# The Psychological Perspective on Strategic Decisions

Inaugural - Dissertation

zur

Erlangung der wirtschaftswissenschaftlichen

Doktorwürde des Fachbereichs

Wirtschaftswissenschaften

der Philipps-Universität Marburg

eingereicht von:

Niklas Nolzen (B.A.)

aus Dachau

| | |
|---|---|
| Erstgutacher/in: | Prof. Dr. Torsten Wulf |
| Zweitgutachter/in: | Prof. Dr. Oscar A. Stolper |
| Einreichungstermin: | 08. April 2021 |
| Prüfungstermin: | 20. Dezember 2021 |
| Erscheinungsort: | Marburg |
| Hochschulkennziffer: | 1180 |

## TABLE OF CONTENTS

## LIST OF TABLES

## TABLE OF FIGURES

## TABLE OF ABBREVIATIONS

e.g. ..... exempli gratia – for example

et al. ..... et alii – and others

i.e. . ..... id est – that is

PCQ ..... PsyCap Questionnaire

PsyCap ..... psychological capital

z.B. ..... zum Beispiel

# I.THE INFLUENCE OF PSYCHOLOGICAL CAPITAL ON STRATEGIC DECISION-MAKING

## Overview of the Cumulative Dissertation

Niklas Nolzen

## 1. Research Question and Objective of the Dissertation

Scholars from various disciplines have invested great effort into understanding how the characteristics of executives influence their strategic decision-making (Bonn, 2005; Schwenk, 1995). Researchers have focused their work on demographic, cognitive, and psychological factors. Executives with longer industry tenure and higher age haven been shown to be more committed to the status quo and less likely to adopt new strategies thus reducing the overall quality of the decisions obtained in a rapidly changing business environment (Hambrick, Geletkanycz, & Fredrickson, 1993; Hitt & Tyler, 1991; Miller, 1991). Moreover, cognitive biases such as the overconfidence bias and illusion of control bias have been shown to negatively affect decision accuracy in a strategic context by limiting the processing and evaluation of information (Camerer & Lovallo, 1999; Duhaime & Schwenk, 1985; Zacharakis & Shepherd, 2001). Also, psychological characteristics like the tolerance for ambiguity of an executive have been studied and found to influence the decision quality in a strategic context (Gupta & Govindarajan, 1984).

However, there are several gaps in the understanding of individual strategic decision-making. Previous research on the effects of executive characteristics on strategic decision-making has primarily been focused on identifying the causes for deficits in the decision-making and the results are inconsistent. For example, whereas multiple studies found age and tenure to be negatively correlated with the adoption of new strategies, potentially reducing the quality of the decision obtained (Hambrick et al., 1993; Hitt & Tyler, 1991; Miller, 1991), Papadakis and Barwise presented evidence for long-tenured CEOs making higher quality strategic decisions by integrating organizational players from various hierarchical layers in the decision process (Papadakis & Barwise, 2002). Furthermore, the effect of tolerance for ambiguity on the quality of a strategic

decision seems to depend on whether a company is pursuing a "grow" or "harvest" strategy (Gupta & Govindarajan, 1984). Thus, it partially remains unclear how strategic decision-makers think, and which characteristics make one a good strategic decision-maker (Bonn, 2005; Powell, Lovallo, & Fox, 2011).

This cumulative dissertation addresses selective research questions among these gaps. The objective of this dissertation is to gain a better understanding of individual strategic decision-making. More specifically, it aims at analyzing why and how individuals differ in their strategic decision-making due to their personal characteristics. Thereby, the focus lies on explaining how a decision-maker's psychological capabilities influence one's decision-making process, i.e., flexibility, and outcome, i.e., quality.

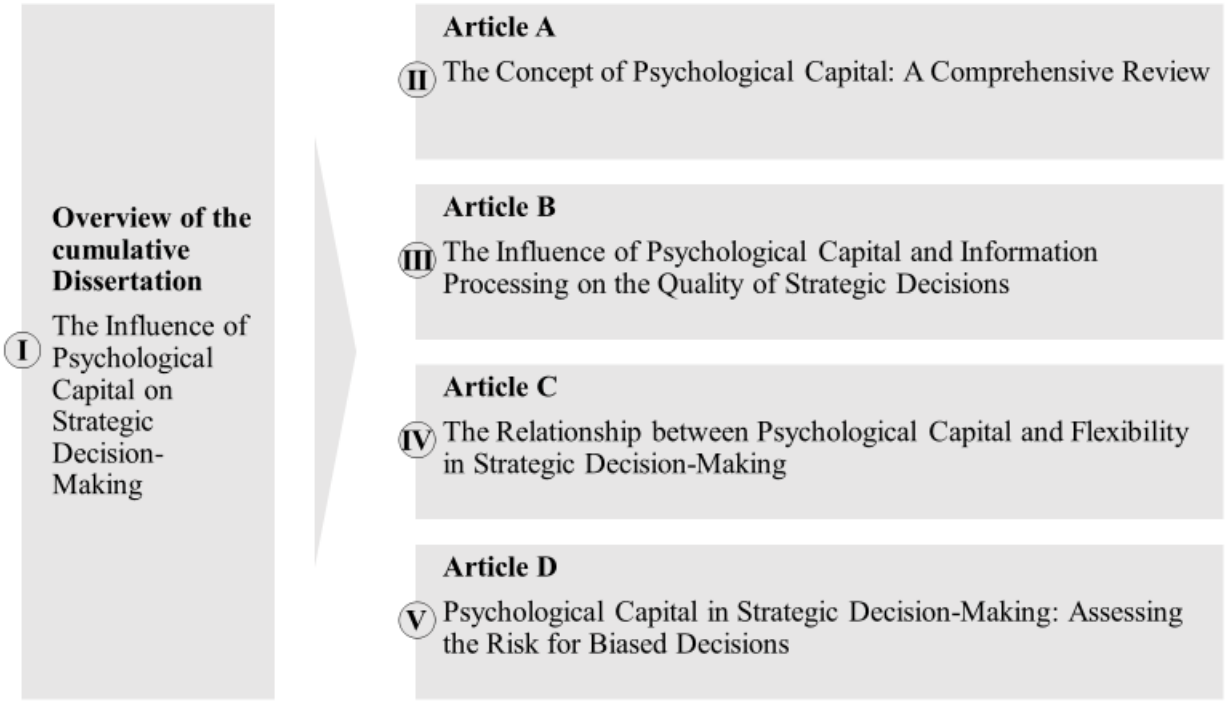
In order to assess these questions, we have conducted a quasi-experimental field study with 49 professionals from the German financial services sector to generate a comprehensive data set with multiple variables describing the characteristics and background of each participant, the process of how the strategic decision is made, as well as the outcome of the decision. This data set is used for the second and third article of this dissertation. While the data on the outcome of the strategic decision is used for the second article, the data on the strategic decision-making process is used for the third article.

The cumulative dissertation is structured as follows, also outlined in Figure 1. Subsequent to this introductory chapter, the first article called *The Concept of Psychological Capital: A Comprehensive Review* provides an extensive literature review on psychological capital (PsyCap) (Luthans & Youssef, 2004), a particularly promising construct for the context of strategic decision-making research capturing one's broader personality. In that article, we reflect on research from

various disciplines to describe the construct and outline its antecedents and effects. Hence, the focus of that article is to present a comprehensive overview of the current literature on PsyCap, highlight its relevance for the field of strategic decision-making, and derive a broad research agenda.

Next, the article *The Influence of Psychological Capital and Information Processing on the Quality of Strategic Decisions* is an empirical article focused on the outcome of strategic decision-making. Based on data from a quasi-experimental field study, we test the relationship between PsyCap, information processing, and quality in strategic decision-making. Our results suggest that higher levels of PsyCap of the decision-maker lead to a more systematic and less heuristic information processing as well as superior strategic decision-making quality, which is mediated by less heuristic information processing.

**Figure 1**: Dissertation Structure



Following that, the third article with the title *The Relationship between Psychological Capital and Flexibility in Strategic Decision-Making* is focused on assessing the process of strategic decision-making. In particular, we empirically test how PsyCap and flexibility in sequential strategic decision processes are related and whether this relationship is influenced by industry experience. Our hypothesis that there is a curvilinear, inverted u-shaped relationship between PsyCap and flexibility in strategic decision-making is supported by the results from our quasi-experimental field study. Our analyses also support a moderating effect of industry experience on this relationship.

Finally, the fourth article called *Psychological Capital in Strategic Decision-Making: Assessing the Risk for Biased Decisions* applies our research results to strategic decision-making in practice. It develops a checklist of situational and personal factors, so that decision-makers are made aware of their individual risk of biased decision-making and can decide on the use of de-biasing tools more deliberately. Accordingly, executives will be able to apply de-biasing tools when most impactful for the value of the company.

### 1.1. Contribution

This cumulative dissertation contributes to the ongoing discussion on individual strategic decision-making in three ways. First, we provide a comprehensive and structured overview of the various articles published on PsyCap. By collecting, analyzing, and structuring prior research from various disciplines, we point out commonalities and disagreements between past studies, and integrate past work and sources into a comprehensive and consistent view on PsyCap. Also, we highlight opportunities to integrate and expand on existing knowledge on PsyCap with a focus on

its relevance for strategic decision-making by outlining emerging research trends and pathways for future research.

Further, we contribute to strategic decision-making research by highlighting the role of personal characteristics for the strategic decision-making process and outcome. Specifically, we identify PsyCap as a driver of the quality of strategic decisions and highlight the mediating role of heuristic information processing in this relationship. Also, we explore how PsyCap influences the process of making strategic decisions, i.e., we analyze the relationship between PsyCap and the degree of flexibility applied in strategic decisions. Additionally, we contribute to the research on PsyCap by highlighting that excessively high levels of PsyCap might lead to undesirable effects and open a new perspective by outlining the effects of PsyCap not only in the organizational behavior field, but also in the strategic decision-making context.

Finally, we add to the transfer of these research results to practice. More specifically, we provide a pragmatic approach for practitioners to decide when the use of these debiasing tools is (most) useful. Based on our research on PsyCap and strategic decision-making, we have developed a checklist of situational and personal factors, so that decision-makers are made aware of their individual risk of biased decision-making and can decide on the use of de-biasing tools more deliberately. Accordingly, executives will be able to apply de-biasing tools when most impactful for the value of the company.

### 1.2. Future Research

The results presented in this cumulative dissertation have valuable implications for the research on individual strategic decision-making and open new avenues for future research. Especially, the analysis of the relationship between individual capabilities and characteristics of

the decision-maker and variables of the decision process seems to be a very promising research path. However, future research is required to further explore individual differences in strategic decision-making in more detail.

