: Sharpening the focus and widening the scope. *Journal of Applied Behavioral Science*, 50(2), 127-149. doi:10.1177/0021886314522322
- Luo, B., Zheng, S., Ji, H., & Liang, L. (2018). Ambidextrous leadership and TMT-member ambidextrous behavior: The role of TMT behavioral integration and TMT risk propensity. *The International Journal of Human Resource Management*, 29(2), 338-359. doi:10.1080/09585192.2016.1194871
- Luu, T. T. (2017a). Ambidextrous leadership, entrepreneurial orientation, and operational performance: Organizational social capital as a moderator. *Leadership & Organization Development Journal*, 38(2), 229-253. doi:10.1108/LODJ-09-2015-0191
- Luu, T. T. (2017b). Reform in public organizations: the roles of ambidextrous leadership and moderating mechanisms. *Public Management Review*, 19(4), 518-541. doi:10.1080/14719037.2016.1195438
- Luu, T. T., Dinh, K., & Qian, D. (2019). Ambidextrous leadership, entrepreneurial orientation and job crafting. *European Business Review*, 31(2), 260-282. doi:10.1108/EBR-06-2015-0061
- Luu, T. T., Viet, L., Masli, E., & Rajendran, D. (2019). Corporate social responsibility, ambidextrous leadership, and service excellence. *Marketing Intelligence & Planning*, 37(5), 580-594. doi:10.1108/MIP-05-2018-0157
- Ma, J., Zhou, X., Chen, R., & Dong, X. (2019). Does ambidextrous leadership motivate work crafting? *International Journal of Hospitality Management*, 77, 159-168. doi:10.1016/j.ijhm.2018.06.025
- MacKenzie, S. B., Podsakoff, P. M., & Jarvis, C. B. (2005). The problem of measurement model misspecification in behavioral and organizational research and some recommended

- solutions. *Journal of Applied Psychology*, 90(4), 710-730. doi:10.1037/0021-9010.90.4.710
- MacNeil, M. K., & Sherif, M. (1976). Norm change over subject generations as a function of arbitrariness of prescribed norms. *Journal of Personality and Social Psychology*, 34(5), 762-773. doi:10.1037/0022-3514.34.5.762
- March, J. G. (1991). Exploration and exploitation in organizational learning. *Organization Science*, 2(1), 71-87. Retrieved from www.jstor.org/stable/2634940
- Marks, M. A., Mathieu, J. E., & Zaccaro, S. J. (2001). A temporally based framework and taxonomy of team processes. *Academy of Management Review*, 26(3), 356-376. doi:10.5465/AMR.2001.4845785
- Mascareño, J., Rietzschel, E., & Wisse, B. (2019). Envisioning innovation: Does visionary leadership engender team innovative performance through goal alignment? *Creativity and Innovation Management*. doi:10.1111/caim.12341
- Mathieu, J. E., Luciano, M. M., D'Innocenzo, L., Klock, E. A., & LePine, J. A. (2019). The development and construct validity of a team processes survey measure. *Organizational Research Methods*, 23(3), 399-431. doi:10.1177/1094428119840801
- Miles, M. B., Huberman, A. M., & Saldana, J. (2013). *Qualitative data analysis: A methods sourcebook* (3 ed.). Los Angeles: Sage.
- Miron-Spektor, E., Erez, M., & Naveh, E. (2011). The effect of conformist and attentive-to-detail members on team innovation: Reconciling the innovation paradox. *Academy of Management Journal*, 54(4), 740-760. doi:10.5465/AMJ.2011.64870100
- Mumford, M. D. (2000). Managing creative people: Strategies and tactics for innovation. *Human Resource Management Review*, 10(3), 313-351. doi:10.1016/S1053-4822(99)00043-1

-
- Newman, A., Round, H., Wang, S., & Mount, M. (2020). Innovation climate: A systematic review of the literature and agenda for future research. *Journal of Occupational and Organizational Psychology*, *93*(1), 73-109. doi:10.1111/joop.12283
- Ng, T. W. H. (2017). Transformational leadership and performance outcomes: Analyses of multiple mediation pathways. *The Leadership Quarterly*, *28*(3), 385-417. doi:10.1016/j.leaqua.2016.11.008
- Nunnally, J. C. (1978). *Psychometric theory* (2nd ed.). New York: McGraw-Hill.
- O'Reilly III, C. A., & Tushman, M. L. (2004). The ambidextrous organization. *Harvard Business Review*, *82*(4), 74-81. Retrieved from <https://hbr.org/2004/04/the-ambidextrous-organization>
- Podsakoff, P. M., MacKenzie, S. B., & Bommer, W. H. (1996). Transformational leader behaviors and substitutes for leadership as determinants of employee satisfaction, commitment, trust, and organizational citizenship behaviors. *Journal of Management*, *22*(2), 259-298. doi:10.1016/S0149-2063(96)90049-5
- Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, *88*(5), 879-903. doi:10.1037/0021-9010.88.5.879
- Podsakoff, P. M., MacKenzie, S. B., Moorman, R. H., & Fetter, R. (1990). Transformational leader behaviors and their effects on followers' trust in leader, satisfaction, and organizational citizenship behaviors. *The Leadership Quarterly*, *1*(2), 107-142. doi:10.1016/1048-9843(90)90009-7

