

How positive psychological characteristics drive strategic decision-making

Inaugural Dissertation

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TABLE OF ABBREVIATIONS

CEO	Chief Executive Officer
e.g.	exempli gratia - for example
i.e.	id est - that is
PsyCap.....	Psychological Capital
ROA	Return on assets
ROE.....	Return on equity
TMGT.....	too much of a good thing
USD	United States Dollar

**I. HOW POSITIVE PSYCHOLOGICAL CHARACTERISTICS
DRIVE STRATEGIC DECISION-MAKING**

Overview of the cumulative dissertation

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1. Research question and goal of the dissertation

Strategic decision-making research has long emphasized the relevance of individuals' psychological characteristics as drivers of strategic decision-making processes and their outcomes (Hambrick, 2007; Miller and Droge, 1986; Powell *et al.*, 2011). Characterized by complexity, ambiguity and lack of structure (Mintzberg *et al.*, 1976; Schwenk, 1984), behavior in strategic decision-making situations is highly dependent on individuals' interpretation of the situation and hence on their underlying psychological characteristics (Finkelstein and Hambrick, 1990). The extant research in this field mainly concentrates on inherently negative characteristics with adverse effects on the strategic decision-making process or strategic decision outcomes (for reviews, see Bromiley and Rau, 2016; Hutzschenreuter and Kleindienst, 2006) such as overconfidence (Russo and Schoemaker, 1992), hubris (Chatterjee and Hambrick, 2007; Hayward and Hambrick, 1997) and narcissism (Campbell *et al.*, 2004). Ordinarily positive psychological characteristics, however, that might improve strategic decision-making processes and outcomes have received little research attention. Hence, they represent a research gap which the present dissertation addresses.

Research on positive psychology has focused on positive psychological characteristics that allow individuals to flourish (Seligman and Csikszentmihalyi, 2000; Seligman *et al.*, 2005). Its positive effects have been shown particularly in research on organizational behavior (Donaldson and Ko, 2010; Luthans and Youssef, 2004; Mills *et al.*, 2013; Seligman *et al.*, 2005). A psychological characteristic that has been of particular interest in positive psychology is Psychological Capital (PsyCap) (Luthans, 2002a, 2002b; Luthans and Youssef, 2004), a state-like psychological characteristic serving as driver of individuals' motivation towards achieving goals (Avey *et al.*, 2011; Luthans *et al.*, 2007b). Its effects in organizational behavior research have been consistently positive (Avey *et al.*, 2011; Dawkins *et al.*, 2013; Newman *et al.*, 2014; Nolzen, 2018). They include for example employees'

improved job performance (e.g. Avey *et al.*, 2010; Avey *et al.*, 2011; Peterson *et al.*, 2011) and higher job satisfaction (e.g. Larson and Luthans, 2006; Luthans *et al.*, 2007b). Despite the relevance of individuals' psychological characteristics in strategic decision-making (Hambrick, 2007; Miller and Droge, 1986; Powell *et al.*, 2011), the potential role of PsyCap in strategic decision-making has not been focused on neither has the question whether PsyCap's potential effects on strategic decision-making differ from those in organizational behavior. Hence, this constitutes the second research gap on which the present dissertation focusses on.

In an attempt to address the aforementioned research gaps, the present dissertation draws on psychological characteristics rooted in positive psychology research and analyzes their relevance for strategic decision-making processes and outcomes. It follows the aim of incorporating ordinarily positive psychological characteristics as drivers of strategic decision-making. Additionally, it aims at extending research on PsyCap by examining its effects in strategic decision-making and thereby addressing potential differences as compared to its effects in organizational behavior. To reach that aim, the dissertation starts by providing a conceptual overview of how PsyCap's components self-efficacy, optimism, hope and resilience might impact strategic decision-making. Based on the results of this overview, the dissertation focuses on the special role of resilience and analyzes its role in strategic decision-making. Afterwards, it examines the overall effects of PsyCap on strategic decision-making. It further builds on these findings to conclude with the provision of a scientifically based but hands-on approach for assessing, allocating and, if required, adapting managers' PsyCap to optimize strategic decision-making.

In line with this, the paper of the dissertation are organized as follows: The first paper, "Psychological Capital decomposed: A conceptual approach on Psychological Capital's effects on the strategic decision-making process", provides a review on how and through

which mechanisms each of PsyCap components impact the phases of the strategic decision-making process. Synthesizing their effects, the paper not only identifies their commonalities and differences but also derives propositions on how PsyCap in its composite form might impact the strategic decision-making process. Thereby, the paper serves as theoretical basis for the subsequent studies of the dissertation.

The second paper, “The role of resilience in strategic decision-making”, focusses on resilience and analyzes its effects on both strategic decision-making processes and strategic decision-making outcomes, drawing on a study with 54 managers. Thereby, the paper adds to the dissertation’s aim of incorporating positive psychological characteristics as drivers of strategic decision-making.

The third paper, “Psychological Capital in strategic decision-making: A curvilinear assessment”, examines the effect of PsyCap in its composite form on strategic decision-making. Specifically, the paper employs a study with 102 managers to analyze PsyCap’s effects on strategic decision-making processes as well as strategic decision-making outcomes. The paper contributes to the dissertation’s aim of assessing the effect of ordinarily positive psychological characteristics on strategic decision-making. It further addresses the dissertation’s second research gap as it extends research on the effects of PsyCap to strategic decision-making and thereby shows differences as compared to its effects in organizational behavior.

Building on the findings of the third paper, the fourth paper, “Managers’ Psychological Capital: The good, the bad, and how to act”, aims at providing tangible recommendations for corporate praxis. It offers a three-step approach on assessing, allocating, and adapting managers’ PsyCap. This comprises the PsyCap Quick Check allowing for a simplified, quick measurement of PsyCap, a typology of three distinct PsyCap profiles emerging from

managers' responses to the PsyCap Quick Check and checklist-type recommendations providing guidance on either PsyCap-development or regulation.

The dissertation contributes to research emphasizing the relevance of individual psychological characteristics in strategic decision-making processes and outcomes (Hambrick, 2007; Miller and Droge, 1986) and specifically addresses the influence of ordinarily positive psychological characteristics in that regard. It also contributes to positive psychology research and specifically to research on PsyCap as it extends its relevance to strategic decision-making and thus to situations characterized by high complexity and ambiguity (Mintzberg *et al.*, 1976; Schwenk, 1984).

The structure of the dissertation is depicted in figure 1.

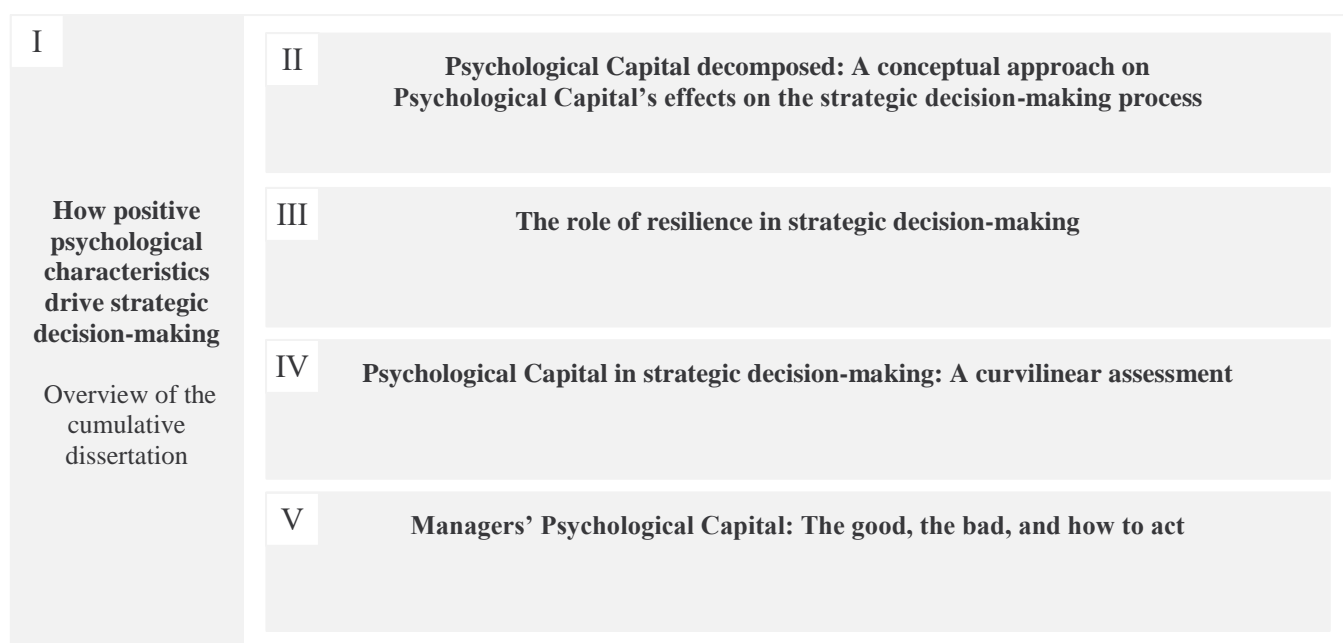


Figure 1: Structure of the dissertation

2. Summary of papers

As the effects of PsyCap on strategic decision-making have not been examined before, the first paper of the present dissertation, "Psychological Capital decomposed: A conceptual approach on Psychological Capital's effects on the strategic decision-making process",

conceptually examines PsyCap's potential role in that regard. Specifically, the paper decomposes PsyCap and reviews how and through which mechanisms each of PsyCap's individual components impacts the phases of the strategic decision-making process including the identification phase, the development phase and the selection phase. As PsyCap has been shown to follow the direction of effects of its components, the findings for the components are synthesized and serve as basis for the formulation of propositions on PsyCap's effects on each of the phases. Based on the review particularly two core findings become apparent. First, different from the effects of PsyCap components self-efficacy, optimism and hope on the identification and selection phase, resilience effects have not yet been addressed. Additionally, in the development phase, self-efficacy, optimism and hope have shown curvilinear effects while resilience has been theoretically considered to play a positive role even though empirical studies on its effect are limited. Second, as PsyCap follows the direction of effects of its components, its proposed effect, particularly on the development phase, is curvilinear. Increasing PsyCap is likely to improve strategic decision making only up to an inflection point after which it impairs it. This potential curvilinear effect contrasts with previous study results showing PsyCap to have linear positive effects in organizational behavior. The findings provide interesting avenues for future studies and hence serve as basis for the empirical papers of the dissertation. The paper is single-authored and an abbreviated version of the paper is currently under review at the Canadian Journal of Administrative Sciences.

Building on the findings of the first paper, the second paper focuses on an empirical investigation of "The role of resilience in strategic decision-making". Specifically, the effects of resilience on both the strategic decision-making process as well as strategic decision-making outcomes are empirically tested in a study involving 54 managers who have participated in a computerized strategic decision-making task. The results not only show that resilience increases

strategic decision-making outcomes but also that it enhances the strategic decision-making process by improving strategic decision-making comprehensiveness. Hence, the study results suggest that resilience constitutes a positive psychological characteristic impacting strategic decision-making and hence points at the relevance of positive psychological characteristics in this regard. The paper is co-authored by Torsten Wulf and Philip Meissner with a quantitative classification of Torsten Wulf 25%, Philip Meissner, 25% and Sina Kiegler 50%. It has been submitted to and accepted by the Strategic Management Society Special Conference in June, 13-15, 2019 in Frankfurt. It has also been submitted to, accepted by and presented at the European Academy of Management Conference in Lisbon in June, 25-28, 2019. The authors' main contributions are the development of the research question, the theoretical derivation of hypotheses and the empirical testing of the hypotheses including the development of a suitable research design to that end.

Drawing on the second core finding of the first paper, the third paper, "Psychological Capital in strategic decision-making: A curvilinear assessment", examines the effects of PsyCap in its composite form on strategic decision-making. Specifically, PsyCap's effects on the strategic decision-making process as well as on strategic decision-making outcomes are analyzed. 102 managers participated in a computerized strategic decision-making task to test the relationships. The study results show that PsyCap exerts a curvilinear effect on strategic decision-making outcomes such that it exerts positive effects on strategic decision-making outcomes until it reaches an inflection point after which its effects turn negative. The empirical findings further demonstrate that this relationship is mediated, at low and medium PsyCap levels, by differences in the strategic decision-making process and more specifically, differences in the information processing style. Thereby, the study emphasizes the relevance of the effects of individuals' ordinarily positive psychological characteristics on strategic decision-making. Additionally, it extends PsyCap's relevance towards strategic decision-

making and thereby shows differences as compared to its effects in organizational behavior. The paper is co-authored by Torsten Wulf and Philip Meissner with a quantitative classification of Torsten Wulf 25%, Philip Meissner 25% and Sina Kiegler 50%. It is prepared for submission to the Strategic Management Journal. The authors' main contributions are the development of the research question, the theoretical derivation of hypotheses and the empirical testing of the hypotheses.

The fourth paper, "Managers' Psychological Capital: The good, the bad, and how to act", builds on the findings of the third paper. Being aware of the curvilinear effect of PsyCap on strategic decision-making and of findings from previous studies that have shown PsyCap to be malleable, attempting to adapt towards the ideal PsyCap range seems worthwhile. To that end, the fourth paper provides a three-step approach serving as guideline for managers. The first step allows for a quick assessment of managers' PsyCap. In the second step, managers can allocate their PsyCap level to one of three central PsyCap profiles. The profile serves as basis for the third step in which, depending on the PsyCap profile, PsyCap levels can be either further developed or regulated. Thereby, the paper provides tangible advice applicable for corporate praxis. The paper is co-authored by Torsten Wulf with a quantitative classification of Torsten Wulf 25% and Sina Kiegler 75%. A shortened version of the paper is prepared for submission to Strategy & Leadership. The authors' main contribution is the transfer of the empirical findings into tangible implications for practitioners through the development and validation of the PsyCap Quick Check, a typology of PsyCap profiles as well as checklist-type recommendations for either PsyCap development or regulation of managers. Figure 2 summarizes the core results of each paper.

<p>I</p> <p>How positive psychological characteristics drive strategic decision-making</p> <p>Overview of the cumulative dissertation</p>	
	<p>II</p> <p>Psychological Capital decomposed: A conceptual approach on Psychological Capital's effects on the strategic decision-making process</p> <p>Core results: The study reviews how PsyCap's components impact the strategic decision-making phases and synthesizes the findings to derive propositions on PsyCap's effect on each phase. While resilience emerges as relatively unresearched, the total effects of PsyCap in its composite form are partly proposed curvilinear which contrasts previous findings in organizational behavior.</p>
	<p>III</p> <p>The role of resilience in strategic decision-making</p> <p>Core results: The study analyzes the effect of resilience on strategic decision-making processes and outcomes. Results show that resilience not only enhances the strategic decision-making process by improving decision comprehensiveness but also the outcome. Resilience emerges as positive individual driver of strategic decision-making.</p>
	<p>IV</p> <p>Psychological Capital in strategic decision making: A curvilinear assessment</p> <p>Core results: The study analyzes the effect of PsyCap on strategic decision-making processes and outcomes. Results show that PsyCap exerts a curvilinear effect on decision-making outcomes which is mediated, at low and medium PsyCap, by differences in information processing. Thus, PsyCap constitutes a relevant individual driver of strategic decision-making.</p>
	<p>V</p> <p>Managers' Psychological Capital: The good, the bad, and how to act</p> <p>Core results: On the basis of the curvilinear effect of PsyCap on strategic decision-making, the paper proposes a three-step approach to assess, allocate and, if required, adapt manager' PsyCap level either through further development or regulation. Thereby, the paper offers tangible recommendations for corporate praxis as lever to optimize strategic decision-making.</p>

Figure 2: Core results of papers

3. Contributions

The paper of the present dissertation add to research on psychological characteristics as drivers of strategic decision-making (Hambrick, 2007; Miller and Droge, 1986; Powell *et al.*, 2011). They also expand positive psychology research (Seligman and Csikszentmihalyi, 2000; Seligman *et al.*, 2005) and specifically, research on PsyCap (Luthans, 2002a, 2002b; Luthans and Youssef, 2004).

The first, second and third paper of the present dissertation contribute to research on psychological characteristics as drivers of strategic decision-making (Hambrick, 2007; Miller

and Droge, 1986; Powell *et al.*, 2011) by incorporating ordinarily positive psychological characteristics and assessing their effects in the strategic decision-making context. The first paper, “Psychological Capital decomposed: A conceptual approach on Psychological Capital’s effects on the strategic decision-making process” contributes to the field theoretically as it reviews how and through which mechanisms each of PsyCap’s individual components impacts the phases of the strategic decision-making process and, based on this, formulates propositions on PsyCap’s effects on each of the phases. It proposes that PsyCap influences each of the strategic decision-making phases and hence theoretically expands research in the field. The second paper, “The role of resilience in strategic decision-making”, theoretically contributes to the research field as it introduces resilience as positive psychological characteristic that enhances strategic decision-making. It further establishes a positive empirical relationship between resilience and both, strategic decision-making processes, i.e. decision comprehensiveness, and outcomes. The theoretical contribution of the third paper, “Psychological Capital in strategic decision-making: A curvilinear assessment”, is achieved by its focus on PsyCap’s effect on information processing as part of the strategic decision-making process as well as on the resulting strategic decision-making outcomes. It further establishes an empirical relationship between PsyCap and these variables and thereby also empirically contributes to the research field.

Second, the first and the third paper advance positive psychology research specifically on PsyCap (Luthans, 2002a, 2002b; Luthans and Youssef, 2004). They not only extend its relevance towards strategic decision-making but also identify differences in its effects as compared to organizational behavior. The first paper, “Psychological Capital decomposed: A conceptual approach on Psychological Capital’s effects on the strategic decision-making process”, does so theoretically by deriving propositions regarding its effects on the phases of the strategic decision-making process that challenge its solely positive impact prevalent in

organizational behavior (Avey *et al.*, 2011; Dawkins *et al.*, 2013; Newman *et al.*, 2014; Nolzen, 2018). Particularly in the development phase (Mintzberg *et al.*, 1976; Schwenk, 1984), PsyCap's components self-efficacy (e.g., Stone, 1994), optimism (e.g. Papenhausen, 2010) and hope (e.g. Snyder *et al.*, 1998) have shown curvilinear effects and since PsyCap follows the effect direction of its components (Avey *et al.*, 2006; Luthans *et al.*, 2007b), the paper proposes a curvilinear effect of PsyCap in this regard. The third paper, "Psychological Capital in strategic decision-making: A curvilinear assessment", empirically substantiates this. Analyzing PsyCap's effects on the strategic decision-making process and more specifically, on information processing as well as on strategic decision-making outcomes, the paper finds that PsyCap exerts curvilinear effects. Since these effects differ from the linear positive effects of PsyCap found in organizational behavior, the results also support research emphasizing the importance of situational dynamics that impact the relationship between individuals' characteristics and performance outcomes (e.g. Debusscher *et al.*, 2016; Le *et al.*, 2011), such as the trait activation theory (Tett and Guterman, 2000) or the "trait as situational sensitivities" model (Marshall and Brown, 2006).

Beyond the aforementioned contributions, the fourth paper of the present dissertation contributes to corporate praxis. Given PsyCap's curvilinear effects on strategic decision-making processes and outcomes, it has a good and a bad side. Consequently, the paper raises managers' awareness towards PsyCap's bad side, that is, its negative effects on strategic decision-making processes and outcomes after having reached very high levels. Second, the paper provides tangible advice on how to achieve a desirable PsyCap level. To that end, the paper provides managers with the validated PsyCap Quick Check, a simplified, quick measurement of managers' PsyCap building on the original 12-item PsyCap questionnaire (Luthans *et al.*, 2007a). Further, the paper offers managers a typology of three distinct PsyCap profiles emerging from their responses to the PsyCap Quick Check. They serve as basis for

scientifically-based (Kahneman *et al.*, 2010; Kahneman and Lovallo, 1993; Klein, 2008; Lovallo and Kahneman, 2003; Luthans *et al.*, 2006; Luthans *et al.*, 2008) checklist-type recommendations for managers to either develop or regulate their PsyCap.

4. Implications and further research

The results derived in the dissertation provide avenues for future research that prospective studies could address to further advance the understanding how ordinarily positive psychological characteristics impact strategic decision-making processes and outcomes.

The first paper of the dissertation, building on a review of PsyCap's components, derives propositions on how PsyCap influences the phases of the strategic decision-making process (Mintzberg *et al.*, 1976; Schwenk, 1984) and thus serves as basis for the empirical studies pursued in the second and the third paper. However, as these studies focus on elements of the development phase of the strategic decision-making process as well as on strategic decision-making outcomes, future research could build on the propositions formulated for PsyCap's effects on the identification and the selection phase of strategic decision-making. For example, future studies could investigate PsyCap's impact on goal formulation or risk taking in this regard.

The second paper focusses on resilience and empirically shows the positive influence of resilience on both, strategic decision comprehensiveness during the strategic decision-making process as well as strategic decision-making outcomes. Even though resilience explains a comparably high share of variance in the dependent variables, further positive characteristics might also play a role. For example, humility, that has been shown to broaden information processing (Rego *et al.*, 2018) or humor, that has been associated with lower levels of stress and improved coping (Mesmer-Magnus *et al.*, 2012) might constitute additional relevant

characteristics for enhanced strategic decision-making processes and outcomes. Further, future studies could incorporate samples from further industries and cultural settings as well as apply further methods, such as surveys (Meissner and Wulf, 2014) or qualitative research (e.g., Burgeois and Eisenhardt, 1988; Hensman and Sadler-Smith, 2011) to substantiate the present findings.

The results of the third paper show PsyCap to improve strategic decision-making outcomes up to an inflection point after which further PsyCap increases impair strategic decision-making outcomes. They further show that this is mediated, for low and medium PsyCap, by differences in the strategic decision-making process, i.e. information processing. However, the mediation is not significant at high PsyCap levels. Even though the sample in the study is sufficiently large and senior, future studies could aim at collecting an even more senior and larger sample size as means to increase the number of individuals with very high PsyCap and hence the understanding of the mediating effects driving the decreasing decision outcomes at very high PsyCap levels. Additionally, future studies could incorporate alternative specifications of the potential mediator (Dreu, 2006) such as a direct measurement of motivation. They also could address additional mechanisms that might become relevant mediators at high PsyCap levels such as the selective attention mechanism, which has been shown to negatively impact strategic decision processes and their outcomes (Geers and Lassiter, 2002; Radcliffe and Klein, 2002; Spirrison and Gordy, 1993). Additionally, similar to the second paper, further studies could also expand the sample in terms of industry and culture as well as apply further research methods (e.g., Burgeois and Eisenhardt, 1988; Hensman and Sadler-Smith, 2011; Meissner and Wulf, 2014) to contribute to the generalizability of the findings.

5. Deutsche Zusammenfassung der Studien

Da die Effekte von PsyCap auf strategische Entscheidungsfindung bislang noch nicht untersucht wurden, nähert sich das erste Paper der Dissertation “Psychological Capital decomposed: A conceptual approach on Psychological Capital’s effects on the strategic decision-making process”, der Rolle von PsyCap in diesem Zusammenhang konzeptionell. Das Paper betrachtet die einzelnen Komponenten von PsyCap und erarbeitet einen detaillierten Überblick, wie und über welche Mechanismen jede der PsyCap Komponenten auf die Phasen des strategischen Entscheidungsfindungsprozesses wirkt. Diese umfassen die Identifikationsphase, die Entwicklungsphase sowie die Auswahlphase. Da PsyCap der Effektrichtung der einzelnen Komponenten folgt, werden die Ergebnisse zu den Effekten der Komponenten schließend zusammengeführt und auf Basis dessen Propositionen zu den Effekten von PsyCap auf die Phasen des strategischen Entscheidungsfindungsprozesses gebildet. Der Überblick führt insbesondere zu zwei Kernergebnissen. Erstens wird deutlich, dass die Rolle von Resilienz, anders als die Komponenten Selbstwirksamkeit, Optimismus und Hoffnung, in der Identifikationsphase sowie der Auswahlphase noch nicht untersucht wurde. In der Entwicklungsphase haben Studien außerdem gezeigt, dass Selbstwirksamkeit, Optimismus und Hoffnung kurvilineare Effekt zeigen während Resilienz eine positive Rolle zugeschrieben wird, auch wenn die empirische Forschung im Hinblick auf die Effekte von Resilienz auch hier noch begrenzt ist. Zweitens ergibt sich für PsyCap, da es der Effektrichtung der Komponenten folgt, insbesondere im Hinblick auf die Entwicklungsphase die Annahme eines kurvilinearen Zusammenhangs. Steigendes PsyCap verbessert zunächst die Entscheidungsergebnisse, erreicht jedoch einen Wendepunkt, ab dem höhere PsyCap Werte die Entscheidungsergebnisse verschlechtern. Dieser mögliche kurvilineare Effektverlauf steht in Kontrast zu den bisher gefundenen linear positiven Effekten von PsyCap in der Organizational Behavior Forschung. Die dargestellten Kernergebnisse bieten

interessante Anknüpfungspunkte für weitere Studien und bilden deshalb die Basis für die nachfolgenden empirischen Paper der Dissertation. Das Paper hat keine Ko-Autoren und eine gekürzte Fassung des Papers ist derzeit im Review Prozess beim Canadian Journal of Administrative Sciences.

Anknüpfend an die Ergebnisse des ersten Papers fokussiert das zweite Paper, “The role of resilience in strategic decision-making”, auf die empirische Untersuchung der Effekte von Resilienz auf strategische Entscheidungsfindung. Es werden sowohl die Effekte von Resilienz auf das Entscheidungsergebnis als auch auf den Entscheidungsprozess untersucht. Hierfür wird ein Studiendesign gewählt, bei dem 54 Manager eine computer-basierte strategische Entscheidungsaufgabe bearbeiten. Die Ergebnisse zeigen nicht nur, dass Resilienz die Entscheidungsergebnisse verbessert sondern auch, dass Resilienz den Entscheidungsprozess verbessert, indem es die Ausführlichkeit und den Umfang des Entscheidungsfindungsprozesses erhöht. Somit arbeitet die Studie Resilienz als einen positiven, individuellen Einflussfaktor für strategische Entscheidungsfindung heraus und untermauert die Relevanz positiver individueller Einflussfaktoren für strategische Entscheidungsfindung. Das Paper wurde in Ko-Autorenschaft mit Torsten Wulf und Philip Meissner erarbeitet mit einer quantitativen Aufteilung von Torsten Wulf 25%, Philip Meissner, 25% und Sina Kiegler 50%. Das Paper wurde eingereicht und angenommen bei der Strategic Management Society Special Conference am 13.-15. Juni 2019 in Frankfurt. Das Paper wurde außerdem eingereicht, angenommen und präsentiert bei der European Academy of Management Conference am 25.-28. Juni 2019 in Lissabon. Die Hauptbeiträge der Autoren sind die Entwicklung der Forschungsfrage, die theoretische Herleitung der Hypothesen sowie die empirische Prüfung der Hypothesen inklusive der hierfür benötigten Entwicklung eines passenden Forschungsdesigns.

Ebenfalls bezugnehmend auf die Ergebnisse des ersten Papers untersucht das dritte Paper, “Psychological Capital in strategic decision-making: A curvilinear assessment”, die Effekte von PsyCap auf strategische Entscheidungsfindung. Es werden sowohl die Effekte von PsyCap auf das Entscheidungsergebnis als auch auf den Entscheidungsprozess untersucht. Zur Untersuchung dieser Zusammenhänge nahmen 102 Manager an einer Studie teil, in der sie eine computer-basierte strategische Entscheidungsaufgabe bearbeiteten. Die Studienergebnisse zeigen, dass PsyCap einen kurvilinearen Effekt auf strategische Entscheidungsergebnisse ausübt. Steigende PsyCap Werte verbessern die Entscheidungsergebnisse bis zu einem Wendepunkt, ab welchem eine weitere Erhöhung von PsyCap die Entscheidungsergebnisse wieder verschlechtert. Darüber hinaus machen die Ergebnisse deutlich, dass dieser kurvilineare Zusammenhang bei geringen und moderaten PsyCap Werten durch Unterschiede im Entscheidungsfindungs-prozess, konkret in der Informationsverarbeitung, mediiert wird. Die Studie zeigt insofern die Relevanz der Effekte grundsätzlich positiver individueller psychologischer Einflussfaktoren für strategische Entscheidungsfindung. Darüber hinaus erweitert sie die Bedeutung der Effekte von PsyCap um strategische Entscheidungsfindung und zeigt hierdurch Unterschiede zu den linear positiven Effekten von PsyCap in der Organizational Behavior Forschung auf. Das Paper wurde in Ko-Autorenschaft mit Torsten Wulf und Philip Meissner erarbeitet mit einer quantitativen Aufteilung von Torsten Wulf 25%, Philip Meissner 25% und Sina Kiegler 50%. Das Paper wird eingereicht bei dem Strategic Management Journal. Die Hauptbeiträge der Autoren sind die Entwicklung der Forschungsfrage, die theoretische Herleitung der Hypothesen sowie die empirische Prüfung der Hypothesen.