Additional research in the field could more closely analyze other variables of the decision process, such as comprehensiveness and consistency. The integration of additional process variables into future analyses could provide new insights to the research domain by combining different relevant perspectives on the decision-making process, thus yielding the potential for better explaining the mechanisms through which personal characteristics of the decision-maker, and PsyCap in particular, effect the decision quality.

Also, studying differences in the effects of PsyCap on information processing and decision quality in diverse cultural contexts may provide additional insights into executives' strategic decision-making behavior. Papadakis and colleagues, for example, outlined that the cultural context influences the decision-making process (Papadakis, Lioukas, & Chambers, 1998). Further investigation of the effects of these cultural context factors could further improve our understanding of the determinants of managerial judgement. Replicating this study in different cultural contexts might also provide first insights on the degree to which the effects of PsyCap depend on less malleable context factors.

In addition, prior research suggests that most strategic decisions in organizations are made by teams rather than individuals (Schwenk, 1995). Studying how executive teams consisting of members with different levels of PsyCap, either homo- or heterogenous constellations, make strategic decisions, may thus provide interesting additional avenues for research in the field. Such

research could for example not only include information processing variables but could also be extended to information sharing and validation between team members.

Such research would improve our understanding of the effects of personal characteristics on strategic decision-making. This could substantially improve our contribution to the strategic decision-making field by providing implications for the reduction of biased judgement, the improvement of strategic decisions, and thus supporting organizational prosperity.

## 2. Summary of Articles

The first article of this cumulative dissertation is called *The Concept of Psychological Capital: A Comprehensive Review*. The article is a literature review on PsyCap encompassing contributions from several research disciplines and including theoretical as well as empirical findings. The focus of that article is to present a comprehensive overview of the current literature on PsyCap, to highlight its relevance for the field of strategic decision-making, and to derive a broad research agenda. In particular, we encourage researchers to expand the research on the effects of PsyCap to other workplace-related domains, especially the field of strategic decision-making, we call for researchers to further study the relationship between emotions and PsyCap, and we suggest analyzing the effects of PsyCap in the context of strategic human resources management. Also, future studies should establish transparency on the interaction between organizational change processes and PsyCap as well as the relative importance of the four components of PsyCap. We close by discussing the implications of our findings for corporate practice, such as employee selection and development.

The first article was written in single authorship. The article was published by the journal *Management Review Quarterly*.

The second article is called *The Influence of Psychological Capital and Information Processing on the Quality of Strategic Decisions*. In this empirical article we focus on the outcome of strategic decision-making and test the relationship between PsyCap, information processing, and quality in strategic decision-making. More precisely, we posit that higher levels of PsyCap lead to a more systematic and less heuristic information processing as well as superior strategic decision-making quality, which is mediated by less heuristic information processing. Empirical results of a quasi-experimental field study with 49 executives from the financial services industry in Germany support this claim. These results open new avenues for research on the outcome of strategic decisions that go beyond the process variables explaining differences in individual strategic decision-making that have been the focus of research thus far.

The second article is co-authored by Torsten Wulf and Philip Meissner. A further refined and advanced version of this article was submitted to the *Journal of Strategy and Management*. The contribution of the author covers the development of the line of argumentation, the preparation, execution, and analysis of the empirical study, as well as the preparation of the results. The contribution can be attributed as follows: Torsten Wulf 25%, Philip Meissner 25%, and Niklas Nolzen 50%.

The third article is called *The Relationship between Psychological Capital and Flexibility in Strategic Decision-Making*. In this article, we focus on assessing the process of strategic decision-making rather than the outcome. We argue that an executive's level of PsyCap may have a fundamental effect on the flexibility applied in strategic decisions. We posit that there is a curvilinear, inverted u-shaped relationship between PsyCap and flexibility in strategic decision-making, which is moderated by industry experience. The empirical results based on the process-

related data from our quasi-experimental field study with 49 executives from the financial services industry in Germany support these hypotheses. These results open new avenues for research on strategic decision-making that explain individual differences in the process of making strategic decisions, and flexibility in particular, that have not been the focus of previous research.

The third article was written in single authorship. The article will be submitted to *Long Range Planning*.

The fourth article is called *Psychological Capital in Strategic Decision-Making: Assessing the Risk for Biased Decisions*. It is an application of our research results to strategic decision-making in practice. Decision-makers are provided with an easy-to-use checklist of situational and personal factors, so that they are made aware of their individual risk of biased decision-making and can decide on the use of de-biasing tools more deliberately. The checklist consists of two sets of questions addressing the individual level of PsyCap as well as the degree of uncertainty, validity, and frequency of the decision situation at hand. Further, we map the results of the checklist to a bias-probability-matrix, which indicates the probability to make a biased decision. Hence, our bias-probability-checklist helps to make a more deliberate decision on the use of de-biasing tools.

The fourth article is co-authored by Torsten Wulf and Philip Meissner. The article is going to be submitted to the *McKinsey Quarterly*. The contribution of the author includes the development of the initial line of argumentation, the elaboration of the bias-probability-checklist, and the derivation of implications for use in practice. The contributions can be qualified as follows: Torsten Wulf 15%, Philip Meisner 15%, and Niklas Nolzen 70%.

**Deutsche Version**

Der erste Beitrag dieser kumulativen Dissertation trägt den Titel *The Concept of Psychological Capital: A Comprehensive Review (Das Konzept des Psychologischen Kapitals: Eine Umfassende Betrachtung)*. Dieser Beitrag ist ein Literaturüberblick zum Forschungsschwerpunkt Psychologisches Kapital (PsyCap) und umfasst sowohl theoretische als auch empirische Forschungsergebnisse aus diversen Disziplinen. Der Fokus des Artikels liegt auf der Darlegung eines umfassenden Überblicks über den aktuellen Stand der Wissenschaft zu PsyCap, der Ausarbeitung ihrer Relevanz für das Forschungsfeld der strategischen Entscheidungsfindung sowie der Ableitung einer umfassenden Forschungsagenda. Im Speziellen ermutigen wir Forscher zur Analyse von PsyCap im einem anderen arbeitsbezogenen Kontext, z.B. dem Feld der strategischen Entscheidungsfindung, wir fordern zu weiteren Analysen des Zusammenhangs zwischen PsyCap und Emotionen auf und empfehlen eine Analyse der Effekte von PsyCap im Rahmen des strategischen Personalmanagements. Außerdem sollte in zukünftigen Studien zusätzliche Transparenz bezüglich der Interaktion von organisatorischen Change-Prozessen und PsyCap wie auch der relativen Wichtigkeit der vier Komponenten von PsyCap geschaffen werden. Wir schließen mit einer Diskussion der Bedeutung der Ergebnisse für die Praxis, z.B. Mitarbeiterauswahl und -entwicklung.

Der erste Artikel wurde in Alleinautorenschaft verfasst. Der Artikel wurde in der wissenschaftlichen Zeitschrift *Management Review Quarterly* veröffentlicht.

Der zweite Artikel heißt *The Influence of Psychological Capital and Information Processing on the Quality of Strategic Decisions (Der Einfluss von Psychologischem Kapital und Informationsverarbeitung auf die Qualität Strategiescher Entscheidungen)*. In diesem empirischen

Beitrag legen wir den Schwerpunkt auf das Ergebnis strategischer Entscheidungen und untersuchen den Zusammenhang zwischen PsyCap, Informationsverarbeitung und der Qualität von strategischen Entscheidungen. Konkret stellen wir die Hypothese auf, dass höhere Level von PsyCap zu systematischer statt heuristischer Informationsverarbeitung sowie höherer strategischer Entscheidungsqualität führen, wobei dieser Zusammenhang von einem geringeren Grad an Heuristiken mediiert wird. Diese Hypothese wird durch die empirischen Ergebnisse einer quasi-experimentellen Feldstudie mit 49 Führungskräften aus dem deutschen Finanzsektor unterstützt. Dies eröffnet neue Forschungsmöglichkeiten im Bereich der Ergebnisse von strategischen Entscheidungen, die über die Prozessvariablen hinausgehen, die bisher zur Erklärung von individuellen Unterschieden in der strategischen Entscheidungsfindung herangezogen wurden.

Der zweite Artikel wurde in gemeinsamer Autorenschaft mit Prof. Dr. Torsten Wulf und Prof. Dr. Philip Meissner verfasst. Eine weiterentwickelte Version dieses Artikels wurde zur Veröffentlichung bei der wissenschaftlichen Zeitschrift *Journal of Strategy and Management* eingereicht. Der inhaltliche Beitrag des Autors umfasst die Entwicklung der Argumentationslinie, die Vorbereitung, Durchführung und Auswertung der empirischen Studie sowie die Aufbereitung der Ergebnisse. Die Beiträge der Mitwirkenden an diesem Artikel sind wie folgt abzuschätzen: Prof. Dr. Torsten Wulf 25%, Prof. Dr. Philip Meissner 25% und Niklas Nolzen 50%.

Der dritte Artikel heißt *The Relationship between Psychological Capital and Flexibility in Strategic Decision-Making (Der Zusammenhangs zwischen Psychologischem Kapital und Flexibilität in Strategischer Entscheidungsfindung)*. In diesem Artikel legen wir den Fokus auf den Prozess der strategischen Entscheidungsfindung. Wir argumentieren, dass das Level von PsyCap einer Führungskraft einen fundamentalen Einfluss auf die Flexibilität in strategischer

Entscheidungsfindung haben könnten. Wir leiten einen nichtlinearen, umgekehrt u-förmigen Zusammenhang zwischen PsyCap und Flexibilität in strategischer Entscheidungsfindung her, der von Industrieerfahrung moderiert wird. Die empirischen Ergebnisse basierend auf den Prozess-fokussieren Daten unserer quasi-experimentellen Feldstudie mit 49 Führungskräften aus der deutschen Finanzindustrie unterstützen diese Hypothesen. Die Ergebnisse ermöglichen weitere Forschung im Bereich der strategischen Entscheidungsfindung, die individuelle Unterschiede in Prozess der strategischen Entscheidungsfindung, und Flexibilität im Speziellen, erklärt.

Der dritte Artikel wurde in Alleinautorenschaft verfasst. Der Artikel wird zur Veröffentlichung bei der wissenschaftlichen Zeitschrift *Long Range Planning* eingereicht.