-
- Poole, M. S., & van de Ven, A. H. (1989). Using paradox to build management and organization theories. *Academy of Management Review*, *14*(4), 562-578.
doi:10.5465/AMR.1989.4308389
- Probst, G., Raisch, S., & Tushman, M. L. (2011). Ambidextrous leadership: Emerging challenges for business and HR leaders. *Organizational Dynamics*, *40*(4), 326-334.
doi:10.1016/j.orgdyn.2011.07.010
- Raisch, S., & Birkinshaw, J. (2008). Organizational ambidexterity: Antecedents, outcomes, and moderators. *Journal of Management*, *34*(3), 375-409. doi:10.1177/0149206308316058
- Rosen, M. A., Bedwell, W. L., Wildman, J. L., Fritzsche, B. A., Salas, E., & Burke, C. S. (2011). Managing adaptive performance in teams: Guiding principles and behavioral markers for measurement. *Human Resource Management Review*, *21*(2), 107-122.
doi:10.1016/j.hrmr.2010.09.003
- Rosing, K., Frese, M., & Bausch, A. (2011). Explaining the heterogeneity of the leadership-innovation relationship: Ambidextrous leadership. *The Leadership Quarterly*, *22*(5), 956-974. doi:10.1016/j.leaqua.2011.07.014
- Rosing, K., Rosenbusch, N., & Frese, M. (2010). Ambidextrous leadership in the innovation process. In A. Gerybadze, U. Hommel, H. W. Reiners, & D. Thomaschewski (Eds.), *Innovation and International Corporate Growth* (pp. 191-204). Berlin, Heidelberg: Springer Berlin Heidelberg.
- Rosing, K., & Zacher, H. (2017). Individual ambidexterity: The duality of exploration and exploitation and its relationship with innovative performance. [Individuelle Ambidexterität: Die Dualität von Erkundung und Nutzung und ihre Beziehung zu innovativen Leistungen]. *European Journal of Work and Organizational Psychology*, *26*(5), 694-709. doi:10.1080/1359432X.2016.1238358

-
- Rowold, J., & Borgmann, L. (2013). Are leadership constructs really independent? *Leadership & Organization Development Journal*, 34(1), 20-43. doi:10.1108/01437731311289956
- Sawyer, J. E. (1992). Goal and process clarity: Specification of multiple constructs of role ambiguity and a structural equation model of their antecedents and consequences. *Journal of Applied Psychology*, 77(2), 130-142. doi:10.1037/0021-9010.77.2.130
- Schein, E. H. (1985). *Organizational culture and leadership: A dynamic view*. San Francisco: Jossey-Bass.
- Schreiner, E. (2017). Ambidextrous leaders and employee innovation, well-being, leader perception: A moderation. *Academy of Management Annual Meeting Proceedings*, 2017(1), 1-1. doi:10.5465/AMBPP.2017.16617abstract
- Schyns, B. (2002). Überprüfung einer deutschsprachigen Skala zum Leader-Member-Exchange-Ansatz [Evaluation of a German scale for the assessment of leader-member exchange]. *Zeitschrift für Differentielle und Diagnostische Psychologie*, 23(2), 235-245. doi:10.1024//0170-1789.23.2.235
- Scott, S. G., & Bruce, R. A. (1994). Determinants of innovative behavior: A path model of individual innovation in the workplace. *Academy of Management Journal*, 37(3), 580-607. doi:10.2307/256701
- Shaffer, J. A., DeGeest, D., & Li, A. (2016). Tackling the problem of construct proliferation: A guide to assessing the discriminant validity of conceptually related constructs. *Organizational Research Methods*, 19(1), 80-110. doi:10.1177/1094428115598239
- Tett, R. P., & Burnett, D. D. (2003). A personality trait-based interactionist model of job performance. *Journal of Applied Psychology*, 88(3), 500-517. doi:10.1037/0021-9010.88.3.500