Das vierte Paper, “Managers’ Psychological Capital: The good, the bad, and how to act”, baut auf den Erkenntnissen des dritten Papers auf. Auf Basis des kurvilinearen Effektes von PsyCap auf strategische Entscheidungsfindung sowie auf Erkenntnissen früherer Studien,

welche die Entwickelbarkeit von PsyCap aufzeigen, ist es erstrebenswert, das PsyCap Level in Richtung des idealen Bereiches zu verändern. Hierfür bietet das vierte Paper einen Ansatz in drei Schritten, welcher als Leitfaden für Manager dienen kann zur Feststellung des PsyCap Wertes, der Einordnung in eines von drei PsyCap Profilen sowie, abhängig von dem PsyCap Profil, zur weiteren Entwicklung oder Regulierung von PsyCaps durch Nutzung von Checklist-basierten Empfehlungen. Hierdurch bietet das Paper konkrete Handlungsempfehlungen für die Unternehmenspraxis. Das Paper wurde in Ko-Autorenschaft mit Torsten Wulf erarbeitet mit einer quantitativen Aufteilung von Torsten Wulf 25% und Sina Kiegler 75%. Eine gekürzte Fassung des Papers ist für die Einreichung bei Strategy & Leadership vorbereitet. Der Hauptbeitrag der Autoren ist die Überführung der wissenschaftlichen Erkenntnisse in konkrete Implikationen für die Unternehmenspraxis anhand der Entwicklung und Validierung des PsyCap Quick Check, der Formulierung einer Typologie zu PsyCap Profilen sowie der Bereitstellung von klaren Handlungsempfehlungen zur Entwicklung oder Regulierung des PsyCaps von Managern.

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**II. PSYCHOLOGICAL CAPITAL DECOMPOSED:
A CONCEPTUAL APPROACH ON PSYCHOLOGICAL CAPITAL'S
EFFECTS ON THE STRATEGIC DECISION-MAKING PROCESS**

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Abstract

Psychological Capital (PsyCap) is a higher order construct comprised of self-efficacy, optimism, hope and resilience. It has been shown to positively affect employees' attitudes, behavior and perceptions. Its role in strategic decision-making, however, has not yet been analyzed and recent publications call for an examination of PsyCap's potential role in this regard. To conceptually approach the question on whether and how PsyCap as a composite construct might affect strategic decision-making and more specifically, the decision-making process, the present paper first reviews how and through which mechanisms each of PsyCap's components impacts the strategic decision-making process. Afterwards, these findings are synthesized to derive first propositions on the role that PsyCap in its composite form might play in this regard. Following the structure of the strategic decision-making process, the paper proposes that PsyCap is likely to affect the identification phase, the development phase and the selection phase of the strategic decision-making process. The paper concludes with a reflection on avenues for future research as well as potential limitations.

Keywords: Psychological Capital (PsyCap), self-efficacy, optimism, hope, resilience, strategic decision-making

1. Introduction

"Positive psychology emerged because not enough attention was being given to the strengths, the positive characteristics of people, that make life worth living (...) and (...) that allow individuals, groups, organizations, and communities to thrive and prosper" (Luthans, 2002a, p. 58). Inspired by the positive psychology movement (Seligman and Csikszentmihalyi, 2000), Luthans (2002a, 2002b) introduced the concept of PsyCap as new type of people-related capital and source of firms' competitive advantage (Hitt and Ireland, 2002; Luthans *et al.*, 2004; Luthans and Youssef, 2004). PsyCap is a higher order construct that describes an individual psychological capacity to drive motivation and resulting efforts (Avey *et al.*, 2011; Luthans *et al.*, 2007) based on one's self-efficacy, optimism, hope and resilience (Luthans and Youssef, 2004; Luthans *et al.*, 2006b).

Since its introduction, PsyCap has become an important subject within organizational behavior research. A variety of literature reviews and meta-analyses condense PsyCap's positive effects on employees' attitudes, their behavior and performance as well as their perceptions of their work environment (Avey *et al.*, 2011; Dawkins *et al.*, 2013; Newman *et al.*, 2014; Nolzen, 2018). In strategic decision-making, however, PsyCap's effects have not yet been analyzed (Avey *et al.*, 2011; Dawkins *et al.*, 2013; Newman *et al.*, 2014; Nolzen, 2018) and recent research calls for an examination of PsyCap's potential role in this regard (Nolzen, 2018). When decomposing PsyCap and considering its individual components, findings regarding their relevance in strategic decision-making, more specifically in the strategic decision-making process, are present. These findings can be assumed to inform about the potential effect of PsyCap in its composite form as PsyCap has been shown to follow the direction of effects of its components (Avey *et al.*, 2006; Luthans *et al.*, 2007).

Thus, to conceptually approach the question which effects PsyCap might exert on the strategic decision-making process, I firstly examine how and through which mechanisms each of PsyCap's individual components impacts the phases of the strategic decision-making process, thereby responding to the call for an individual consideration of PsyCap's components (Dawkins *et al.*, 2013). Afterwards, I synthesize the findings and derive first propositions on the effects of PsyCap on each phase of the strategic decision-making process.

Thereby, I contribute to the current research debate on PsyCap in two ways. First, instead of providing a review focusing on PsyCap as higher-order construct (Avey *et al.*, 2011; Dawkins *et al.*, 2013; Newman *et al.*, 2014; Nolzen, 2018), I review PsyCap's components individually and focus on their effects on the strategic decision-making process. This allows for a comprehensive, thorough reflection on commonalities and potential differences (Dawkins *et al.*, 2013) and identifies interesting areas for further research. Second, I synthesize the findings for self-efficacy, optimism, hope and resilience and derive first propositions on how PsyCap in its composite form might affect the strategic decision-making process. Addressing the call to approach PsyCap's potential relevance in that regard (Nolzen, 2018), these propositions might serve as promising basis for further studies.

The structure of the present paper is as follows. First, I provide the theoretical background on PsyCap and its components. Afterwards, I elaborate on the strategic decision-making process and analyze the effects for each of PsyCap's components within its phases. Based on their synthesis, I derive first propositions on how PsyCap in its composite form might impact the strategic decision-making process. I conclude with a discussion of future research areas and possible limitations of the present paper.

2. Theoretical considerations on PsyCap and its components

PsyCap is a construct rooted in organizational behavior research (Avey *et al.*, 2011; Dawkins *et al.*, 2013; Newman *et al.*, 2014; Nolzen, 2018). While PsyCap in its composite form has been introduced in the early years of 2000 (Luthans, 2002a, 2002b; Luthans and Youssef, 2004) its components have been researched previously (Bandura, 1997; Seligman, 1998; Snyder *et al.*, 1991; Wagnild and Young, 1993). The subsequent paragraphs outline the definition of PsyCap and its components as well as their effects in organizational behavior research.

Higher order construct PsyCap

PsyCap is defined as “an individual’s positive psychological state of development and is characterized by: (1) having confidence (self-efficacy) to take on and put in the necessary effort to succeed at challenging tasks; (2) making a positive attribution (optimism) about succeeding now and in the future; (3) persevering toward goals and, when necessary, redirecting paths to goals (hope) in order to succeed; and (4) when beset by problems and adversity, sustaining and bouncing back and even beyond (resiliency) to attain success” (Luthans *et al.*, 2006b, p. 3).

The definition of PsyCap’s components to be state-like implies their development potential and hence a possible competitive advantage (Luthans, 2002a, 2002b; Luthans *et al.*, 2006a; Luthans *et al.*, 2006b; Luthans *et al.*, 2007; Luthans and Youssef, 2007; Luthans *et al.*, 2008). PsyCap’s conceptualization as higher-order construct follows an empirical and theoretical rationale. Empirically, while being conceptually independent constructs (Carifio and Rhodes, 2002; Luthans *et al.*, 2007; Magaletta and Oliver, 1999; Youssef and Luthans, 2007), self-efficacy, optimism, hope and resilience likewise exhibit shared variance and load on one higher-order factor, that is PsyCap (Avey *et al.*, 2011; Luthans *et al.*, 2005; Luthans *et*

al., 2007). Analyses comparing PsyCap's individual components with PsyCap as construct suggest the latter to have superior predictive power (Avey *et al.*, 2011; Luthans *et al.*, 2005; Luthans *et al.*, 2007; Sweetman *et al.*, 2011). The theoretical foundation Luthans and colleagues (Avey *et al.*, 2011; Luthans *et al.*, 2007) apply is rooted in the synergetic logic on multidimensional constructs (Law *et al.*, 1998) and psychological resource theory (Hobfoll, 2002). Further theoretical support for the interlinkages among the components have been provided by Bandura (1997) and Snyder (2000) who infer that self-efficacious people will be more resilient and hopeful people will display higher self-efficacy and resilience.

Meta-analyses and reviews on PsyCap have consistently reported its positive effects in organizational behavior relating to employees' attitudes, behavior and perceptions (Avey *et al.*, 2011; Dawkins *et al.*, 2013; Newman *et al.*, 2014; Nolzen, 2018). In the context of employee's attitudes, PsyCap has been shown to exhibit a positive relationship with job satisfaction (e.g. Larson and Luthans, 2006; Luthans *et al.*, 2007) and organizational commitment (Avey *et al.*, 2011; Larson and Luthans, 2006) while being negatively related to intentions to quit, job search and cynicism (Avey *et al.*, 2008a; Avey *et al.*, 2008b; Avey *et al.*, 2009; Avey *et al.*, 2010b; Avey *et al.*, 2011; Siu *et al.*, 2015). In the context of employee behavior, PsyCap has been shown to increase performance (e.g. Avey *et al.*, 2010c; Avey *et al.*, 2011; Peterson *et al.*, 2011) and organizational citizenship while lowering counterproductive workplace behavior (Avey *et al.*, 2010b; Gooty *et al.*, 2009; Norman *et al.*, 2010). Additionally, PsyCap has been found to positively relate to creativity (Gupta and Singh, 2014; Huang and Luthans, 2015; Sweetman *et al.*, 2011), innovative behavior (Abbas and Raja, 2015; Luthans *et al.*, 2011) and lower levels of absenteeism (Avey *et al.*, 2006). The positive role of PsyCap in employees' perception of their work environment has been apparent for example in less symptoms of stress at work (Abbas and Raja, 2015; Avey *et al.*,

2009; Siu *et al.*, 2015) and better psychological well-being (Avey *et al.*, 2010a; Avey *et al.*, 2011; Culbertson *et al.*, 2010).

PsyCap's components

Self-efficacy

Self-efficacy is defined as the individual's efficacy expectation or the belief to be able to successfully perform a certain task and to demonstrate the required motivation, cognitive capabilities and actions to that end (Snyder *et al.*, 1991; Stajkovic and Luthans, 1998). Its roots trace back to Bandura's social cognitive theory that posits central cognitive processes on which self-efficacy is built on comprising intentionality, forethought, observation, self-regulation and self-reflection (Bandura, 2001; Luthans *et al.*, 2006b; Stajkovic and Luthans, 1998). These cognitive processes emphasize the agentic nature of self-efficacy (Bandura, 2001). In the context of PsyCap, self-efficacy is considered synonymous to confidence (Luthans *et al.*, 2006b). High levels of self-efficacy are considered to result in unrealistic overconfidence (Luthans *et al.*, 2006b; Stone, 1994; Vancouver *et al.*, 2002). Reviews and meta-analyses on self-efficacy focus on its findings in organizational behavior research and mainly derive human resource applications (Appelbaum and Hare, 1996; Gist, 1987; Sadri and Robertson, 1993). Particularly, the positive effects of self-efficacy in personal goal setting and commitment towards assigned goals as well as its positive link to employee performance are outlined (Appelbaum and Hare, 1996; Gist, 1987; Sadri and Robertson, 1993). Recent studies in organizational behavior have shown that self-efficacy positively relates to self-rated (Luthans *et al.*, 2007; Rego *et al.*, 2010) and objective performance as well as job satisfaction (Luthans *et al.*, 2007).

Optimism

Optimism is characterized by a positive attributional style (Seligman, 1998). This refers to an internal ascription of positive events and an external, temporary explanation of negative incidents resulting in a positive outcome expectancy and high perceived degree of control (Luthans, 2002a; Peterson, 2000). Given its characteristic of being state-like, optimism as defined in PsyCap is line with what Peterson (2000) refers to as little optimism in which "the focus is on specific causal explanations for concrete events" (Peterson, 2000, p. 49). Another form of optimism refers to dispositional optimism, an individual's general outcome expectancy and attribution style for future life events (Peterson, 2000; Scheier and Carver, 1985). Peterson (2000) summarizes the effects of optimism comprising positive linkages for example with academic and occupational success, perseverance and health. Recent studies in organizational behavior have shown optimism to increase job satisfaction, organizational commitment, work happiness and supervisor-rated performance (Youssef and Luthans, 2007) as well as self-rated performance (Rego *et al.*, 2010).

Hope

The definition of hope comprises two elements which are agency and pathways (Snyder *et al.*, 1991; Snyder *et al.*, 1996). While agency refers to the individual's determination to achieve a goal, pathways relates to the perceived ability to find ways to achieve the aspired goal (Luthans, 2002a, 2002b; Snyder *et al.*, 1991). These two dimensions of hope are considered to be a cognitive set with reciprocal interdependence (Snyder *et al.*, 1991). Hence, the emphasis rests on hope as thinking process rather than as emotion (Snyder *et al.*, 1996; Snyder, 2002). Research on the effects of hope has spread across diverse domains including health, well-being, coping and academic performance (Luthans *et al.*, 2006b; Luthans and Youssef, 2007). In organizational behavior research, hope has been shown to lead to multiple

desired outcomes. For example, hopeful leaders' subordinate retention and job satisfaction is higher and their work units report higher profits (Peterson and Luthans, 2003). Additionally, hope has been found to foster employees' work happiness and organizational commitment (Youssef and Luthans, 2007) and to positively relate to supervisor-rated performance (Luthans *et al.*, 2005).

Resilience

Originally rooted in developmental and clinical psychology as an extraordinary strength (Masten *et al.*, 1990; Masten, 2001), Masten (2001) established resilience as an ordinary, learnable capacity that allows for adaption in situations of adversity or risk leading to successful outcomes. In the context of positive psychology, resilience is defined as “the positive psychological capacity to rebound, to ‘bounce back’ from adversity, uncertainty, conflict, failure or even positive change, progress and increased responsibility” (Luthans, 2002b, p. 702). Literature reviews on resilience emphasize its relevance as employee strength (Kossek and Perrigino, 2016; Linnenluecke, 2017). In organizational behavior, it has been reported to improve stress resistance (Ong *et al.*, 2006), commitment to change (Shin *et al.*, 2012) and adaptive coping (Parker *et al.*, 2015). It has also been shown to reduce the negative effects of stress on job satisfaction (Krush *et al.*, 2013). Additionally, resilience has been found to increase job satisfaction, work happiness (Youssef and Luthans, 2007) and performance (Luthans *et al.* 2005; Luthans *et al.* 2007).

3. Relevance of PsyCap's components in strategic decision-making

PsyCap has not yet been analyzed regarding its effects on strategic decision-making (Nolzen, 2018). To conceptually derive first propositions on how PsyCap in its composite form might affect strategic decision-making and more specifically, the strategic decision-making process, it is necessary to understand how and through which mechanisms each of

PsyCap's components impact the key elements of the phases of the strategic decision-making process. Hence, after outlining the three phases of the strategic decision-making process and their key elements, I systematically examine the effects of PsyCap's components on each of them and, based on this, derive first propositions. As an overview, the relevant papers examined for the effects of each PsyCap component on each phase are listed in Appendices A to C.

Strategic decision-making process

Mintzberg and colleagues (1976) consider the strategic decision-making process to be complex, non-routine, important and to comprise a specific set of actions and factors that occur throughout the process. They assume three central phases of the strategic decision-making process that are the identification, development and selection phase. Starting with an initial identification of the strategic problem in which the stimuli for action is recognized and analyzed, the *formulation* of strategic *goals* is the first key element within the identification phase (Mintzberg *et al.*, 1976; Schwenk, 1984). In the second phase, the development phase, strategic alternatives need to be derived in order to address the strategic problem identified and reach the formulated goal. Hence, *information search* and *information processing* are key elements of the this phase (Mintzberg *et al.*, 1976; Schwenk, 1984). The development phase is often interlinked with the third phase, the selection phase, in which strategic choices are made based on a set of criteria and their evaluation (Mintzberg *et al.*, 1976; Schwenk, 1984). Their evaluation comprises an assessment of the risks involved with the strategic alternatives making decision-makers' *risk taking (willingness)* a key element of this phase (Hoskisson *et al.*, 2017; Schwenk, 1984).

Identification phase

Self-efficacy

Self-efficacy has been shown to impact goal formulation such that more self-efficacious individuals set themselves higher goals (Appelbaum and Hare, 1996; Bandura and Wood, 1989; Earley and Lituchy, 1991; Gist, 1987; Phillips and Gully, 1997; Wood and Bandura, 1989; Wood *et al.*, 1990). This is based on the cognitive mechanism of forethought and the higher perceived levels of capabilities, also referred to as efficacy expectation (Snyder *et al.*, 1991). Earley and Lituchy (1991) compare three models dealing with the relationships among self-efficacy and goal-formulation. In their studies, where they measured self-efficacy based on self-reported efficacy expectation ratings and personal goal formulation based on a single item asking for individuals' personal performance goal, they confirmed self-efficacy to lead to higher personal goals (Earley and Lituchy, 1991). This positive influence of self-efficacy on goal formulation is explained similar to the outlined mechanism of Snyder *et al.* (1991), through self-efficacious individuals' perception of high goals as achievable and the resulting willingness to take on challenges (Earley and Lituchy, 1991). The study of Phillips and Gully (1997) lends further support on the outlined effect.

Optimism

Optimism is interlinked with an increased belief to achieve challenging goals and goal directed behavior based on optimists' internal attributional style and the positive outcome expectancy related to it (Luthans, 2002a; Peterson, 2000; Scheier and Carver, 1985; Snyder *et al.*, 1991). Thus, through optimists' positive internal attribution style and perceived outcome control, optimistic individuals formulate higher, more ambitious goals (Zhang and Fishbach, 2010). Counteractive optimism further increases the prediction to achieve higher goals (Zhang and Fishbach, 2010). That is, individuals predict higher goal achievement in the presence of

challenging obstacles and when they consider their achievement as controllable (Zhang and Fishbach, 2010), both of which are usually present in managers' strategic decision-making (Mintzberg *et al.*, 1976; Schwenk, 1984).

Hope

Already by definition, the nature of hope as a cognitive state of thinking in determining goals and defining ways to achieve them illustrates its relevance in goal formulation within the identification phase (Snyder *et al.*, 1991; Snyder *et al.*, 1998). Snyder *et al.* (1991) has provided statistical evidence for the positive relationship of hope with the number of goals set as well as their difficulty. This is explained through hopeful individuals' higher sense of agency and pathway, a cognitive set also referred to as the reciprocal interaction of efficacy and outcome expectation. They reflect the individual's belief to be able to achieve a certain goal and the individual's perception of strategies in order to do so and hence increase number and difficulty of goals set (Snyder *et al.*, 1991).

Resilience

Neither existing reviews on resilience (Kosseck and Perrigino, 2016; Linnenluecke, 2017) nor any of the relevant papers of the present work addresses how resilience might relate to goal formulation in the identification phase in the strategic decision-making process. This constitutes an interesting field for future research which will be addressed in the discussion.

Synthesis

The present examination of how PsyCap's components impact the identification phase of the strategic decision-making process and more specifically goal formulation illustrates the relevance of three out of four PsyCap components. Mainly based on positive efficacy expectancy, outcome expectancy as well as the reciprocal interaction of them inherent in self-

efficacy, optimism and hope, these components foster challenging goal setting and more specifically, decision maker's setting of increasingly difficult goals. As PsyCap in its composite form has been shown to follow the direction of effects of its components (Avey *et al.*, 2006; Luthans *et al.*, 2007), it is reasonable to assume that PsyCap follows the positive effect of self-efficacy, optimism and hope on goal formulation. Thus, I propose:

Proposition 1: PsyCap strengthens decision maker's propensity to formulate increasingly difficult goals.

Development phase

Self-efficacy

In the context of information search, Stone (1994) has shown that moderate levels of self-efficacy produce a more suitable, stronger varying information search in a complex decision-making task as compared to high and low self-efficacy, indicating a curvilinear relationship. In the case of high self-efficacy, this is explained through complacency or overconfidence, which leads to the absence of increasing efforts given the belief of superior performance in any case. Participants with moderately induced self-efficacy, however, increase their efforts and attention since they are committed towards goal achievement but not sure to perform well in any case (Stone, 1994). In a more recent study, Beck and Schmidt (2012) have also reported a curvilinear effect of self-efficacy on information search, more specifically, on the number of information pieces collected in a complex decision-making task. While increases in self-efficacy at lower levels of self-efficacy align with a perceived achievability of the goal but only in case sufficient information is collected, increases at high levels of self-efficacy lead to a perception of the task as easily achievable (Beck and Schmidt, 2012). Seijts and colleagues (2004) have reported mixed findings regarding the effect of self-efficacy on information search in a business simulation task, reporting positive and no effects.

Performance ambiguity helps to explain these different findings as it is a key reason why highly self-efficacious individuals become overconfident and decrease efforts (Stone, 1994). While participants in the study of Seijts (2004) received immediate feedback about the effectiveness of their applied strategy and hence could evaluate their performance, this was not the case in the studies previously mentioned where there was either a lack of performance feedback (Stone, 1994) or ambiguity in terms of relative performance required (Beck and Schmidt, 2012). The study of Schmidt and DeShon (2010) has reported performance ambiguity as boundary condition for the negative effect of self-efficacy on efforts invested.

In the context of information processing, Bandura and colleagues' early studies (Bandura and Wood, 1989; Wood *et al.*, 1990; Wood and Bandura, 1989) have found a positive relationship between self-efficacy and systematic analytical thinking. They describe self-efficacious peoples' higher perceived achievability of the goal to motivate their controlled, systematic thinking processes. People with low self-efficacy, in contrast, are inwardly focused, dealing with self-doubts that increase experienced stress and undermine effective cognitive processing (Bandura and Wood, 1989; Wood *et al.*, 1990; Wood and Bandura, 1989). At the same time, however, they also address the potential threat of demotivating effects in case of very high levels self-efficacy (Bandura and Jourden, 1991). Specifically, they have shown in a complex decision-making experiment that individuals with initially moderate self-efficacy levels that, based on a manipulation, increased throughout the experiment strongly increased their analytical thinking strategies while this was not the case for individuals with initially high self-efficacy levels (Bandura and Jourden, 1991). These findings point at a different perception of effort in analytical thinking required to successfully achieve one's goal depending on individuals' initial level of self-efficacy (Bandura and Jourden, 1991; Beck and Schmidt, 2012). They are in line with the argumentation of Beck and Schmidt regarding the effect of self-efficacy on information search (2012). Hence, they

support the possibility of a curvilinear effect of self-efficacy on information processing where at moderate levels of self-efficacy information processing behavior might be most analytic. This is further substantiated as high levels of self-efficacy are considered to result in unrealistic overconfidence (Luthans *et al.*, 2006b; Stone, 1994; Vancouver *et al.*, 2002) and overconfidence has been shown to bias information processing, for example in the context of decision maker's investment decisions (e.g. Malmendier and Tate, 2008; Simon and Houghton, 2003; Smit and Kil, 2017). Additionally, research on collective efficacy, which is similar to self-efficacy (Tasa and Whyte, 2005) has reported curvilinear effects of efficacy on systematic information processing (Tasa and Whyte, 2005; Whyte, 1998). For example, Tasa and Whyte (2005) have found a curvilinear effect of efficacy on vigilant problem solving such that at high and low levels of efficacy, vigilant problem solving decreases. In case of high efficacy levels, this is explained similar to Stone (1994) through complacency based on the belief of superior performance in the given situation that undermines the perceived necessity for thorough processing of information. Low efficacy individuals, however, lack the motivation and commitment required to induce vigilant problem solving (Tasa and Whyte, 2005).

Optimism

Examining optimism and information search, recent research on dispositional optimism has found a curvilinear relationship of managerial dispositional optimism with search behavior such that at moderate levels search of ways to improve performance is highest (Papenhausen, 2010). At moderate levels of dispositional optimism, a positive outcome expectation of goal attainment motivates individuals in a strategy simulation task to invest increasing effort in information search. Pessimists, however, do doubt any positive outcome which inhibits their motivation to conduct the required search behavior. At extreme levels of optimism, in contrast, an absolute assurance of being successful prevents the engagement in

problem focused activities including thorough, cautious information search (Papenhausen, 2010).

Also in the context of information processing, very high levels of optimism have been shown to exert negative effects. For example, the study of Geers and Lassiter (2002) provides empirical evidence for highly optimistic individuals to be less likely to recognize disconfirming information and contradictions in the context of expected versus de-facto experiences. When primed with a positive expectation and afterwards confronted with a non-positive stimuli, optimists assimilate their affective reaction towards their positive expectation. This is also the case when primed with a negative expectation before being confronted with a positive film clip. While optimists assimilate towards their expectations, pessimists notice the discrepancy. These effects are explained through the selective attention mechanism of optimists. While pessimists recognize inconsistencies and expectation-disconfirming information given their ability to focus attention to disconfirming information, optimists, even though extracting similar amounts of data, select expectation confirming information that lead to overlooking of contradictions (Geers and Lassiter, 2002). The tendency of highly optimistic individuals to overlook contradicting information based on the selective attention mechanism has also been illustrated in an earlier study which shows naïve optimism to be negatively related with error detection in a proofreading task (Spirrison and Gordy, 1993). Radcliff and Klein (2002) have also provided empirical evidence for extreme optimism to foster defensive information processing. Through self-serving information choice and the recall of less unfavorable information, which again are characteristics of the selective attention mechanism, optimists attempt to sustain their unrealistic, self-enhancing belief (Radcliffe and Klein, 2002). In the context of a highly stressful field experiment, dispositional optimism has been shown to negatively relate to self-reported situational awareness, a cognitive construct and information-processing variable (Eid *et al.*, 2005). In the context of

sustainable strategic decision-making relating to climate change, Mazutis and Eckardt (2017) theorize that extreme optimism decreases the generation of a broad set of options in strategic decisions through highly positive outcome expectancies which reduce the perceived proximity and expected negativity of consequences. Hence, decision comprehensiveness, defined as procedural rationality or the extensiveness of the strategy process (Fredrickson and Mitchell, 1984; Miller, 2008), is lowered (Mazutis and Eckardt, 2017). Finally, through optimists' attentional bias to positive information, recalling takes also place selectively (Gibson and Sanbonmatsu, 2004). Optimists overestimated past performance as they recalled winning more than losing. Further, they significantly recalled more near wins than pessimists which substantiates different selective attention (Gibson and Sanbonmatsu, 2004). While confirming the outlined negative effects of extreme optimism on information processing by showing that it leads to an attentional biases for positively valenced stimuli, the study of Segerstrom (2001) further has shown that moderate levels of optimism lead to optimal information processing. Specifically, information processing in terms of attention paid to positive and negative information has been shown to be most balanced at moderate optimism as compared to high or low optimism indicating a curvilinear effect of optimism on information processing (Segerstrom, 2001).

Hope

Even though empirical evidence linking hope to the development phase in the strategic decision-making phase is rare, it likely plays a role given its relevance in information search and processing found in related fields. Hope has been consistently shown to bias information search and more specifically to lead to selection of information in favor of the hoped-for outcome (Cohen-Chen *et al.*, 2014; Macinnis and Chun, 2006; Macinnis and Mello, 2005; Snyder *et al.*, 1998). For example, in an experimental study on the effects of hope on information selection, Snyder *et al.* (1998) have shown hope to be positively related to

positive self-referential information selection, measured based on individuals' freely chosen time spent on positive or negative information. Further studies confirm the findings that hope impacts the type of information selected (Cohen-Chen *et al.*, 2014; Mello *et al.*, 2007). In the context of conflict, high-hope individuals have been shown to have a preference for information confirming their positive self-referential thoughts and hoped-for goal (Cohen-Chen *et al.*, 2014; Mello *et al.*, 2007; Snyder *et al.*, 1998). This is similar to the selective attention mechanism described for optimists (Geers and Lassiter, 2002; Spurrison and Gordy, 1993) and in line with the theoretical considerations of Macinnis and colleagues (Macinnis and Chun, 2006; Macinnis and Mello, 2005) who also point at selective attention and information search in favor of the hoped-for outcome implied by high hope.

The findings on the effect of hope on information processing are mixed. For example, Chang (1998) has examined the relationship of hope and rational problem solving. The study has found that high hope is positively related to positive problem orientation and rational problem solving and negatively related to negative problem orientation and problem avoidance. This is explained through consciousness efforts to pursue and reach a certain goal driven by hope (Chang, 1998), reflecting the elements agency and pathways (Snyder *et al.*, 1991; Snyder *et al.*, 1996). Higher problem solving skills as well as better performance in cognitive tasks of high hope individuals have been also shown in two previous studies of Snyder and colleagues (Snyder *et al.*, 1991; Snyder *et al.*, 1996). At the same time, however, hope is theorized to bias information processing. Similar to information search, Macinnis and colleagues (Macinnis and Mello, 2005) consider hope to bias processing in favor of the hoped-for outcome leading to information misinterpretation as well as uncritical judgement of information confirming the desired outcome versus overly strict judgement for disconfirming information. This is considered to be particular the case in the presence of high involvement and if the goal congruent outcome is perceived as threatened (Macinnis and Chun, 2006;

Macinnis and Mello, 2005). Hence, de Mello, MacInnis and Stewart (2007) include the perceived threat of achieving the goal congruent outcome in their studies. They empirically show that when high-hope individuals' goal is threatened, they pursue uncritical information evaluation to retain their goal congruent outcome. However, when the perceived threat in achieving the goal congruent outcome is low, high hope individuals process information more objectively and are better able to discriminate information. They invest conscious efforts in order to achieve the goal congruent outcome but do so without following motivated processing as they do not perceive their goal as threatened. Hence, the threat of goal achievement moderates the relationship between hope and information processing (Mello *et al.*, 2007) and might be a reason for the seemingly contradicting findings of the effects of hope on information processing. However, even if the perceived threat to achieve the hoped-for goal is low and more objective information processing is pursued (Mello *et al.*, 2007), excessive levels of hope, also referred to as false hope, align with overconfidence and are considered disadvantageous (Polivy and Herman, 2002). They imply irrational persistence in the hoped-for outcome where information are ignored or distorted (Polivy and Herman, 2002). Hence, hope might exert a curvilinear effect (Luthans *et al.*, 2006b) on information processing in case the hoped-for outcome is not perceived to be threatened.