Der vierte Artikel heißt *The Role of PsyCap in Strategic Decisions: Assessing the Risk for Biased Strategic Decision-Making (Die Rolle von PsyCap in Strategischen Entscheidungen: Analyse des Risikos von Verzerrter Strategischer Entscheidungsfindung)*. Dieser Beitrag überträgt die Ergebnisse unserer Forschung zu strategischer Entscheidungsfindung auf die Praxis. Wir stellen Entscheidungsträger einen einfach handhabbaren Fragenkatalog mit persönlichen und situativen Kriterien zur Verfügung, der es ermöglicht, sich über das eigene Risiko von verzerrten Entscheidungen bewusst zu werden und entsprechend über den Einsatz von Hilfsmitteln zu entscheiden. Der Fragenkatalog besteht aus zwei Fragereihen, die das individuelle Level von PsyCap und den Grad an Ungewissheit, Validität und Häufigkeit der Entscheidungssituation adressieren. Darüber hinaus übertragen wir die Ergebnisse des Fragenkatalogs auf eine Verzerrungs-Wahrscheinlichkeits-Matrix, die eine Indikation zur Wahrscheinlichkeit von verzerrten Entscheidungen liefert. Entsprechend unterstützt unser Verzerrungs-

Wahrscheinlichkeits-Fragenkatalog, objektiv über den Einsatz entsprechender Hilfsmittel zur Entzerrung von Entscheidungen zu urteilen.

Der vierte Artikel wurde in gemeinsamer Autorenschaft mit Prof. Dr. Torsten Wulf und Prof. Dr. Philip Meissner verfasst. Der Artikel wird zur Veröffentlichung bei der Zeitschrift *McKinsey Quarterly* eingereicht. Der inhaltliche Beitrag des Autors umfasst die Entwicklung ursprünglichen Argumentationslinie, die Ausarbeitung des Verzerrungs-Wahrscheinlichkeits-Fragenkatalogs sowie die Ableitung von Implikationen für die Praxis. Die Beiträge der Mitwirkenden an diesem Artikel sind wie folgt abzuschätzen: Prof. Dr. Torsten Wulf 15%, Prof. Dr. Philip Meissner 15% und Niklas Nolzen 70%.

## References

Bonn, I. (2005). Improving strategic thinking: A multilevel approach. ***Leadership & Organization Development Journal***, 26(5), 336–354.

Camerer, C., & Lovallo, D. (1999). Overconfidence and excess entry: An experimental approach. ***The American economic review***, 89(1), 306–318.

Duhaime, I. M., & Schwenk, C. R. (1985). Conjectures on cognitive simplification in acquisition and divestment decision making. ***Academy of Management Review***, 10(2), 287.

Gupta, A. K., & Govindarajan, V. (1984). Business unit strategy, managerial characteristics, and business unit effectiveness at strategy implementation. ***Academy of Management Journal***, 27(1), 25–41.

Hambrick, D. C., Geletkanycz, M. A., & Fredrickson, J. W. (1993). Top executive commitment to the status quo: Some tests of its determinants. ***Strategic Management Journal***, 14(6), 401–418.

Hitt, M. A., & Tyler, B. B. (1991). Strategic decision models: Integrating different perspectives. ***Strategic Management Journal***, 12(5), 327–351.

Luthans, F., & Youssef, C. M. (2004). Human, social, and now positive psychological capital management: Investing in people for competitive advantage. ***Organizational dynamics***, 33(2), 143–160.

Miller, D. (1991). Stale in the saddle: CEO tenure and the match between organization and environment. ***Management Science***, 37(1), 34–52.

Papadakis, V. M., & Barwise, P. (2002). How much do CEOs and top managers matter in strategic decision-making? ***British Journal of Management***, 13(1), 83–95.

Papadakis, V. M., Lioukas, S., & Chambers, D. (1998). Strategic decision-making processes: The role of management and context. ***Strategic Management Journal***, 19(2), 115–147.

Powell, T. C., Lovallo, D., & Fox, C. R. (2011). Behavioral strategy. ***Strategic Management Journal***, 32, 1369–1386.

Schwenk, C. (1995). Strategic decision making. ***Journal of Management***, 21(3), 471–493.

Zacharakis, A. L., & Shepherd, D. A. (2001). The nature of information and overconfidence on venture capitalists' decision making. ***Journal of Business Venturing***, 16(4), 311–332.

# II. THE CONCEPT OF PSYCHOLOGICAL CAPITAL: A COMPREHENSIVE REVIEW

## Article A

Niklas Nolzen

**Abstract**

In this paper, we provide a comprehensive view on the concept of psychological capital (PsyCap) and develop an agenda for future research. PsyCap describes an individual's psychological capacity that can be measured, developed, and managed for performance improvement. The higher-order construct comprises the psychological resources self-efficacy, hope, optimism, and resilience, and has been linked with a range of desirable work attitudes, behaviors, and other outcomes. By analyzing and structuring the existing literature on PsyCap, we identified several research gaps that require further analysis. In particular, we encourage researchers to expand the research on the effects of PsyCap to other workplace-related domains, especially the field of strategic decision-making, we call for researchers to further study the relationship between emotions and PsyCap, and we suggest analyzing the effects of PsyCap in the context of strategic human resources management. Also, future studies should establish transparency on the interaction between organizational change processes and PsyCap as well as the relative importance of the four components of PsyCap. We close by discussing the implications of our findings for corporate practice, such as employee selection and development.

**Keywords**

Psychological capital, PsyCap, Hope, Optimism, Resilience, Self-efficacy

## 1. Introduction

A few years ago, Martin Seligman introduced a new movement in psychology, called positive psychology (Seligman & Csikszentmihalyi, 2000). In contrast to traditional psychology with its focus on mental illness and pathology, positive psychology encourages an emphasis on how to build on people's strengths, such as traits, virtues, and talents, to make their lives more worthwhile and productive. Informed by the ideas of this movement, Luthans and Youssef introduced the concept of psychological capital, hereafter PsyCap (Luthans & Youssef, 2004), within the emerging positive organizational behavior movement (Cameron & Spreitzer, 2012; Luthans & Church, 2002). PsyCap describes an individual's psychological capacity that can be measured, developed, and managed for performance improvement. It is formed by the psychological resources that best match the inclusion criteria defined in positive organizational behavior: self-efficacy, hope, optimism, and resiliency (Luthans, Avolio, Avey, & Norman, 2007; Luthans & Youssef, 2004; Luthans, Youssef, & Avolio, 2007). When combined, these four resources compose a higher-order construct which is based on the commonalities these four first-order constructs share (Hobfoll 2002) and which has been empirically supported (Avey, Reichard, Luthans, & Mhatre, 2011; Luthans et al., 2007).

The introduction of the concept of PsyCap has significantly contributed to the substantial increase in the volume of articles published on positive organizational scholarship in leading journals (Donaldson & Ko, 2010) since it addresses one of the most critical reasons for the neglect of positive psychology in the past (Cameron & Caza, 2004). Specifically, PsyCap and its reliable and valid measure (Luthans et al., 2007) resolve the lack of an adequate composite and quantitative measure of positive psychological phenomena, which had led to most of the scholarly work in the

past being rather conceptual and definitional than empirical (Cameron & Caza, 2004). Furthermore, as PsyCap is also open for development and related to performance improvement it is objectively measurable not only in terms of the level of PsyCap but in bottom-line impact, too, and thus a return on investment can be calculated for PsyCap (Luthans & Youssef, 2004). Hence, it is possible to quantify the effect an investment in human resources, i.e., a PsyCap intervention, has on the bottom line and therefore compare it to other investment opportunities related to traditional capital. Furthermore, PsyCap is highly relevant for the field of human resources development as it allows executives to demonstrate that human resources can be utilized as a source of competitive advantage by measuring, developing, and leveraging it for organizational success (Ardichvili, 2011). Pfeffer supports the strategic importance of human resources for a company, providing evidence that the one-eighth of organizations and their managers which are fully committed to the belief that human resources are their most important asset and act accordingly over time are superior in productivity, innovation, quality, customer satisfaction, and profitability (Pfeffer, 1998).

Since the concept of PsyCap was introduced in 2004, scholars have been engaged in numerous studies investigating the antecedents and effects of PsyCap. They have developed empirical and conceptual support for PsyCap as a core construct (Avey et al., 2011; Luthans et al., 2007; Luthans & Youssef, 2007), demonstrated the effect of PsyCap on employee attitudes, behaviors, and well-being (Avey et al., 2011), and developed a PsyCap measure (Luthans et al., 2007). While the scientific work on the conceptualization, measurement, and effects of PsyCap has been focused on the individual as the level of analysis, the research on the antecedents of PsyCap has also been conducted on the team- and organizational-level. This paper offers a structured and comprehensive review of the substantial amount of research on PsyCap that has been conducted

since the first article on PsyCap was published, including a first meta-analytical review (Avey et al., 2011) and a first literature review (Newman, Ucbasaran, Zhu, & Hirst, 2014). Covering the existing research on PsyCap from all disciplines and analyzing all aspects of the concept, including the PsyCap construct, its antecedent, its effects, and moderators, this review of the existing literature on PsyCap aims at identifying research gaps and highlighting opportunities for future research. In particular, we encourage researchers to expand the research on the effects of PsyCap to other workplace-related domains, especially the field of strategic decision-making, we call for researchers to further study the relationship between emotions and PsyCap, and we suggest analyzing the effects of PsyCap in the context of strategic human resources management. Also, future studies should establish transparency on the interaction between organizational change processes and PsyCap as well as the relative importance of the four components of PsyCap.

This paper contributes to the ongoing discussion of PsyCap in three ways. First, we provide a comprehensive and structured overview of the various articles published on PsyCap. By collecting, analyzing, and structuring literature from various disciplines, we provide an overview of the theoretical concept of PsyCap and differentiate it from the concept of positive traits as well as other concepts of human resources, i.e., human and social capital.

Second, we reflect different empirical findings on antecedents and effects of PsyCap. Specifically, we seek to contribute to the field by analyzing results of prior research, pointing out commonalities and disagreements between past studies, and integrating past work and sources into a comprehensive and consistent view on PsyCap.

Finally, we identify research gaps in the existing literature on PsyCap. By outlining emerging research trends and pathways for future research, we highlight opportunities to integrate and expand on existing knowledge.

## 2. Review Method and Structure

As indicated above, a substantial amount of research on PsyCap has been conducted by researchers from various disciplines. Depending on their research focus, they have analyzed different aspects of the concept of PsyCap and published their findings in a broad set of publications. We aim to link the results of the existing research to provide a structured and comprehensive presentation of the current state of scientific knowledge on PsyCap. To thoroughly review the existing literature on PsyCap from all disciplines, we used a database search using Ebsco Business Source Premier. We applied the search terms PsyCap and psychological capital for matches in title, subject terms, and abstract of academic papers, which yielded 69 results. We then excluded 21 papers published in journals without scholarly peer review or issued before the introduction of PsyCap in 2004 to preempt a lack of relevance or inferior quality of the papers included in the review. Next, we further reduced the number of papers to 43 based on manual screening of the remaining literature. In a final step, we followed up on the references in the papers that met our selection criteria to add further articles of significance for a comprehensive understanding of the concept of PsyCap and its differentiation from similar concepts, which resulted in a final literature base comprising a total of 139 papers. The list of publications cited in this paper can be found in Table 1.