- Tett, R. P., & Guterman, H. A. (2000). Situation trait relevance, trait expression, and cross-situational consistency: Testing a principle of trait activation. *Journal of Research in Personality, 34*(4), 397-423. doi:10.1006/jrpe.2000.2292
- Thayer, A. L., Petruzzelli, A., & McClurg, C. E. (2018). Addressing the paradox of the team innovation process: A review and practical considerations. *American Psychologist, 73*(4), 363-375. doi:10.1037/amp0000310
- Tuncdogan, A., Acar, O. A., & Stam, D. (2017). Individual differences as antecedents of leader behavior: Towards an understanding of multi-level outcomes. *The Leadership Quarterly, 28*(1), 40-64. doi:10.1016/j.leaqua.2016.10.011
- Tung, F.-C. (2016). Does transformational, ambidextrous, transactional leadership promote employee creativity? Mediating effects of empowerment and promotion focus. *International Journal of Manpower, 37*(8), 1250-1263. doi:10.1108/IJM-09-2014-0177
- Van Knippenberg, D. (2017). Team innovation. *Annual Review of Organizational Psychology and Organizational Behavior, 4*, 211-233. doi:10.1146/annurev-orgpsych-032516-113240
- Vera, D., & Crossan, M. (2004). Strategic leadership and organizational learning. *Academy of Management Review, 29*(2), 222-240. doi:10.5465/AMR.2004.12736080
- Wanous, J. P., Reichers, A. E., & Hudy, M. J. (1997). Overall job satisfaction: How good are single-item measures? *Journal of Applied Psychology, 82*(2), 247-252. doi:10.1037/0021-9010.82.2.247
- Welbourne, T. M., Johnson, D. E., & Erez, A. (1998). The Role-Based Performance Scale: Validity analysis of a theory-based measure. *Academy of Management Journal, 41*(5), 540-555. doi:10.2307/256941

-
- West, M. A. (1990). The social psychology of innovation in groups. In M. A. West & J. L. Farr (Eds.), *Innovation and Creativity at Work: Psychological and Organizational Strategies* (pp. 4-36). Chichester: Wiley.
- West, M. A. (2002). Sparkling fountains or stagnant ponds: An integrative model of creativity and innovation implementation in work groups. *Applied Psychology: An International Review*, *51*(3), 355-387. doi:10.1111/1464-0597.00951
- West, M. A., & Anderson, N. R. (1996). Innovation in top management teams. *Journal of Applied Psychology*, *81*(6), 680-693. doi:10.1037/0021-9010.81.6.680
- West, M. A., Borrill, C. S., Dawson, J. F., Brodbeck, F., Shapiro, D. A., & Haward, B. (2003). Leadership clarity and team innovation in health care. *The Leadership Quarterly*, *14*(4-5), 393-410. doi:10.1016/S1048-9843(03)00044-4
- Ye, Q., Wang, D., & Guo, W. (2019). Inclusive leadership and team innovation: The role of team voice and performance pressure. *European Management Journal*. doi:10.1016/j.emj.2019.01.006
- Zaccaro, S. J. (2007). Trait-based perspectives of leadership. *American Psychologist*, *62*(1), 6-16. doi:10.1037/0003-066X.62.1.6
- Zacher, H., Robinson, A. J., & Rosing, K. (2014). Ambidextrous leadership and employees' self - reported innovative performance: The role of exploration and exploitation behaviors. *The Journal of Creative Behavior*, *50*(1), 24-46. doi:10.1002/jocb.66
- Zacher, H., & Rosing, K. (2015). Ambidextrous leadership and team innovation. *Leadership & Organization Development Journal*, *36*(1), 54-68. doi:10.1108/LODJ-11-2012-0141
- Zacher, H., & Wilden, R. G. (2014). A daily diary study on ambidextrous leadership and self-reported employee innovation. *Journal of Occupational & Organizational Psychology*, *87*(4), 813-820. doi:10.1111/joop.12070

-
- Zhang, Y., Waldman, D. A., Han, Y.-L., & Li, X.-B. (2015). Paradoxical leader behaviors in people management: Antecedents and consequences. *Academy of Management Journal*, 58(2), 538-566. doi:10.5465/amj.2012.0995

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Appendix A: Interview Material from Qualitative Study 1