Resilience

Resilience is considered to positively relate to information search, and more specifically to the amount and breath of information search (Fiol and O'Connor, 2003; Shin and Kelly, 2015). In the context of bandwagon decisions, resilience is considered to foster mindfulness that, in turn, leads to an extended and more varied information search (Fiol and O'Connor, 2003). Bandwagon decisions are adoptions of trends within an industry due to pressure caused by competitors already having adopted them. In such strategic decision situations, mindfulness, a state of alertness and awareness, ensures resistance against imprudent pursuing

of generally accepted solutions and search for further information (Fiol and O'Connor, 2003). Additionally, given resilient peoples' conviction that they can always bounce back from failure, variance seeking through the discovery of more and more varied information is not considered as undesired situation to fear (Fiol and O'Connor, 2003). Other studies, even though not focusing on strategic decision-making, have empirically supported the positive relation of resilience and information search (Shin and Kelly, 2015). Investigating resilience in decision-making strategies in the career context, Shin and Kelly (2015) have found empirical evidence for resilience to be negatively related to lack of information and inconsistent information. Furthermore, resilience is positively related to information gathering, defined as the degree to which individuals pursue comprehensive information search and organization (Gati *et al.*, 2010; Shin and Kelly, 2015).

Additionally, resilience is considered to improve information processing (Fiol and O'Connor, 2003; Shin and Kelly, 2015; Sutcliffe and Vogus, 2003). For example, in their framework, Sutcliffe and Vogus (2003) present resilience as an antecedent of broader information processing when responding to organizational threats. They consider resilience, as it builds on adequate competencies and experiences and reduces perceived stress in the face of threats, to broaden individuals' perception and information processing skills (Sutcliffe and Vogus, 2003). This is in line with the considerations of Fiol and O'Connor (2003) who also theorize resilience to broaden information processing. More specifically, they assume resilience to imply more active, multi-perspective and less rule-based information processing based on the mechanism of increased mindfulness (Fiol and O'Connor, 2003). Additionally, Shin and Kelly (2015) have provided empirical evidence for resilience to be positively related to analytic information processing in the context of career decision-making.

Synthesis

The findings illustrate that all of PsyCap's components play a role in information search and information processing of the development phase. Under conditions of ambiguity, which is a key characteristic of strategic decision-making (Mintzberg *et al.*, 1976), self-efficacy has been found to be curvilinear related to amount and variety of information searched (Beck and Schmidt, 2012; Stone, 1994). Optimism has also shown a curvilinear relationship with information search (Papenhausen, 2010). Both, self-efficacy and optimism, initially increase efforts dedicated to information search based on positive efficacy and outcome expectations. However, at extreme levels they induce overconfidence in being successful which decreases perceived necessity of and resulting effort in information search (Beck and Schmidt, 2012; Papenhausen, 2010; Stone, 1994). Hope, through high-hope individuals' affinity for pathway and agentic thoughts, has been shown to reduce the variety of information search such that it is biased in favor of the hoped-for outcome (Cohen-Chen *et al.*, 2014; Mello *et al.*, 2007; Snyder *et al.*, 1998). Resilience, in contrast, has been considered to increase the amount and variety of information searched (Fiol and O'Connor, 2003).

With self-efficacy and optimism, two out of four of PsyCap's components have been shown to exert a curvilinear effect on information search. Hope and resilience, however, seem to oppose each other regarding their effects on information search. Even though the relative strength of effects of the components on information search has not been researched and cannot be assessed within the present paper, previous studies have shown PsyCap's components to mutually reinforce each other and to be highly positively related (Avey *et al.*, 2006; Luthans *et al.*, 2007). Hence, low and medium levels of self-efficacy and optimism align with low and medium levels of hope and resilience. Consequently, the positive effects of increasing self-efficacy and optimism on information search at low and medium levels in combination with the positive effect of increasing resilience are likely to overcompensate

possible negative effects of hope. At very high levels of self-efficacy and optimism, however, their negative effects in combination with the negative effects of high levels of hope on information search are likely to overcompensate possible positive effects of resilience. Considering the finding, that PsyCap follows the direction of effects of its components (Avey *et al.*, 2006; Luthans *et al.*, 2007), this leads me to the overall proposition of a curvilinear effect of PsyCap on information search. I propose:

Proposition 2: Decision maker's PsyCap has a curvilinear relationship with information search such that at low levels, increases in PsyCap increase the amount and variety of information searched while at high levels, increases in PsyCap reduce the amount and variety of information searched. At moderate levels of PsyCap, decision maker's amount and variety of information searched should be highest.

In the context of information processing, self-efficacy has been found to exert a curvilinear effect on analytical information processing (Bandura and Jourden, 1991; Tasa and Whyte, 2005; Whyte, 1998). High levels of optimism have been consistently shown to induce a selective attention mechanism which distorts analytical information processing (Geers and Lassiter, 2002; Gibson and Sanbonmatsu, 2004; Radcliffe and Klein, 2002; Spirrison and Gordy, 1993). At the same time, moderate levels of optimism have been shown to lead to rational, balanced information processing, indicating also a curvilinear relationship (Segerstrom, 2001). The mixed findings on the effects of hope on information processing (Chang, 1998; Macinnis and Mello, 2005; Snyder *et al.*, 1991; Snyder *et al.*, 1998) are conditional on individuals' perceived threat of reaching the goal congruent outcome (Mello *et al.*, 2007). However, even if the hoped-for outcome is not perceived to be threatened, excessive hope aligns with overconfidence (Polivy and Herman, 2002) which is a key reason for the negative effects of very high self-efficacy on analytical information processing (Bandura and Jourden, 1991; Tasa and Whyte, 2005; Whyte, 1998). As such, hope can also be

considered to exert a curvilinear effect on analytical information processing (Luthans *et al.*, 2006b) in case the hoped-for outcome is not perceived as being threatened. If its perceived as being threatened, hope negatively effects analytical information processing (Mello *et al.*, 2007). Resilience, in contrast, through decreasing perceived stress and fear of challenging situations fosters mindfulness which is considered to be generally beneficial for analytical information processing (Fiol and O'Connor, 2003; Sutcliffe and Vogus, 2003).

Depending on the perceived threat towards the hoped-for outcome, either three or two out of four PsyCap components have been found to exert a curvilinear effect on analytical information processing. Hence, either, self-efficacy, optimism and hope can be assumed to jointly overcompensate the theorized linear positive effects of resilience. Or, in line with the reasoning of Proposition 2, depending on the level of self-efficacy and optimism, they interact with resilience or hope and overcompensate the opposing effect of the respectively remaining variable. This leads to the proposal of a curvilinear effect of PsyCap in both cases.

Proposition 3: Decision maker's PsyCap has a curvilinear relationship with information processing such that at low levels, increases in PsyCap foster analytical information processing while at high levels, increases in PsyCap reduce analytical information processing. At moderate levels of PsyCap, decision-makers' analytical information processing should be highest.

Selection phase

Self-efficacy

Self-efficacy is of relevance within risk taking in the selection phase. People with high self-efficacy are willing to take higher risk, for example in investment decisions (Dulebohn, 2002; Krueger and Dickson, 1994; Whyte *et al.*, 1997). This is explained through differences in opportunity and threat perceptions of a decision situation. While in case of high self-

efficacy, the situation is perceived as opportunity that is controllable and will successfully be managed given the higher perceived level of capabilities, low self-efficacy results in fear of failure since the situation is considered as uncontrollable threat (Krueger and Dickson, 1994; Whyte, 1998). Hence, the effect of self-efficacy on risk taking has been shown to be mediated by the perception of opportunity and threats (Krueger and Dickson, 1994). This has been underpinned by the findings of Whyte and colleagues (1997) who have shown self-efficacy to be related to increasing escalation of commitment and willingness to take risk in the context of failing projects. Collective efficacy has shown similar effects. It increases the perceived abilities to successfully cope with challenging circumstances resulting in higher risk taking (Knight *et al.*, 2001; Whyte, 1998).

Optimism

Decision makers' optimism effects their subsequent risk taking. Kahneman und Lovallo (1993) describe optimism as cognitive mechanism that fosters risk taking in the context of decision-making. As optimistic decision makers consider forecasting problem as unique, they rarely apply results of past cases with comparable characteristics but rely on individual scenarios and extrapolate present trends matching their goals and plans, referred to as inside view. Additionally, their perception of being able to control future events offers overly optimistic forecast and hence increases risk taking (Kahneman and Lovallo, 1993; Lovallo and Kahneman, 2003). Likewise, Smit and Kil (2017) have theorized that overly optimistic executives overestimate potential returns while underestimating risk associated with an acquisition and hence, instead of investing in minority stake strategies, take higher risks as they are more likely to make full acquisitions (Smit and Kil, 2017). In line with this, an empirical investigation of Åstebro, Jeffrey and Adomdza (2007) has shown optimistic inventors to take higher risks, apparent in an increased perseverance of investments after being told to quit. Compared to pessimists, optimistic inventors spend 166% more than their

pessimistic counterparts given their tendency to discount and distrust negative, disconfirming information and their high perceived controllability of future events (Åstebro *et al.*, 2007).

Further supporting findings have been reported in a study on the impact of cognitive differences of executives on decision-making in which Wally and Baum (1994) have empirically illustrated a positive relationship between optimism and risk tolerance.

Hope

The role of hope in risk taking is scarcely researched to date (Reimann *et al.*, 2014). However, the findings of Reimann et al. (2014) contribute to understanding the role of hope in risk taking in the selection phase. Results across four studies have consistently shown a significant relationship between hope and risk taking which is moderated by outcome threat. In the presence of a threat for the goal congruent outcome, high hope increases risk taking while in its absence, high hope decreases risk taking. High-hope individuals, when facing a goal-congruent threat, tend to selectively process information such that negative information are discounted and self-serving conclusions in favor of reaching ones gain are drawn (Reimann *et al.*, 2014). This is line with theoretical considerations that theorize hope to motivate risk taking by reducing perceptions that potential negative consequences might occur (Macinnis and Chun, 2006; Macinnis and Mello, 2005). However, when there is no threat for the goal congruent outcome, hope does not only evoke thoughts about the potential gain but also to induce careful reflection on potential losses. Thus, the motivation to avoid losses is stronger leading to decreased risk-taking (Reimann *et al.*, 2014). These findings support the relevance of the perceived threat for the goal congruent outcome also examined in the context of information processing (Mello *et al.*, 2007).

Resilience

The findings on the role of resilience in the strategy selection phase are limited. A recent review on resilience identifies the effect of resilience on risk taking in decision-making as key topic for further research (Kossek and Perrigino, 2016). Previous work rather elaborated on resilience as answer to or outcome of risky situations such as catastrophes and crises (Linnenluecke, 2017; Powley, 2009; van der Vegt *et al.*, 2015) but did not focus on resilience effects on risk taking in the strategic decision-making process (Kossek and Perrigino, 2016). Hence, its role in risk-taking in strategic decision-making constitutes an interesting field for future research which will be addressed in the discussion.

Synthesis

Self-efficacy increases decision-makers' risk taking mainly through an increased perception of situations as controllable opportunities rather than as threats (Knight *et al.*, 2001; Krueger and Dickson, 1994). Optimists, given their positive outcome expectations of future events as controllable opportunities, also show increasing risk taking (Åstebro *et al.*, 2007; Smit and Kil, 2017). In the context of hope, risk taking depends on the perceived threat of the hoped-for outcome (Reimann *et al.*, 2014). Hence, either three or two of PsyCap's components that have been researched regarding its effects on risk taking increase risk taking. Consequently, PsyCap either follows the consistent direction of effects of self-efficacy, optimism and hope (Avey *et al.*, 2006; Luthans *et al.*, 2007) or it is reasonable to assume that the positive effect of self-efficacy and optimism on risk taking overcompensate the potentially decreasing effect of hope on risk taking. Both possibilities lead to the following proposition:

Proposition 4: PsyCap strengthens decision maker's perception of situations as controllable opportunities which leads to increasing risk taking.

4. Discussion

PsyCap has become an important subject within organizational behavior research and has been consistently shown to exert positive effects on employees' attitudes, their behavior and performance as well as their perceptions of their work environment (Avey *et al.*, 2011; Dawkins *et al.*, 2013; Newman *et al.*, 2014; Nolzen, 2018). In strategic decision-making, however, PsyCap's role has not yet been analyzed and recent research calls for an examination of PsyCap's potential role in this regard (Nolzen, 2018). In this paper, I follow this call and conceptually approach the question how PsyCap might affect strategic decision-making, more specifically, the phases of the strategic decision-making process. Based on an analysis of how and through which mechanisms each of PsyCap's components impacts the key elements of the strategic decision-process, I derive first propositions on the effects of PsyCap as a higher-order construct. They are summarized in figure 3.

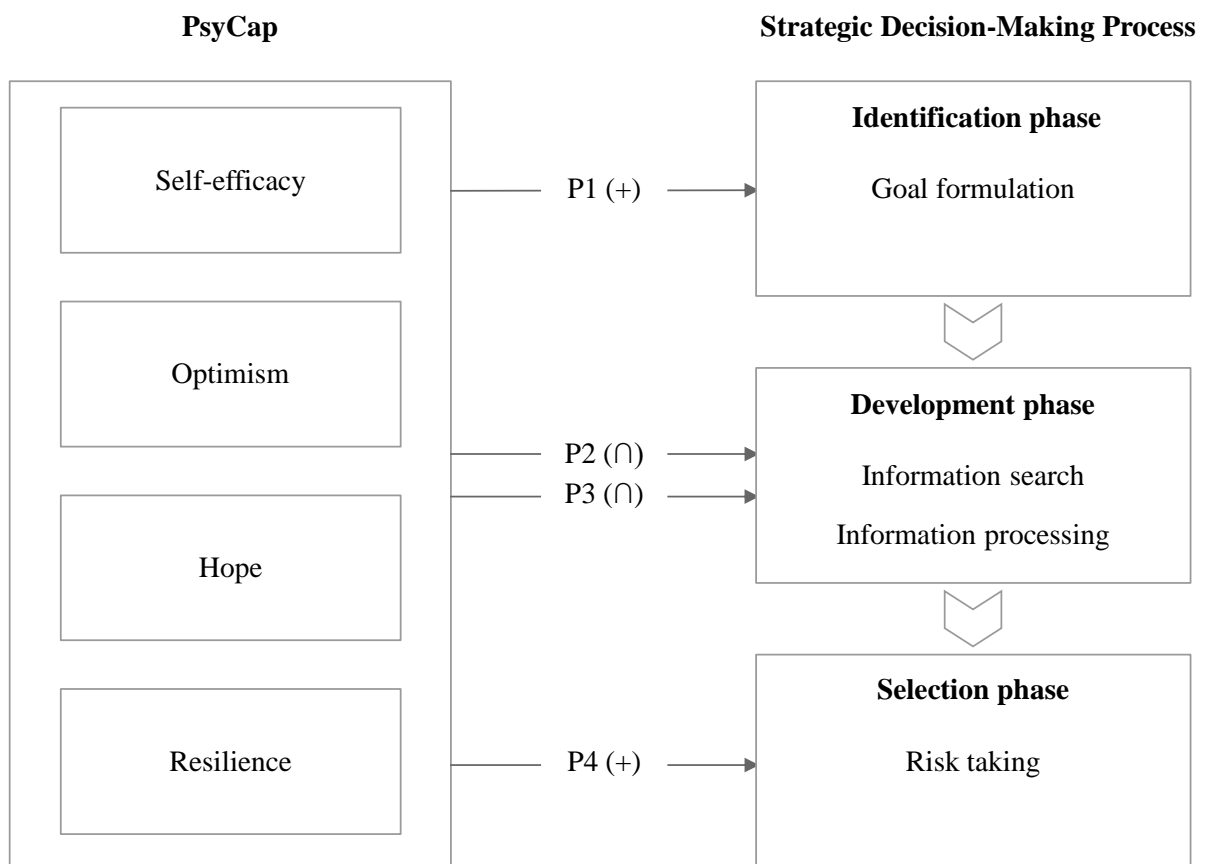


Figure 3. Summary of PsyCap's proposed effects on the strategic decision-making process

Future research

The present paper makes two contributions to the current research debate in PsyCap. First, by reviewing the effects of PsyCap's components on the strategic decision-making process, their commonalities and differences and resulting research gaps become apparent. In that regard, particularly resilience seems to play a special role and allows for interesting avenues for future research. This refers to resilience individual relevance in the strategic decision-making process as well as its interplay with self-efficacy, optimism and hope when being comprised to PsyCap. Regarding resilience individual relevance in the strategic decision-making process, its effects on goal formulation in the identification phase and risk taking in the selection phase have not yet been addressed. In the context of information search and information processing in the development phase, resilience has been theoretically considered to play a positive role, however, empirical studies on its effect are limited. Hence, it seems worthwhile to empirically assess resilience effects in this regard. Specifically, as strategic decision-making is stressful and requires adaptive responses (Hambrick *et al.*, 2005; Holan and Mintzberg, 2004) and resilience is associated with better stress regulation (Kimura *et al.*, in press; Ong *et al.*, 2006; Tugade and Fredrickson, 2004) and broad-minded, responsive coping (Fredrickson, 2001; Parker *et al.*, 2015), resilience might be advantageous in the strategic decision-making process. Regarding the interplay of resilience with self-efficacy, optimism and hope in the context of information search and processing, resilience seems to follow a different direction of effects as compared of self-efficacy, optimism and hope. They follow curvilinear or negative relationships, depending on the described boundary conditions, whereas resilience is considered to positively affect information search and processing. Consequently, it would be highly interesting to empirically assess the relative strengths of effects of PsyCap's components as well as their interplay. It could be interesting to analyze whether different combinations of PsyCap's components might differ in their

effects, their explanatory power of its effects (Nolzen, 2018) or whether one of its components, such as resilience, might exert special influence on the direction of effects.

Second, the propositions on how PsyCap as a higher order construct might impact the strategic decision-making process could serve as promising basis for further studies. Particularly, PsyCap's effect on the development phase, specifically on information search and processing, might be of interest for further research. So far, research on PsyCap has focused on its linear positive relationships in organizational behavior which is why higher levels of PsyCap have been considered desirable as they allow for advantageous effects (Avey *et al.*, 2011). In the development phase of the strategic decision-making process, however, more PsyCap might not always be better. Based on the effects of its individual components, PsyCap, when reaching very high levels, might reach an inflection point after which its effects might turn negative, referred to as "too-much-of-a-good-thing" effect (Pierce and Aguinis, 2013). Since managers are likely to exhibit exceptionally high levels of ordinarily positive constructs (Hiller and Hambrick, 2005), it would be interesting to investigate whether PsyCap reaches such an inflection point in managers' strategic decision-making and thus exerts a different pattern of effects as compared to the positive linear effects reported in organizational behavior.

Limitations

As with all research, the present paper exhibits some limitations. Firstly, the propositions on how PsyCap might affect strategic decision-making are based on the findings of the effects of PsyCap's individual components in the strategic decision-making process. Even though this approach clearly contributes to understanding PsyCap's potential effects in the strategic decision-making process as PsyCap's effects follow the direction of effects of its components (Avey *et al.*, 2006; Luthans *et al.*, 2007), the conceptual nature of the present paper does not allow for any conclusion regarding the components' relative strength of

effects. Specifically regarding information search and processing in the development phase, the effects of PsCap's components exhibit partly differing underlying mechanisms, directions and contingencies. Due to this and their unclear relative importance, a final conclusion on the direction of the effect that PsCap in its recomposed form might have is not possible without applying statistical analyses.

Second, related to the first limitation, research on potential effects of resilience is scarce specifically for the identification and selection phase. Hence, the propositions formulated are mainly based on the body of research on self-efficacy, optimism and hope. The direction of effects of resilience is not clear within these phases and since the relative strengths of effects cannot be conceptually assessed the potential impact of resilience on the relationship proposed cannot be concluded even though the propositions draw on a strong research base for self-efficacy, optimism and hope.

5. Concluding remarks

While PsCap's effects in the organizational behavior literature have been intensively researched and consistently shown to be positive, its role in strategic decision-making has not been assessed. Based on a re- and decomposition of PsCap, the present work conceptually approaches PsCap's potential effects within the strategic decision-making process and proposes the construct to impact the identification, development and selection phase. Future studies could build on the present propositions and attempt to empirically substantiate the understanding of PsCap in strategic decision-making. Further, deepening the knowledge of the relative strength of PsCap's components' effects on the phases of strategic decision-making process provides interesting areas for further scientific work, specifically reflecting on the potential role of resilience. Clearly, continuing research on PsCap's role in strategic

decision-making is highly promising and likely enlarges the construct's relevance from organizational behavior towards managerial decision-making.

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III. THE ROLE OF RESILIENCE IN STRATEGIC DECISION-MAKING

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THE ROLE OF RESILIENCE IN STRATEGIC DECISION-MAKING

Abstract

A large body of research has explored individual-level antecedents that negatively impact strategic decision-making processes and strategic decision outcomes. However, comparably little attention has been devoted to personality attributes that positively affect strategic decision-making processes and strategic decision outcomes. Drawing on positive psychology, we introduce resilience as a personality attribute that improves both strategic decision-making processes and strategic decision outcomes. Based on a quasi-experimental field study involving 54 managers who undertook a computerized strategic decision-making task, we show that resilience improves strategic decision-making processes by increasing strategic decision comprehensiveness and improves strategic decision outcomes. We contribute to strategic decision-making research by integrating resilience as a positive, individual-level antecedent of strategic decision-making. In addition, we add to research on the relationship between strategic decision-making processes and outcomes by introducing resilience as an underlying factor that might help explain the ambiguous findings in this field.

Keywords: Resilience, strategic decision-making process, strategic decision comprehensiveness, strategic decision outcomes

1. Introduction

The quality of strategic decision-making processes and outcomes is of central importance for organizations (Dean Jr. and Sharfman, 1996; Elbanna and Child, 2007; Shepherd and Rudd, 2014). Research on strategic decision-making and upper echelons shows that individual-level antecedents play an important role in strategic decision-making processes and outcomes (Hambrick, 2007; Hiller and Hambrick, 2005; Powell *et al.*, 2011). However, this research mainly concentrates on those personality attributes that explain deficits in the strategic decision-making process or negative strategic decision outcomes (for reviews, see Bromiley and Rau, 2016; Hutzschenreuter and Kleindienst, 2006). For example, the extant research has found that overconfidence (Simon and Houghton, 2003) and narcissism (Zhu and Chen, 2015) foster excessive risk taking. In addition, overconfidence has been shown to increase resistance to necessary strategic change (Chen *et al.*, 2015; Park *et al.*, 2011) and lowers the quality of acquisition decisions (Malmendier and Tate, 2008), while narcissism has been reported to foster performance declines in pre-crisis contexts (Patel and Cooper, 2014).

Personality attributes that *positively* impact strategic decision-making processes and outcomes have received little research attention. This is surprising, as research in positive psychology identifies a number of personality attributes, such as gratitude, hope, and humor, that positively affect such factors as job performance and satisfaction (Donaldson and Ko, 2010; Mills *et al.*, 2013; Seligman *et al.*, 2005; Seligman and Csikszentmihalyi, 2000). One attribute that has received a great deal of attention in positive psychology research is resilience (Cohrs *et al.*, 2013; Mills *et al.*, 2013; King *et al.*, 2016), which is defined as the ability of an individual to adaptively and suitably respond to and bounce back from highly uncertain and challenging situations (Luthans *et al.*, 2006; Masten *et al.*, 1990). In positive psychology research, resilience is associated with improved stress regulation (Kimura *et al.*, in press; Ong *et al.*, 2006; Tugade and Fredrickson, 2004) and adaptive, broad-minded coping

(Parker *et al.*, 2015; Fredrickson, 2001). As strategic decision-making situations are stressful and often require adaptive responsiveness (Hambrick *et al.*, 2005; Holan and Mintzberg, 2004), resilience might also be beneficial in the strategic decision-making context.

Based on positive psychology and strategic decision-making research, we argue that individual resilience improves strategic decision outcomes because of its stress-mitigating effect (Fredrickson, 2001; Kimura *et al.*, in press; Krush *et al.*, 2013; Ong *et al.*, 2006; Parker *et al.*, 2015; Tugade and Fredrickson, 2004). Moreover, we suggest that resilience improves the comprehensiveness of strategic decision-making processes owing to its positive effects on openness to experience (Block and Kremen, 1996; Klohnen, 1996; Shin *et al.*, 2012) and broad-minded coping (Fredrickson, 2001; Parker *et al.*, 2015). A quasi-experimental empirical analysis involving 54 managers in the financial services industry supports our hypotheses.

We make two contributions to strategic decision-making research. First, we extend research in this field by introducing resilience as an individual-level antecedent that positively affects both strategic decision-making processes and strategic decision outcomes. Second, we contribute to research on the relationship between strategic decision-making processes and strategic decision outcomes by presenting resilience as an underlying factor that allows for a more differentiated analysis of the interplay between strategic decision-making processes and outcomes. As such, resilience might help explain the ambiguous findings in extant research concerning the relationship between strategic decision (process) comprehensiveness and strategic decision outcomes (Forbes, 2007; Meissner and Wulf, 2014; Miller, 2008).

The paper is structured as follows. After outlining the theoretical basis for the individual-level antecedents of strategic decision-making, we focus on resilience and derive our hypotheses. Thereafter, we describe our methodological procedure and the empirical

results. To conclude, we discuss research opportunities, limitations, and practical implications.

2. Background and hypotheses

Individual-level antecedents of strategic decision-making processes and strategic decision outcomes

Strategic decision-making processes are characterized by uncertainty, complexity, and a lack of structure. In addition, they involve substantial resource commitments (Mintzberg *et al.*, 1976; Schwenk, 1984). They are highly relevant for organizations, as they can influence the outcomes in terms of organizational performance (Dean Jr. and Sharfman, 1996; Elbanna and Child, 2007; Shepherd and Rudd, 2014). The extant research identifies decision makers' personality attributes as important drivers of strategic decision-making processes and their outcomes (Hambrick, 2007).

The majority of studies in this field have focused on personality attributes that are primarily detrimental for strategic decision-making processes and strategic decision outcomes. Early studies, for example, found a positive relationship between managers' need for achievement and aggressive expansion strategies (Miller and Toulouse, 1986). They also associated managers' internal locus of control with greater risk taking (Miller *et al.*, 1982). More recent research has mainly analyzed the effects of managerial overconfidence (Russo and Schoemaker, 1992), hubris (Hayward and Hambrick, 1997), narcissism (Campbell *et al.*, 2004), and hyper core self-evaluation (Hiller and Hambrick, 2005). Managerial overconfidence, for example, has been shown to reduce the breadth of information search (Stone, 1994). Overconfidence has also been linked to risky, less successful product introductions (Simon and Houghton, 2003), greater resistance to strategic change (Park *et al.*, 2011), and resistance to corrective feedback (Chen *et al.*, 2015). In addition, it has been

shown to lead to lower-quality acquisition decisions (Malmendier and Tate, 2008) and detrimental investment decisions in recession phases (Mueller and Brettel, 2012). Hubris (Haynes *et al.*, 2010) and narcissism have been associated with excessive risk taking (Campbell *et al.*, 2004; Zhu and Chen, 2015). Hubris has also been linked to higher acquisition premiums and subsequent shareholder losses (Hayward and Hambrick, 1997), an increased likelihood of venture failure (Hayward *et al.*, 2006), the tendency to invest in high-risk projects (Li and Tang, 2010), and a higher likelihood of financial restatements—an indicator of unethical decision-making (McManus, 2018). Narcissism has been found to foster more aggressive adoption of technological discontinuities (Gerstner *et al.*, 2013). It has also been associated with extreme performance fluctuations over time (Chatterjee and Hambrick, 2007), lower performance in crisis situations (Patel and Cooper, 2014), slower post-crisis recoveries (Buyl *et al.*, in press), and an increasing number and duration of organizational lawsuits (O'Reilly *et al.*, 2018). Managers' hyper CSE has been associated with non-comprehensive decision-making as well as increased risk taking, extreme performance outcomes, and greater resistance to change (Hiller and Hambrick, 2005).

Despite the large body of research on the impact of personality attributes on strategic decision-making, few studies have addressed *positive* personality attributes that improve, rather than negatively impact, strategic decision-making processes and strategic decision outcomes. Among the few positive personality attributes that have been researched are humility (Owens *et al.*, 2013) and charisma (Waldman *et al.*, 2004). Humility has been associated with more balanced information processing (Rego *et al.*, 2018), improved information sharing among decision makers, and enhanced firm performance (Ou *et al.*, 2018). Findings regarding the effect of charisma on strategic decision outcomes are mixed. While Agle *et al.* (2006) find no relationship between charisma and subsequent performance, Tosi *et al.* (2004) report a positive effect of charisma on shareholder returns under conditions

of high uncertainty. In addition, charisma has consistently been associated with higher degrees of strategic change (Waldman *et al.*, 2004; Wowak *et al.*, 2016).