**Table 1:** Publications Cited in this Review

| **Journals** | |
|---|---|
| Academy of Management Journal | Journal of Occupational Health |
| Academy of Management Review | Journal of Occupational Health Psychology |
| Administrative Science Quarterly | Journal of Organizational Behavior |
| BMC Public Health | Journal of Organizational Behavior Management |
| Business and Economics Research Journal | Journal of Personality |
| Canadian Journal of Administrative Sciences | Journal of Personality and Social Psychology |
| Career Development International | Journal of Small Business and Entrepreneurship |
| Cognition & Emotion | Journal of Social and Clinical Psychology |
| European Journal of Work and Organizational Psychology | Journal of Strategy and Management |
| Frontiers of Business Research in China | Leadership & Organization Development Journal |
| Frontiers of Entrepreneurship Research | Management and Organization Review |
| Harvard Business Review | Management International Review |
| Health Psychology | METU Studies in Development |
| Human Resource Development International | Organizational Dynamics |
| Human Resource Development Quarterly | Organizational Research Methods |
| Human Resource Management | Pakistan Journal of Commerce and Social Sciences |
| International Business Research | Personality and Social Psychology Bulletin |
| International Entrepreneurship and Management Journal | Personnel Psychology |
| International Journal of Human Resource | Psychological Bulletin |
| International Journal of Human Resource Management | Research in Organizational Behavior |
| International Journal of Stress Management | Review of General Psychology |
| Journal of Advanced Nursing | Social Behavior and Personality |
| Journal of Business Research | South African Journal of Economic and Management Sciences |
| Journal of Business, Economics and Finance | Strategic Management Journal |

**Table 1:** *Continued*

| | |
|---|---|
| Journal of Career Assessment | The Academy of Management Annals |
| Journal of Clinical Psychology | The Academy of Management Executive |
| Journal of Education for Business | The Academy of Management Learning and Education |
| Journal of Happiness Studies | The American Behavioral Scientist |
| Journal of Human Resources in Hospitality & Tourism | The American Journal of Sociology |
| Journal of Leadership & Organizational Studies | The American Psychologist |
| Journal of Macromarketing | The Finnish Journal of Business Economics |
| Journal of Management | The Journal of Applied Behavioral Science |
| Journal of Management Accounting Research | The Journal of Applied Psychology |
| Journal of Management and Economics | The Journal of Nursing Administration |
| Journal of Managerial Issues | The Journal of Positive Psychology |
| Journal of Managerial Psychology | Thunderbird International Business Review |
| Journal of Nursing Measurement | Work |
| Journal of Occupational and Organizational Psychology | |

| **Books** | |
|---|---|
| Handbook of affective science | Psychological capital: Developing the human competitive edge |
| Handbook of hope: Theory, measures & applications | Self-efficacy: The exercise of control |
| Handbook of positive psychology | The human equation: Building profits by putting people first |
| Handbook of social and clinical psychology | The nature of managerial work |
| Human capital: A theoretical and empirical analysis, with special reference to education | The Oxford handbook of positive organizational scholarship |
| Learned optimism | The routledge companion to organizational change |
| Practicing organizational development | |

The identified relevant articles can be attributed to the higher-order construct of PsyCap and its underlying psychological resources, the antecedents of PsyCap, the effects of PsyCap, and its moderators. Hence, we structure the remaining sections of this paper as follows. In the first section, we describe the core-construct of PsyCap as well as its underlying psychological resources and measures. Next, the antecedents of PsyCap are discussed. Here, we also describe research on specific interventions to increase the individual level of PsyCap. In the third section, the effects of PsyCap on attitudes, behavior, and other effects are presented. Finally, we conclude with opportunities for future research as well as implications for corporate practice.

## 3. Definition of PsyCap

In 2004, based on the ideas of the positive psychology movement (Seligman & Csikszentmihalyi, 2000), Luthans and Youssef introduced the higher-order construct of PsyCap to capture one's positively oriented human resource strengths and psychological capacities (Luthans & Youssef, 2004). They defined that a variable needs to be state-like (as opposed to states, traits, and trait-like), positive, unique, validly measurable, developable, and can result in performance improvement in order to be included in the construct of PsyCap. The psychological capacities that were selected based on those criteria and that are collectively referred to as PsyCap, are self-efficacy, hope, optimism, and resilience. This selection has been widely recognized and applied in a significant number of studies since its introduction (Newman et al., 2014). Hence, the only definitional variation of PsyCap differing from these four selected psychological capacities was used in two studies by Luthans and colleagues (Luthans, Avolio, Walumbwa, & Li, 2005) and Rego and colleagues (Rego, Sousa, Marques, & Cunha, 2012b), who excluded self-efficacy and build a higher-order construct comprising hope, optimism, and resilience only. Furthermore, even

though the above criteria would allow for other widely recognized constructs or capacities in positive psychology to be included in the definition of PsyCap, researchers have solely focused their studies on PsyCap as defined by Luthans and Youssef. Particularly, other constructs like wisdom, well-being, gratitude, forgiveness, and courage have also been discussed for inclusion in PsyCap but to date no empirical assessment of the fit of any of these constructs has been published (Dawkins, Martin, Scott, & Sanderson, 2013; Luthans et al., 2007).

High-PsyCap individuals have built the positive psychological resources of self-efficacy, hope, optimism, and resilience. Drawing on Frederickson's broaden-and-build theory, theses psychological resources can be tapped when needed (Fredrickson, 2001). In particular, these individuals draw on their self-efficacy to intentionally set challenging goals and bring up the motivation to try to achieve them (Bandura, 1997). Hope and optimism allow them to positively assess their chances of success and to generate and pursuit different pathways to achieve their goals (Seligman, 1998; Snyder, Irving, & Anderson, 1991). Additionally, resilience provides these individuals with the ability to recover from setbacks while trying to achieve their goals (Masten, 2001). In combination, these four positive psychological resources form a synergistic resource set that enables an individual to uphold an internalized sense of control while goals are being successfully pursued. This underlying common thread and the unique characteristics of the four resources that form a higher-order core construct when combined will be further detailed in the following. Also, the differentiation between PsyCap and comparable and related constructs will be outlined.

### 3.1. Higher-Order Construct of PsyCap

Luthans and his co-authors established a theoretical foundation and provided empirical evidence for PsyCap as a higher-order construct (Dawkins et al., 2013; Luthans et al., 2007). They focused their analysis on individual-level PsyCap. Accordingly, this paper is limited to PsyCap on an individual level since almost all research on the higher-order construct of PsyCap has been focused on the individual as the level of analysis. However, this does not preclude future research on PsyCap on other levels and scholars have recently begun to examine PsyCap on a team- and organizational-level with a proposal of a measure of organizational-level PsyCap (Luthans et al., 2007; McKenny, Short, & Payne, 2013).

Based on the theory and research for each of the four components of PsyCap (Bandura, 1997; Masten, 2001; Seligman, 1998; Snyder et al., 1991), they developed an integrative theoretical foundation for PsyCap. While prior research has shown that they each have conceptual independence and empirically based discriminant validity, the four components also share an underlying link tying them together, a higher-order core factor (Luthans et al., 2007). This common, underlying link is a process driving motivation and behavior whereby the shared variance between self-efficacy, hope, optimism, and resilience comprises the higher-order factor of PsyCap, representing one's "positive appraisal of circumstances and probability for success based on motivated effort and perseverance" (Luthans et al., 2007). One demonstrating resilience with adversity, who is also efficacious, hopeful, and has a positive perspective, is expected to have the confidence and persistence to explore different options and deal with challenges while striving to achieve ambitious goals, making one a stronger performer. This higher-order factor is conceptually supported by Bandura, who found those high in self-efficacy being more resilient to unfortunate

events (Bandura, 1997). Furthermore, Snyder concluded that those high in hope also show high self-efficacy and resilience (Bandura, 1997; Luthans et al., 2007; Snyder, 2000).

Based on this theoretical foundation, the higher-order construct PsyCap has a stronger relationship with job-related measures like performance and job satisfaction than the four components included in it; in other words, the whole is greater than the sum of its parts. Empirical evidence supporting a higher-order construct showed that the combination of hope, optimism, and resilience, indicating the common, higher- order factor, had a stronger effect on performance than each of them individually (Larson & Luthans, 2006; Luthans et al., 2005). Further studies provided full support for a significant positive relationship between PsyCap and job performance as well as satisfaction, which is relatively stronger and more consistent than for the individual components (Avey et al., 2011). Moreover, the expected higher-order factor of PsyCap has also been tested with confirmatory factor and competing models analyses (Culbertson, Fullagar, & Mills, 2010; Gooty, Gavin, Johnson, Frazier, & Snow, 2009). The results provided additional support for the expected higher-order structure of PsyCap.

The higher-order construct PsyCap can also be clearly differentiated from related psychological constructs, i.e., it meets the criteria of being distinctive (Luthans & Youssef, 2007). Specifically, PsyCap with its state-like psychological capacities can be clearly distinguished from the concepts of positive traits, trait-like constructs, and states. Applying the criterion of malleability, a continuum is employed for the differentiation of these concepts. Traits like intelligence and talent, which are very stable over time and difficult to change, build one extreme of the continuum. These traits are followed on the continuum by trait-like constructs, which are relatively stable and difficult to change, like the Big Five personality dimensions (Goldberg, 1990)

and core self-evaluations (Judge, Locke, & Durham, 1997). Next are the state-like psychological resources, which are relatively adaptable and open for development, including self-efficacy, hope, optimism, and resilience. Evidence supports that the higher-order construct combining these four resources can also be considered state-like (Luthans, Avey, Avolio, Norman, & Combs, 2006). On the other extreme of the continuum are states representing momentary feelings, like pleasure and positive moods, due to its volatile nature (George, 1991). Research provides empirical support for this differentiation (Luthans et al., 2007; Peterson, Luthans, Avolio, Walumbwa, & Zhang, 2011). The findings show that unique variance beyond recognized trait-like personality and core self-evaluations is explained by PsyCap when predicting job satisfaction and affective organizational commitment. Further analysis using longitudinal data (Luthans et al., 2007) offered additional support for the state-like nature of PsyCap as well as discriminant validity between PsyCap and core self-evaluations while also indicating convergence between the two higher-order constructs (Peterson et al., 2011). Additionally, a clear distinction between PsyCap and other concepts of human resources, i.e., human and social capital, was established (Luthans & Youssef, 2007). While PsyCap describes one's psychological capacity or "what one is", human capital captures an individual's knowledge, skills or competencies derived from education or experience; in other words: "what one knows" (Becker, 1994; Luthans et al., 2006). Social capital summarizes one's relationships, networks, and connections as well as the underlying resources and structures on an inter-personal, inter-group, and inter-organizational level or simply "who one knows" (Coleman, 1988; Luthans et al., 2006). These three concepts of "people capital" have in common that they can be developed in a workplace environment through trainings, interventions, and proactive management.