Interview Guide and Protocol

Flexibles Führen im Innovationskontext

Lehrforschungsprojekt

Interviewleitfaden

I. Einleitung und Hintergrund	
Vorstellung	<p>„Herzlichen Dank, dass Sie sich für das Interview Zeit nehmen. Ich stelle mich Ihnen kurz vor: Mein Name ist...</p> <p>Im Rahmen unseres Forschungsprojekts untersuchen wir Führungsverhalten im Innovationskontext und möchten dazu gerne dieses Interview mit Ihnen führen.</p> <p>Wir haben hierfür ca. 30 – 45 Minuten eingeplant.“</p>
Datenschutz & Aufzeichnung	<p>„Alles, was Sie mir jetzt gleich erzählen, wird vertraulich behandelt. Die Interview-Daten werden nicht an Dritte weitergegeben und werden ausschließlich im Rahmen unseres Forschungsprojekts verwendet. Für eine bessere Auswertung würde ich das Gespräch gerne mit einem Aufnahmegerät aufzeichnen. Sind Sie damit einverstanden?</p> <p>Ich benötige von Ihnen eine Erklärung zur Teilnahmebereitschaft. Diese können Sie natürlich zu jedem Zeitpunkt ohne Angabe von Gründen sowie folgenlos zurückziehen und ebenso jederzeit das Gespräch beenden. In diesem Falle werden Ihre Daten gelöscht. Wenn Sie zu einem späteren Zeitpunkt wünschen, dass Ihre Daten gelöscht werden, können Sie mir dies jederzeit direkt mitteilen. Die Löschung Ihrer personenbezogenen Daten erfolgt generell gemäß der Grundsätze der Forschung am Menschen der deutschen Gesellschaft für Psychologie (DGPs) und des Bundesverbandes Deutscher Psychologen (BDP), sobald sie nicht mehr für die Auswertung benötigt werden, spätestens aber nach 10 Jahren.</p> <p>Die Ergebnisse und Primärdaten dieser Studie sollen als wissenschaftliche Publikation veröffentlicht werden können. Dies geschieht in vollständig anonymisierter Form, d. h. ohne dass die Daten den jeweiligen TeilnehmerInnen an der Studie zugeordnet werden können. Eine allgemeine, vollständig anonymisierte Zusammenfassung der Gesamtergebnisse wird Ihnen bereitgestellt.</p> <p>Ich bitte Sie an dieser Stelle, der Datenschutzerklärung, der Datenaufzeichnung sowie auch der freiwilligen Teilnahmebereitschaft zuzustimmen oder diese abzulehnen.“</p>
Kontakt	<p>„Falls Sie nach dem Interview noch Fragen haben, können Sie mich gerne unter folgender E-Mail-Adresse (Innovation.Fuehrung@gmail.com) kontaktieren.“</p> <p>[Infozettel inklusive Kontaktinformationen]</p>
Informationen zum Ablauf	<p>„Sind Sie bereit? Ich werde Ihnen jetzt einige Fragen stellen und möchte Sie bitten, ausführlich und ehrlich zu antworten. Falls Ihnen jedoch einmal nichts einfallen sollte, dürfen Sie das auch gerne sagen und müssen sich nicht gezwungen fühlen, eine Antwort geben zu müssen.</p> <p>Ich werde mir während des Gesprächs ein paar Notizen machen, lassen Sie sich davon nicht irritieren.“</p>
[Start der Gesprächsaufzeichnung]	

Flexibles Führen im Innovationskontext
Lehrforschungsprojekt

II Einstimmung auf die Thematik	
<p>„Sie erleben bestimmt tagtäglich, dass moderne Unternehmen sehr flexibel und anpassungsfähig agieren müssen, um wettbewerbsfähig und innovativ zu sein.</p> <p>Gerade im Innovationsprozess sind diese Agilität und Flexibilität von enormer Bedeutung.</p> <p>Um Agilität sicher zu stellen, muss die Führungskraft im Innovationsprozess öfters zwischen im Wesentlichen zwei Herangehensweisen flexibel wechseln können. Und zwar zum einen zwischen öffnendem Verhalten, um neue Ideen zu generieren, und zum anderen aber auch wieder schließendem Verhalten, um die Ideen umzusetzen.</p> <p>Genau dieser Wechsel ist für uns besonders interessant, weil er für die Führungskraft eine besondere Herausforderung darstellt.“</p> <p>„Haben Sie da vielleicht ein Beispiel aus Ihrer täglichen Arbeit vor Augen, bei dem es genau um diesen dynamischen Wechsel Ihrer Führungskraft zwischen öffnendem und schließendem Verhalten geht?“</p>	<p>[Grafik vorlegen]</p> <p>Opening:</p> <ul style="list-style-type: none"> • erlaubt Fehler • motiviert zu Risiken • Raum eigene Ideen <p>Closing:</p> <ul style="list-style-type: none"> • Überwachung Zielerreichung • Korrektur • Planeinhaltung <p>[Verständnis sicherstellen; ggf. eigene Beispiele oder zurück zur Grafik]</p> <p>[Paraphrasieren]</p>

III. Kritisches Ereignis +	
<p>„Denken Sie jetzt bitte an eine konkrete Situation, bei der Ihre Führungskraft den agilen Wechsel zwischen der Förderung der Ideengenerierung und dem Forcieren der Umsetzung der Ideen besonders gut gemeistert hat. Dann erzählen Sie mir bitte einmal davon.“</p>	
Nachfragen	
<p>Führungsverhalten [Identifikation von Verhaltensweisen der FK beim Wechsel]</p>	<p>„Welche Verhaltensweisen waren besonders förderlich?“ → Verhaltensweisen im Detail (z.B. Kommunikation, Aktion) „Inwiefern förderlich?“</p>
<p>Reaktion der Mitarbeiter</p>	<p>„Wie haben Sie den Wechsel persönlich wahrgenommen?“ → Reaktion Team</p>
<p>Charakteristika des Innovationsprozesses bzw. der Situation [Klärung Projekthintergrund]</p>	<p>„Was waren förderliche Faktoren?“ → Zeitrahmen → Art der Innovation → Involvierte Personen</p>