Other personality attributes that might have a positive effect on strategic decision-making processes and strategic decision outcomes have rarely been addressed by researchers in the strategic decision-making field. This is surprising, as research in positive psychology identifies a number of positive personality attributes that might be relevant in the strategic decision-making context.

Positive psychology and the role of resilience

Positive psychology appeared as a research field in the 1990s (Seligman and Csikszentmihalyi, 2000). In contrast to many other areas of psychology, this field of research emphasizes positive personality attributes that allow individuals to flourish (Seligman and Csikszentmihalyi, 2000; Seligman *et al.*, 2005). Positive psychology quickly spread across other research domains, such as education and economics, and it has contributed to the emergence of research into positive organizational behavior (for reviews, see Donaldson and Ko, 2010; Meyers *et al.*, 2013; Mills *et al.*, 2013). Research on positive organizational behavior investigates employees' positive personality attributes—such as gratitude, hope, humor, and psychological capital—and their effects in the work environment (Donaldson and Ko, 2010; Luthans and Youssef, 2004; Mills *et al.*, 2013; Seligman *et al.*, 2005).

Gratitude has been shown to contribute positively to organizational citizenship behavior (Spence *et al.*, 2014), prosocial behavior (Grant and Gino, 2010), and job performance (Grant and Wrzesniewski, 2010). Hope has been associated with improved job performance (Peterson and Byron, 2008; Peterson and Luthans, 2003), the development of more and better solutions in response to novel tasks (Peterson and Byron, 2008), higher employee retention and satisfaction (Peterson and Luthans, 2003), and greater perceived job autonomy (Reis and

Hoppe, 2015). Humor has been linked to lower perceived stress levels, enhanced coping skills, higher job satisfaction, and improved performance (Mesmer-Magnus *et al.*, 2012), as well as the development of more creative solutions (Holmes, 2007). Finally, psychological capital has been shown to positively influence job satisfaction (Abbas *et al.*, 2012), organizational commitment (Avey *et al.*, 2011), citizenship behavior (Avey *et al.*, 2010), and job performance (Chen, 2015). In addition, it is associated with reductions in perceived stress (Abbas and Raja, 2015).

A personality attribute of particular interest in positive psychology research is resilience (Cohrs *et al.*, 2013; Mills *et al.*, 2013; King *et al.*, 2016). Originally conceptualized as an exceptional individual trait (Masten, 2001), resilience has been established in more recent research as a state-like personality attribute that is malleable and, therefore, open to development (Fredrickson, 2001; Robertson *et al.*, 2015; Vanhove *et al.*, 2016). Resilience has been found to contribute to a broad range of desired outcomes in the work environment. Attention has been devoted to its impact on stress regulation and adaptive, broad-minded coping. The impact of resilience on stress regulation is evident in lower degrees of emotional exhaustion (Bande *et al.*, 2015) and lower levels of biopsychosocial strain (Ferris *et al.*, 2005), both of which have been observed in more resilient individuals. In this context, resilience is believed to exert a moderating effect on the relationship between job stress and job satisfaction, such that it mitigates the negative effect of stress on satisfaction (Krush *et al.*, 2013). The increased stress resistance and quicker stress recovery exhibited by more resilient individuals are associated with more positive emotions in stressful situations (Ong *et al.*, 2006). These positive emotions lead to an appraisal of stressful situations as opportunities rather than as threats (Tugade and Fredrickson, 2004).

In addition to its stress-mitigating effect, resilience has been associated with more problem-focused, adaptive coping behavior (Parker *et al.*, 2015) and an openness to new

experiences. For example, resilient individuals have been found to perceive organizational change as more positive and to show a greater commitment to such change (Shin *et al.*, 2012). Moreover, they tend to embrace new experiences more openly (Block and Kremen, 1996; Klohnen, 1996). Finally, resilient individuals tend to show greater confidence in their personal abilities to respond to challenges (Kotzé and Lamb, 2012). Resilience has also been associated with a lower propensity to quit (Bande *et al.*, 2015); greater job satisfaction, work happiness, and organizational commitment (Youssef and Luthans, 2007); and improved job performance (Luthans *et al.*, 2005; Luthans *et al.*, 2007).

As strategic decision-making situations are generally characterized as highly stressful and as requiring adaptive coping (Hambrick *et al.*, 2005; Holan and Mintzberg, 2004), we argue that resilience might have beneficial effects in the strategic decision-making context. More specifically, resilience might positively and independently impact both strategic decision outcomes and the strategic decision-making process.

Effect of resilience on strategic decision outcomes

We argue that resilience positively impacts strategic decision outcomes through its stress-mitigating effect. Strategic decision-making situations are generally described as uncertain, complex, and unstructured in nature (Mintzberg *et al.*, 1976; Schwenk, 1984). These characteristics are associated with increased levels of stress on the side of the decision maker (Hambrick *et al.*, 2005; Holan and Mintzberg, 2004). Negative emotions, such as stress, have been shown to lower the information-processing capacities of decision makers (Conway and Giannopoulos, 1993), to impair their ability to perform cognitive tasks (Ellis and Moore, 1999), and to lead to less attentive decision-making (Carver and Harmon-Jones, 2009). For example, Preston *et al.* (2007) use a gambling task to show that stress slows the process through which individuals learn to avoid disadvantageous choices and to select advantageous alternatives. Overall, stress is associated with simpler decision strategies and

more polarized judgements (Mano, 1992), which result in more disadvantageous choices (Leder *et al.*, 2013, 2015), particularly under conditions of high uncertainty, in situations that are perceived as threatening (Starcke and Brand, 2012), and in novel task environments (Keinan, 1987).

Because of their greater stress resistance and their ability to quickly recover from stress, resilient individuals are able to reduce the negative effects of stress in strategic decision situations. In particular, resilient individuals have been found to experience more positive emotions in stressful situations and to perceive such situations as opportunities rather than as threats (Ong *et al.*, 2006; Shin *et al.*, 2012; Tugade and Fredrickson, 2004). Such positive emotions enhance innovativeness, and creativity in problem-solving processes (Isen, 2001). Thus, resilient individuals might be less likely to suffer a reduction in information-processing capacities or to engage in the less attentive decision-making that is associated with such negative emotions as stress in the strategic decision-making context. We posit:

Hypothesis 1: Higher levels of individual resilience positively affect strategic decision outcomes.

Effect of resilience on the strategic decision-making process

We also argue that resilience leads to a more systematic strategic decision-making process. Strategy process research identifies strategic decision comprehensiveness as an important indicator of systematic strategic decision-making processes (Forbes, 2007; Meissner and Wulf, 2014; Miller, 2008). Strategic decision comprehensiveness is defined as the degree to which a strategic decision-making process is exhaustive and inclusive in terms of information search, information processing, alternative generation, and alternative evaluation (Fredrickson and Mitchell, 1984; Miller, 2008; Forbes, 2007). Resilient individuals have been found to be more open to change (Shin *et al.*, 2012) and to new experiences (Block

and Kremen, 1996; Klohnen, 1996). Openness to change and new experiences has been associated with broad-minded coping behavior as well as broadened attention and thinking processes (Fredrickson, 2001). Furthermore, openness to experience has been linked to broader information scanning (Fiol and O'Connor, 2003) and greater strategic flexibility, which include broader information integration and alternative consideration (Nadkarni and Herrman, 2010). Thus, we argue that resilience contributes to a more comprehensive strategic decision-making process owing to its positive impact on adaptive coping and openness to experience. We posit:

Hypothesis 2: Higher levels of individual resilience positively affect strategic decision comprehensiveness.

3. Method

Sample and research design

To test our hypotheses, we conducted a quasi-experimental field study involving 54 managers from the financial services industry in Germany. We restricted our sample to one industry to avoid potentially confounding systematic industry effects (Dess *et al.*, 1990). For our study, we approached 93 managers working for banks or insurance companies who had been involved in at least one strategy project with a global strategy consulting company in the previous year. Thus, we ensured that all participants had experience in making strategic decisions. Non-respondents received a follow-up request. 54 individuals agreed to participate in the study in person. Of these 54 participants, 48 percent worked for banks and 52 percent worked for insurance companies. 63 percent were male and 37 percent were female. Their ages ranged from 27 to 65 with an average age of 39.4. The majority of the participants (83 percent) held a master's degree or the equivalent, and the participants had been working for

their current employers for an average of 6.4 years. Their overall average work experience was 15.4 years.

In line with Chesney and Locke (1991), we asked each manager in our sample to participate in a computerized strategic decision-making task. The computerized task we used was Harvard Business School's "Strategy Simulation: The Balanced Scorecard" (Narayanan, 2014). The use of computer-based tasks to study the influence of individuals' personality attributes on strategic decision-making processes and outcomes is suggested by Hambrick (2007). This approach responds to the call for methodological diversity in strategy research (Powell *et al.*, 2011). In addition, the use of a computerized strategic decision-making task reduces the threat of common method bias (Podsakoff *et al.*, 2003). Instead of relying on self-reported information, the strategy simulation allowed us to measure strategic decision outcomes based on actual firm performance and, hence, to rely on a different source than the predictor variable (Podsakoff *et al.*, 2003). This measurement of strategic decision outcomes also reduces the threat of the social desirability bias (Fisher, 1993). This bias was further mitigated by the fact that we did not provide the participants with information on our measurements and by the fact that we guaranteed complete anonymity (Fisher, 1993).

In the strategy simulation, participants were instructed to imagine themselves as CEOs of a struggling automotive parts manufacturer and they were given the goal of maximizing the company's exit value. Before starting the simulation, each participant was told that she or he would receive a purchase offer from a private equity company reflecting the value of the company at the end of the simulation. This exit value was contingent on the extent to which initiatives selected during the simulation matched the strategy that the participant chose at the beginning of the simulation. Hence, each participant's first task was to select one of four strategies for the company. In addition, each participant had to choose metrics to monitor the strategy's success. Afterwards, each participant was offered a budget of USD 25 million that

she or he could allocate to initiatives that she or he believed best matched the selected strategy. Each initiative was assigned a fit value that indicated how well it matches the selected strategy. The budget was (re-)allocated to initiatives in eight consecutive periods. After each period, the participants received performance feedback based on the selected metrics as well as additional financial data, which they could use to alter their budget-allocation decisions. Given the complexity, uncertainty, and resource commitments involved in the strategy simulation (Narayanan, 2014), it matches the characteristics of strategic decision-making processes (Mintzberg *et al.*, 1976; Schwenk, 1984).

Procedure

The data-collection procedure consisted of three central parts. After a verbal briefing outlining the overall procedure for the study, the participants were asked to fill out an initial questionnaire that tested for resilience (Wagnild, 2016). Second, participants were given a short briefing on the theoretical foundations of the balanced scorecard tool and the particularities of the strategy simulation. In addition, each participant was asked to read an outline of the simulation, which was provided as a handout. After reading the outline, participants were asked to start the simulation. The third part of the data collection took place after the simulation was finished, at which point each participant was asked to complete an additional questionnaire, which included items on decision comprehensiveness (Miller *et al.*, 1998) as well as the demographic variables used in the study.

Measures

Resilience: To measure resilience, we used the short version of the original resilience scale (Wagnild and Young, 1993), the RS-14 (Wagnild, 2016), which is widely applied in positive psychology research (e.g., Aiena *et al.*, 2015; Shin and Kelly, 2015). The scale comprises 14 items measured on a seven-point Likert scale (1 = strongly disagree; 7 = strongly agree). As a measure of resilience, we used the mean value of the 14 items. The

Cronbach's alpha for the scale was .80, which indicates a high level of scale reliability. The full questionnaire can be found in Appendix D.

Strategic decision outcomes: For each participant, strategic decision outcomes were measured as the difference between the firm's exit value after completion of the strategy simulation and its value at the start of the simulation (which was set at USD 40). The exit value is calculated on the basis of an algorithm that uses such measures as price-to-book value and return on equity. These measures, in turn, are driven by the fit between the strategy that a participant chooses at the start of the simulation and the initiatives to which the participant allocates the firm's resources in each of the eight rounds.

Strategic decision comprehensiveness: We follow Miller et al. (1998) and Meissner and Wulf (2014) in measuring strategic decision comprehensiveness using the mean value of five items measured on a seven-point Likert scale (1 = not at all; 7 = to a great extent). Participants were asked to evaluate their decision-making process for a non-routine decision. In the introduction to the items, we specifically linked this non-routine decision to the strategy simulation. The Cronbach's alpha for the scale was .84, which indicates a high level of scale reliability. The items are listed in the Appendix E.

Control variables: We included five control variables in our analysis. First, we controlled for *age*, as strategic decision making can differ depending on seniority (Chatterjee and Hambrick, 2011). Second, as gender can affect strategic decision-making processes and outcomes (Jeong and Harrison, 2017; Malhotra *et al.*, 2018), we included *gender* as a control variable. Third, we controlled for the participants' *educational level*, as this might influence strategic decision-making processes and outcomes (Hitt and Tyler, 1991). To do so, we measured the participants' highest educational degree (i.e., vocational training, bachelor's degree, master's degree, doctoral degree, or their equivalents). Fourth, we controlled for

automotive work experience, which we measured as the participants' professional experience in the automotive industry in months, as the strategy simulation dealt with an automotive parts supplier and work experience in the industry might affect the participants' strategic choices (Hitt and Tyler, 1991; Gerstner *et al.*, 2013). Finally, we included dummy variables for the strategy selected at the beginning of the simulation—*customer integration*, *product innovation*, or *low initial cost*—in order to control for potential effects of the initial strategic choice.

4. Results

Table 1 presents the means, standard deviations, and correlations for all variables. The correlations between the independent variables were all less than 0.55. We applied additional tests to address the potential for multicollinearity and heteroscedasticity in our sample. To control for multicollinearity, we calculated the variance inflation factors. All variance inflation factor scores were less than 2.2, suggesting that multicollinearity is not a concern (Hair *et al.*, 2014). To test for heteroscedasticity, we tested whether the regression residuals were dependent on the values of the independent variables using the Breusch-Pagan/Cook-Weisberg test for heteroscedasticity (Breusch and Pagan, 1979; Cook and Weisberg, 1983). The results were not significant, which implies that heteroscedasticity is not a problem.

Table 2 shows the results of the regression analyses that we used to test our hypotheses. Our first hypothesis proposes a positive effect of resilience on strategic decision outcomes. Thus, we used strategic decision outcomes as the dependent variable in Models 1 and 2. In Model 1, we introduced only the control variables. We entered the main effect of resilience into Model 2. Model 2 yields significant results and explains 34 percent of the variance in strategic decision outcomes. In addition, we find a significant, positive effect of resilience on strategic decision outcomes ($\beta = 0.34$; $p = 0.009$), which supports Hypothesis 1.

Our second hypothesis proposes a positive effect of resilience on strategic decision comprehensiveness. Consequently, we used strategic decision comprehensiveness as the dependent variable in Models 3 and 4. We introduced only the control variables in Model 3 and entered the main effect of resilience into Model 4. Model 4 shows significant results and explains 40 percent of the variance in strategic decision comprehensiveness. Furthermore, we find a significant, positive effect of resilience on strategic decision comprehensiveness ($\beta = 0.41$; $p = 0.001$), which supports Hypothesis 2.

Variables	Min	Max	Mean	SD	1	2	3	4	5	6	7	8	9
1 Strategic decision outcomes	-22.88	99.15	34.20	34.61	1								
2 Strategic decision comprehensiveness	1.80	6.60	4.64	1.11	0.01	1							
3 Resilience	57.00	96.00	83.24	7.30	0.30*	0.45**	1						
4 Age	27.00	65.00	39.42	8.84	-0.29*	0.25	0.06	1					
5 Gender (female)	0.00	1.00	0.37	0.49	0.22	0.23	0.09	-0.05	1				
6 Education level	2.00	4.00	3.04	0.39	0.16	-0.10	-0.07	-0.10	-0.21	1			
7 Automotive experience	0.00	240.00	21.19	44.13	-0.16	0.09	0.04	0.20	-0.11	0.14	1		
8 Strategy: Customer integration	0.00	1.00	0.11	0.32	-0.15	0.01	0.21	0.11	0.10	-0.05	0.20	1	
9 Strategy: Product innovation	0.00	1.00	0.20	0.41	0.12	0.34*	0.07	-0.03	0.05	0.13	0.00	-0.37**	1
10 Strategy: Low initial costs	0.00	1.00	0.52	0.50	-0.02	-0.30*	-0.06	0.04	-0.29	-0.18	-0.08	-0.18	-0.53***

* p < 0.05; ** p < 0.01; *** p < 0.001; N = 54

Table 1: Descriptive statistics and correlations

Variables	Strategic decision outcomes		Strategic decision comprehensiveness	
	Model 1	Model 2	Model 3	Model 4
Controls				
Age	-0.21	-0.22 †	0.25 †	0.24 †
Gender (female)	0.30 *	0.27 *	0.20	0.16
Education level	0.30 *	0.30 *	-0.01	0.00
Automotive experience	-0.10	-0.10	0.04	0.05
Strategy: Customer integration	-0.03	-0.15	0.05	-0.08
Strategy: Product innovation	0.16	0.07	0.32 †	0.21
Strategy: Low initial costs	0.20	0.14	-0.08	-0.14
Main effect				
Resilience	-	0.34 **	-	0.41 **
n	54	54	54	54
R-squared	0.24	0.34	0.24	0.40
Δ R-squared	-	0.11 **	-	0.16 **
Adjusted R-squared	0.12	0.23	0.13	0.29
F	2.04 †	2.95 *	2.12 †	3.73 **
Standardized coefficients are reported.				
† p < 0.10; * p < 0.05; ** p < 0.01				

Table 2: Regression results

As a robustness check and to address the threat of common method bias, we re-ran our analyses using decision time as an alternative measure of strategic decision comprehensiveness. Extant research indicates that comprehensive information collection and processing are time-consuming activities (Hiller and Hambrick, 2005; Hutzschenreuter and Kleindienst, 2006; Priem *et al.*, 1995; Sparrow, 1999). Moreover, the extant research shows that a high information load, which is typical of strategic decisions, increases decision time (Helgeson and Ursic, 1993; Jacoby *et al.*, 1974). Hence, we used decision time as a more objective measure of strategic decision comprehensiveness. In line with Helgeson and Ursic (1993) as well as Jacoby *et al.* (1974), we measured decision time as the total time required to (re-)allocate the budget to the various initiatives from period one to period eight, including the time spent analyzing performance feedback. Thus, this measure reflects the time required for thoughtful analysis and the planning of strategic responses. Our results remain unchanged—resilience is positively and significantly related to decision time. This offers further support for Hypothesis 2. The results can be found in Appendix F.

5. Discussion

Strategic decision making and upper echelons research has highlighted the relevance of individual-level antecedents for strategic decision-making processes and strategic decision outcomes (Hambrick, 2007; Hiller and Hambrick, 2005; Powell *et al.*, 2011). However, individual-level antecedents that have a positive influence on strategic decision making have received little attention thus far. In this paper, we show that individual resilience might be a factor that positively impacts both strategic decision-making processes and strategic decision outcomes.

Our paper makes two contributions to strategic decision-making research. First, we contribute to this research stream by introducing resilience as a positive, individual-level antecedent that impacts strategic decision-making processes and outcomes. Thus, our paper goes beyond extant research in the field, which mainly focuses on those attributes that negatively affect strategic decision-making processes and outcomes, such as managerial overconfidence (Russo and Schoemaker, 1992), hubris (Hayward and Hambrick, 1997), narcissism (Campbell *et al.*, 2004), and hyper core self-evaluation (Hiller and Hambrick, 2005). Moreover, this paper adds to and supports the few studies that have identified other positive, individual-level drivers of strategic decision comprehensiveness and strategic decision outcomes, such as humility (Owens *et al.*, 2013) and charisma (Waldman *et al.*, 2004). Comparisons of the direct effects as well as the interactions among these antecedents might offer additional insights into ways to improve strategic decision-making processes and outcomes.

Second, our paper provides a foundation for additional research on the relationship between strategic decision comprehensiveness and strategic decision outcomes (Forbes, 2007; Miller, 2008). This research has thus far yielded inconclusive results. While some studies report a positive effect of strategic decision comprehensiveness on strategic decision

outcomes in unstable environments (Burgeois and Eisenhardt, 1988; Goll and Rasheed, 1997; Priem *et al.*, 1995), others find a positive effect in stable environments (Fredrickson, 1984; Fredrickson and Mitchell, 1984). A third group of studies finds no relationship between strategic decision comprehensiveness and strategic decision outcomes (Hough and White, 2003). We find direct and positive effects of individual resilience on both strategic decision comprehensiveness and strategic decision outcomes. However, we do not find a direct effect of strategic decision comprehensiveness on strategic decision outcomes or a mediating effect of strategic decision comprehensiveness on the relationship between individual resilience and strategic decision outcomes. This finding is in line with Forbes' (2007) reconceptualization of the relationship between strategic decision comprehensiveness and strategic decision outcomes. Forbes (2007) argues that past research on this relationship suffers from theoretical and methodological problems. In particular, he criticizes the link between strategic decision comprehensiveness and organizational performance (as a measure of decision outcomes) that past research has tried to establish (e.g., Glick *et al.*, 1993) and proposes a need to rely on strategic decision quality instead (Amason, 1996). In addition, he argues that the impact of strategic decision comprehensiveness on strategic decision quality depends on the organization's information environment. We add to this reconceptualization of the relationship by presenting individual resilience as another underlying factor that might help explain the interplay among strategic decision comprehensiveness, strategic decision quality, and strategic decision outcomes. As such, our findings might enrich the long-standing discussion as to whether and under which conditions comprehensive strategic decision-making processes are beneficial for an organization.

Limitations

As with all research, our study has several limitations that provide avenues for future research. First, we focused on 54 managers working in a single industry (i.e., financial

services) in a single country (i.e., Germany). Even though other studies have also relied on samples from one industry and one national setting (e.g., Buyl *et al.*, in press; Gerstner *et al.*, 2013; Simon and Houghton, 2003), future research on the effects of individual resilience should incorporate individuals from different industries and cultural settings.

Second, our study used a quasi-experimental design based on a computerized strategic decision-making task. Even though our strategy simulation matched all characteristics of strategic decision-making (Mintzberg *et al.*, 1976; Schwenk, 1984) and experiments are commonly used in strategic decision-making research (e.g., Agarwal *et al.*, 2010; Meissner and Wulf, 2017; Song *et al.*, 2002), future studies should attempt to investigate the effect of resilience on strategic decision-making using different methods, such as surveys (Meissner and Wulf, 2014) or qualitative research (e.g., Burgeois and Eisenhardt, 1988; Hensman and Sadler-Smith, 2011).

Finally, we strictly focused on resilience as an individual-level antecedent of strategic decision comprehensiveness and strategic decision outcomes. Even though we were able to explain 34 percent and 41 percent of variance in strategic decision outcomes and comprehensiveness, respectively, other individual-level variables might play a role. For instance, humility has been shown to broaden information processing (Rego *et al.*, 2018) and improve strategic decision outcomes (Ou *et al.*, 2018). Similarly, humor has been associated with lower levels of stress and enhanced adaptive coping skills (Mesmer-Magnus *et al.*, 2012). Therefore, future studies might consider additional factors.

Implications for corporate practice

The results of this study also have implications for corporate practice. As resilience positively affects the strategic decision-making process and strategic decision outcomes, it might constitute a personality attribute to which organizations should pay attention. Research

by Fredrickson (2001), Robertson et al. (2015), and Vanhove et al. (2016) has shown that resilience can be shaped through training. Therefore, organizations should assess and further develop the resilience of their strategic decision makers in order to improve strategic decision-making processes and outcomes.

6. Concluding remarks

Despite the large body of research on individual-level antecedents of strategic decision-making processes and strategic decision outcomes, personality attributes that positively affect strategic decision-making processes and outcomes have received little attention. In this paper, we draw on positive psychology and introduce resilience into strategic decision-making research. Our results show that resilience constitutes a positive individual-level antecedent of a more systematic strategic decision-making process and better strategic decision outcomes. Hence, resilience might be a relevant personality attribute that is worthy of investments and that provides interesting avenues for future research.

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**IV. PSYCHOLOGICAL CAPITAL IN STRATEGIC DECISION-MAKING:
A CURVILINEAR ASSESSMENT**

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PSYCHOLOGICAL CAPITAL IN STRATEGIC DECISION MAKING: A CURVILINEAR ASSESSMENT

Abstract

A large body of research has analyzed individual psychological characteristics that drive strategic decision-making. However, this research has mainly focused on trait-based, negative characteristics that explain impaired strategic decision-making processes and outcomes. Recently, Psychological Capital (PsyCap), a psychological construct conceptualized as state-like individual strength, has been proposed as an alternative driver of strategic decision-making. Drawing on the effects of PsyCap's single components, we argue that PsyCap exerts a curvilinear effect on strategic decision-making. Based on an empirical study involving 102 managers who participated in a computerized strategic decision-making task, we show that PsyCap improves strategic decision-making outcomes up to an inflection point after which it impairs it. We further show that this effect is mediated by heuristic information processing. By introducing PsyCap as a relevant driver of managers' strategic decision-making we expand research in this field as PsyCap not only differs from previously researched characteristics in its explanation of effects but also in its conceptualization as state-like and its resulting malleability.

Keywords: PsyCap, strategic decision-making, strategic decision outcomes, heuristic information processing

1. Introduction

Individual psychological characteristics have been found to be important drivers of strategic decision-making (Hambrick, 2007; Hiller and Hambrick, 2005; Powell *et al.*, 2011). Research, however, has mainly focused on inherently negative individual characteristics that explain impaired strategic decision-making processes or outcomes (for reviews, see Bromiley and Rau, 2016; Hutzschenreuter and Kleindienst, 2006) and that are trait-based such as narcissism (Chatterjee and Hambrick, 2007) and hubris (Hayward and Hambrick, 1997). For example, narcissism has been found to foster excessive risk taking (Zhu and Chen, 2015) and to spur performance-decreases in pre-crisis contexts (Patel and Cooper, 2014). Hubris has also been associated with excessive risk taking (Haynes *et al.*, 2010) as well as higher acquisition premiums and shareholder losses (Hayward and Hambrick, 1997).

Recently, Psychological Capital (PsyCap; Luthans and Youssef, 2004) has been proposed as an alternative psychological construct that might be an important driver of strategic decision-making (Nolzen, 2018). Different to inherently negative characteristics, PsyCap is defined as driver of motivation and resulting efforts towards goal achievement (Avey *et al.*, 2011; Luthans *et al.*, 2007) based on an individual's perceived self-efficacy, hope, optimism and resilience to achieve the goal (Luthans and Youssef, 2004; Luthans *et al.*, 2006b). In contrast to trait-based psychological characteristics, PsyCap is defined as state-like and hence open for development (Luthans *et al.*, 2006a; Luthans *et al.*, 2008). PsyCap has been extensively researched in organizational behavior and consistently reported to positively impact employees' behavior and performance (e.g. Avey *et al.*, 2010b; for meta-analyses and reviews see Avey *et al.*, 2011; Dawkins *et al.*, 2013; Newman *et al.*, 2014; Nolzen, 2018). Despite the relevance of individual characteristics in strategic decision-making (Hambrick, 2007; Hiller and Hambrick, 2005; Powell *et al.*, 2011), and the importance of PsyCap as individual driver of workplace behavior (e.g. Avey *et al.*, 2010b), PsyCap's role in strategic

decision-making has not yet been researched (Nolzen, 2018). This is surprising as PsyCap might not only enrich research in this field as it is likely to go beyond explaining solely negative effects but also as it offers possibilities for action given its malleability (Luthans *et al.*, 2006a; Luthans *et al.*, 2008).

Building on research on the effects of PsyCap's single components in strategic decision-making, the direction of which PsyCap follows (Avey *et al.*, 2006; Luthans *et al.*, 2007), we argue that PsyCap exerts a curvilinear effect on managers' strategic decision-making. While PsyCap's components initially drive motivated efforts (Avey *et al.*, 2011; Luthans *et al.*, 2007), excessive levels of self-efficacy, optimism and hope induce an extreme confidence of goal achievement leading to decreasing motivated efforts, negatively impacting strategic decision-making processes and their outcomes (Beck and Schmidt, 2012; Papenhausen, 2010; Polivy and Herman, 2002; Segerstrom, 2001; Stone, 1994). Hence, we assume that PsyCap improves strategic decision-making outcomes only up to an inflection point after which it impairs them and that this is based on differences in motivated efforts (Levin *et al.*, 2000; Locke and Latham, 2004; Wood *et al.*, 1990). We further argue that the differences in motivated efforts are apparent in differences in the applied information processing styles and more specifically, in differences in heuristic information processing (Chaiken and Maheswaran, 1994; Maheswaran and Chaiken, 1991). PsyCap initially increases motivated efforts towards goal achievement (Avey *et al.*, 2011; Kim and Noh, 2016; Luthans *et al.*, 2007; Siu *et al.*, 2014) which results in a decrease in heuristic information processing as individuals consider it as not sufficient to achieve their goal (Maheswaran and Chaiken, 1991; Dreu *et al.*, 1999). At very high PsyCap levels, however, individuals' confidence to reach the desired goal increases and hence they increasingly engage in heuristic information processing (Maheswaran and Chaiken, 1991). As information processing, in turn, has been shown to impact resulting strategic decision-making outcomes (Dean Jr. and Sharfman, 1996; Elbanna

and Child, 2007; Shepherd and Rudd, 2014) and increasing heuristic information processing negatively impacts decision outcomes (Elbanna and Child, 2007; Khatri and Ng, 2000), we assume heuristic information processing to mediate the relationship between PsyCap and strategic decision-making outcomes. An empirical study involving 102 managers in the financial services industry supports our hypotheses.