## 3.2. Underlying Psychological Resources

As indicated above, the higher-order construct of PsyCap comprises the psychological resources that best meet the criteria defined by Luthans and Youssef: self-efficacy, hope, optimism, and resilience (Luthans & Youssef, 2004). For each of these four constructs, scholars have established considerable research on the theoretical foundation, its empirical evidence, and the relationship with a range of outcomes. These findings indicate that the four constructs meet the inclusion criteria for PsyCap of being state-like, positive, unique, validly measurable, open for development, and impactful on performance improvement.

### 3.2.1. Self-efficacy

Self-efficacy represents a positive belief and is defined as one's confidence to take on and put in the necessary resources and actions to succeed at tasks in a challenging environment (Bandura, 1997; Stajkovic & Luthans, 1998b). People high in self-efficacy have the ability to take on challenging tasks, to mobilize the required cognitive resources, and to succeed even when facing obstacles. In some of the extensive theory and research that has been established on the positive construct of self-efficacy, it has been conceptualized and measured as a state (Bandura, 1997; Maurer & Pierce, 1998). However, in other studies, self-efficacy has been shown to be developable and domain specific, which demonstrates its state-like nature (Bandura, 1997). The conceptual independence and empirical discriminant validity have been manifested by Bandura, and Carifio and Rhodes (Bandura, 1997; Carifio & Rhodes, 2002). Building on Stajkovic and Luthans' translation of self-efficacy to the work environment (Stajkovic & Luthans, 1998b), scholars have demonstrated the relationship between self-efficacy and multiple work-related dimensions,

including leadership (Chemers, Watson, & May, 2000), creativity (Tierney & Farmer, 2002), and workplace performance (Stajkovic & Luthans, 1998a).

### 3.2.2. Hope

The positive psychological resource of hope describes the existence of goals and the conviction and energy to pursue those goals and when necessary to redirect the paths to these goals in order to succeed (Snyder et al., 1991). People high in hope are motivated by their confidence to find a way to achieve their goals. In his theoretical foundation of the construct, Snyder established its openness for development through interventions, which also supports the state-like nature of hope (Snyder, 2000). The construct of hope has also been shown to be unique (Bryant & Cvengros, 2004; Carifio & Rhodes, 2002; Snyder, 2000), and valid and reliable measures have been established (Snyder et al., 1996). Furthermore, the relevance of hope for the workplace has recently been established. Among others, research has supported the relationship between hope and supervisor-rated performance (Luthans et al., 2005) as well as organizational profitability (Peterson & Luthans, 2003).

### 3.2.3. Optimism

In positive psychology, optimism is defined as one's positive attribution about current and future success (Bandura & Locke, 2003; Seligman, 1998). As a result, optimistic people take credit for favorable events and distance from unfavorable ones, which motivates their determination and helps them to deal with difficult situations. In contrast to self-efficacy and hope, which explain their effect on the pursuit of goals through an internal perspective only, optimism adds an external dimension. Like hope, optimism may have a dispositional level but can be developed through focused sessions and can therefore be considered as state-like (Scheier & Carver, 1987; Seligman,

1998). Scholars have also shown optimism to have conceptual independence (Luthans, Youssef, & Avolio, 2007) and empirically based discriminant validity (Bryant & Cvengros, 2004; Carifio & Rhodes, 2002; Magaletta & Oliver, 1999). In the work environment, optimism has been found to predict a wide range of positive outcomes including leadership effectiveness (Chemers et al., 2000) and workplace performance (Seligman & Schulman, 1986). Optimism is most commonly quantified using the measure developed by Scheier and Carver (1985).

#### 3.2.4. Resilience

Resilience describes one's ability to bounce back to attain success when beset by problems and adversity (Coutu, 2002; Masten, 2001). In positive psychology, resilient people accept reality and have a stable set of beliefs, which makes them capable of responding and adapting to new situations. Resilience is considered to be a learnable psychological capacity and therefore meets the criteria of being state-like (Masten & Reed, 2002). As part of the extensive theoretical foundation building in the clinical and developmental psychology, the resilience scale was developed as a valid and reliable measure by Wagnild and Young (1993). Additionally, researchers have demonstrated resilience to be unique (Luthans et al., 2007) and analyzed its relevance for the workplace. For example, a significant relationship between employees' resilience and job-satisfaction as well as performance was found in phases of significant change and transformation (Larson & Luthans, 2006; Luthans et al., 2005).

### 3.3. Measures

In 2007, Luthans and his colleagues introduced a self-report measure, the PsyCap questionnaire (PCQ) (Luthans et al., 2007). The PCQ is a 24-item questionnaire and is acknowledged as the standard measure for PsyCap. It builds on scales for each of the four

underlying psychological resources, which were developed in a work-related context and had already demonstrated reliability and validity in previous studies. From these pre-existing measures for self-efficacy (Parker, 1998), hope (Snyder et al., 1996), optimism (Scheier & Carver, 1985), and resilience (Wagnild & Young, 1993), the six items which were most valid with being state-like and relevant to the workplace or adjustable to it were put into a 6-point Likert-type scale and included in the PCQ (Luthans et al., 2007). Although Luthans and his colleagues empirically validated the PCQ measure and it is the most widely used measure since, critical evaluations have addressed some issues of concern. Dawkins and colleagues suggested further analysis of the interplay between the subcomponents of PsyCap and a validation of the use of a composite PCQ score (Dawkins et al., 2013), while Newman and his colleagues addressed the potential issue of common method and social desirability biases and recommend a validation of other measures like physiological or third-party-report measure (Newman et al., 2014). Complementing the PCQ, Harms and Luthans developed a questionnaire which addressed the concern of social desirability biases by measuring the level of PsyCap through implicit questions (Harms & Luthans, 2012). However, to date no study using this implicit PsyCap questionnaire has been published. Similarly, a questionnaire with the PCQ items being adopted to the cultural background of China has not been referred to in any other study (Qingshan, Le, & Xuansheng, 2014).

## 4. Antecedents of PsyCap

Since the concept of PsyCap was introduced in 2004, scholars have not only established empirical and conceptual support for PsyCap as a higher-order construct, but also investigated the antecedents of PsyCap. While the scientific work on the conceptualization, measurement, and effects of PsyCap has been focused on the individual as the level of analysis, most research on the

antecedents of PsyCap has been conducted on the team- and organizational-level as well as focused interventions. Even though this focus is conforming to and contingent on the definition of PsyCap and its components as state-like, further research on the antecedents of PsyCap on an individual-level is required to establish transparency on the malleability of PsyCap for an individual person and to affirm the state-like nature of PsyCap and its components. The list of studies cited in this chapter can be found in Table 2.

### 4.1. Individual-level Antecedents

On the individual as the level of research on PsyCap antecedents, recent studies have examined the effect of different dimensions of one's overarching self-concept on PsyCap. Ngo and his colleagues found that employees with strong gender role orientation, i.e., femininity and masculinity, experience higher levels of PsyCap (Ngo, Foley, Ji, & Loi, 2014). The authors had based their hypothesis on prior research demonstrating individuals with strong gender role orientation to be more likely to rise to challenges, to show a mastery identity, and to attribute their successes more internally than externally, which all explains a positive relationship with PsyCap. Similarly, in a study with college students, ethnic identity was found to positively impact an individual's PsyCap (Combs, Milosevic, Jeung, & Griffith, 2012). This effect ethnic identity has on one's PsyCap was explained by the challenges the students had to cope with in the process of developing their ethnic identity.

**Table 2:** Published articles on antecedents of PsyCap included in this review

| **Individual-level Antecedents** | | | |
|---|---|---|---|
| **Study** | **Direct Antecedents** | **Mediated antecedents** | **Moderators** |
| Brandt et al., 2011 | country of origin, personality dimensions (extraversion vs. introversion, intuition vs. sensing, thinking vs. feeling) | | |
| Combs et al., 2012 | ethnic identity β=0.42** | | |
| Du Plessis & Barkhuizen, 2012 | individual characteristics (age, marital status, home language, seniority, qualifications) | | |
| Liu et al., 2012 | age r=0.09*/0.1*, occupational stress (ERR β=-0.3**, over-commitment β=-0.12**) | | |
| Luthans et al., 2013 | overall well-being β=0.79 | | |
| Ngo et al., 2014 | gender role orientation (masculinity, femininity) | | |
| Saruhan, 2013 | trust in organization β=0.40** | | |
| Siu et al., 2015 | positive emotions β=0.57** | | |

| **Team-level Antecedents** | | | |
|---|---|---|---|
| **Study** | **Direct Antecedents** | **Mediated antecedents** | **Moderators** |
| Gooty et al., 2009 | follower perception of transformational leadership β=0.91* | | |
| Kwok et al., 2015 | family emotional support | | |

**Table 2:** *Continued*

| Study | Direct Antecedents | Mediated antecedents | Moderators |
|---|---|---|---|
| Liao & Liu, 2015 | abusive supervision β=-0.12*, supervisor student exchange β=0.23** | | negative relationship between abusive supervision and PsyCap weaker when team member support high (mediated by supervisor student exchange) |
| Liu, 2013 | perceived supervisor support r=0.39** | | |
| McMurray et al., 2010 | transformational and transactional leadership β=0.25** | | |
| Rego et al., 2012 | supervisors' authentic leadership β=0.67** | | |
| Story et al., 2013 | quality of leader-follower-relationship β=0.15* | | |
| Walumbwa et al., 2010 | leader PsyCap β=0.52** | | |
| Wooley et al., 2011 | authentic leadership β=-0.15*, positive work climate β=0.84* | authentic leadership related to positive work climate β=0.83** | |

**Organizational-level Antecedents**

| Study | Direct Antecedents | Mediated antecedents | Moderators |
|---|---|---|---|
| Liu et al., 2012 | age r=0.09*/0.1*, occupational stress (ERR β=-0.3**, over-commitment β=-0.12**) | | |
| Luthans et al., 2008 | supportive climate β=0.23**/0.5**/0.52** | | |