Flexibles Führen im Innovationskontext
Lehrforschungsprojekt

III. Kritisches Ereignis -

„Denken Sie jetzt bitte an eine konkrete Situation, bei der Ihre Führungskraft den agilen Wechsel zwischen der Förderung der Ideengenerierung und dem Forcieren der Umsetzung der Ideen besonders gut gemeistert hat. Dann erzählen Sie mir bitte einmal davon.“

Nachfragen

Führungsverhalten [Identifikation von Verhaltensweisen der FK beim Wechsel]	„Welche Verhaltensweisen waren besonders hinderlich?“ → Verhaltensweisen im Detail (z.B. Kommunikation, Aktion) „Inwiefern hinderlich?“ „Haben Sie Verbesserungsvorschläge?“
Reaktion der Mitarbeiter	„Wie haben Sie den Wechsel persönlich wahrgenommen?“ → Reaktion Team
Charakteristika des Innovationsprozesses bzw. der Situation [Klärung Projekthintergrund]	„Was waren hinderliche Faktoren?“ → Zeitrahmen → Art der Innovation → Involvierte Personen

IV. Demografische Daten

„Vielen Dank für Ihre wertvollen Aussagen. Jetzt habe ich abschließend nur noch ein paar Fragen zu Ihrer Person:“

Geschlecht	<input type="checkbox"/> männlich <input type="checkbox"/> weiblich
Alter	„Wie alt sind Sie?“
Dauer Unternehmenszugehörigkeit	„Wie lange arbeiten Sie bereits in diesem Unternehmen?“
Dauer Teamzugehörigkeit	„Wie lange arbeiten Sie schon in diesem Team?“
Abteilung/Position	„In welcher Abteilung arbeiten Sie?“
Führungs-/Projektverantwortung	„Haben Sie in diesem Team Führungs- oder Projektverantwortung?“
Unternehmen	[wird eintragen]
Unternehmensgröße	[wird eintragen]
Branche	[wird eintragen]

V. Abschluss

„Vielen Dank! Wir sind nun am Ende des Gesprächs angekommen. Darf ich Sie gegebenenfalls nochmals kontaktieren, wenn sich Rückfragen zu unserem heutigen Gespräch ergeben?“

[Ende der Gesprächsaufzeichnung]

Flexibles Führen im Innovationskontext
Lehrforschungsprojekt

Nr. ____

Interview - Protokoll

Angaben zum Interview			
Datum:		Uhrzeit:	<input type="text"/> bis <input type="text"/>
Interviewnummer:		Audiodatei:	

Angaben zum Unternehmen			
Name:			
Branche:		Größe:	

I. Einleitung und Hintergrund	
Vorstellung	
[1]	Dank für Teilnahme
[2]	Mein Name ist...
[3]	Interview im Rahmen von Forschungsprojekt
[4]	Dauer
Gesprächsnotizen	
Notizen:	

II. Einleitung und Hintergrund	
Eingangsprüfung	
[1]	Vertraulichkeit
[2]	Aufzeichnung
[3]	Einverständniserklärung: Teilnahmbereitschaft + Datenschutz + Datenaufzeichnung
[4]	Hinweis auf Notizen
Gesprächsnotizen	
Notizen:	

Beginn der Gesprächsaufzeichnung

Flexibles Führen im Innovationskontext
Lehrforschungsprojekt

III. Einstimmung auf die Thematik	
<ul style="list-style-type: none"> • „Sie erleben bestimmt tagtäglich, dass moderne Unternehmen sehr flexibel und anpassungsfähig agieren müssen, um wettbewerbsfähig und innovativ zu sein. • Gerade im Innovationsprozess sind diese Agilität und Flexibilität von enormer Bedeutung. • Um Agilität sicher zu stellen, muss die Führungskraft im Innovationsprozess öfters zwischen im Wesentlichen zwei Herangehensweisen flexibel wechseln können. Und zwar zum einen zwischen Führungsverhalten, um Ideen zu generieren, welches wir öffnendes Verhalten nennen. Und zum anderen aber auch Führungsverhalten um Ideen umzusetzen, welches wir schließendes Verhalten nennen. • Genau dieser Wechsel ist für uns besonders interessant, weil er für die Führungskraft eine besondere Herausforderung darstellt.“ 	<p>[Grafik vorlegen]</p> <p>Opening:</p> <ul style="list-style-type: none"> • erlaubt Fehler • motiviert zu Risiken • Raum eigene Ideen <p>Closing:</p> <ul style="list-style-type: none"> • Überwachung Zielerreichung • Korrektur • Planeinhaltung
<p>„Haben Sie da vielleicht ein Beispiel aus Ihrer täglichen Arbeit vor Augen, bei dem es genau um diesen dynamischen Wechsel Ihrer Führungskraft zwischen öffnendem und schließendem Verhalten geht?“</p>	
<p>Notizen</p>	
[1]	Ggf. eigene Beispiele oder zurück zur Grafik
[2]	Paraphrasieren
Verständnis sichergestellt	
Perspektive auf Führungsverhalten	