Our study makes three conceptual contributions. First, we expand research emphasizing the relevance of individuals' psychological characteristics in strategic decision-making (Hambrick, 2007; Miller and Droge, 1986). In contrast to psychological characteristics previously researched in strategic decision-making, PsyCap not only differs in its direction of effects but also in its conceptualization as state-like and its resulting malleability (Luthans *et al.*, 2006a; Luthans *et al.*, 2006b; Luthans *et al.*, 2008). Second, our study also supports research emphasizing the relevance of individual differences as drivers of information processing (Maheswaran and Chaiken, 1991; Petty and Cacioppo, 1986) as we show PsyCap to impact strategic decision-making outcomes through its influence on information processing. Thus, PsyCap might represent a psychological underlying factor contributing to understand the psychological underpinnings of individual differences in information processing. Third, we contribute to research on the effects of PsyCap as we extend PsyCap's relevance to strategic decision-making research. Different to previous research that has focused on PsyCap's effects on employees' behavior and performance, we analyze PsyCap's effects on managers' strategic decision-making and thereby in situations characterized by high complexity and ambiguity (Mintzberg *et al.*, 1976; Schwenk, 1984).

2. Background and Hypotheses

Individual psychological characteristics as drivers of strategic decision-making

Strategic decision-making situations are characterized by complexity, ambiguity and lack of structure (Mintzberg *et al.*, 1976; Schwenk, 1984). Given these characteristics, individuals' psychological characteristics are important drivers of strategic decision-making processes and their outcomes (Hambrick, 2007; Miller and Droge, 1986) as they influence individuals' interpretation of the situation and resulting behavior (Finkelstein and Hambrick, 1990). Hence, research has long investigated how managers' psychological characteristics drive strategic decision-making (Hambrick, 2007).

The majority of research has focused on negative psychological characteristics that adversely impact strategic decision-making processes and outcomes such as narcissism (Chatterjee and Hambrick, 2007), hubris (Hayward and Hambrick, 1997), hyper-core self-evaluations (CSEs; Hiller and Hambrick, 2005) and overconfidence (Russo and Schoemaker, 1992). Narcissism, an individual's ingrained trait, refers to a positively inflated self-view as well as the application of strategies to keep and promote this self-concept (Campbell *et al.*, 2004; Chatterjee and Hambrick, 2007). It has not only been found to spur excessive risk taking (Campbell *et al.*, 2004; Zhu and Chen, 2015) and performance-declines in pre-crisis contexts (Patel and Cooper, 2014) but also to decelerate post-crisis recovery (Buyl *et al.*, in press). Narcissism has further been shown to drive an aggressive adoption of technological discontinuities (Gerstner *et al.*, 2013) and has been linked to extreme performance fluctuation (Chatterjee and Hambrick, 2007) as well as an increased amount and length of firm lawsuits (O'Reilly *et al.*, 2018). Hubris is defined as trait-based, exaggerated positive self-concept and pride (Hayward and Hambrick, 1997; Hiller and Hambrick, 2005). Besides its association with excessive risk taking (Haynes *et al.*, 2010; Li and Tang, 2010), increased acquisition premiums and shareholder losses (Hayward and Hambrick, 1997), hubris has further been

linked to an increased probability of venture failure (Hayward *et al.*, 2006). It has also been associated with unethical decision-making, measured as likelihood of financial restatements (McManus, 2018). Managers' hyper CSE is a dispositional trait and refers to excessive levels of self-esteem, emotional stability, locus of control and generalized self-efficacy (Hiller and Hambrick, 2005). Hyper CSEs are considered to align with less comprehensive decision-making, growing risk taking, higher persistence in chosen strategies as well as extreme performance outcomes (Hiller and Hambrick, 2005). Overconfidence relates to distorted judgements such that an individual is unrealistically confident of being correct or achieving a certain outcome (Russo and Schoemaker, 1992). Overconfidence has been associated with resistance to corrective feedback (Chen *et al.*, 2015) and to strategic change (Park *et al.*, 2011) as well as with highly risky, less successful product introductions (Simon and Houghton, 2003). It has further been shown to lead to disadvantageous investments (Mueller and Brettel, 2012) and lower-quality acquisitions (Malmendier and Tate, 2008).

As outlined, narcissism, hubris, hyper-CSEs and overconfidence are negative psychological characteristics that have been shown to impair managers' strategic decision-making processes and outcomes. Additionally, narcissism (Chatterjee and Hambrick, 2007), hubris (Hayward and Hambrick, 1997) and hyper-CSEs (Hiller and Hambrick, 2005) are defined as trait-based and hence are enduring and stable. PsyCap not only differs in its conceptualization as generally positive psychological characteristic but also in its conceptualization as state-like and its resulting malleability (Luthans *et al.*, 2006a; Luthans *et al.*, 2006b; Luthans *et al.*, 2008).

The concept of psychological capital

PsyCap was introduced in 2004 (Luthans and Youssef, 2004) based on the positive psychology movement that focuses on psychological characteristics enabling individuals to flourish (Seligman and Csikszentmihalyi, 2000). PsyCap drives individuals' motivation

towards goal achievement (Avey *et al.*, 2011; Luthans *et al.*, 2007) drawing on the synergistic effect of its capacities self-efficacy, hope, optimism and resilience (Luthans *et al.*, 2006b; Luthans *et al.*, 2007). While self-efficacy provides individuals with the perceived ability to reach the goal (Bandura, 1993; Stajkovic and Luthans, 1998), optimism provides them with a positive outcome expectation, i.e. the expectation to achieve the goal (Seligman, 1998). The capacity of hope, through its elements of agency and pathways, not only ensures the individual's determination to pursue the goal but also to determine ways how to achieve it (Snyder *et al.*, 1991; Snyder *et al.*, 1996). Resilience ensures adaptability on the way towards goal achievement (Masten, 2001). Different to fixed traits, PsyCap is defined as state-like and consequently open for development (Luthans *et al.*, 2007). Studies have shown PsyCap's malleability for example through short micro interventions (Luthans *et al.*, 2006a) and web-based training sessions (Luthans *et al.*, 2008).

Since its introduction, PsyCap has been intensively researched in organizational behavior and consistently reported to positively impact employees' behavior, attitudes and perceptions (for reviews see Dawkins *et al.*, 2013; Avey *et al.*, 2011; Newman *et al.*, 2014; Nolzen, 2018). Related to employees' behavior, a wide variety of studies has found PsyCap to increase performance (e.g. Avey *et al.*, 2010b; Avey *et al.*, 2011; Peterson *et al.*, 2011). The positive effect of PsyCap on performance is the one most researched within PsyCap and is explained by the mechanism of motivation and resulting efforts towards goal achievement driven by PsyCap (Avey *et al.*, 2011). PsyCap has further been found to increase employees' engagement in organizational citizenship behavior and to decrease detrimental workplace behavior (Avey *et al.*, 2010a; Gooty *et al.*, 2009; Norman *et al.*, 2010). It also, for example, relates positively to employees' innovative behavior (Abbas and Raja, 2015; Luthans *et al.*, 2011) and creativity (Gupta and Singh, 2014; Huang and Luthans, 2015; Sweetman *et al.*, 2011). Relevant effects of PsyCap on employees' attitudes comprise its positive relationship

with job satisfaction (Abbas *et al.*, 2012; Avey *et al.*, 2011; Larson and Luthans, 2006; Luthans *et al.*, 2007; Siu *et al.*, 2015) and organizational commitment (Avey *et al.*, 2011; Larson and Luthans, 2006) as well as its negative relations with cynicism, job search and intentions to quit cynicism (Avey *et al.*, 2008a; Avey *et al.*, 2008b; Avey *et al.*, 2009; Avey *et al.*, 2010a; Avey *et al.*, 2011; Siu *et al.*, 2015). The positive influence of PsyCap on employees' perceptions has been shown for example for higher quality of work life (Nguyen and Nguyen, 2012) and fewer symptoms of stress at work (Abbas and Raja, 2015; Avey *et al.*, 2009; Siu *et al.*, 2015).

Despite the importance of individual psychological characteristics as drivers of strategic decision-making (Hambrick, 2007) and the relevance of PsyCap as individual driver of behavior in the workplace (e.g. Avey *et al.*, 2010b), PsyCap's role for managers' strategic decision-making has not yet been assessed (Nolzen, 2018). This is surprising as PsyCap might constitute a particular relevant individual driver of managers' strategic decision making that goes beyond a primary focus on explaining deficits in strategic decision-making which is rooted in its components.

Psychological capital in strategic decision-making

Different to the explanation of primarily negative effects of existing psychological characteristics in strategic decision-making, PsyCap is likely to exert curvilinear effects on strategic decision-making. This is based on the effects of PsyCap's components self-efficacy, optimism and hope, the direction of which PsyCap follows (Avey *et al.*, 2006; Luthans *et al.*, 2007).

First, self-efficacy has been shown to exert curvilinear effects in strategic decision-making. Stone (1994), for example, has shown in a complex decision-making experiment that self-efficacy exerts curvilinear effects on both the strategic decision-making outcome as well

as the preceding decision-making process. More specifically, he has shown that moderate levels of self-efficacy, as compared to low or high self-efficacy levels, lead to higher decision accuracy based on higher variability in information search and lower decision speed (Stone, 1994). This is explained based on individuals' overconfidence implied by high levels of self-efficacy. While moderately self-efficacious individuals increase motivated efforts based on their perceived achievability of the goal (Bandura, 1993; Stajkovic and Luthans, 1998), overconfident individuals are certain to be successful independent of efforts invested and hence do not invest additional effort (Stone, 1994). The findings are in line with Bandura and Jourden (1991) who have shown that individuals with initially moderate self-efficacy levels that increased throughout a complex decision-making experiment strongly increased their analytical thinking strategy while this was not the case for individuals with initially high self-efficacy levels. Also, a recent study of Beck and Schmidt (2012) reports a curvilinear relationship of self-efficacy and outcome, mediated by effort invested in terms of information collected prior to decision-making. While increases in self-efficacy at initially moderate levels increased information collection, increases at high self-efficacy levels led to less effort invested at the expense of outcome. Being overconfident in their abilities, highly self-efficacious individuals did not feel the need to invest further efforts (Beck and Schmidt, 2012). The detrimental effects of overconfidence on strategic decision-making processes and outcomes implied by high self-efficacy levels (Luthans *et al.*, 2006b; Stone, 1994; Vancouver *et al.*, 2002) have been shown in a broad range of studies previously outlined (e.g. Chen *et al.*, 2015; Park *et al.*, 2011; Simon and Houghton, 2003). Also in the context of collective efficacy, studies have reported curvilinear effects of efficacy on strategic decision-making such that at moderate efficacy levels, decision outcomes were highest based on vigilance in the preceding information processing (Tasa and Whyte, 2005; Whyte, 1998). In sum, these findings demonstrate curvilinear effects of self-efficacy in strategic decision-making based on

differences in motivated efforts invested. While self-efficacy initially increases motivated efforts based on individuals' perceived ability to achieve the goal (Stajkovic and Luthans, 1998; Bandura, 1993), excessive levels imply overconfidence (Luthans *et al.*, 2006b; Stone, 1994; Vancouver *et al.*, 2002) leading to decreasing efforts in the strategic decision-making process (Bandura and Jourden, 1991; Beck and Schmidt, 2012; Stone, 1994; Tasa and Whyte, 2005).

Second, optimism is also reported to "have costs if it is too unrealistic" (Peterson, 2000, p. 50). Papenhausen (2010) has shown optimism to curvilinear relate to the strategic decision-making process, more specifically, to managerial search. Using a strategy simulation task, Papenhausen (2010) has shown that at moderate levels of optimism, efforts invested in information search towards achieving improved outcomes, were highest. High optimists, in contrast, exert an extreme confidence of being successful (Papenhausen, 2010) inducing an absence of the perceived need to continue investing further effort in order to be successful (Scheier and Carver, 1992). Also the study of Segerstrom (2001) indicates a curvilinear effect of optimism on the decision-making process and more specifically on the focus of attention when processing information. Specifically, it shows that at moderate levels of optimism, information processing in terms of attention paid to positive and negative information is most balanced as compared to low or high optimism (Segerstrom, 2001). In line with this, Gibson and Sanbonmatsu (2004) show that highly optimistic individuals do not adequately react to feedback which is likely to be based on optimists attentional focus towards positive information. Also referred to as selective attention mechanism, this attentional focus also serves as explanation for highly optimistic individuals overlooking contradictions (Geers and Lassiter, 2002) as well as informational errors (Spirrison and Gordy, 1993) and drawing on defensive information processing, characterized by selective information choice and recall (Radcliffe and Klein, 2002). These findings align with theoretical considerations on

optimisms' curvilinear effects (Luthans *et al.*, 2006b). Optimism initially fosters motivated efforts based on individuals' positive outcome expectancy and perceived control (Luthans, 2002; Peterson, 2000; Seligman, 1998). Excessive levels of optimism, however, imply selective attention as well as overconfidence decreasing efforts invested and negatively impacting the strategic decision-making process (Geers and Lassiter, 2002; Papenhausen, 2010; Radcliffe and Klein, 2002; Segerstrom, 2001; Spurrison and Gordy, 1993).

Third, hope has been found to positively relate to rational problem solving based on individuals' conscious motivated efforts to pursue and achieve the hoped-for goal (Chang, 1998), reflecting hopeful individuals' agency and pathway thoughts (Snyder *et al.*, 1991; Snyder *et al.*, 1996). It further has been shown to lead to better problem solving skills and performance in a cognitive task environment (Snyder *et al.*, 1991; Snyder *et al.*, 1996). At the same time, however, excessive levels of hope, also referred to as false hope (Polivy and Herman, 2002), are considered to be detrimental as they imply overconfidence and ignorance and distortion of information in favor of the hoped-for goal (Polivy and Herman, 2002; Luthans *et al.*, 2006b). Again, these findings reflect theoretical considerations on a possible curvilinear effect of hope (Luthans *et al.*, 2006b). Similar to self-efficacy and optimism, the curvilinear effect of hope might be rooted in differences in motivated effort invested. Hope initially drives motivated efforts based on the interaction of individuals' willingness to achieve a hoped-for goal and the definition of pathways towards it (Snyder *et al.*, 1991; Snyder *et al.*, 1996). At excessive levels, however, false hope induces overconfidence and distorted information processing (Polivy and Herman, 2002; Luthans *et al.*, 2006b) to the detriment of the strategic decision-making process.

As PsyCap's components have been shown to exert curvilinear effects on strategic decision-making and as PsyCap in its composite form has been shown to follow the direction of its components' effects (Avey *et al.*, 2006; Luthans *et al.*, 2007), we argue that PsyCap

exerts a curvilinear effect on strategic decision-making. More specifically, PsyCap might have a curvilinear effect on managers' strategic decision-outcome based on differences in motivated efforts invested, apparent in differences in their information processing style.

Hypotheses

We argue that PsyCap exerts a curvilinear effect on strategic decision-making outcomes. Based on the synergistic effect of individuals' perceived self-efficacy, hope, optimism and resilience to achieve a goal (Luthans and Youssef, 2004; Luthans *et al.*, 2006b), PsyCap has been shown to increase motivation for efforts directed towards goal achievement (Avey *et al.*, 2011; Kim and Noh, 2016; Luthans *et al.*, 2007; Siu *et al.*, 2014). Motivation and its resulting efforts, in turn, are important predictors of performance (Locke and Latham, 2004) that positively contribute to complex decision-making outcomes (Wood *et al.*, 1990). For example, Levin and colleagues (2000) have used a computerized decision-making task to show that individuals' motivation, measured as need for cognition (Cacioppo and Petty, 1982; Dreu *et al.*, 2008), results in higher-quality decisions, apparent in higher fits between assigned importance of options' attributes and option selection. At the same time, however, very high levels of PsyCap's single components self-efficacy, optimism and hope have been shown to induce an extreme confidence of goal achievement leading to decreasing motivated efforts (Beck and Schmidt, 2012; Papenhausen, 2010; Polivy and Herman, 2002; Segerstrom, 2001; Stone, 1994). As research has found that PsyCap follows the direction of effects of its components (Avey *et al.*, 2006; Luthans *et al.*, 2007), very high levels of PsyCap are likely to decrease motivated efforts and consequently lead to worse strategic decision-making outcomes (Levin *et al.*, 2000; Locke and Latham, 2004; Wood *et al.*, 1990). Hence, we posit:

H1: PsyCap has a curvilinear relationship with strategic decision-making outcomes such that increasing PsyCap leads to improvements in the strategic decision-making outcome

at low and moderate PsyCap levels but to decreases in the strategic decision-making outcome at high levels (inverted U-shape).

We further argue that the curvilinear effect of PsyCap on strategic decision-making outcomes is mediated by information processing styles, specifically heuristic information processing. Heuristic information processing, according to the dual-process theory of Chaiken (1980), is a processing style that relies on easily accessible information, low attention to details, simple rules as well as non-content cues and requires little effort. PsyCap has been found to initially foster motivated efforts (Avey *et al.*, 2011; Kim and Noh, 2016; Luthans *et al.*, 2007; Siu *et al.*, 2014). Motivated efforts, in turn, have been shown to lead to lower levels of heuristic information processing (Maheswaran and Chaiken, 1991) since individuals with high motivation perceive the employment of heuristic processing as not sufficient in order to achieve the hoped-for goal and refrain from it (Chaiken *et al.*, 1989; Maheswaran and Chaiken, 1991). For example, DeDreu and colleagues (1999) have shown that individuals with high motivation, measured as individuals' low need for cognitive closure, are less likely to pursue heuristic information processing in complex negotiation- and decision-making situations as compared to individuals with low motivation who use heuristic cues. At the same time, based on the effects of PsyCap's components at very high levels (Beck and Schmidt, 2012; Papenhausen, 2010; Polivy and Herman, 2002; Segerstrom, 2001; Stone, 1994), individuals with very high levels of PsyCap can be assumed to be highly confident to reach their goal and hence less motivated to invest further efforts. Such reductions in motivated effort have been shown to increase heuristic information processing as decision-makers perceive it as sufficient (Maheswaran and Chaiken, 1991). Their likelihood to act less deliberately and more instinctively increases (Ferris *et al.*, 2011; Hiller and Hambrick, 2005). Previous studies of Chaiken and colleagues (Chaiken, 1980; Chaiken and Maheswaran, 1994) have shown in a series of experiments that individuals employ heuristic processing in case of

low motivation while this was not the case for the high motivation group. Heuristic information processing, measured as intuitive decision making (Khatri and Ng, 2000), in turn, has been shown to negatively relate to strategic decision effectiveness (Elbanna and Child, 2007) and to decrease financial and non-financial performance (Khatri and Ng, 2000). In a meta-analysis, Philips and colleagues (Phillips *et al.*, 2016) generally provide support for these findings and report intuition to negatively relate to decision performance.

Differences in manager's motivated effort become apparent in differences in their heuristic information processing (Maheswaran and Chaiken, 1991) and information processing styles in the strategic decision-making process, including heuristic information processing (Elbanna and Child, 2007; Khatri and Ng, 2000), influence the outcome of strategic decisions (Dean Jr. and Sharfman, 1996; Elbanna and Child, 2007; Shepherd and Rudd, 2014). Hence, it is reasonable to assume that heuristic information processing mediates the relationship between PsyCap and strategic decision-making outcome. We posit

H2: Heuristic information processing mediates the curvilinear relationship between PsyCap and strategic decision-making outcome.

3. Method

Sample and research design

102 managers who are working in the financial services industry in Germany took part in the present study. We initially invited 195 managers, all of which had worked on a strategy project involving a global strategy consultancy to ensure previous involvement in strategic decision-making. After approaching non-respondents with a follow-up request, a final amount of 102 managers participated in our study which asked for personal presence of both the participant and the investigator. The sample is drawn from one industry only to mitigate potential confounding effects due to industry (Dess *et al.*, 1990). Out of the 102 individuals that took part in the study, 59.8 % were male and 40.2 % were female. Their average age was 34.1 years. The majority of the participants, 75.5 %, held a master degree or equivalent and their overall average tenure was 9.3 years.

We followed Chesney and Locke (1991) and applied a computerized strategic decision-making task, more specifically Harvard Business School's "Strategy Simulation: The Balanced Scorecard" (Narayanan, 2014). Each of the participating managers in our sample had to accomplish the strategy simulation individually. The application of such strategy simulation tasks not only reduces the threat of common method bias (Podsakoff *et al.*, 2003) but also the threat of the social desirability bias (Fisher, 1993). It measures firm performance based on behavior instead of relying on self-reported information and does not rely on the similar source as the independent variable (Podsakoff *et al.*, 2003). Additionally, integrating computerized decision-making tasks corresponds to Hambricks' (2007) recommendation to include such tasks when examining individuals' effects on strategic decision-making and also reflects the need for methodological diversity in research on strategic decision-making (Powell *et al.*, 2011).

The strategy simulation required the participants to take over the CEO role of a struggling automotive parts manufacturer. In the beginning, they were assigned the goal of maximizing the company's performance until the end of the simulation and were told that they would receive a purchase offer from a private equity firm reflecting the company's performance. To maximize the company's performance, each participant had to maximize the fit between an initially chosen strategy and initiatives selected during the simulation. Consequently, participants first had to choose one out of four strategies to pursue during the simulation. Additionally, they were asked to choose performance metrics they considered suitable to track their success. Afterwards, participants played eight consecutive periods in which they were offered a budget of USD 25 million that they could (re-)allocate to initiatives they considered to match best with their chosen strategy. After each period, participants were able to track their performance metrics and further financial data, based on which they could change their budget allocation for the subsequent period. The strategy simulation involved complexity, uncertainty and resource commitments (Narayanan, 2014) and thus aligns with the characteristics of strategic decision-making processes (Mintzberg *et al.*, 1976; Schwenk, 1984).

Procedure

After the participants had received a verbal briefing of the general study procedure, they were firstly asked to answer questions testing for PsyCap (Luthans *et al.*, 2006b). Second, the participating managers were shortly briefed on the balanced scorecard tool applied in the simulation as well as on further specifics of the simulations and had to read through a brief hand-out containing further instructions on the simulation. Afterwards, they were asked to run the simulation. The final step of the data collection procedure asked each participant to answer further questions covering items on heuristic information processing (Smerecnik *et al.*, 2012) as well as the demographic variables used in the study.

Measures

PsyCap: To measure PsyCap we used the self-report PsyCap measure (Luthans *et al.*, 2006b) which has been already used in a wide range of previous studies (e.g. Luthans *et al.*, 2007; Avey *et al.*, 2010b; Peterson *et al.*, 2011). The scale has 24 items measured on a six-point Likert scale (1 = strongly disagree; 6 = strongly agree). 21 items are positively phrased. 3 items are reverse scored and have to be re-scored prior to deriving the summed PsyCap score. Sample items include “I feel confident analyzing a long-term problem to find a solution” and “There are lots of ways around any problem”. Higher individuals’ total score indicate higher levels of PsyCap. Cronbach’s alpha was .86. The full questionnaire can be found in Appendix G.

Heuristic information processing: Following Smerecnik *et al.* (2012), we measured heuristic information processing ($\alpha=0.76$) using five items measured on a seven-point Likert scale (1 = completely disagree; 7 = completely agree). All items are positively worded and higher values indicate a higher degree of heuristic information processing. The measurement has been reported to exert high validity and reliability (Smerecnik *et al.*, 2012) and has been already used in previous studies (e.g. Gaspar *et al.*, 2016). The participants were asked to evaluate their information processing approach. In the introduction, we specifically linked the items to their information processing approach during the strategy simulation. Sample items include “I skimmed through the information” and “I did not spend much time thinking about the information”. The items are listed in Appendix H.

Strategic decision outcomes: We measured strategic decision outcomes using the final return on equity (ROE) achieved in the strategy simulation after having played all eight rounds. ROE is an acknowledged, widely used outcome measure in management (Richard *et al.*, 2009) and has been previously used as dependent variable in strategic decision-making research (e.g. Richardson, 2000; Kim *et al.*, 2017; Westphal and Bednar, 2005; Lubatkin *et*

al., 2006). In the simulation, ROE is calculated based on individuals' achieved net income divided by equity. Net income is derived based on sales, which are driven by the fit between participants' chosen strategy and the initiatives funded less interest, tax expenses and initiatives spending. In case initiatives spending does not sufficiently match the chosen strategy, a penalty is calculated to also reflect a fit mismatch in spending. Thus, resulting ROE is an objective outcome measure reflecting individuals' achieved strategic decision outcomes.

Control variables: We controlled for five variables in our analysis. First, we controlled for *age* since seniority can impact strategic decision-making (Chatterjee and Hambrick, 2011). Second, we included *gender* as control, as it also can impact strategic decision-making (Jeong and Harrison, 2017; Malhotra *et al.*, 2018). Our third control variable was the individual's *educational level* (Hitt and Tyler, 1991) which we measured asking for individuals' highest educational degree, i.e. vocational training, bachelor degree, master degree, doctoral degree or equivalent. Fourth, we also controlled for *automotive work experience* since the strategy simulation dealt with an automotive parts supplier and the type of work experience can affect strategic choices (Gerstner *et al.*, 2013; Hitt and Tyler, 1991). We measured automotive work experience by asking for the participants' professional experience in automotive industry in month. Lastly, as research has shown that required decision time impacts strategic decision outcomes (Miller and Judge, 1991), we also controlled for *time*. In line with previous studies (Helgeson and Ursic, 1993; Jacoby *et al.*, 1974), we measured decision time as total time required to (re-)allocate budget to the initiatives across all periods including time required for analyzing performance feedback.

4. Results

Table 3 shows the means, standard deviations, and correlations for all variables. The correlations between the independent variables were all less than 0.4. To test for multicollinearity and heteroscedasticity, we applied additional tests. First, addressing the threat of multicollinearity, we calculated the variance inflation factors. All variance inflation factors, except those of PsyCap and its squared term, were less than 1.3. Hence, multicollinearity is not a problem (Hair *et al.*, 2014). Further, we applied the Breusch-Pagan/Cook-Weisberg to test for heteroscedasticity (Breusch and Pagan, 1979; Cook and Weisberg, 1983). As the results were not significant, heteroscedasticity of the residuals is not a concern.

Table 4 shows the results of the regression analyses that we used to test our first hypothesis. Our first hypothesis proposes a curvilinear effect of PsyCap on strategic decision-making outcomes. Thus, we used strategic decision-making outcomes as the dependent variable in Models 1 and 2. In Model 1, we introduced only the control variables. We entered PsyCap and PsyCap squared into Model 2 to test for PsyCap's curvilinear effects (Aiken and West, 1991). Model 2 shows significant results and explains 34 percent of the variance in strategic decision outcomes. Additionally, while PsyCap has a significant positive association with strategic decision outcomes ($b = 0.246$; $p = 0.001$), PsyCap squared has a significant negative association with strategic decision outcomes ($b = -0.024$; $p = 0.003$). These findings support the curvilinear relationship as proposed in Hypothesis 1. To further substantiate the curvilinear relationship, we plotted the graph (see Figure 4) and calculated the inflection point (Haans *et al.*, 2016; Lind and Mehlum, 2010) which is at a PsyCap level of 5.13.