**Table 2:** *Continued*

| Study | Direct Antecedents | Mediated antecedents | Moderators |
|---|---|---|---|
| Mathe & Scott-Halsell, 2012 | perceived external prestige β=0.47** | | positive relationship between perceived external prestige and PsyCap stronger when manager customer orientation high β=0.12 |
| Nigah et al., 2012 | satisfaction with buddying β=0.22* | | |
| Qadeer & Jaffery, 2014 | organizational climate γ=0.19** | | |
| Venkatesh & Blaskovich 2012 | budget participation β=0.54** | | |
| Wang et al., 2012 | work-family-conflict (WIF r=0.13*/-0.03, FIW r=-0.04/-0.11**) | | |
| Wooley et al., 2011 | authentic leadership β=-0.15*, positive work climate β=0.84* | authentic leadership related to positive work climate β=0.83** | |

**Interventions**

| Study | Direct Antecedents | Mediated antecedents | Moderators |
|---|---|---|---|
| Dello Russo & Stoykova 2015 | (intervention) F=17.52** | | |
| Demerouti et al., 2011 | (intervention) d=0.89**/0.59** | | |
| Ertosun et al., 2015 | (intervention) | | |
| Luthans et al., 2006 | (intervention) | | |
| Luthans et al., 2008 | (intervention) F=6.55** | | |

**Table 2:** *Continued*

| Study | Direct Antecedents | Mediated antecedents | Moderators |
|---|---|---|---|
| Luthans et al., 2010 | (intervention) F=11.41**<br>t=5.16**/2.99** | | |

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

There is also growing evidence that an individual's attitudes and states influence the level of PsyCap. For example, Siu and her colleagues found that positive emotions were positively related to PsyCap (Siu, Cheung, & Lui, 2015). Positive emotions have not only been shown to be the driving force behind one's ability to bounce-back from adversity but also provide one with a positive view on own achievements in the past as well as the future. In line with that argumentation, Luthans and his colleagues established a positive relationship between overall well-being and PsyCap (Luthans, Youssef, Sweetman, & Harms, 2013). They pointed out that well-being provides one with the energy and motivation to pursue and achieve challenging goals and therefore helps to build and sustain high levels of PsyCap. Another positive relationship was demonstrated by Saruhan between an employee's trust in organization and PsyCap (Saruhan, 2013). Employees who feel that management does what is best for the organization and its members are more likely to develop a positive expectation of future outcomes as well as feelings of empowerment.

Last, recent studies have presented empirical evidence that statistically significant differences exist between groups of individuals based on their personal and cultural background, e.g., country of origin, personality dimensions, and qualifications (Brandt, Gomes, & Boyanova, 2011; Du Plessis & Barkhuizen, 2012). The authors point out that the evidence of individuals high in extraversion, intuition, and thinking scoring especially high in all dimensions of PsyCap is in line with past research highlighting that people with extraverted and intuitive tendencies tend to have higher self-esteem and are more likely to take on managerial responsibilities. Additionally, older people seem to score higher on PsyCap than their junior counterparts (Liu, Chang, Fu, Wang, & Wang, 2012), which can be explained by a longer history of positive experiences in their life. These results support our recommendation for further research in this regard to affirm the state-like nature of PsyCap.

### 4.2. Team-level Antecedents

On the team-level, researchers have identified numerous external factors which influence the level of PsyCap positively or negatively. Recent studies have established a relationship between leader characteristics and employees' PsyCap. Story and her colleagues found support for a positive contagion effect of managers' PsyCap on followers (Story, Youssef, Luthans, Barbuto, & Bovaird, 2013). This positive relationship was partially being mediated by the quality of their relationship. High-PsyCap leaders tend to engage in more positive appraisal of their leadership situation, which in turn is observed by their followers and serves as a model for their high PsyCap. Also, positive leaders' increased confidence and trust in their employees' ability to succeed professionally promotes their employees directly and through a positive leader–follower-relationship to have the confidence to take on challenging tasks and make a positive attribution about future outcomes, implying higher levels of PsyCap. Additional support for a positive relationship between leader and follower PsyCap was presented by Walumbwa and his colleagues (Walumbwa, Peterson, Avolio, & Hartnell, 2010).

In addition to leader characteristics, leadership behavior has been found to significantly influence employees' level of PsyCap. For example, researchers identified a positive relationship between employees' positive perception of transformational leadership and their level of PsyCap (Gooty et al., 2009; McMurray, Pirola-Merlo, & Sarros, 2010). Transformational leaders address their followers with a vision and personal experiences that enthuse a higher sense of purpose and create the positive environment in which followers evaluate current and future circumstances favorably and are willing to act accordingly. Further, a transformational leader's role modeling supports followers in developing confidence in their abilities and having the assurance of being

provided support in case of failure by their supervisors. Similarly, authentic leadership was established as another antecedent of PsyCap in studies conducted by Rego and his colleagues (Rego, Sousa, Marques, & Cunha, 2012a) as well as Wooley and her colleagues (Wooley, Caza, & Levy, 2011). A recent study also demonstrated that higher perceived supervisor support led to higher levels of PsyCap (Liu, 2013). High supervisor support creates a climate of collaboration with a shared goal commitment, which energizes employees and serves as a mechanism supporting them in overcoming challenges to accomplish their goals. Furthermore, negative leadership behavior has also been shown to negatively influence followers' PsyCap. Liao and Liu found evidence that abusive supervision, defined as hostile verbal and non-verbal behaviors excluding physical contact, had a significant negative effect on followers' PsyCap (Liao & Liu, 2015). According to the authors, abusive supervision includes overly-negative feedback, which is negatively related to one's self-efficacy and fosters self-doubts, which in turn decrease one's level of hope. Additionally, it leads to an environment of negative appraisal and lack of trust, which negatively influences optimism and resilience.

Last, a study published in 2015 found evidence for a team-level antecedent outside the workplace, social and emotional support by one's family (Kwok, Cheng, & Wong, 2015). Individuals being socially, and in particular emotionally, supported by their family showed significantly higher levels of PsyCap than individuals not being able to have recourse to that support. Kwok and her colleagues argue that a supportive family essentially creates the supportive environment that is necessary for an individual to develop the basis for high levels of PsyCap.

### 4.3. Organizational-level Antecedents

On the organizational level, there is growing evidence that the workplace environment is related to employees' level of PsyCap. For example, in three recently published articles, the results showed that a positive and supportive organizational climate has a positive effect on employees' PsyCap (Luthans, Norman, Avolio, & Avey, 2008; Qadeer & Jaffery, 2014; Wooley et al., 2011). The authors argue that a supportive climate at the workplace ensures employees that their work effort is acknowledged and hence results in them being optimistic and self-confident about the future. Similarly, PsyCap was found to be positively affected by satisfaction with buddying in the workplace in a study published in 2012 (Nigah, Davis, & Hurrell, 2012). A high-quality buddying relationship provides employees with an active exchange with a role model, which is shown to increase their levels of self-efficacy. Additionally, a buddy offers emotional support in case of failure, which increases one's level of resiliency and in turn is positively related to hope and optimism. Recent work also demonstrates that employees being actively involved in the budget setting process or having budgetary responsibilities experience significantly higher levels of PsyCap than their counterparts without this involvement or responsibility (Venkatesh & Blaskovich, 2012). Participation in the budget setting process provides employees with the opportunity to actively influence the resources available for achieving their goals in a structured and collaborative exchange with their supervisors, which positively effects all sub-components of PsyCap. Additionally, perceived external prestige was found to positively influence PsyCap development in employees (Mathe & Scott-Halsell, 2012). In contrast, recent work conducted with Asian participants revealed that occupational stress (Liu et al., 2012) and work-family conflicts (Wang, Liu, Wang, & Wang, 2012) are negatively related with an individual's level of PsyCap. Liu and her colleagues found that feelings of being under-rewarded and over-committed, which

indicate occupational stress, lead to a fewer positive expectations of the future, lower confidence in one's ability to cope with challenges, and significantly decrease one's capabilities to recover after failure. Also, occupational stress as well as work-family conflicts resulted in individuals allocating time and effort to improving these situations at the expense of other work-related activities, which decreased their levels of PsyCap.

### 4.4. Interventions

In addition to the research on external factors influencing the level of PsyCap, recent studies assessed the effect of workplace interventions on employees' level of PsyCap. In 2006, Luthans and his colleagues developed a micro-intervention model, the PsyCap Intervention (PCI) (Luthans et al., 2006). The PCI is a highly focused, very short training session of 1–3 h, which draws from past research on self-efficacy, hope, optimism, and resilience development. Using management students and practicing managers, the PCI significantly increased their pre- to post-measured PsyCap. Even though the 3 per cent increase in PsyCap found in this study does not seem particularly large, the authors used utility analysis to argue that PCI could potentially have a significant positive impact on the bottom line of a company, which equals a positive return on investment for PCI. Similar results were found in other studies using other face-to-face trainings (Demerouti, van Eeuwijk, Snelder, & Wild, 2011; Ertosun, Erdil, Deniz, & Alpkan, 2015) and a web-based training with employees representing a wide range of industries (Demerouti et al., 2011; Luthans, Avey, & Patera, 2008). Furthermore, there is growing evidence that PCI not only significantly increases participants' level of PsyCap but also has a direct impact on participants' job performance (Luthans, Avey, Avolio, & Peterson, 2010). Both, self-rated performance and manager-rated performance, significantly increased pre- to post-intervention for the managers

participating in the PCI. Dello Russo and Stoykova were able to generalize the effectiveness of the PCI (Dello Russo & Stoykova, 2015). They found evidence that even when conducted by different trainers, the PCI had a significant effect on the participants' PsyCap. Additionally, this increase in the level of PsyCap was shown to be stable over a 1-month-period, supporting the durability of the training effect.

## 5. Effects of PsyCap

The higher-order construct of PsyCap, comprising the psychological resources self- efficacy, hope, optimism, and resilience, has been found to be a significant predictor of desirable work outcomes. The numerous studies investigating the effects of PsyCap indicate significant positive relationships between PsyCap and positive employee attitudes, positive employee behavior, and other positive outcomes (Avey et al., 2011). The list of studies cited in this chapter can be found in Table 3.