Flexibles Führen im Innovationskontext
Lehrforschungsprojekt

IV. Kritisches Ereignis +

„Denken Sie jetzt bitte an eine konkrete Situation, bei der Ihre Führungskraft den agilen Wechsel zwischen der Förderung der Ideengenerierung und dem Forcieren der Umsetzung der Ideen besonders gut gemeistert hat. Dann erzählen Sie mir bitte einmal davon.“

Nachfragen

Führungsverhalten	Förderliche Verhaltensweisen	[Identifikation von Verhaltensweisen der FK beim Wechsel]
	Verhaltensweisen im Detail (z.B. Kommunikation, Aktion)	
	Inwiefern förderlich	
Reaktion der Mitarbeiter	Eigene Wahrnehmung und Reaktion auf Wechsel	
	Reaktion des Teams	
Charakteristika des Innovationsprozesses bzw. der Situation	Förderliche Faktoren/Rahmenbedingungen	[Klärung Projekthintergrund]
	Zeitraumen	
	Art der Innovation	
	Involvierte Personen	

Notizen

Flexibles Führen im Innovationskontext
Lehrforschungsprojekt

V. Kritisches Ereignis -		
„Denken Sie jetzt bitte an eine konkrete Situation, bei der Ihrer Führungskraft der agile Wechsel zwischen der Förderung der Ideengenerierung und dem Forcieren der Umsetzung der Ideen nicht gelungen ist. Dann erzählen Sie mir bitte einmal davon.“		
Nachfragen		
Führungsverhalten	Hinderliche Verhaltensweisen	[Identifikation von Verhaltensweisen der FK beim Wechsel]
	Verhaltensweisen im Detail (z.B. Kommunikation, Aktion)	
	Inwiefern hinderlich	
	Verbesserungsvorschläge	
Reaktion der Mitarbeiter	Eigene Wahrnehmung und Reaktion auf Wechsel	
	Reaktion des Teams	
Charakteristika des Innovationsprozesses bzw. der Situation	Hinderliche Faktoren/Rahmenbedingungen	[Klärung Projekthintergrund]
	Zeitraumen	
	Art der Innovation	
	Involvierte Personen	
Notizen		

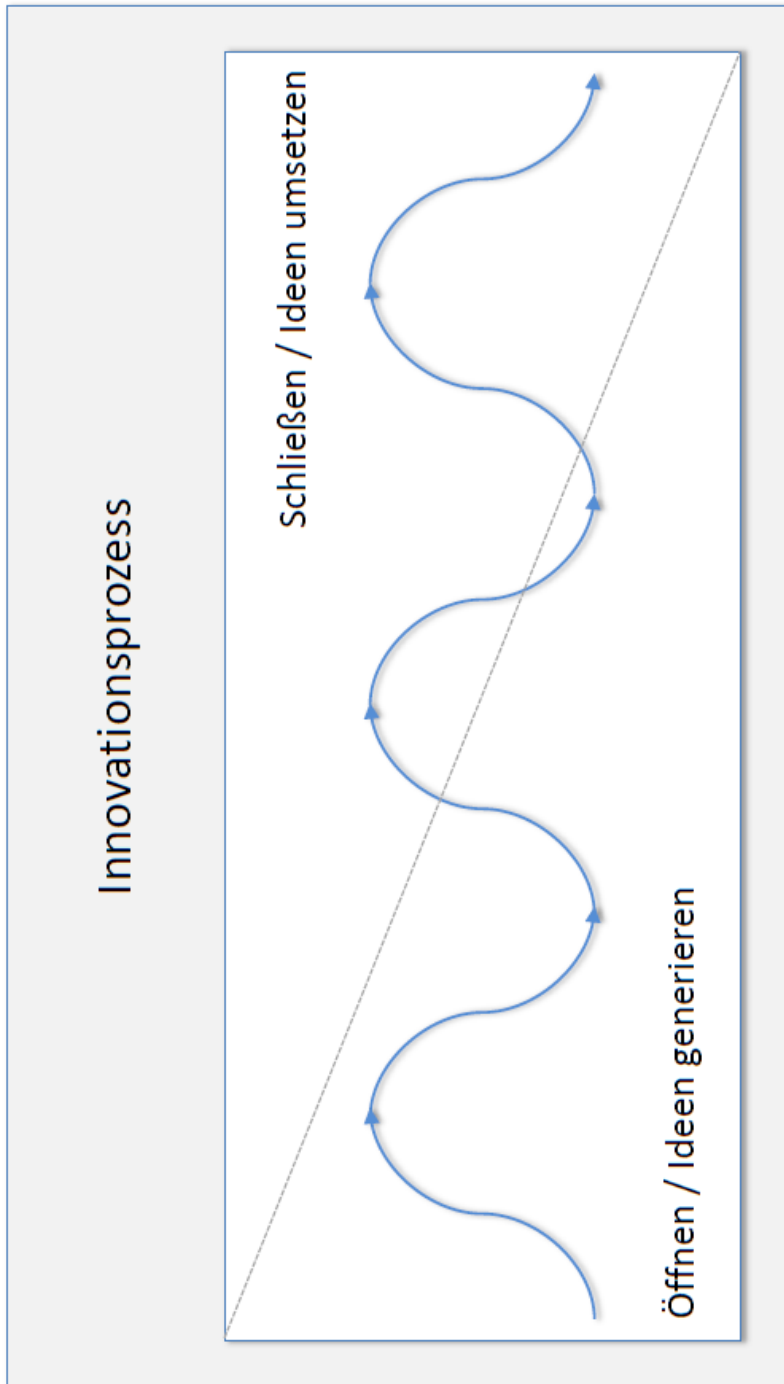
Flexibles Führen im Innovationskontext
Lehrforschungsprojekt