Variables	Min	Max	Mean	SD	1	2	3	4	5	6	7	8
1 Strategic decision outcomes	0.02	0.15	0.09	0.02	1							
2 Heuristic information processing	1.00	5.20	2.92	0.98	-0.455**	1						
3 PsyCap	3.42	5.71	4.76	0.44	0.372**	-0.370**	1					
4 Age	23.00	65.00	34.07	8.76	-0.176	-0.042	0.285**	1				
5 Gender (female)	0.00	1.00	0.40	0.49	-0.041	-0.014	-0.033	-0.080	1			
6 Education level	0.00	3.00	1.88	0.51	0.222*	-0.097	0.172	0.299**	-0.098	1		
7 Automotive experience	0.00	240.00	12.93	33.55	-0.045	-0.011	0.116	0.310**	-0.086	0.182	1	
8 Time	648.00	3798.00	1830.19	639.51	0.018	-0.173	0.169	0.083	0.126	-0.117	0.051	1

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; $N = 102$

Table 3: Descriptive statistics and correlations

Variables	Strategic decision outcomes		Strategic decision outcomes		Heuristic info. processing		Strategic decision outcomes	
	Model 1		Model 2		Model 3		Model 4	
Controls	<i>Coeff</i>	<i>SE</i>	<i>Coeff</i>	<i>SE</i>	<i>Coeff</i>	<i>SE</i>	<i>Coeff</i>	<i>SE</i>
Age	-0.001 *	0.000	-0.001 **	0.000	0.004	0.011	-0.001 **	0.000
Gender (female)	-0.002	0.005	-0.002	0.004	-0.003	0.186	-0.002	0.004
Education level	0.014 **	0.005	0.013 **	0.004	-0.245	0.184	0.011 **	0.004
Automotive experience	0.000	0.000	0.000	0.000	0.002	0.003	0.000	0.000
Time	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Main effect								
PsyCap	-		0.246 ***	0.072	-7.539 *	3.214	0.192 **	0.071
PsyCap squared	-		-0.024 **	0.008	0.731 *	0.347	-0.019 *	0.008
Heuristic information processing	-		-		-		-0.007 **	0.002
n	102		102		102		102	
R-squared	0.114		0.343		0.201		0.410	
Δ R-squared	-		0.229 ***		-		-	
Adjusted R-squared	0.068		0.294		0.141		0.360	
F	2.470 *		7.009 ***		3.372 **		8.093 ***	

* p < 0.05; ** p < 0.01; *** p < 0.001

Table 4: Regression results

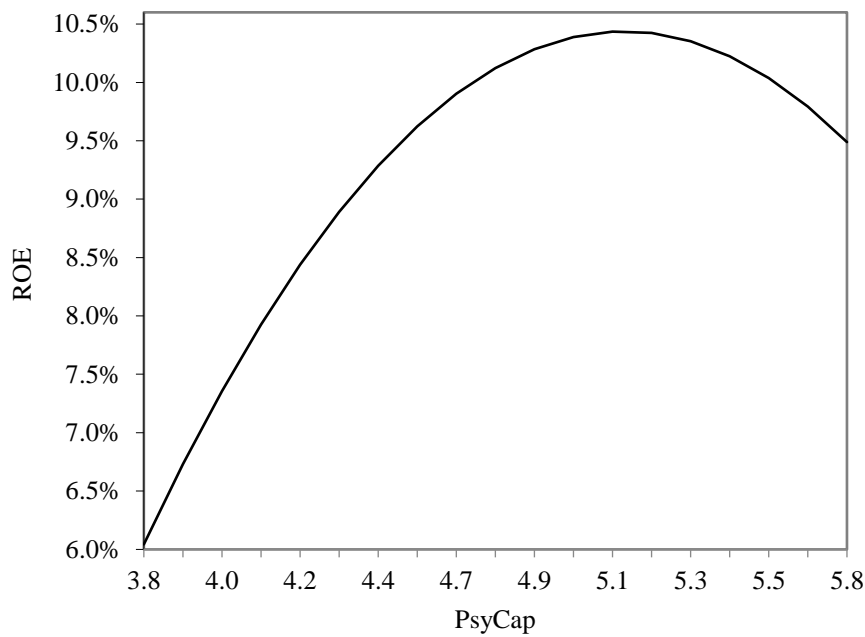


Figure 4: Curvilinear relationship between PsyCap and strategic decision outcomes

Our second hypothesis proposes that heuristic information processing mediates the curvilinear relationship between PsyCap and strategic decision-making outcome. In order to test this hypothesis, we followed Hayes' and Preacher's (2010) approach on instantaneous indirect effects analysis and applied their MEDCURVE macro. This analysis allows for the estimation of indirect effects (denoted as θ) in causal systems where the independent and dependent variables are related in non-linear ways. It estimates the indirect effect of X on Y through M at different values of X as X's indirect effect varies in non-linear systems (Hayes and Preacher, 2010). Consequently, we estimated the instantaneous indirect effects of PsyCap on strategic decision outcomes through heuristic information processing at different PsyCap values, applying the suggested values of PsyCap's sample mean, -1SD, +1SD based on 5000 bootstrap samples (Hayes and Preacher, 2010). In line with our hypotheses, we specified the relationships in our indirect effect model as shown in Table 4. While the specification of the relationship between PsyCap and strategic decision outcomes is apparent based on Model 2, the model specification for the mediator model on the relationship between PsyCap and heuristic information processing is apparent in Model 3. Model 4 shows the full dependent

variable model. The results of our indirect effect analysis are shown in Table 5. Increasing PsyCap of managers with low and moderate PsyCap levels significantly increases strategic decision outcomes through its indirect effect on heuristic information processing at a decreasing rate (95% CI for $\theta_{x=4.3223} = 0.0031$ to 0.0168 ; 95% CI for $\theta_{x=4.7627} = 0.0007$ to 0.0115). At high PsyCap levels, increasing PsyCap decreases strategic decision outcomes, however, the indirect effect through heuristic information processing is not statistically different from zero as zero is inside the confidence interval and hence not significant (95% CI for $\theta_{x=5.2030} = -0.0085$ to 0.0076 ; Hayes and Preacher, 2010). Thus, the negative effect of high levels of PsyCap on strategic decision outcomes might not (only) be due to heuristic information processing, which we will address in our discussion. Overall, our findings support our second hypothesis for low and moderate levels of PsyCap.

	$\theta(x)$	CI (95%)	
Low PsyCap (M=4.3223)	0.0088	0.0031	0.0168
Moderate PsyCap (M=4.7627)	0.0042	0.0007	0.0115
High PsyCap (M=5.2030)	-0.0005	-0.0085	0.0076

Table 5: Instantaneous indirect effect results

As a robustness check for alternative measurement specifications we re-ran our analyses using individuals' achieved return on assets (ROA) and stock price as alternative measurements of strategic decision outcome. ROA is a popular performance measure in management (Richard *et al.*, 2009) and has been previously applied as dependent variable in strategic decision-making research (e.g. Lubatkin *et al.*, 2006; Chatterjee and Hambrick, 2007; Sanders and Hambrick, 2007). Likewise, also stock price based measures are a commonly used (Richard *et al.*, 2009) and have been applied in strategic decision-making research (e.g. Chatterjee and Hambrick, 2007; Hayward and Hambrick, 1997; Park *et al.*, 2011). Our results remained unchanged - PsyCap is curvilinear related to strategic decision outcomes and heuristic information processing mediates this relationship for low and medium

levels of PsyCap. These results offer further support for our hypotheses.

5. Discussion

Given the relevance of individuals' psychological characteristics as drivers of strategic decision-making processes and their outcomes (Hambrick, 2007; Miller and Droge, 1986), PsyCap has been identified as an alternative psychological characteristic that might impact individuals' strategic decision-making (Nolzen, 2018). We have hypothesized that PsyCap's effects in strategic decision-making follow a curvilinear pattern such that PsyCap improves strategic decision-making outcomes up to an inflection point after which it impairs them. The findings of our study support our hypotheses and might provide interesting contributions for theory and praxis.

Implications for theory

Our paper makes three contributions to theory. First, our findings expand research emphasizing the relevance of individual psychological characteristics in strategic decision-making (Hambrick, 2007). In contrast to previously researched characteristics that have primarily negative effects on strategic decision-making such as narcissism (e.g., Chatterjee and Hambrick, 2007; Patel and Cooper, 2014), hubris (e.g., Hayward and Hambrick, 1997; Li and Tang, 2010), hyper CSEs (Hiller and Hambrick, 2005) and overconfidence (e.g., Simon and Houghton, 2003; Chen *et al.*, 2015), PsyCap exerts a curvilinear effect in our sample. It improves strategic decision-making up to an inflection point after which its effects turn negative. Additionally, PsyCap is not a trait but state-like and hence malleable (Luthans *et al.*, 2006a; Luthans *et al.*, 2008). These characteristics clearly differentiate PsyCap from previously researched psychological characteristics in strategic decision-making and make it a highly relevant driver of managers' strategic decision-making. At the same time, when reaching excessive levels, PsyCap's components induce an extreme confidence of goal

achievement (Beck and Schmidt, 2012; Papenhausen, 2010; Polivy and Herman, 2002; Segerstrom, 2001; Stone, 1994). Thus, it could be interesting for future research to directly analyze how PsyCap relates to those psychological characteristics that, at their core, are characterized by excessive levels of confidence such as hyper CSEs and overconfidence including potential differences in those relationships between low versus high PsyCap individuals.

Second, our study also supports research emphasizing the relevance of individual differences as drivers of information processing (Maheswaran and Chaiken, 1991; Petty and Cacioppo, 1986) as we have shown PsyCap to impact strategic decision-making outcomes through its influence on information processing for low and medium PsyCap levels. While drivers of individuals' information processing are also message-related and contextual factors (Borgstede *et al.*, 2014), particularly dual-system theories of information processing such as the dual-process theory of Chaiken (1980) emphasize the relevance of individual differences for information processing (Evans, 2008). Individual differences that have been shown to influence subsequent information processing encompass for example cognitive capacities and abilities (e.g., Barrett *et al.*, 2004), values (e.g. Borgstede *et al.*, 2014), attitudes (Fazio *et al.*, 1986) and motivation (e.g. Levin *et al.*, 2000). We add to the relevance of individual differences as drivers of information processing by presenting PsyCap as a psychological underlying factor relating to individual's heuristic information processing. As such, our study might contribute to understand the psychological underpinnings of individual differences in information processing.

Third, we contribute to theory on PsyCap's effects as we expand PsyCap's relevance beyond organizational behavior, analyzing its effects in strategic decision-making. We thereby focus on task environments that differ from those researched in organizational behavior since the task environment of managers, strategic decision-making, is characterized

by complexity, ambiguity and lack of structure (Mintzberg *et al.*, 1976; Schwenk, 1984). As we, in contrast to the linear positive effects of PsyCap in organizational behavior, find a non-linear effect of PsyCap in strategic decision-making, our paper might also add to and support research highlighting the relevance of situational dynamics influencing the relationship between personal characteristics and performance (e.g. Debusscher *et al.*, 2016; Le *et al.*, 2011). Theories in this field, such as the trait activation theory (Tett and Guterman, 2000) or the “trait as situational sensitivities” model (Marshall and Brown, 2006) constitute that the expression of personality depends on the task environment, referred to as situational cues, that arouse personality-related behavior. In line with this, also the *effects* of personality-related behavior can differ depending on the task environment (Debusscher *et al.*, 2016; Le *et al.*, 2011). For example, Le *et al.* (2011) have shown that, depending on task complexity, different levels of neuroticism lead to best outcomes. While low levels of neuroticism result in best performance for complex tasks, moderate levels of neuroticism lead to best performance in less complex tasks. Applied to our present study and to the previous findings on PsyCap’s effect in organizational behavior, PsyCap might follow this logic such that moderate levels of PsyCap lead to best outcomes in complex tasks while high levels of PsyCap lead to best outcomes in less complex tasks. On this basis, it could be interesting for future research to experimentally compare the effects of PsyCap on individuals’ outcomes in different task environments such as complex vs. simple tasks to assess the contingency of PsyCap’s effects on situational dynamics.

Limitations

As with all research, our study has limitations that provide avenues for future research. First, even though our results not only show curvilinear effects of PsyCap on strategic decision outcomes but also on heuristic information processing (s. Table 2), our analysis of indirect effects (Hayes and Preacher, 2010) is significant at low and medium PsyCap levels

but not at high PsyCap levels (s. Table 5). Even though our sample is sufficiently large and senior, comprising 102 managers who all have gained experience in strategic decision-making and have an average tenure of 9.3 years, the share of participants with PsyCap levels exceeding its inflection point of 5.13 amounts to 18.6%. Hence, future studies could attempt to collect an even larger sample size with similar or even higher seniority of participants in order to increase the number of individuals with very high PsyCap levels. This might not only help to substantiate our findings of PsyCap's curvilinear effects on strategic decision outcomes and information processing but also to shed light on the mediating effects driving the decreasing decision outcomes at very high PsyCap levels as they might become stronger pronounced and visible. Additionally, as proposed for example by Dreu (2006), future studies could include alternative specifications of the mediator such as a direct measurement of motivation or overconfidence. Further, as is for example the case in the study of Ames and Flynn (2007), it might be possible that additional mechanisms become relevant mediators at high levels of PsyCap. For example, the selective attention mechanism, which has been shown to negatively impact strategic decision processes and their outcomes (Geers and Lassiter, 2002; Radcliffe and Klein, 2002; Spirrison and Gordy, 1993), might be a relevant driver of the decreasing strategic decision outcomes at high PsyCap levels and hence could be included as additional variable in future studies.

Second, the managers in our sample are working in the financial services industry in Germany. Even though the focus on one industry and one national setting has already been applied in previous research (Simon and Houghton, 2003; Gerstner *et al.*, 2013; Buyl *et al.*, in press) and helps to reduce the threat of incorporating possible confounding systematic effects (Dess *et al.*, 1990), future studies on PsyCap's effects on strategic decision-making should analyze different industries and cultural environments.

Third, we used a quasi-experimental set-up and applied a computerized strategy simulation (Narayanan, 2014). Even though experiments are a common method in strategic decision-making research (Agarwal *et al.*, 2010; Meissner and Wulf, 2017; Song *et al.*, 2002) and the simulation we applied (Narayanan, 2014) reflects the characteristics of strategic decision-making (Mintzberg *et al.*, 1976; Schwenk, 1984), future studies could incorporate further methods to test the effects of PsyCap in strategic decision-making. For example, qualitative research (Burgeois and Eisenhardt, 1988) or surveys (Meissner and Wulf, 2014) are suitable methods in strategic decision-making research.

Implications for corporate praxis

The results of the present study have also implications for corporate praxis. PsyCap has been shown to be malleable for example through PsyCap micro-interventions (Luthans *et al.*, 2006a) and dedicated web-based trainings (Luthans *et al.*, 2008). Hence, being aware of the curvilinear effects of PsyCap in strategic decision-making is relevant to suitably invest in adaptations of managers' PsyCap. More specifically, depending on managers' PsyCap level, either further increases or a regulation of PsyCap levels might be appropriate in order to optimize managers' strategic decision-making.

6. Concluding remarks

With the present study, we attempt to enrich research on individual psychological characteristics as drivers of strategic decision-making. As an extension to research with a primary focus on trait-based, negative individual psychological characteristics, we introduce PsyCap as relevant driver of managers' strategic decision-making. Drawing on the effects of PsyCap's individual components in strategic decision-making, we hypothesized a curvilinear effect of PsyCap on strategic decision-making outcomes. Our results show that PsyCap improves strategic decision outcomes up to an inflection point after which it reduces strategic decision outcomes and that this is mediated by heuristic information processing for low and medium PsyCap levels. While these results illustrate that PsyCap is a relevant psychological driver of managers' strategic decision-making that goes beyond a focus on explaining solely negative effects, they also allow for taking subsequent action as PsyCap is malleable. Additionally, our findings might provide an interesting basis for further studies on PsyCap's effects in strategic decision-making.

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**V. MANAGERS' PSYCHOLOGICAL CAPITAL:
THE GOOD, THE BAD, AND HOW TO ACT**

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MANAGERS PSYCHOLOGICAL CAPITAL: THE GOOD, THE BAD, AND HOW TO ACT

Abstract

Different to its linear positive effects on employees' performance, theory and recent empirical findings suggest that Psychological Capital (PsyCap) exerts non-linear effects on managers' performance. Referred to as "too much of a good thing" (TMGT) effect, PsyCap improves managers' strategic decision-making outcomes only up to an inflection point after which it impairs it. Based on these findings and research showing PsyCap to be malleable, we provide managers with a scientifically based but hands-on approach for assessing, allocating and, depending on the PsyCap level, developing or regulating their PsyCap in order to optimize strategic decision-making.

Keywords: Psychological Capital, strategic decision-making outcomes

1. Introduction

Elon Musk might be one of the presently most prominent examples of how a manager's personality shapes his or her strategic decision-making behavior. More specifically, he exemplifies how desirable personal characteristics might become detrimental when taken too far. While his enthusiastic, energetic personality has spurred courageous decisions leading to the founding of highly innovative firms such as PayPal, SpaceX and Tesla (Morris, 2015), it likewise has led to erratic, flawed decisions. Recent instances include his twitter announcement to take Tesla private just to revise this decision a few weeks later (Gelles, 2018) or his decision to keep or reopen the majority of Tesla's retail stores in the USA just a few weeks after having announced to shut down most retail locations and move towards a fully online sales model (Kolodny, 2019). Similarly, Travis Kalanick, former CEO of UBER, illustrates how personal characteristics can be a double-edged sword. Based on his fearless, brash personality (Hartmans and Leskin, 2019; Larcker and Tayan, 2017; McGee, 2017), Kalanick disrupted the transportation industry by founding UBER despite tremendous regulatory barriers and considerable headwinds from the taxi industry (Larcker and Tayan, 2017). At the same time, however, exactly this lacking anxiety of any consequences has induced detrimental decision-making, including spying, illegal piloting of self-driving vehicles and fraudulent hiring strategies (Larcker and Tayan, 2017; Levin, 2017) – decisions that not only damaged the company's reputation but also led to million-dollar fines and finally to Kalanick's resignation following investors' pressure (Hartmans and Leskin, 2019; Larcker and Tayan, 2017).

These are just a few cases that show how managers' personal characteristics influence their strategic decision-making (Hambrick, 2007; Miller and Droge, 1986). More specifically, both examples illustrate how a manager's inflated self-concept comprising an excessive perceived ability to reach goals (Bandura, 1993; Stajkovic and Luthans, 1998), excessively

optimistic outcome expectations (Seligman, 1998) and an extreme determination to achieve goals (Snyder *et al.*, 1991; Snyder *et al.*, 1996) can have both, positive but also detrimental impacts on managers' decision-making. These aspects are core tenets of PsyCap, a new psychological construct and individual self-concept that is based on an individuals' perceived self-efficacy, optimism, hope and resilience to achieve a goal (Luthans and Youssef, 2004; Luthans *et al.*, 2006b). PsyCap has been shown to drive motivation and resulting efforts towards goal achievement (Avey *et al.*, 2011b; Luthans *et al.*, 2007b). In contrast to personality characteristics that are trait-based and that refer to individuals' enduring and stable self-views such as individuals' core self-evaluations (Judge *et al.*, 1998), PsyCap is malleable and thus open for development (Luthans *et al.*, 2006a; Luthans *et al.*, 2008b; Luthans *et al.*, 2006b). Originally rooted in organizational behavior research, PsyCap has been strongly researched and studies have consistently shown that increasing levels of PsyCap have positive effects on employees' behavior and attitudes (Avey *et al.*, 2011b; Dawkins *et al.*, 2013; Newman *et al.*, 2014; Nolzen, 2018). This includes their job performance (Luthans *et al.*, 2005; Peterson *et al.*, 2011), job satisfaction (Abbas *et al.*, 2012) and organizational commitment (Larson and Luthans, 2006).

When it comes to strategic decision-making, however, PsyCap might not only have positive effects. As the examples of Musk and Kalanick indicate, research on the effects of PsyCap's single components in strategic decision-making shows that they exert so called "too much of a good thing" (TMGT) effects (Pierce and Aguinis, 2013). At very high levels, the ordinarily positive characteristics of self-efficacy, optimism and hope evoke excessive confidence, decreasing motivated efforts (Beck and Schmidt, 2012; Papenhausen, 2010; Polivy and Herman, 2002; Segerstrom, 2001; Stone, 1994) and ultimately worsen strategic decision-making (Levin *et al.*, 2000; Locke and Latham, 2004; Wood *et al.*, 1990). Since PsyCap follows the direction of effects of its components (Avey *et al.*, 2006; Luthans *et al.*,

2007b), it is likely to exert TMGT effects in strategic-decision making. This is supported by a first study involving 102 managers. The study empirically shows that PsyCap exhibits a TMGT effect on strategic decision-making outcomes. Hence, depending on managers' PsyCap level, PsyCap can have a bright as well as a dark side and this is partly due to differences in motivated efforts invested during the decision process.

Given the TMGT effect of PsyCap on strategic decision-making, managers should adapt their PsyCap towards adequate levels. To this end, we provide a three-step approach for managers to assess, allocate and, if required, adapt their PsyCap levels. As a first step, managers need to become aware of their PsyCap level. Therefore, we provide managers with the PsyCap Quick Check allowing for a simplified, quick measurement of PsyCap, building on the scientifically developed 12-item questionnaire by Luthans and colleagues (Luthans *et al.*, 2007a). Secondly, managers can identify their PsyCap Profile emerging from their responses to the PsyCap Quick Check based on a typology of three distinct PsyCap profiles. They serve as basis for, thirdly, the scientifically-based (Kahneman *et al.*, 2010; Kahneman and Lovallo, 1993; Klein, 2008; Lovallo and Kahneman, 2003; Luthans *et al.*, 2006a; Luthans *et al.*, 2008b) checklist-type recommendations that provide managers with guidance on either PsyCap-development or regulation.

2. Managers' personality in strategic-decision making

Research has shown that managers' personal characteristics influence their strategic decision-making behavior (Hambrick, 2007; Miller and Droge, 1986). As strategic decision-making situations are characterized by high levels of ambiguity, complexity and lack of structure (Mintzberg *et al.*, 1976), behavior in such situations is highly dependent on managers' interpretation of the situation (Finkelstein and Hambrick, 1990). This comprises their interpretation of the importance of information as well as their decision where to focus

on and how to react correspondingly (Finkelstein and Hambrick, 1990). The interpretation is shaped by managers' cognition and hence their underlying personal characteristics (Finkelstein and Hambrick, 1990). Consequently, management research has long investigated managers' characteristics and their effects on strategic decision-making (Hambrick, 2007). In the past years, research has started to investigate personal characteristics that are ordinarily beneficial but can be harmful in case they become too strongly pronounced, referred to as TMGT effects (Pierce and Aguinis, 2013). They are particularly interesting in strategic decision-making as managers are likely to exhibit higher levels of ordinarily positive characteristics (Hiller and Hambrick, 2005).

3. PsyCap: A double edged sword

PsyCap is a new and important psychological concept rooted in organizational behavior research (Luthans and Youssef, 2004) and refers to an individuals' self-concept regarding his or her self-efficacy, optimism, hope and resilience (Luthans *et al.*, 2007b; Luthans *et al.*, 2006b). While self-efficacy refers to individuals' perceived ability to reach goals (Bandura, 1993; Stajkovic and Luthans, 1998), optimism describes individuals' positive outcome expectation (Seligman, 1998). Hope incorporates the elements of agency and pathways and thus ensures both individuals' determination to pursue goals as well as to find ways to achieve them (Snyder *et al.*, 1991; Snyder *et al.*, 1996). Resilience allows individuals to suitably adapt and respond to potential challenges on the way towards goal achievement (Masten, 2001). Different to trait-based, enduring psychological characteristics, PsyCap is state-like and hence malleable (Luthans *et al.*, 2006a; Luthans *et al.*, 2008b; Luthans *et al.*, 2006b). Studies have shown that PsyCap can be developed for example by means of web-based trainings (Luthans *et al.*, 2008b) or short micro intervention-sessions (Luthans *et al.*, 2006a). Organizational behavior research has consistently found that increasing levels of PsyCap are beneficial as they improve employee behavior and attitudes (Avey *et al.*, 2011b; Dawkins *et al.*, 2013;

Newman *et al.*, 2014; Nolzen, 2018). For example, studies have shown that PsyCap positively relates to employees' job performance, measured as supervisor-rated performance, merit-based salary (Luthans *et al.*, 2005) and sales revenues (Peterson *et al.*, 2011). Further research has found that PsyCap increases employees' job satisfaction (Abbas *et al.*, 2012) and correlates positively with organizational commitment (Larson and Luthans, 2006). In strategic decision-making, however, PsyCap might not follow this linear positive pattern. Based on the effects of PsyCap's single components in strategic decision-making, the direction of which PsyCap follows (Avey *et al.*, 2006; Luthans *et al.*, 2007b), PsyCap is likely to exert TMGT effects in strategic decision-making. As such it exhibits a bright and a dark side.

The bright side

PsyCap has been shown to increase motivation and resulting goal-directed efforts (Avey *et al.*, 2011b; Kim and Noh, 2016; Luthans *et al.*, 2007b; Siu *et al.*, 2014) which, in turn, are important predictors of performance (Locke and Latham, 2004), positively contributing to complex decision-making outcomes (Wood *et al.*, 1990). PsyCap's positive effects on motivation towards goal achievement are rooted in the synergistic effect of its components (Luthans and Youssef, 2004; Luthans *et al.*, 2006b). Self-efficacy increases motivated efforts based on individuals' perceived ability to achieve the goal (Stajkovic and Luthans, 1998; Bandura, 1993). Optimism fosters motivated efforts given individuals' positive outcome expectancy as well as perceived control (Luthans, 2002; Peterson, 2000; Seligman, 1998) and hope drives motivated efforts based on the interaction of individuals' willingness to achieve a hoped-for goal and the definition of pathways towards it (Snyder *et al.*, 1991; Snyder *et al.*, 1996). Resilience contributes to the synergistic effect through its positive association with positive emotions in stressful situations, such as strategic decision-making, and a perception of such situations as opportunities rather than as threats (Ong *et al.*, 2006; Shin *et al.*, 2012; Tugade and Fredrickson, 2004).

The dark side

At the same time, however, very high levels of PsyCap's components, particularly of self-efficacy, optimism and hope have been shown to induce extreme confidence of goal achievement leading to decreasing motivated efforts (Beck and Schmidt, 2012; Papenhausen, 2010; Polivy and Herman, 2002; Segerstrom, 2001; Stone, 1994) and ultimately impaired strategic decision-making (Levin *et al.*, 2000; Locke and Latham, 2004; Wood *et al.*, 1990). Very high levels of self-efficacy induce overconfidence (Bandura and Jourden, 1991; Beck and Schmidt, 2012; Luthans *et al.*, 2006b; Stone, 1994; Vancouver *et al.*, 2002) as highly self-efficacious individuals are extremely confident of having the abilities to succeed in achieving their goal. Hence they refrain from investing further efforts towards goal-achievement as they perceive them as not necessary (Bandura and Jourden, 1991; Beck and Schmidt, 2012; Stone, 1994). Very high levels of optimism also come at a cost (Peterson, 2000). Having very strong positive outcome expectations, excessive optimists not only fall prey to selective attention involving an unbalanced focus on positive information (Gibson and Sanbonmatsu, 2004; Segerstrom, 2001) and overlooking of contradictions and errors (Geers and Lassiter, 2002; Spirrison and Gordy, 1993) but also become excessively confident of being successful (Papenhausen, 2010) which worsens their strategic decision-making. Likewise, also excessive hope induces overconfidence and distorted information processing (Luthans *et al.*, 2006b; Polivy and Herman, 2002) to the detriment of strategic decision-making. In sum, three out of four of PsyCap's components have been shown to negatively impact strategic decision-making if reaching excessive levels. As PsyCap follows the direction of its components (Avey *et al.*, 2006; Luthans *et al.*, 2007b), the positive and negative effects of its components suggest a TMGT effect of PsyCap in strategic decision-making.

Empirical support

To empirically investigate the proposed TMGT effect of PsyCap on managers' strategic decision-making, we conducted an empirical study with 102 managers. All of them are working in the financial services industry in Germany and have recently participated in a strategy project involving a global strategy consultancy. The results of our empirical study show that PsyCap exerts TMGT effects. PsyCap improves managers' strategic decision-making outcomes only up to an inflection point. After having reached the inflection point, further increases in PsyCap impair strategic decision-making outcomes. This is partly based on differences in managers' heuristic information processing during their decision-making process. Heuristic processing is an information processing style that relies on easily accessible information, low attention to details and simple rules and requires little effort (Chaiken, 1980). Managers with increasing PsyCap levels from low to moderate PsyCap show increasing motivation to achieve set goals. For this reason they refrain from heuristic processing (Chaiken *et al.*, 1989; Maheswaran and Chaiken, 1991) and tend to comprehensively, attentively search for and process information and develop a larger set of valid alternatives (Chaiken, 1980; Maheswaran and Chaiken, 1991). In strategic decision-making research, such behavior is called systematic processing (Schwenk, 1995). In contrast, managers with very high levels of PsyCap are extremely confident to achieve set goals in any case. Hence, they are less motivated to invest further efforts towards goal achievement (Beck and Schmidt, 2012; Papenhausen, 2010; Polivy and Herman, 2002; Segerstrom, 2001; Stone, 1994) and pursue heuristic information processing (Maheswaran and Chaiken, 1991). Subsequent strategic decision-making outcomes are impaired. A graphical illustration of PsyCap's TMGT effects on strategic decision-making outcomes is depicted in Figure 5. The inflection point (Lind and Mehlum, 2010; Haans *et al.*, 2016) which represents the ideal level of PsyCap in our study is at 5.1.

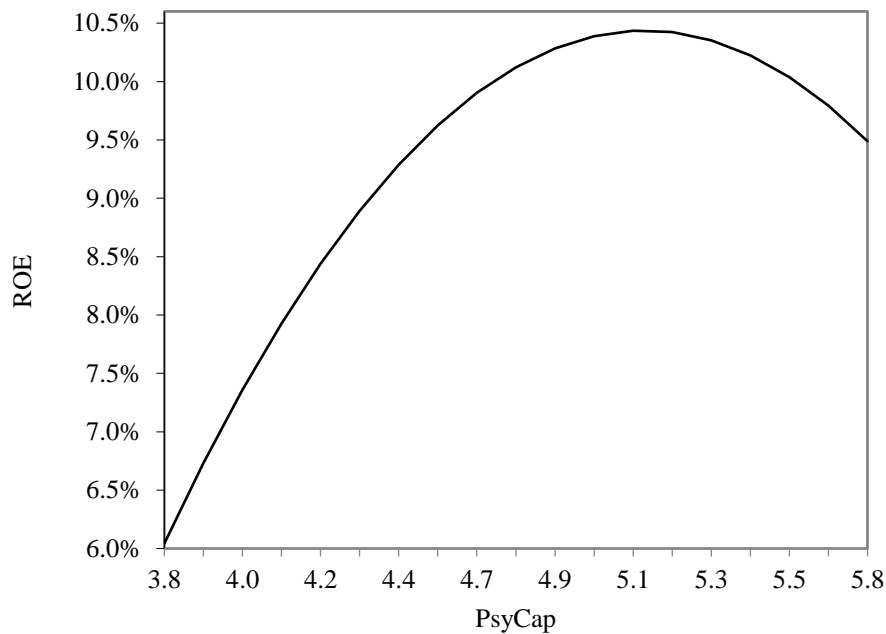


Figure 5: Curvilinear relationship between PsyCap and strategic decision outcomes

4. How to act: A three-step approach

As PsyCap critically influences managers' strategic decision-making outcomes, they should adapt their PsyCap towards ideal levels. For this purpose, we developed a three-step approach serving as guide for managers to assess, allocate and, depending on their PsyCap level, develop or regulate their PsyCap.