**Table 3:** Published articles on effects of PsyCap included in this review

| **Effects on Attitudes** | | | | |
|---|---|---|---|---|
| **Study** | **Direct effects** | **Mediated effects** | **Moderating effects** | **Moderators** |
| Abbas et al., 2014 | job satisfaction β=0.56**, supervisor-rated performance β=0.54** | | negative relationship between perceived organizational politics and job satisfaction β=0.17**/supervisor-rated performance β=0.33** weaker when PsyCap high, positive relationship between perceived organizational politics and turnover intention stronger when PsyCap high β=0.14** | |
| Ali & Ali, 2014 | job satisfaction r=0.46**, job burnout r=0.58** | job satisfaction related to job burnout | | |
| Alkire & Avey, 2013 | intention to apply for a job with multinational enterprise β=0.23** | | | |
| Avey et al., 2008 | positive emotions β=0.69**, cynicism β=-0.31*, | positive emotions related to engagement β=0.45*/organizational citizenship β=0.26*/deviance β=-0.39** | | positive relationship between PsyCap and positive emotions stronger when mindfulness low β=-0.15* |

**Table 3:** Continued

| Study | Direct effects | Mediated effects | Moderating effects | Moderators |
|---|---|---|---|---|
| Avey et al., 2008 | feeling of empowerment β=0.61**, cynicism β=-0.14* | feeling of empowerment related to intentions to quit β=-0.38** | | |
| Avey et al., 2010 | cynicism β=-0.42*, intentions to quit β=-0.17*, organizational OCBs β=0.22*, CWBs β=-0.32* | | | |
| Avey & Jensen, 2009 | perceived symptoms of stress β=-0.35**, intentions to quit β=-0.24**, job search behavior β=-0.16** | perceived symptoms of stress related to intentions to quit β=0.13*/job search behavior β=0.17** | | |
| Combs et al., 2012 | importance of competence & growth (vs status and independence and vs comfort and security) aspect of a job β=0.50** | | | |
| Kaplan & Bickes, 2013 | job satisfaction | | | |
| Kim & Noh, 2016 | intrinsic motivation β=0.36* (optimistic resilience) | intrinsic motivation related to entrepreneurial confidence β=0.23* | | |
| Kwok et al., 2015 | job satisfaction | | | |
| Larson & Luthans, 2006 | job satisfaction r=0.37**, organizational commitment r=0.31** | | | |

**Table 3:** Continued

| Study | Direct effects | Mediated effects | Moderating effects | Moderators |
|---|---|---|---|---|
| Luthans et al., 2007 | job satisfaction r=0.32**/0.53**, job performance r=0.33**/0.22** | | | |
| Luthans et al., 2008 | performance β=0.25**/0.26*/0.32**, satisfaction r=0.39**/0.54**/0.72**, commitment r=0.31**/0.44**/0.48** | | | |
| Luthans & Jensen, 2005 | Commitment to organizational mission r=0.38**, intentions to remain with organization r=0.45** | | | |
| Ngo et al., 2014 | job satisfaction, career satisfaction | | | |
| Nigah et al., 2012 | work engagement β=0.55** | | | |
| Pouramini & Fayyazi, 2015 | job satisfaction β=0.4**, OCB β=0.53**, employee engagement β=0.67** | | | |
| Siu et al., 2014 | intrinsic motivation β=0.41**, study engagement β=0.33** | intrinsic motivation related to study engagement β=0.42** | | |

**Table 3:** Continued

| Study | Direct effects | Mediated effects | Moderating effects | Moderators |
|---|---|---|---|---|
| Siu et al., 2015 | work well-being (satisfaction β=0.61**, stress symptoms β=-0.26**) | work well-being (satisfaction β=-0.37**, stress symptoms β=0.32**) related with turnover intentions | | |
| Tüzün et al., 2014 | | | negative relationship between perceived supervisory support and turnover intention weaker when PsyCap high z=-2.2* | |

| **Effects on Behavior** | | | | |
|---|---|---|---|---|
| **Study** | **Direct effects** | **Mediated effects** | **Moderating effects** | **Moderators** |
| Abbas et al., 2014 | job satisfaction β=0.56**, supervisor-rated performance β=0.54** | | negative relationship between perceived organizational politics and job satisfaction β=0.17**/supervisor-rated performance β=0.33** weaker when PsyCap high, positive relationship between perceived organizational politics and turnover intention stronger when PsyCap high β=0.14** | |

**Table 3:** Continued

| Study | Direct effects | Mediated effects | Moderating effects | Moderators |
|---|---|---|---|---|
| Abbas & Raja, 2015 | innovative performance β=0.21**, job stress β=-0.13* | | | |
| Anjum et al., 2014 | work-centrality β=0.50*, supervisor-rated performance β= 0.51* | work-centrality related to supervisor-rated performance β=0.35* | | |
| Avey et al., 2006 | involuntary absenteeism β=-0.30* | | | |
| Avey et al., 2008 | positive emotions β=0.69**, cynicism β=-0.31*, | positive emotions related to engagement β=0.45*/organizational citizenship β=0.26*/deviance β=-0.39** | | positive relationship between PsyCap and positive emotions stronger when mindfulness low β=-0.15* |
| Avey et al., 2010 | cynicism β=-0.42*, intentions to quit β=-0.17*, organizational OCBs β=0.22*, CWBs β=-0.32* | | | |
| Avey et al., 2010 | performance (financial performance β=0.25*, referrals within the firm β=0.14**, supervisor-rated performance β=0.35**/0.31*) | | | |
| Avey & Jensen, 2009 | perceived symptoms of stress β=-0.35**, intentions to quit β=-0.24**, job search behavior β=-0.16** | perceived symptoms of stress related to intentions to quit β=0.13*/job search behavior β=0.17** | | |

**Table 3:** *Continued*

| Study | Direct effects | Mediated effects | Moderating effects | Moderators |
|---|---|---|---|---|
| Baluku et al., 2016 | entrepreneurial success β=0.34** | | positive relationship between startup capital and entrepreneurial success stronger when PsyCap (optimism) high | |
| Chen & Lim, 2012 | perceived employability β=0.66** | perceived employability related to seeking employment assistance β=0.29*/seeking financial assistance β=0.22*; seeking employment assistance related to preparatory job search β=0.67**/active job search β=0.60** | | |
| Gooty et al., 2009 | performance β=0.94*, individual OCB β=0.65*, organizational OCB β=0.63* | | | |
| Hmieleski & Carr, 2008 | new venture performance β=0.22* | | | positive relationship between PsyCap and new venture performance stronger when environmental dynamism high β=0.44** |
| Jensen & Luthans, 2006 | authentic leadership style β=0.42** | | | |
| Liu, 2013 | job performance β=0.72** | | | |

**Table 3:** *Continued*

| Study | Direct effects | Mediated effects | Moderating effects | Moderators |
|---|---|---|---|---|
| Luthans et al., 2005 | supervisor-rated performance β=0.25**/0.18** | | | |
| Luthans et al., 2007 | job satisfaction r=0.32**/0.53**, job performance r=0.33**/0.22** | | | |
| Luthans et al., 2008 | supervisor-rated performance β=0.26** | | | |
| Luthans et al., 2008 | performance β=0.25**/0.26*/0.32**, satisfaction r=0.39**/0.54**/0.72** , commitment r=0.31**/0.44**/0.48** | | | |
| Luthans et al., 2011 | innovation β=0.24**, mastery-oriented mindset β=0.15** | mastery-oriented mindset related to problem solving performance β=0.21**/innovation β=0.10** | | |
| Luthans et al., 2012 | academic performance β=0.01* | | | |
| Nguyen & Nguyen, 2012 | job performance β=0.47**, quality of work life β=0.67** | quality of work life related to job performance β=0.38**/quality of life β=0.63** | | |

**Table 3:** *Continued*

| Study | Direct effects | Mediated effects | Moderating effects | Moderators |
|---|---|---|---|---|
| Norman et al., 2010 | organizational citizenship β=0.30**, deviance β=-0.58** | | | positive/negative relationship between PsyCap and organizational citizenship β=0.31**/deviance β=0.74** stronger when organizational identity high |
| Peterson et al., 2011 | supervisor-rated performance β=2.08**, financial performance β=2.43** | | | |
| Polatci & Akdogan, 2014 | psychological well-being β=0.46, work-family-spillover β=0.18/-0.15, family-work-spillover β=0.26/-0.16, performance β=0.4 | psychological well-being β=0.25 and work-family-spillover β=0.14/0.11 related to performance | | |
| Pouramini & Fayyazi, 2015 | job satisfaction β=0.4**, OCB β=0.53**, employee engagement β=0.67** | | | |
| Qadeer & Jaffery, 2014 | individual OCB γ=0.28**, organizational OCB γ=0.29** | | | |
| Rego et al., 2010 | self-rated performance r=0.58** | | | |

**Table 3:** *Continued*

| Study | Direct effects | Mediated effects | Moderating effects | Moderators |
|---|---|---|---|---|
| Rego et al., 2012 | positive affect β=0.67**, positivity ratio β=0.63**, creativity β=0.62* | positive affect β=0.13** and positivity ratio β=0.34** related to creativity | | |
| Rego et al., 2012 | positive affect β=0.19** (self-efficacy) β=0.57** (hope), creativity β=0.20** (self-efficacy) β=0.42** (hope) | positive affect related to creativity β=0.14** | | |
| Rego et al., 2012 | creativity β=0.49** | | | |
| Sun et al., 2012 | job embeddedness β=0.35**, self-rated performance β=0.52** | job embeddedness positively related with self-rated performance β=0.14** | | |
| Sweetman et al., 2011 | creative performance r=0.25** | | | |
| Venkatesh & Blaskovich, 2012 | job performance β=0.4** | | | |
| Walumbwa et al., 2010 | job performance β=0.28** | | | positive relationship between PsyCap and job performance stronger when service climate high β=0.33** |

**Table 3:** *Continued*

| Study | Direct effects | Mediated effects | Moderating effects | Moderators |
|---|---|---|---|---|
| Wang et al., 2014 | | | positive relationship between leader-member-exchange and job performance weaker when PsyCap high β=-0.15** | |

| **Other Effects** | | | | |
|---|---|---|---|---|
| **Study** | **Direct effects** | **Mediated effects** | **Moderating effects** | **Moderators** |
| Abbas & Raja, 2015 | innovative performance β=0.21**, job stress β=-0.13* | | | |
| Avey et al., 2010 | psychological well-being (PWB β=0.19**, GHQ β=0.12*) | | | |
| Avey & Jensen, 2009 | perceived symptoms of stress β=-0.35**, intentions to quit β=-0.24**, job search behavior β=-0.16** | perceived symptoms of stress related to intentions to quit β=0.13*/job search behavior β=0.17** | | |
| Baron et al., 2016 | stress level β=-0.43**, subjective well-being β=0.44** | stress level related to subjective well-being β=-0.36** | | negative relationship between PsyCap and stress level stronger when age high β=-0.02 |
| Bergheim et al., 2013 | perceived safety climate β=0.80*/β=0.57** | | | |