VI. Demografische Daten	
	Antwort
Geschlecht	<input type="checkbox"/> männlich <input type="checkbox"/> weiblich
Alter	
Dauer Unternehmenszugehörigkeit	
Dauer Teamzugehörigkeit	
Abteilung/Position	
Führungs-/Projektverantwortung	
Wenn ja, für wie viele	
Notizen	

VII. Abschluss		
[1]	Bedanken	
[2]	Bei Rückfragen kontaktieren?	
[3]	Zusammenfassung Gesamtergebnisse	
[4]	Unsere Kontaktinformationen	[Infozettel mit Kontaktinformationen aushändigen]
Notizen		

Ende der Gesprächsaufzeichnung

Visualisation of Ambidextrous Leadership in Innovation Processes



Interview Sample Details

Interview	Age	Gender	Role	Industry Sector	Function
01	55	m	F / C	Pharmaceutical	Change Management
02	30	m	F / C	Production	Production
03	35	m	L	Construction	Research & Development
04	30	m	F / C	Construction	Research & Development
05	35	m	F / C	Services	Strategy
06	40	w	L	Information Technology	Strategy
07	35	m	L	Medical Technology	Marketing
08	30	w	F / C	Insurance	Strategy
09	35	m	L	Sports	Process Management
10	30	m	F / C	Transportation	Strategy
11	35	m	L	Information Technology	Process Management
12	50	w	F / C	Consumer Goods	Marketing
13	30	m	F / C	Construction	Strategy

Note. F = Follower. C = Consultant. L = Leader. Leaders self-reported on their own leadership behaviours, whereas followers and consultants reported on their (project) leader's leadership behaviours. In order to protect the anonymity of the interviewees, the participants' age was rounded.

Appendix B: Translated German Scales from Studies 2, 3, and 4

German Version of the Temporal Flexibility Behaviour Items (Study 2)

Meine Führungskraft ...

-
- | | |
|--------|--|
| TFB 11 | ... regt dazu an, eine Idee bzw. ein Problem aus einem anderen Blickwinkel zu betrachten. |
| TFB 02 | ... macht deutlich, dass ein Innovationsprojekt wechselnde Anforderungen (z. B. Ideengenerierung, Ideenumsetzung etc.) umfasst. |
| TFB 10 | ... regt dazu an, über neue Herangehensweisen an eine Problemstellung nachzudenken. |
| TFB 09 | ... regt dazu an, Perspektiven anderer Personen bzw. Positionen (z. B. des Kunden, einer anderen Abteilung etc.) einzunehmen. |
| TFB 03 | ... bereitet mich darauf vor, dass ein Innovationsprojekt nicht geradlinig verläuft. |
| TFB 12 | ... regt zur generellen Bewertung bzw. Überprüfung einer Idee an. |
| TFB 14 | ... stellt ihr Knowhow zur Verfügung. |
| TFB 16 | ... bindet alle beteiligten Personen bei Entscheidungen (z. B. bezüglich des weiteren Vorgehens, an welchen Ideen weitergearbeitet wird etc.) ein. |
| TFB 20 | ... bringt durch ihr Feedback eigene Ideen und alternative Vorgehensweisen mit ein, um diese weiter zu diskutieren. |
| TFB 19 | ... gibt mir wiederholt Feedback zu erarbeiteten Ideen. |
| TFB 15 | ... bringt eigene Erfahrungen (z. B. durch Praxisbeispiele etc.) ein. |
| TFB 17 | ... tauscht sich regelmäßig auf inhaltlicher Ebene mit mir aus. |
| TFB 05 | ... gibt eine Struktur für das Innovationsprojekt vor. |
| TFB 06 | ... gibt fixe Termine innerhalb des Innovationsprojektes vor. |
| TFB 04 | ... unterteilt das Innovationsprojekt in Teilschritte bzw. Teilziele. |
| TFB 07 | ... teilt konkrete Anforderungen des Innovationsprojektes (z. B. Kundenanforderungen) mit. |
| TFB 08 | ... macht die Zielsetzung des Innovationsprojektes deutlich. |
-

Note. TFB = Temporal Flexibility Behaviour. Items were sorted by factor loadings from the EFA and correspond with the English items shown in Table 4 from Study 2. Items are not consecutively numbered, as some items were dropped from the initial item pool before the EFA was calculated.