Assess: Determine your PsyCap level

First, managers need to assess their individual PsyCap level. For this purpose, we developed the PsyCap Quick Check, a simplified version of the 12-item PsyCap questionnaire that has been applied and validated in a broad range of previous studies (Avey *et al.*, 2011a; Chen, 2015; Huang and Luthans, 2015; Luthans *et al.*, 2008a; Norman *et al.*, 2010a; Norman *et al.*, 2010b). The PsyCap Quick Check applies the items used in the 12-item PsyCap questionnaire, however, employs a simplified phrasing. Additionally, the PsyCap Quick Check reduces the 6-point rating scale of the PsyCap questionnaire to a simplified, 5-point

rating scale indicating the frequency with which managers' show the behavior outlined in the item (1=almost never, 2=seldom, 3=sometimes, 4=often, 5=almost always). Sample items include e.g., "I find ways to deal with troubles at work" and "I take stress at work with ease". The full PsyCap Quick Check is depicted in figure 6. To derive their PsyCap level, managers have to sum up the scores of all items in the PsyCap Quick Check and divide them by 12, the total number of items. For example, the sum of a manager's item scores who answered four items with "sometimes", four items with "often" and four items with "almost always" would amount to 48. To derive the final PsyCap level, the manager needs to divide 48 by 12, the total number of items. Hence, his or her PsyCap level would amount to 4.

To properly test the PsyCap Quick Check, we conducted a validation study. We asked individuals with a minimum of 3 years of work experience and a current employment in the service sector focusing on consulting, banking and insurance to participate. A final amount of 27 professionals took part in the validation study. Each of the participants was required to individually answer the questions of the PsyCap Quick check which was provided online by means of an email link. The PsyCap Quick Check achieved a high reliability of $\alpha=0.85$ and a SD of 0.52 which corresponds to previous studies using the original 12-item questionnaire (Chen, 2015; Huang and Luthans, 2015; Luthans *et al.*, 2008a). The achieved mean was a PsyCap level of 4.09 with a minimum of 2.92 and a maximum of 4.92.

Please respond to the statements below and select the answer that describes best how you think about yourself in your work environment right now.

	Almost always	Often	Sometimes	Seldom	Almost never
I feel confident representing my work area in meetings with management.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I feel confident discussing the company's strategy.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I feel confident presenting to colleagues.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I find ways to solve troubles at work.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I see myself as successful at work.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I find ways to reach my work goals.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I meet the work goals I have set for myself.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I can manage my work "on my own" if I have to.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I take stress at work with ease.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I can go through difficult times at work as I've done so before.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I look on the bright side of things regarding my job.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I'm optimistic about my future regarding my job.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Figure 6: PsyCap quick check

Allocate: Identify your PsyCap profile

In a second step managers need to identify their individual PsyCap profile. Based on extant research we developed three central PsyCap profiles that emerge from managers' responses in the PsyCap Quick Check. Managers with PsyCap levels lower than 4.0 possess a PsyCap "Development Profile". Their PsyCap self-concept can range from slightly negative to moderately positive at most. Hence they are mixedly confident in relying on their PsyCap components to succeed in achieving their goals. They are likely to doubt their success potential, at least from time to time, which might prevent them from investing further motivated efforts towards goal achievement and thus from achieving best possible strategic decision-making outcomes. In our validation study, 41%, equivalent to 11 participants, exhibit a "Development Profile".

Managers with PsyCap levels ranging from 4.0 up to levels lower than 4.5 possess a PsyCap "Preserve Profile". They are characterized by an overall positive self-concept and are generally confident to rely on their PsyCap components to achieve goals. At the same time, they do not take goal achievement for granted and thus are not excessively confident of achieving their goal in any case. This overall positive but balanced self-concept spurs motivated efforts towards goal achievement and enhances strategic decision-making outcomes. Hence, "Preserve Profiles" are desirable. 37% or 10 of the participants in our validation study show PsyCap levels belonging to the "Preserve Profile".

Managers exhibiting PsyCap levels of 4.5 or higher have a PsyCap "Regulation Profile". They are excessively confident of their abilities and, along with this, are sure to succeed in achieving their desired goals in any case. Based on this inflated positive self-concept, they run the risk of perceiving the investment of additional efforts towards goal achievement as not necessary. Thus, they are inclined to refrain from investing further efforts

which can impair strategic decision-making outcomes. In our validation study, 22%, equivalent to 6 participants, exhibit a “Regulation Profile”. Table 6 summarizes the profiles.

	Development Profile	Preserve Profile	Regulation Profile
PsyCap Quick Check Levels	< 4.0	4.0 - < 4.5	≥ 4.5
Characteristics	<ul style="list-style-type: none"> Slightly negative to moderately positive self-concept Mixed confidence including self-doubts in relying on PsyCap to succeed in goal achievement 	<ul style="list-style-type: none"> Positive self-concept Confidence in relying on PsyCap to succeed in goal achievement but awareness of goal achievement not being granted 	<ul style="list-style-type: none"> Inflated positive self-concept Excessive confidence of succeeding in goal achievement in any case
Implications	<ul style="list-style-type: none"> Limited investment of motivated efforts to ensure goal achievement Prevention from best possible strategic decision-making 	<ul style="list-style-type: none"> Suitable investment of motivated efforts to ensure goal achievement Enhanced strategic decision-making 	<ul style="list-style-type: none"> Decrease of investment of motivated efforts Impaired strategic decision-making

Table 6. PsyCap quick check profiles

Act: Develop or regulate your PsyCap level

In a last step, managers with a PsyCap “Development Profile” or “Regulation Profile” should adapt their PsyCap level and attempt to move towards the desirable “Preserve Profile”. For that purpose, we developed checklists with concrete recommendations for each of these profiles.

Our recommendations for the “Development Profile” are based on existing PsyCap trainings that have been shown to successfully enhance PsyCap (Luthans *et al.*, 2006a; Luthans *et al.*, 2008b). These trainings split the development of PsyCap into two main tasks (Luthans *et al.*, 2008b) and we applied this split to the “Development Checklist”. Managers

need to follow the recommendations of both tasks in order to holistically increase their PsyCap level. The first task, “Setback Reframing”, mainly focuses on self-efficacy and resilience development and comprises four steps. Firstly, managers should imagine a concrete and recent work-related setback in which they felt circumstance were out of their control. This can for example refer to a recent decision of outsourcing selected processes which turns out create heavy processing frictions. Secondly, for this specific setback, managers have to critically reflect and differentiate in what was in and what was out of their control. Afterwards, they should focus on what was in their control and develop concrete actions involving their personal resources such as their experiences, their skills or their network they could have employed. In the fourth step, managers should repeat the exercise using an anticipated future setback. The steps of directing managers’ attention to a recent setback, re-framing its impact and specifying personal actions that they could have applied are required to increase managers’ awareness of their personal resources to deal with setbacks. Thereby, managers change their perception of the setback as partly controllable. Hence, managers perceive task mastery which increases their perceived self-efficacy (Luthans *et al.*, 2006a; Luthans *et al.*, 2008a). Additionally, managers develop resilience as they raise awareness of the personal resources they could use to respond to challenging circumstances (Luthans *et al.*, 2006a; Luthans *et al.*, 2008a). The repetition of the steps using an anticipated future setback strengthens managers’ learning experience and facilitates its transfer to possible future situations (Luthans *et al.*, 2008b). Following the four steps of “Setback Reframing”, managers can raise their self-efficacy and resilience. However, as self-efficacy and resilience are only two of four PsyCap components, managers also need to increase optimism and hope to successfully enhance their overall PsyCap.

To increase their optimism and hope, managers should follow the four steps of “Goal Splitting”. Similar to “Setback Reframing”, the task is split in four steps. First, managers

should define a personally valuable and reasonably challenging future work-related goal. This can relate for example to a manager's goal of achieving a certain sales growth within his or her department. In the second step, managers have to split their goal into smaller, more approximate subgoals. Thirdly, they should define concrete pathways on how to achieve the goals. Afterwards, their final task is to identify obstacles that might occur as well as suitable contingency plans to overcome these potential obstacles. The task to define a personally valuable and challenging future goal is required as it creates motivation (Luthans *et al.*; Snyder, 1995, 2002) and hence directly addresses managers' determination to pursue the goal (Snyder *et al.*, 1991; Snyder *et al.*, 1996). The definition of subgoals increases managers' perceived success and sustains their motivation as they can imagine their progress (Luthans *et al.*, 2006a; Snyder, 1995) and perceive the overall goal as more attainable (Luthans *et al.*, 2006a; Luthans *et al.*, 2008b). Thereby, these steps enhance managers' determination to achieve the goal, i.e. the agency dimension of hope (Snyder *et al.*, 1991; Snyder *et al.*, 1996). The specification of managers' pathways on how to achieve their set goals and of dealing with potential obstacles enhances the pathway dimension of hope as managers define ways towards goal achievement (Snyder *et al.*, 1991; Snyder *et al.*, 1996). Additionally, all of the steps increase managers' general optimism as they foster their positive outcome expectations (Luthans *et al.*, 2006a). Consequently, following the four steps of "Goal Splitting", managers can increase their optimism and hope. In combination with the task of "Setback Reframing", managers increase all four components of PsyCap and thus holistically enhance their PsyCap levels towards the "Preserve Profile". The full "Development Checklist" can be found in Appendix I.

For the checklist providing recommendations for PsyCap "Regulation Profiles", we also applied the already established split into two tasks but in this case with the goal of regulating overall PsyCap levels. To holistically regulate their PsyCap levels, managers need to follow

both tasks. Different, however, to the “Development Checklist”, resilience is not included in the “Regulation Checklist”. Previous studies analyzing the single components of PsyCap have shown excessive levels of self-efficacy, optimism and hope to worsen strategic decision-making (Levin *et al.*, 2000; Locke and Latham, 2004; Wood *et al.*, 1990) based on exaggerated confidence (Beck and Schmidt, 2012; Papenhausen, 2010; Polivy and Herman, 2002; Segerstrom, 2001; Stone, 1994). For resilience, however, previous studies suggest that it improves strategic decision-making outcomes as it mitigates stress and improves coping (e.g., Ong *et al.*, 2006; Parker *et al.*, 2015) which is why we excluded it.

The first task of the “Regulation Checklist” is a “Pre-mortem Development”. It serves specifically for regulating managers’ excessive perceived self-efficacy and synthesizes existing, successful methodologies (Kahneman *et al.*, 2010; Klein, 2008). Managers need to follow four steps. First, managers should specify a concrete upcoming decision-making situations. This can for example refer to the decision of whether or not to introduce a new product. Second, managers have to imagine that their decision has led to the worst possible outcomes and to detail these outcomes. In the third step, their task is to list all potential reasons that might have led to the occurrence of the negative outcomes. This includes also their own mistakes. Based on these insights, managers finally have to rethink their decision involving the formulation of potential precautionary measures or the clarification of further questions relevant for the decision that were raised during steps one to three. The steps of taking time to think through worst possible decision-making outcomes including managers’ own failures are required to sensitize managers for potential problems and mistakes early on (Klein, 2008). This reduces excessively self-efficacious managers’ tendency to just go ahead. Their exaggerated perceived ability to reach goals in any case is reduced (Kahneman *et al.*, 2010; Klein, 2008). Hence, when managers follow the four steps of “Pre-mortem Development” they can regulate excessive self-efficacy. However, to comprehensively

regulate excessive levels of overall PsyCap, managers also need to regulate excessive optimism and hope.

To regulate excessive optimism and hope, managers can conduct an “External Review”. This task is based on the work of Kahneman and Lovallo (Kahneman and Lovallo, 1993; Lovallo and Kahneman, 2003). It also takes into account study results that have emphasized the relevance of an external perspective in related contexts such as debiasing (Meissner and Wulf, 2016). The task involves five steps. First, managers should think of decisions that are comparable to their current decision and create a reference class of outcomes. Returning to the aforementioned example of introducing a new product, managers should specify examples of product introductions that are comparable to their current decision situation as well as their outcomes. Second, they have to specify the distribution of outcomes. If possible, they should quantify this distribution, for example in terms of achieved sales, and derive the extremes, the average as well as clusters (Lovallo and Kahneman, 2003). Let’s assume the minimum sales to amount to €2M, the maximum to amount to €55M and the average sales of comparable product introduction cases to amount to €20M. Third, managers should make a first intuitive prediction of their position in the distribution. For example, they might predict to achieve sales of €40M. Afterwards, managers’ task is to critically reflect their own prediction reliability. By including past predictions and actual outcomes they should determine how well on average their predictions have forecasted outcomes using a value between 0 and 1. 0 indicates that their past predictions were completely unrelated to the actual outcomes. 1 indicates perfect predictions (Lovallo and Kahneman, 2003). In our example, let’s assume the prediction reliability to be 0.7. Finally, managers have to correct their initial prediction towards a more realistic one, incorporating their prediction reliability. Mathematically, they would have to operate the following (Lovallo and Kahneman, 2003), leading to a corrected predicted sales estimate of €26M.

$$€40M + [0.7 (€20M - €40M)] = €26M$$

By taking an external view, excessively optimistic expectations have been shown to become much more objective and reliable (Kahneman and Lovallo, 1993; Lovallo and Kahneman, 2003). Through the steps in the checklist, managers are encouraged to incorporate external, de-facto information of comparable cases. They are forced to adjust their initial expectations and decisions accordingly instead of focusing on the present case as unique, falling into the trap of overoptimistic predictions (Kahneman and Lovallo, 1993; Lovallo and Kahneman, 2003). Hence, the checklist regulates managers' excessive optimism. It also regulates excessive hope as pathway and agency thoughts are also recalibrated towards the adjusted goal. Consequently, if a quantification of outcomes in step two is not possible or desired, all steps of taking an "External Review" are also suitable to be pursued qualitatively as this equally ensures an adjustment of managers' initial expectations towards more realistic predictions. When pursuing both tasks, the "Pre-mortem Development" as well as taking an "External Review", managers can regulate their overall PsyCap levels towards the "Preserve Profile". The full "Regulation Checklist" can be found in Appendix J.

5. Conclusion

Theory and empirical findings suggest that PsyCap exerts TMGT effects on strategic decision-making outcomes, partly driven by its effect on motivated efforts invested during the decision process and resulting information processing styles. Based on these findings and the malleability of PsyCap, we offer a scientifically based, three-step-approach allowing for a pragmatic assessment, allocation and adaption of managers' PsyCap level. While the PsyCap Quick Check and the resulting PsyCap Profiles allow for a brief assessment and allocation of managers' PsyCap level, the corresponding checklist provides guidance on how to either develop or regulate present PsyCap levels to improve resulting strategic decision-making outcomes.

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APPENDIX

Appendix A

Relevant studies on the effects of self-efficacy, optimism, hope and resilience on the identification phase of strategic decision making

PsyCap component	Author (Year)	Research focus	Method and sample	Central variables	Central findings
Self-efficacy	Appelbaum and Hare (1996)	Examination of the role of self-efficacy for motivation, goal setting and performance and derivation of implications for human resource management.	Literature review	Self-efficacy, motivation, goal-setting, performance	Synthesis of findings on self-efficacy in the context of personal goal setting and assigned goals and development of human resource applications. Self-efficacy leads to the setting of more challenging personal goals. Assigned goals can impact self-efficacy such that challenging, yet achievable goals can lead to stable self-efficacy beliefs. Furthermore, self-efficacy increases goal commitment which can converge assigned goals and personal goals. In the human resource context, self-efficacy is considered to be of relevance in personnel selection, trainings, performance appraisal and absenteeism.
	Bandura and Wood (1989)	Analysis of the influence of environmental organizational factors, self-regulatory mechanisms comprising self-efficacy, personal goal setting and analytical thinking and performance in complex managerial decision-making.	Application of a complex decision making simulation game and survey; 60 graduate business students	Organizational controllability, performance standards, past performance, self-efficacy, personal goal setting, analytic strategies, performance	Participants operating under high perceived controllability and low stringency of performance show higher and improving levels of self-efficacy and more efficient use of analytic strategies. Participants operating under high perceived controllability show more challenging personal goal setting and improved organizational performance, while operating under high performance standards decreases challenging goal setting. Additionally, self-efficacy enhances challenging personal goal setting and analytical strategies. Challenging personal goals and analytical strategies enhance performance and partly mediate the relationship between self-efficacy and performance. Personal goals are also indirectly related to performance through analytical strategies.

PsyCap component	Author (Year)	Research focus	Method and sample	Central variables	Central findings
	Earley and Lituchy (1991)	Analysis of the interplay between efficacy, goal-setting and performance comparing three efficacy-goal models.	Study 1: Application of a calculation task and survey; 100 business students Study 2: Application of a computer simulation and survey; 100 business students Study 3: Application of a field study and survey; 127 business students	Multi-directional modelling on the variables assigned goal, trait efficacy, ability, self-efficacy, personal goal, performance valence (satisfaction of goal achievement), performance	Empirical comparison of three goal-efficacy models, where the model in which self-efficacy is an antecedent of personal goal setting overall shows best fit to the data analyzed. Self-efficacy consistently enhances challenging personal goal setting. Personal goals partially mediate the relationship between self-efficacy and performance.
	Gist (1987)	Examination of the concept of self-efficacy and the relevance of self-efficacy for organizational behavior and human resource management.	Literature review	Self-efficacy, goal-setting, feedback, intrinsic interest and motivation	In the motivational context, self-efficacy is considered to positively impact the level of goal setting, to reciprocally interact with feedback and to relate to intrinsic interest and motivation. In the human resource context, self-efficacy is considered to be of relevance for example in personnel selection, training and vocational counseling and leadership.
	Philips and Gully (1997)	Analysis of an integrated model of a set of individual differences, self-efficacy, goal setting, need for achievement and performance.	Application of a survey and of secondary data (grades earned) 405 students	Ability, learning goal orientation, performance goal orientation, locus of control, self-efficacy, self-set goals, performance	Ability, learning goal orientation and locus of control enhance self-efficacy. Self-efficacy enhances self-set goals. Self-set goals partly mediate the relationship between self-efficacy and performance.

PsyCap component	Author (Year)	Research focus	Method and sample	Central variables	Central findings
	Wood and Bandura (1989)	Overview article and meta-analysis of the interaction of environmental organizational factors, individuals' self-regulatory mechanisms comprising self-efficacy, personal goal setting and analytical strategies and performance in complex managerial decision making.	Overview article summarizing and analyzing data of previous studies	Conception of managerial capabilities, organizational controllability, performance standards, organizational complexity, past performance, self-efficacy, personal goal setting, analytic strategies, performance	Conception of managerial skills as acquirable vs. as stable results in higher, stable self-efficacy, challenging personal goal setting, efficient use of analytic strategies and enhanced organizational performance. Participants operating under perceived organizational controllability show stable self-efficacy, set increasingly challenging personal goals and apply analytic strategies and show higher organizational performance. Additionally, self-efficacy enhances challenging personal goal setting and analytical strategies. Challenging personal goals and analytical strategies enhance performance and partly mediate the relationship between self-efficacy and performance. Personal goals are also indirectly related to performance through analytical strategies.
	Wood et al. (1990)	Analysis of the influence of environmental organizational factors, self-regulatory mechanisms comprising self-efficacy, personal goal setting and analytical thinking and performance in complex managerial decision-making.	Application of a complex decision making simulation game and survey; 60 graduate business students	Assigned goals, task complexity, , past performance, self-efficacy, personal goal setting, analytic strategies, performance	Participants operating under challenging assigned goals and low task complexity show higher organizational performance. Self-efficacy enhances challenging personal goal setting and analytical strategies. Challenging personal goals and analytical strategies enhance performance and partly mediate the relationship between self-efficacy and performance.

PsyCap component	Author (Year)	Research focus	Method and sample	Central variables	Central findings
Optimism	Luthans (2002)	Proposition of a positive organizational behavior approach and its implications in the workplace.	Theoretical paper	Self-efficacy, hope, optimism, well-being, emotional intelligence	Proposition of self-efficacy, hope, optimism, well-being and emotional intelligence as concepts for positive organizational behavior, positively impacting workplace performance. Optimism is described as the heart of positive organizational behavior and its characteristics are considered to enhance aspiration levels and challenging goal setting.
	Peterson (2000)	Examination of the characteristics of optimism.	Theoretical paper	Optimism	Reflection on the development of optimism and the emergence of different types of optimism comprising optimism as human nature, as individual characteristic, dispositional optimism and optimistic explanatory style. Discussion of issues within optimism research including the difference of specific versus general optimism, the dichotomy of pessimism and optimism and the relevance of reality in optimism. Description of optimism as increasing the belief of and efforts to achieving goals despite facing difficulties.
	Scheier and Carver (1985)	Analysis of the optimism scale.	Study 1: Application of a survey; > 1000 undergraduates Study 2: Application of a survey; > 100 undergraduates Study 3: Application of a survey; 141 undergraduates	Optimism, large set of alternative variables to assess optimism's convergent and discriminant validity (e.g., self-esteem), physical symptoms	Optimism scale reported as appropriate measurement for the investigation of optimism. Optimism shown as factor to explain physical symptom experience. In this regard, reflection of the relevance of goal-attainment, as mediating factor contributing to the positive effects of optimism on physical symptom experience (less symptoms).
	Snyder et al. (1991)	Analysis of the validity of the hope scale.	Empirical validation study of the hope scale; 6 college student samples comprising between 339 to 995 participants; 2 psychological	Hope, large set of alternative variables to assess hope's convergent and discriminant validity (e.g. problem solving	Demonstration of internal consistency, test-retest reliability, factor structure and agency and pathways components of the hope scale. Description of relationship between hope and goal-setting. Hope is significantly positively related with the number of goals set as well as with goal difficulty. Hope is further significantly positively related to perceived problem solving ability. Optimism is included as alternative construct, considered to potentially lead to the selection of increasingly

PsyCap component	Author (Year)	Research focus	Method and sample	Central variables	Central findings
			treatment samples, comprising 97 and 109 participants	ability), goal-related behavior	difficult goals as it supports a positive goal approach instead of an avoidance approach.
	Zhang and Fischbach (2010)	Analysis of counteractive optimism, a self-regulation mechanism as response to anticipated obstacles, as driver of future goal achievement predictions.	Study 1: Application of computer simulation and survey; 191 students Study 2: Application of field tasks and survey; 104 students Study 3: Application of an experimental reading task; 389 students Study 4: Application of computer tasks; 85 students Study 5: Application of computer tasks; 64 students	Anticipated obstacle level, accuracy motivation, sense of control, predicted performance, time allocation, persistence, predicted/actual task completion	Support of the relevance of counteractive optimism in fostering optimistic predictions of goal achievement: In case of high (vs. low) anticipated obstacles, individuals invest more time in goal related activities, predict enhanced performance and lower health risks. Accuracy motivation and sense of control moderates these relationships.
Hope	Snyder et al. (1991)	Analysis of the validity of the hope scale.	Empirical validation study of the hope scale; 6 college student samples comprising between 339 to 995 participants; 2 psychological treatment samples, comprising 97 and 109 participants	Hope, large set of alternative variables to assess hope's convergent and discriminant validity (e.g. problem solving ability), goal-related behavior	Demonstration of internal consistency, test-retest reliability, factor structure and agency and pathways components of the hope scale. Description of relationship between hope and goal-setting. Hope is significantly positively related with the number of goals set as well as with goal difficulty. Hope is further significantly positively related to perceived problem solving ability. Optimism is included as alternative construct, considered to potentially lead to the selection of increasingly difficult goals as it supports a positive goal approach instead of an avoidance approach.

PsyCap component	Author (Year)	Research focus	Method and sample	Central variables	Central findings
	Snyder et al. (1998)	Analysis of the role of hope for self-referential thinking.	Study 1: Application of an audiotape experiment and survey; 33 students Study 2: Application of an audiotape experiment and survey; 46 students	Hope, listening preferences, memory (recall of items)	Conceptualization of hope as fostering positive self-views and setting a higher amount and more challenging goals. Support of the relevance of hope for self-referential thinking: High-hope is significantly positively related to positive self-referential information input. High-hope individuals as compared to low hope individuals remember and generate significantly less negative information input.
Resilience	Linnenluecke (2017)	Examination of the role of resilience in business and management research.	Literature review	Resilience	Literature review on resilience and identification of key research areas of resilience. Resilience research areas comprise resilience as organizational response, as organizational reliability, as employee strength, as adaptability of business models and as design principle in the context of supply chain vulnerability.
	Kossek and Perrigino (2016)	Examination of the role of resilience at the occupational level.	Literature review	Resilience	Literature review on resilience at the occupational level and development of a multi-level occupational resilience framework. Resilience is considered as response to cognitive, emotional or physical stress triggers, mediating the effect of these stressors on adaptive performance, risk taking and well-being.

Appendix B

Relevant studies on the effects of self-efficacy, optimism, hope and resilience on the development phase of strategic decision making

PsyCap component	Author (Year)	Research focus	Method and sample	Central variables	Central findings
Self-efficacy	Bandura and Jourden (1991)	Analysis of the influence of social comparison conditions and their relation with self-efficacy, analytic strategies, dissatisfaction and organizational performance.	Application of a complex decision making simulation game and survey; 60 graduate students	Social comparison, self-efficacy, self-set goals, self-set reactions, analytic strategies, organizational performance	Social comparison conditions affect participants perceived self-efficacy, use of analytical strategies and level of reactions (e.g., dissatisfaction) and organizational performance. Participants operating under the condition with incremental improvements compared to the group they are compared with show moderate initial self-efficacy levels. These levels increase throughout the simulation game. Further, their application of analytic strategies strongly increases. In the condition where participants are seemingly constantly superior to their peers, initial self-efficacy levels are high and remain high. Their application of analytical strategies increases only very slightly. Performance increases are best for participants operating under incremental improvements and initial moderate but rising self-efficacy levels while participants under the superior condition show a decreasing performance.
	Bandura and Wood (1989)	Analysis of the influence of environmental organizational factors, self-regulatory mechanisms comprising self-efficacy, personal goal setting and analytical thinking and performance in complex managerial decision-making.	Application of a complex decision making simulation game and survey 60 graduate business students	Organizational controllability, performance standards, past performance, self-efficacy, personal goal setting, analytic strategies, performance	Participants operating under high perceived controllability and low stringency of performance show higher and improving levels of self-efficacy and more efficient use of analytic strategies. Participants operating under high perceived controllability show more challenging personal goal setting and improved organizational performance, while operating under high performance standards decreases challenging goal setting. Additionally, self-efficacy enhances challenging personal goal setting and analytical strategies. Challenging personal goals and analytical strategies enhance performance and partly mediate the relationship between self-efficacy and and performance. Personal goals are also indirectly related to performance through analytical strategies.

PsyCap component	Author (Year)	Research focus	Method and sample	Central variables	Central findings
	Beck and Schmidt (2012)	Analysis of the influence of changes in self-efficacy on resource allocation and performance depending on individuals' initial level of self-efficacy.	Study 1: Stock prediction task, survey; 85 undergraduate students Study 2: Stock prediction task, survey; 86 undergraduate students	Self-efficacy, resource allocation, goal difficulty, performance	Within-person increases at low levels of self-efficacy increase resource allocation, measured as number of information pieces collected, while increases at high levels of self-efficacy decrease resource allocation. Hence, increases and decreases in self-efficacy have different effects on resource allocation depending on individuals' initial self-efficacy levels. Resource allocation mediates the relationship between self-efficacy and performance. Additionally, goal difficulty moderates these relationships.
	Luthans et al. (2006b)	Examination of the concept of PsyCap.	Theoretical book	PsyCap, self-efficacy, optimism, hope, resilience	Description of the concept of PsyCap and its components. Examination of antecedents, effects and potential threats of each of PsyCap's components.
	Malmendier and Tate (2008)	Analysis of the impact of CEO overconfidence on the amount and value of mergers.	Secondary data set (publicly traded data on the company, CEO articles, merger databases, compustat data, personal public CEO data); 394 firms, 738 CEOs	Overconfidence, merger frequency, internal resources, deal quality	CEO overconfidence increases the amount of acquisitions made in case of perceived undervaluation of the "own" firm and overestimation of potential gains from the merger. CEO overconfidence increases the likelihood of lower-quality acquisitions in case of a high amount of internal resources.
	Schmidt and DeShon (2010)	Analysis of the impact of performance ambiguity on the relationship between self-efficacy and performance.	Application of a computerized anagram task and survey, 73 undergraduates	Performance ambiguity, ability, self-efficacy, effort, performance	Self-efficacy negatively relates to performance under high performance ambiguity and positively relates to performance under low ambiguity. Self-efficacy negatively relates to effort under high performance ambiguity and positively relates to effort under low ambiguity. Effort mediates the interactive effect of self-efficacy and performance ambiguity on performance.

PsyCap component	Author (Year)	Research focus	Method and sample	Central variables	Central findings
	Seijts et al. (2004)	Analysis of the impact of different goal conceptions on performance.	Application of a computer simulation and survey; 170 business school students	Goal orientation, self-efficacy, information search, performance	In a complex task, self-efficacy and information search mediate the effect of a challenging learning goal on performance. Self-efficacy is significantly positively related to information search. In terms of the effects of goal conception, conceptions of goals as challenging learnings goals lead to higher performance as compared to do your best or performance goals.
	Simon and Houghton (2003)	Analysis of the impact of overconfidence on risky product introductions.	Application of interviews, survey and firm data analyses; 55 CEOs or direct CEO reports	Overconfidence, extreme certainty, achieved success, pioneering product introductions	Overconfidence increases risky, pioneering product introductions. Extreme certainty increases risky, pioneering product introductions. Achieved success negatively impacts pioneering product introductions.
	Smit and Kil (2017)	Examination of behavioral biases of decision makers in the context of acquisitions and outline of a toolkit to address them.	Theoretical paper	Illusion of Control, Overconfidence, Optimism, Confirmation and commitment bias	Discussion of behavioral biases in executive decision making including overconfidence and optimism. Overconfidence narrows the actual potential variance of investment payoffs resulting in a perception of a more certain payoff than is warranted. Optimism shifts expectations about an acquisition up towards higher return/cash flow expectations and can also increase perceived probability of these expected positive outcomes. Development of toolkit overcome behavioral pitfalls.
	Stone (1994)	Analysis of the effects of self-efficacy judgements on decision processes and performance.	Study 1: Demonstration of an option choice experiment and survey; 47 students Study 2: Application of an option choice experiment and survey; 139 students	Self-efficacy, information search, cognitive processing, choice accuracy	Initial judgements of self-efficacy in cognitively complex tasks are overconfident. At moderate performance expectations (self-efficacy), variability in information search is higher and cognitive choices take longer. Variability in information search and the duration of cognitive choices are significantly positively related to choice accuracy and partly mediate the relationship between self-efficacy and choice accuracy.

PsyCap component	Author (Year)	Research focus	Method and sample	Central variables	Central findings
	Tasa and Whyte (2005)	Analysis of the relationship between collective efficacy and problem solving in group decision-making.	Application of a computer simulation and survey; 162 students	Collective efficacy, vigilant problem solving, decision outcome	Collective efficacy has a significant curvilinear relationship with vigilant problem solving such that in case of moderate efficacy, vigilant problem solving is highest. Vigilant problem solving is significantly positively related with decision outcome and mediates the relationship between collective efficacy and decision outcome.
	Vancouver et al. (2002)	Analysis of the effects of self-efficacy on performance.	Study 1: Application of an analytic game and survey; 87 undergraduates Study 2: Application of an analytic game and survey; 104 undergraduates	Self-efficacy, level of confidence, logic errors, performance	High levels of induced self-efficacy negatively relate to subsequent performance (within person measurement). Self-efficacy positively relates to overconfidence and increases the likelihood of committing logic errors.
	Whyte (1998)	Examination of the role of collective efficacy for lacking vigilance in decision making.	Theoretical paper	Perceived collective efficacy, concurrence seeking, group polarization, groupthink	Development of a new framework on groupthink in which efficacy is the central explanatory variable for groupthink leading to decreasing vigilance in information processing and increasing risk taking.
	Wood and Bandura (1989)	Overview article and meta-analysis of the interaction of environmental organizational factors, individuals' self-regulatory mechanisms comprising self-efficacy, personal goal setting and analytical strategies and performance in	Overview article summarizing and analyzing data of previous studies	Conception of managerial capabilities, organizational controllability, performance standards, organizational complexity, past performance, self-efficacy, personal goal setting,	Conception of managerial skills as acquirable vs. as stable results in higher, stable self-efficacy, challenging personal goal setting, efficient use of analytic strategies and enhanced organizational performance. Participants operating under perceived organizational controllability show stable self-efficacy, set increasingly challenging personal goals and apply analytic strategies and show higher organizational performance. Additionally, self-efficacy enhances challenging personal goal setting and analytical strategies. Challenging personal goals and analytical strategies enhance performance and partly mediate the relationship between self-efficacy and performance.

PsyCap component	Author (Year)	Research focus	Method and sample	Central variables	Central findings
Optimism		complex managerial decision making.		analytic strategies, performance	Personal goals are also indirectly related to performance through analytical strategies.
	Wood et al. (1990)	Analysis of the influence of environmental organizational factors, self-regulatory mechanisms comprising self-efficacy, personal goal setting and analytical thinking and performance in complex managerial decision-making.	Application of a complex decision making simulation game and survey; 60 graduate business students	Assigned goals, task complexity, , past performance, self-efficacy, personal goal setting, analytic strategies, performance	Participants operating under challenging assigned goals and low task complexity show higher organizational performance. Self-efficacy enhances challenging personal goal setting and analytical strategies. Challenging personal goals and analytical strategies enhance performance and partly mediate the relationship between self-efficacy and and performance.
	Eid et al. (2005)	Analysis of the effects of optimism and situational awareness in the context of a field training exercise.	Application of a field experiment and survey; 132 military cadets	Dispositional optimism, situational awareness	Optimism significantly negatively relates to perceived situational awareness.
	Geers and Lassiter (2002)	Analysis of the effects of optimism on the realization of discrepancies between expectations and de-facto experiences.	Study 1: Application of a video experiment and survey; 122 students Study 2: Application of a video experiment and survey; 105 students	Affective expectation, optimism, pessimism, affective experience	Highly optimistic individuals assimilate their inconsistent affective experience towards their initial expectations. Highly optimistic individuals are significantly less likely to recognize a contradiction in affective expectation and experience compared to pessimists.

PsyCap component	Author (Year)	Research focus	Method and sample	Central variables	Central findings
	Gibson and Sanbonmatsu (2004)	Analysis of the relationship between optimism and behavior in the context of gambling.	Study 1: Application of a survey; 70 students Study 2: Application of a gambling experiment; 118 students Study 3: Application of a gambling experiment; 120 students	Optimism, gambling expectations, maintenance of expectations, adaption of betting behavior, memory of wins	Optimists are more likely to believe winning in gambling than pessimists. While there is a significant relationship for pessimism between prior performance and subsequent betting, such that pessimists reduce betting after experiencing feedback in the form of losses, this relationship is not significant for optimism. Optimists overestimate past performance while pessimists underestimate past performance.
	Mazutis and Eckhardt (2017)	Examination of biases in strategic decision making that prevent decision makers from adopting sustainable strategies in the context of climate change.	Theoretical paper	Perception bias, optimism bias, relevance bias, volition bias, problem identification, alternative generation, alternative evaluation, strategic choices	Description of the impact of biases on sustainable strategic decision making in the context of climate change. Description of high levels of optimism as optimism bias that lead to an underestimation of future negative effects and a reduction of assessing a broad set of alternatives in pursuing more sustainable decision making. Development of mitigating strategies to overcome the biases such as employing a pre-mortem or taking an external view to tackle the optimism bias.
	Papenhausen (2010)	Analysis of the influence of optimism on managerial search.	Application of a business simulation game and survey; 194 participants	Optimism, search behavior	Optimism exhibits a significant curvilinear relationship with managerial search such that at moderate levels of optimism, managerial search is the highest.
	Radcliff and Klein (2002)	Analysis of the relationship of optimism with processing and memory of risk health information.	Application of an essay reading task and survey; 146 adults	Optimism, unrealistic optimism, risk, belief profile, knowledge,	Unrealistic optimists recall less health risk relevant information. Unrealistic optimists select information gathering in a self-favoring manner. Unrealistic optimists believe to be at lower absolute health risk levels as compared to dispositional optimists. Unrealistic optimists hold optimistic risk beliefs for themselves

PsyCap component	Author (Year)	Research focus	Method and sample	Central variables	Central findings
Hope				information processing	but not for others whereas dispositional optimists hold optimistic beliefs for themselves and others.
	Segerstrom (2001)	Analysis of the effects of optimism and pessimism on attentional biases in the context of a stroop task.	Application of an experimental stroop task and survey; 48 students	Optimism, interference (defined as response latency for stimuli of interest), skin conductance response (SCR)	Optimism is related to a greater attentional bias towards positive stimuli as compared to negative stimuli, measured as interference. Optimism is further associated with slower SCRs for negative stimuli. Moderate optimists show most balance processing of stimuli.
	Spirrison and Gordy (1993)	Analysis of the effects of the constructive thinking inventory and performance.	Application of a proofreading task and survey; 193 students	Constructive Thinking Inventory, error detection	Naive optimism, a specific domain of constructive thinking, is significantly negatively related to the number of detected errors in a proofreading passage.
	Chang (1998)	Analysis of the relationship of hope and problem-solving related abilities and coping.	Application of a survey; 211 students	Hope, problem solving, coping activities, life satisfaction	High hope groups (vs. low hope) significantly differ in problem solving dimensions such that high hope individuals show greater problem solving abilities, for example in terms of positive problem orientation and rational problem solving.
	Cohen-Chen et al. (2014)	Analysis of the role of hope and fear on information processing in the context of political conflicts.	Application of a computer simulation (mock news site) and survey; 222 participants	Political conflict, fear, hope, information processing	Hope enhances positively biased information processing in favor of finding a solution for a political conflict. Fear decreases positively biased information processing in favor of finding a solution for a political conflict. Hence, Hope biases information acquisition towards positive, solution oriented information while fear biases information acquisition towards information leading to a reject of the proposed conflict solution.

PsyCap component	Author (Year)	Research focus	Method and sample	Central variables	Central findings
	de Mello et al. (2007)	Analysis of the effects of hope on motivated reasoning in the context of consumer behavior.	Study 1: Application of a reading and evaluation task and survey; 99 students Study 2: Application of a video watching and evaluation task and survey; 81 students Study 3: Application of an information collection and evaluation task; 101 students	Confidence in achieving a hoped-for outcome, motivated reasoning (information search, brand evaluation), weight give to positive/negative information	Differences in confidence in achieving a hoped-for outcome lead to significant differences in motivated reasoning such that groups with lower confidence show higher motivated reasoning in favor of the hoped-for outcome. Decreasing confidence in achieving a hoped-for outcome increases selective information search, decreases information discrimination in evaluating high and low credibility arguments and leads to an underweighting of negative information (which is contrary to the hoped-for goal).
	Luthans et al. (2006b)	Examination of the concept of PsyCap.	Theoretical book	PsyCap, self-efficacy, optimism, hope, resilience	Description of the concept of PsyCap and its components. Examination of antecedents, effects and potential threats of each of PsyCap's components.
	MacInnis and Chun (2006)	Examination of the concept of hope in the context of consumer behavior, focusing on its relevance for individuals' behavior.	Theoretical paper	Hope, information processing, self-deception, risk-taking, product satisfaction, life satisfaction, materialism	Review on the concept of hope in the context of consumer behavior. Theoretical derivation of relevant effects of hope including biased information processing and increased risk taking. Information processing might be biased by hope through positive or negative misinterpretation or selective attention. Risk taking is considered to be influenced by hope as hope might motivate individuals to follow risky paths in order to achieve their yearned for goals.
	MacInnis and de Mello (2005)	Examination of the role of hope for evaluative judgements and choices in the context of consumer behavior.	Theoretical paper	Hope, information processing, risk perception, satisfaction, self-regulation	Theoretical derivation of propositions on hopes' effect on information processing and attention focus, satisfaction, risk-taking and self-regulation. Regarding information processing and attention, in the presence of high involvement and high hope, information processing is considered to be motivated based on the suggestion to achieve the desired outcome and information attention is selective towards information congruent

PsyCap component	Author (Year)	Research focus	Method and sample	Central variables	Central findings
					with desired outcome. The length of information search depends on the nature of information encountered such that if the information confirms that the goal congruent outcome is possible, search terminates whereas if it suggests it is not, search continues. Elaboration of information is extensive and prone to a confirmation bias for information suggesting that desired outcome is possible and criteria for judging information are weaker for information suggesting that desired outcome is possible and stricter for those suggesting the desired outcome is not possible. In the context of risky choices, high hope reduces perceptions that a potential negative consequence occurs and thus increases the willingness to bear risk.
	Polivy and Herman (2002)	Examination of the "false hope syndrome" in the context of self-changes and its psychological consequences.	Theoretical paper	Hope, psychological and physical consequences	Review of the reasons for false hope and description of a false hope model in which initially unrealistic assumptions of about the overall achievability of the self-change goal motivate the individual to commit to change. After initial progress with changes becoming more difficult to achieve and to sustain, further progress fail to materialize. Failure is softened by attributions not focusing on the initially unrealistic goal.
	Snyder et al. (1991)	Analysis of the validity of the hope scale.	Empirical validation study of the hope scale; 6 college student samples comprising between 339 to 995 participants; 2 psychological treatment samples, comprising 97 and 109 participants	Hope, large set of alternative variables to assess hopes' convergent and discriminant validity (e.g. problem solving ability), goal-related behavior	Demonstration of internal consistency, test-retest reliability, factor structure and agency and pathways components of the hope scale. Description of relationship between hope and goal-setting. Hope is significantly positively related with the number of goals set as well as with goal difficulty. Hope is further significantly positively related to perceived problem solving ability. Optimism is included as alternative construct, considered to potentially lead to the selection of increasingly difficult goals as it supports a positive goal approach instead of an avoidance approach.

PsyCap component	Author (Year)	Research focus	Method and sample	Central variables	Central findings
	Snyder et al. (1996)	Analysis of the validity of the hope scale.	Empirical validation study of the state hope scale; 4 student samples between 74 to 168 participants	Hope, performance	Support of internal consistency of the state hope scale as well as of the presence of its sub factors agency and pathways that exhibit high internal consistency each. Support for the hope scales construct validity as well as its discriminant validity as compared to other concepts. Support of the predictive power of the hope scales as it significantly positively relates to correct answers achieved in a complex learning task.
	Snyder et al. (1998)	Analysis of the role of hope for self-referential thinking.	Study 1: Application of an audiotape experiment and survey; 33 students Study 2: Application of an audiotape experiment and survey; 46 students	Hope, listening preferences, memory (recall of items)	Conceptualization of hope as fostering positive self-views and setting a higher amount and more challenging goals. Support of the relevance of hope for self-referential thinking: High-hope is significantly positively related to positive self-referential information input. High-hope individuals as compared to low hope individuals remember and generate significantly less negative information input.
Resilience	Fiol and Connor (2003)	Examination of the relevance of mindfulness for decision makers in the context of bandwagon decisions.	Theoretical paper	Decision structures, reluctance to simplify, resilience, preoccupation with failure, mindfulness, information scanning, information processing, decision-making outcome	Development of a model in which mindfulness of decision makers is considered as decisive factor to avoid imprudent pursuing of generally accepted strategies ('bandwagons') and to foster search for further information and their suitable interpretation. Resilience is presented as key influencing factor of mindfulness.

PsyCap component	Author (Year)	Research focus	Method and sample	Central variables	Central findings
	Shin and Kelly (2015)	Analysis of the effects of resilience on decision-making strategies in the career decision-making context.	Application of a survey, 364 college students	Resilience, career decision making strategies, career decision making difficulties	Resilience decreases overall career decision difficulties. Resilience decreases lack of information and inconsistent information. Resilience is significantly positively related to information processing, information gathering, effort invested in the process, speed of making the final decision and willingness to compromise.
	Sutcliffe and Vogus (2003)	Examination of the characteristics of resilience and its mechanisms in responding to threats.	Theoretical paper	Threats, resilience, information processing, loosening of control, utilization of slack capabilities (cognitive, relational, emotional), enabling conditions (competence, growth, efficacy), strategic adjustments	Development of a framework in which resilience is presented as desirable response to potential threats leading to broader information processing, decentralizing authority and the deployment of organizational employment which in turn allow for positive adjustment. Resilience is considered to be facilitated through enabling conditions such as growth, competencies and efficacy.

Appendix C

Relevant studies on the effects of self-efficacy, optimism, hope and resilience on the selection phase of strategic decision making

PsyCap component	Author (Year)	Research focus	Method and sample	Central variables	Central findings
Self-efficacy	Dulebohn (2002)	Analysis of the effects of a broad set of demographic and psychological individual characteristics on risk behavior in the context of investment decisions in retirement plans.	Application of investment allocation scenarios and survey; 759 college and university employees	Income, age, participation on other plans, locus of control, self-efficacy, knowledge, gender, general risk propensity, investment risk behavior, loss tolerance	Personal demographics including income and other retirement plan investment are significantly positively related to investment risk taking and real loss tolerance. Age is significantly negatively related to investment risk taking and real loss tolerance. Self-efficacy, knowledge and general risk propensity are significantly positively related to investment risk taking and real loss tolerance. Among other variables, self-efficacy is further a significant predictor of increasing investment risk taking and real loss tolerance.
	Knight et al. (2001)	Analysis of the effects of both external and individual-specific factors on risk dimensions of firm strategy.	Application of an experimental compute -simulation and survey; 264 students	Goal difficulty, monetary incentives, collective efficacy, strategic risk, tactical implementation, strategic risk, performance, tactical implementation	Goal difficulty enhances choosing risky strategies. Collective efficacy also enhances choosing risky strategies and partly mediates the relationship between goal difficulty and choosing risky strategies. Monetary incentives decrease choosing risky strategies in case of easy goals.
	Krueger and Dickson (1994)	Analysis of the effects of self-efficacy on opportunity perception and resulting risk behavior.	Application of experimental dilemma decision making and gambling tasks and survey; 153 business students	Self-efficacy, opportunity and threat perception, risk taking	Self-efficacy increases risk taking. Additionally, self-efficacy increases opportunity perception and decreases threats perception. Opportunity and threats perception mediate the relationship between self-efficacy and risk taking.

PsyCap component	Author (Year)	Research focus	Method and sample	Central variables	Central findings
Optimism	Whyte (1998)	Examination of the role of collective efficacy for lacking vigilance in decision making.	Theoretical paper	Perceived collective efficacy, concurrence seeking, group polarization, groupthink	Development of a new framework on groupthink in which efficacy is the central explanatory variable for groupthink leading to decreasing vigilance in information processing and increasing risk taking.
	Whyte et al. (1997)	Analysis of the effects of self-efficacy on escalating commitment in decision-making.	Application of an experimental decision making task and survey; 132 business students	Self-efficacy, escalating commitment, risk taking, investment	High Self-efficacy (vs. low) implies increases in escalating commitment to a losing course of action, in willingness to take risk to turn around a losing course of action and in investments devoted to a losing course of action.
	Åstebro et al. (2007)	Analysis of the role of optimism, sunk costs and overconfidence in investment decisions.	Usage of real-life inventor advice data and survey; 780 inventors for full survey, 300 people form general population	Optimism, sunk cost, overconfidence, spending time, spending height	Optimism is significantly positively related with height of expenditure after negative advice to quit such that above-average optimists have higher expenditures as compared to below-average optimists. Sunk costs are significantly positively related with height and time of expenditure after negative advice to quit.
	Kahneman and Lovallo (1993)	Examination of the rationale of overly optimistic forecasts in decision-making.	Theoretical paper	Optimism, risk taking	Elaboration on the rational why individuals are overly optimistic in forecasting future outcomes and overly timid in evaluating single risky prospects. In forecasting future outcomes, individuals are often bold and take large risks which is considered to be due, among others, to an inside view and an illusion of control. The inside view is characterized by considering a specific case at hand as unique and hence leads to a neglect of past results and statistics of cases that are similar in relevant dimensions. Ultimately, this increases managerial risk taking as decision makers apply present anchors and view themselves as able to control the outcome.

PsyCap component	Author (Year)	Research focus	Method and sample	Central variables	Central findings
Hope	Lovallo and Kahneman (2003)	Examination of the threats of overly optimistic forecasts for executive decisions.	Theoretical paper	Optimism, decision making	Description of potential negative effects of exaggerated perceived control and overly optimistic outcome expectations on executives' forecasts and resulting decisions. Development of an approach to improve reliability of executives' forecasts.
	Smit and Kil (2017)	Examination of behavioral biases of decision makers in the context of acquisitions and outline of a toolkit to address them.	Theoretical paper	Illusion of Control, Overconfidence, Optimism, Confirmation and commitment bias	Discussion of behavioral biases in executive decision making including overconfidence and optimism. Overconfidence narrows the actual potential variance of investment payoffs resulting in a perception of a more certain payoff than is warranted. Optimism shifts expectations about an acquisition up towards higher return/cash flow expectations and can also increase perceived probability of these expected positive outcomes. Development of toolkit overcome behavioral pitfalls.
	Wally and Baum (1994)	Analysis of a model of determinants for decision-making pace.	Application of an acquisition scenario and survey; 151 executives	Cognitive ability, use of intuition, tolerance for risk (incl. optimism), propensity to act, decision speed	Support of the proposed model in which CEOs' cognitive ability, risk tolerance, intuition use and propensity to act are positively related to decision speed. Additionally, optimism is significantly positively related to overall tolerance for risk and to decision speed.
	MacInnis and Chun (2006)	Examination of the concept of hope in the context of consumer behavior, focusing on its relevance for individuals' behavior.	Theoretical paper	Hope, information processing, self-deception, risk-taking, product satisfaction, life satisfaction, materialism	Review on the concept of hope in the context of consumer behavior. Theoretical derivation of relevant effects of hope including biased information processing and increased risk taking. Information processing might be biased by hope through positive or negative misinterpretation or selective attention. Risk taking is considered to be influenced by hope as hope might motivate individuals to follow risky paths in order to achieve their yearned for goals.
	MacInnis and de Mello (2005)	Examination of the role of hope for evaluative judgements and choices in the context of consumer behavior.	Theoretical paper	Hope, information processing, risk perception, satisfaction, self-regulation	Theoretical derivation of propositions on hopes' effect on information processing and attention focus, satisfaction, risk-taking and self-regulation. Regarding information processing and attention, in the presence of high involvement and high hope, information processing is considered to be motivated

PsyCap component	Author (Year)	Research focus	Method and sample	Central variables	Central findings
					<p>based on the suggestion to achieve the desired outcome and information attention is selective towards information congruent with desired outcome. The length of information search depends on the nature of information encountered such that if the information confirms that the goal congruent outcome is possible, search terminates whereas if it suggests it is not, search continues. Elaboration of information is extensive and prone to a confirmation bias for information suggesting that desired outcome is possible and criteria for judging information are weaker for information suggesting that desired outcome is possible and stricter for those suggesting the desired outcome is not possible. In the context of risky choices, high hope reduces perceptions that a potential negative consequence occurs and thus increases the willingness to bear risk.</p>
	Reimann et al. (2014)	Analysis of the role of hope in financial risk seeking.	<p>Study 1 Validation study; 115 participants (American idol viewers)</p> <p>Study 2: Application of a betting game and survey; 151 participants from an American consumer panel</p> <p>Study 3: Application of a stock investment task and survey; 56 students</p> <p>Study 4: Application of a betting game and survey; 115 students</p> <p>Study 5: Application of a case study and</p>	Hope, outcome threat, risk seeking	<p>In the presence of outcome threat, high hope increases risk taking. In the absence of outcome threat, high hope decreases risk taking.</p> <p>In the presence of an outcome threat, high-hope individuals are driven by the motivation to achieve gains. In the absence of an outcome threat, high-hope individuals are driven by the motivation to avoid losses.</p>

PsyCap component	Author (Year)	Research focus	Method and sample	Central variables	Central findings
Resilience			survey; 604 participants from an American consumer panel		
	Kossek and Perrigino (2016)	Examination of the role of resilience at the occupational level.	Literature review	Resilience	Literature review on resilience at the occupational level and development of a multi-level occupational resilience framework. Resilience is considered as response to cognitive, emotional or physical stress triggers, mediating the effect of these stressors on adaptive performance, risk taking and well-being.
	Linnenluecke (2017)	Examination of the role of resilience in business and management research.	Literature review	Resilience	Literature review on resilience and identification of key research areas of resilience. Resilience research areas comprise resilience as organizational response, as organizational reliability, as employee strength, as adaptability of business models and as design principle in the context of supply chain vulnerability.
	Powley (2009)	Examination of crises and subsequent resilience activation.	Qualitative interviews; 60 participants	Liminal suspension, compassionate witnessing, relational redundancy, resilience	Development of a framework in which the development of resilience based on social interaction is described. Liminal suspension, compassionate witnessing as well as relational redundancy are presented as antecedents of resilience
	van der Vegt et al. (2015)	Call for studying organizations during crises and expanding knowledge on options to enhance resilience in such circumstances.	Theoretical paper	Resilience	Outline of the roots of organizational resilience. Presentation of different types of resilience as response to adverse circumstances at diverging levels, e.g., individual and social resilience, network resilience, organizational resilience. Proposition of a research agenda for investigating resilience.

Appendix D

Questionnaire Resilience

Resilience (Wagnild, 2016)

Please read each statement and select the number to the right of each statement that best indicates your feelings about the statement.							
Please respond to all statements.							
1 = strongly disagree, 7 = strongly agree							
	1	2	3	4	5	6	7
I usually manage difficulties one way or another at work.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I feel proud that I have accomplished things in my life.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I usually take things in stride.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I am friends with myself.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I feel that I can handle many things at a time.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I am determined.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I can get through difficult times because I've experienced difficulty before.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I have self-discipline.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I keep interested in things.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I can usually find something to laugh about.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My belief in myself gets me through hard times.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
In an emergency, I'm someone people generally can rely on.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My life has meaning.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
When I'm in a difficult situation, I can usually find my way out of it.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Appendix E

Questionnaire Strategic Decision Comprehensiveness

Strategic Decision Comprehensiveness (Miller et al., 1998)

Please read the following statements and select the number that best indicates your level of agreement or disagreement with each statement.

Please respond to all statements.

1 = not at all, 7 = to a great extent

When confronted with the "Balanced Scorecard Simulation," which is an important, non-routine problem or opportunity, to what extent did you...

	1	2	3	4	5	6	7
... develop many alternative responses?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
... consider many diverse criteria for eliminating possible courses?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
... thoroughly examine multiple explanations for the problem or opportunity?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
... conduct multiple examinations of any suggested course of action?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
... search extensively for possible responses?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Appendix F

Table C.1

Regression Results^a

Variables	Decision time	
	Model 5	Model 6
Controls		
Age	0.35 **	0.35 **
Gender (female)	0.23	0.20
Education level	-0.05	-0.05
Automotive experience	0.00	0.01
Strategy: Customer integration	0.32 *	0.23
Strategy: Product innovation	0.25	0.18
Strategy: Low initial costs	0.11	0.06
Main effects		
Resilience	-	0.26 *
n	54	54
R-squared	0.29	0.35
Δ R-squared	-	0.06 *
Adjusted R-squared	0.18	0.23
F	2.62 *	2.99 **

^a Standardized coefficients are reported.

* p < 0.05; ** p < 0.01

Appendix G

Questionnaire PsyCap

PsyCap (Luthans et al., 2006b)

Below are statements that describe how you might think about yourself **right now**.

Please use the following scales to indicate your level of agreement or disagreement with each statement.

Please respond to all statements.

1 = strongly disagree, 2 = disagree, 3 = somewhat disagree, 4 = somewhat agree, 5 = agree, 6 = strongly agree

	1	2	3	4	5	6
I feel confident analyzing a long-term problem to find a solution.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I feel confident in representing my work area in meetings with management.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I feel confident contributing to discussions about the company's strategy.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I feel confident helping to set targets/goals in my work area.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I feel confident contacting people outside the company (e.g., suppliers, customers) to discuss problems.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I feel confident presenting information to a group of colleagues.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If I should find myself in a jam at work, I could think of many ways to get out of it.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
At the present time, I am energetically pursuing my goals at work.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There are lots of ways around any problem.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Right now I see myself as being pretty successful at work.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I can think of many ways to reach my current work goals.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
At this time, I am meeting the work goals that I have set for myself.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
When I have a setback at work, I have trouble recovering from it, moving on.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I usually manage difficulties one way or another at work.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I can be "on my own," so to speak, at work if I have to.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I usually take stressful things at work in stride.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I can get through difficult times at work because I've experienced difficulty before.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I feel I can handle many things at a time at this job.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
When things are uncertain for me at work, I usually expect the best.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If something can go wrong for me work-wise, it will.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I always look on the bright side of things regarding my job.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I'm optimistic about what will happen to me in the future as it pertains to work.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
In this job, things never work out the way I want them to.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I approach this job as if "every cloud has a silver lining".	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Appendix H

Questionnaire Heuristic Information Processing

Heuristic Information Processing (Smerecnik et al., 2012)

Please read the following statements and select the level of agreement that best indicates your approach during the "Balanced Scorecard Simulation"
Please respond to all statements.

1 = completely disagree, 7 = completely agree

	1	2	3	4	5	6	7
I skimmed through the information.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I did not spend much time thinking about the information.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The provided material did not contain useful information on which I based my decision.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
While reading the information I did not think about the arguments presented in the information.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The information contained too many conflicting data.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Appendix I

Development Checklist

Setback Reframing

- 1** Think of a concrete, work-related setback in which you felt "stuck", i.e. you felt circumstances were out of your control, and reflect your immediate reactions.
- 2** Assess the realistic impact of the situation by clearly differentiating in what was in and what was out of control.
- 3** For what was within your control, develop a set of actions based on your personal resources you could have used.
- 4** Repeat using an anticipated future set-back.

Goal Splitting

- 1** Define a personally valuable, reasonably challenging future work-related goal with a concrete beginning & ending.
- 2** Break down the goal in smaller sub-goals.
- 3** Specify multiple, concrete pathways on how to achieve the goals.
- 4** Identify concrete obstacles and develop contingency plans in case of their occurrence.

Appendix J

Regulation Checklist

Pre-mortem Development

- 1** Specify a concrete upcoming decision-making situation.
- 2** Imagine your decision has led to the worst possible outcomes and specify these outcomes.
- 3** Specify all possible reasons that could have led to the failure, including your own mistakes.
- 4** Re-think your decision.

External Review

- 1** Think of comparable decisions of external cases by creating a reference class.
- 2** Assess the distribution of outcomes of these cases.
- 3** Make an intuitive prediction of your decision's outcome within the distribution.
- 4** Estimate the reliability of your prediction.
- 5** Correct your intuitive estimate.

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VERSICHERUNG NACH § 9 ABS. 1b DER PROMOTIONSORDNUNG DES FACHBEREICHES WIRTSCHAFTSWISSENSCHAFTEN DER PHILIPPS- UNIVERSITÄT MARBURG VOM 08. JUNI 2009:

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Sina Kiegler, M.Sc.