German Version of the Ambidextrous Leadership Scale (Studies 2, 3, and 4)

 Meine Führungskraft / unsere Führungskraft ...

- OLB 1 ... erlaubt verschiedene Wege, eine Aufgabe zu erledigen.
- OLB 2 ... ermutigt mit verschiedenen Ideen zu experimentieren.
- OLB 3 ... gibt Raum für eigenständiges Denken und Handeln.
- OLB 4 ... gibt Raum für eigene Ideen.
- OLB 5 ... motiviert dazu, auch Risiken einzugehen.
- OLB 6 ... lässt Fehler zu.
- OLB 7 ... ermutigt aus Fehlern zu lernen.
-
- CLB 1 ... führt Routinen ein.
- CLB 2 ... greift verbessernd ein.
- CLB 3 ... achtet darauf, dass Regeln eingehalten werden.
- CLB 4 ... achtet darauf, dass Aufgaben einheitlich erledigt werden.
- CLB 5 ... kontrolliert die Zielerreichung.
- CLB 6 ... ahndet Fehler.
- CLB 7 ... hält sich an Pläne.
-
- TFB 1 ... regt dazu an, eine Idee bzw. ein Problem aus einem anderen Blickwinkel zu betrachten.
- TFB 2 ... macht deutlich, dass ein Innovationsprojekt wechselnde Anforderungen umfasst (z. B. Ideengenerierung, Ideenumsetzung etc.).
- TFB 3 ... stellt ihr Knowhow zur Verfügung.
- TFB 4 ... bindet alle beteiligten Personen bei Entscheidungen (z. B. bezüglich des weiteren Vorgehens, an welchen Ideen weitergearbeitet wird etc.) ein.
- TFB 5 ... gibt eine Struktur für das Innovationsprojekt vor.
- TFB 6 ... unterteilt das Innovationsprojekt in Teilschritte bzw. Teilziele.
-

Note. OLB = Opening Leader Behaviour. CLB = Closing Leader Behaviour. TFB = Temporal Flexibility Behaviour.

German Versions of the Innovation Scales (Studies 2, 3, and 4)

Original items of different innovation scales (outcomes) used in Study 2, Study 3, and Study 4

Follower innovative job performance (Study 2)

- Item 1 Wie häufig generieren Sie neue Ideen, um etwas zu verbessern?
- Item 2 Wie häufig suchen Sie nach neuen Arbeitsmethoden, -techniken oder -instrumenten?
- Item 3 Wie häufig erarbeiten Sie originelle Lösungen für Probleme?
- Item 4 Wie häufig mobilisieren Sie Unterstützung für innovative Ideen?
- Item 5 Wie häufig gewinnen Sie Zustimmung für innovative Ideen?
- Item 6 Wie häufig begeistern Sie wichtige Organisationsmitglieder für innovative Ideen?
- Item 7 Wie häufig setzen Sie innovative Ideen in nützliche Anwendungen um?
- Item 8 Wie häufig führen Sie innovative Ideen systematisch in Ihr Arbeitsumfeld ein?
- Item 9 Wie häufig beurteilen Sie den Nutzen innovativer Ideen?

Follower innovation (Study 3)

- Item 1 Wie häufig kommen Sie auf neue Ideen?
- Item 2 Wie häufig arbeiten Sie an der Umsetzung neuer Ideen?
- Item 3 Wie häufig finden Sie bessere Wege etwas zu tun?
- Item 4 Wie häufig entwickeln Sie bessere Prozesse und Routinen?

FSLB (Study 3)

- Item 1 Wie zufrieden sind Sie generell mit dem Verhalten Ihrer Führungskraft in Bezug auf das Anleiten zur Ideengenerierung und Ideenumsetzung?

Team innovation (Study 4)

- Item 1 Dieses Team setzt oft neue Ideen um, um die Qualität seiner Produkte und Services zu verbessern.
 - Item 2 Dieses Team beschäftigt sich wenig mit neuen, alternativen Methoden und Vorgehensweisen zur Erledigung seiner Arbeit. (Reverse coded)
 - Item 3 Dieses Team produziert oft neue Services, Methoden oder Vorgehensweisen.
 - Item 4 Dies ist ein innovatives Team.
-

Note. FSLB = follower satisfaction with leader behaviour for guiding idea generation and implementation (single item measure).