**Table 3:** *Continued*

| Study | Direct effects | Mediated effects | Moderating effects | Moderators |
|---|---|---|---|---|
| Culbertson et al., 2010 | eudaimonic well-being β=0.75** | eudaimonic well-being related to hedonic well-being β=0.78** | | |
| Liu et al., 2012 | depressive symptoms β=-0.29**/-0.32**/-0.27**/-0.37** | | | |
| Luthans et al., 2013 | Relationship PsyCap: relationship satisfaction β=0.56, hours spent with family and friends β=0.27; Health PsyCap: health satisfaction β=0.36, BMI β=-0.25, cholesterol β=-0.24 | work satisfaction β=0.26, relationship satisfaction β=0.53, health satisfaction β=0.27 related to overall well-being | | |
| Roberts et al., 2011 | incivility β=-0.26** | | positive relationship between stress level and incivility weaker when PsyCap high β=-0.14** | |
| Siu et al., 2015 | work well-being (satisfaction β=0.61**, stress symptoms β=-0.26**) | work well-being (satisfaction β=-0.37**, stress symptoms β=0.32**) related with turnover intentions | | |

**Table 3:** *Continued*

| Study | Direct effects | Mediated effects | Moderating effects | Moderators |
|---|---|---|---|---|
| Wang et al., 2012 | burnout (emotional exhaustion β=-0.17**/-0.23**, cynicism β=-0.31**/-0.32**, professional efficacy β=0.36**/0.23**) | | | |

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

### 5.1. Effects on Attitudes

Multiple studies have examined the relationship between PsyCap and desirable employee attitudes. Individuals high in PsyCap have been found to experience higher levels of job satisfaction and organization commitment (Abbas, Raja, Darr, & Bouckenooghe, 2014; Ali & Ali, 2014; Kaplan & Bickes, 2013; Kwok et al., 2015; Larson & Luthans, 2006; Luthans et al., 2007; Luthans & Jensen, 2005; Luthans et al., 2008; Ngo et al., 2014; Pouramini & Fayyazi, 2015). The positive psychological resources combined in the higher-order construct of PsyCap enable individuals not only to be more successful at work but also give them more confidence and stimulate positive thinking, all increasing their job satisfaction and organization commitment. Similarly, researchers found the negative relationship between perceived politics at work and job satisfaction to be weaker for individuals high in PsyCap, indicating a moderating effect of PsyCap (Abbas et al., 2014). This moderating effect was explained by high-PsyCap individuals' capacity to mitigate the negative effects of an adverse environment and take up the challenge instead of reacting negatively, which is rooted in their confidence and persistence to explore different options and deal with challenges while striving to achieve challenging goals. Furthermore, researchers found a significant negative relationship between PsyCap and job burnout, which was mediated by job satisfaction (Ali & Ali, 2014).

There has also been support for a positive relationship between an individual's PsyCap and feelings of empowerment and intrinsic motivation (Avey, Hughes, Norman, & Luthans, 2008; Kim & Noh, 2016; Siu, Bakker, & Jiang, 2014). In their study analyzing the effect of PsyCap on intrinsic motivation, Kim and Noh found that internal motivation in turn was positively related to entrepreneurial confidence, implying that individuals high in PsyCap are more likely to start a new

venture. However, the authors also found support that their participants' PsyCap consisted of only two dimensions, hopeful self-efficacy and optimistic resilience. While optimistic resilience was positively related with intrinsic motivation, hopeful self-efficacy had no significant effect (Kim & Noh, 2016). Siu and her colleagues confirmed the relationship between PsyCap and intrinsic motivation, which then had a positive effect on engagement (Siu et al. 2014). Avey and his colleagues also found that PsyCap was related to positive emotions (Avey, Wernsing, & Luthans, 2008). In turn, these positive emotions were then positively related to engagement and negatively to cynicism, which were found to be attitudes of importance for organizational change. Other published articles support the relationships between PsyCap and cynicism (Avey, Luthans, & Youssef, 2010) as well as employee engagement (Nigah et al., 2012; Pouramini & Fayyazi, 2015). Research has also established that the above-mentioned positive attitudes related to PsyCap have a negative effect on one's intention to quit the job (Avey, Hughes et al., 2008; Avey & Jensen, 2009; Avey, Luthans, & Youssef, 2010; Luthans & Jensen, 2005; Siu et al., 2015). The positive attitudes that were found to mediate the negative relationship between PsyCap and intentions to quit one's job include empowerment (Avey et al., 2008) and job satisfaction (Siu et al., 2015). Additionally, researchers found the negative relationship between perceived supervisory support and turnover intention to be weaker for high-PsyCap individuals, which can be explained by employees with high levels of PsyCap being more likely to perceive themselves as able to cope with challenges at work on their own, thus being less dependent on support by their supervisor (Tüzün, Cetin, & Basim, 2014).

In contrast to these results, Abbas and his colleagues found support for a moderating effect of PsyCap on the negative relationship between perceived politics and intentions to quit the job, in the way that this relationship was stronger for individuals with high levels of PsyCap (Abbas et al.,

2014). The authors argue that high-PsyCap individuals tend to be more confident, willing to assess options and potentially change, which might lead to an assessment of job alternatives with less perceived politics and accordingly higher intentions to quit. Finally, PsyCap was found to positively influence one's intention to apply for a job with a multinational enterprise (Alkire & Avey, 2013) and the importance of the competence and growth aspect in the job selection process (Combs et al., 2012), allowing human resources departments to integrate PsyCap as a criterion in their recruitment and selection process.

### 5.2. Effects on Behavior

PsyCap has also been found to have a significant effect on positive employee behavior. Numerous studies have found a significant relationship between an individual's PsyCap and job performance (Abbas et al., 2014; Avey, Nimnicht, & Pigeon, 2010; Liu, 2013; Luthans et al., 2005; Luthans, Avey, Clapp-Smith, & Li, 2008; Luthans et al., 2007; Luthans et al., 2008; Nguyen & Nguyen, 2012; Rego, Marques, Leal, Sousa, & Pina e Cunha, 2010; Sun, Zhao, Yang, & Fan, 2012; Venkatesh & Blaskovich, 2012; Walumbwa et al., 2010; Wang, Sui, Luthans, Wang, & Wu, 2014). Individuals high in PsyCap are resilient with adversity, efficacious, hopeful, and have a positive perspective, which gives them the confidence and persistence to explore different options and deal with challenges while striving to achieve ambitious goals, making them stronger performers. While these studies investigated the direct relationship between PsyCap and job performance, Sun and his colleagues presented support for job embeddedness as a mediator for the PsyCap-performance relationship (Sun et al., 2012), Anjum and his colleagues identified work centrality as another mediator (Anjum, Ahmed, & Karim, 2014), and Polatci and Akdogan found the relationship between PsyCap and job performance to be partially mediated by well-being and work-family-

spillover (Polatci & Akdogan, 2014). Furthermore, Wang and her colleagues identified PsyCap to moderate the positive relationship between the leader-follower-relationship and job performance in such a way that the relationship is weaker for employees with high levels of PsyCap (Wang et al., 2014). The authors argue that a positive leader-follower-relationship has the strongest effect on followers' job performance under conditions when employees lack positive psychological states, while the effect decreases with the employees' existing level of positive psychological capacities. Besides traditional measures for job performance, such as self-reported performance (Luthans et al., 2007, 2008; Nguyen & Nguyen, 2012; Rego et al., 2010; Sun et al., 2012; Venkatesh & Blaskovich, 2012) and supervisor-rated performance (Abbas et al., 2014; Anjum et al., 2014; Avey et al., 2010; Luthans et al., 2005; 2007, 2008; Rego et al., 2010; Walumbwa et al., 2010; Wang et al., 2014), researches have also found a positive relationship between PsyCap and job performance when using alternative measures, such as relative merit-based salary (Luthans et al., 2005), individual level sales performance data, and customer referrals within the firm (Avey et al., 2010). Furthermore, Peterson and her colleagues found evidence showing that over time, change in an individual's level of PsyCap is positively related to change in performance (Peterson et al., 2011). The authors used longitudinal data from a large financial service organization for their analyses, which showed significant within-individual change in PsyCap, which in turn was positively related to performance, measured as supervisor-rated performance and as sales revenue.

While most researchers have focused on the effect of PsyCap on employee job performance, there is also growing evidence for a positive relationship between PsyCap and academic performance (Luthans, Luthans, & Jensen, 2012) as well as entrepreneurial success (Baluku, Kikooma, & Kibanja, 2016; Hmieleski & Carr, 2008). Hmieleski and Carr found PsyCap to have a significant effect on new venture performance, explaining unique variance beyond financial

capital, human capital, and social capital (Hmieleski & Carr, 2008). Similarly, Baluku, Kikooma, and Kibanja found support for a positive relationship between PsyCap and entrepreneurial success and also found hope to significantly moderate the positive relationship between startup capital and entrepreneurial success (Baluku et al., 2016). However, further analysis of the components of entrepreneurial success revealed that PsyCap had a significant effect on entrepreneur's satisfaction, venture survival time, and generated employment, but not financial outcomes. The authors argue that the high number of influencing factors on financial outcomes is the reason.

In addition to the effect on performance and entrepreneurial success, researchers have found PsyCap to influence other desirable employee behaviors. For example, multiple studies found PsyCap to be a predictor of organizational citizenship behavior (Avey, Luthans, & Youssef, 2010; Gooty et al., 2009; Pouramini & Fayyazi, 2015; Qadeer & Jaffery, 2014). As PsyCap has been shown to be related to various desirable work behaviors, the authors argue that it is also very likely that PsyCap leads to positive behavior not covered in one's job definition and hence individuals with high levels of PsyCap show more frequent and consistent engagement in organizational citizenship behavior. Researchers also examined the relationship between an individual's PsyCap and creativity (Rego et al., 2012a; Sweetman, Luthans, Avey, & Luthans, 2011). PsyCap was found to be positively related to creative performance (Sweetman et al., 2011) and to partially mediate the positive relationship between supervisor's authentic leadership and an employee's creativity (Rego et al., 2012a). Additionally, self-efficacy and hope were shown to predict creativity directly as well as through positive affect as a mediator (Rego et al., 2012b, c). Similarly, recent work by Abbas and Raja found evidence for a positive relationship between PsyCap and innovative behavior at the workplace (Abbas & Raja, 2015). High-PsyCap individuals were shown to be more creative in the idea generation process and more successful in their implementation at work. Apart

from presenting additional support for the positive PsyCap-innovation-relationship, Luthans and his colleagues found support for PsyCap predicting effective problem solving (Luthans, Youssef, & Rawski, 2011). This effect on problem solving performance was mediated by a mastery-oriented mindset. Entrepreneurs high in PsyCap were also found to be more likely to have an authentic leadership style (Jensen & Luthans, 2006; Luthans et al., 2011).

However, recent studies also demonstrate that individuals high in PsyCap not only engage in more desirable behavior, but also engage in less undesirable behaviors (Avey, Luthans, & Youssef, 2010). For example, PsyCap was found to predict positive emotions, which in turn were not only positively related to organizational citizenship, but also negatively related to deviance, a negative reaction often associated with organizational restructuring (Avey et al., 2008). In addition, Norman and his colleagues found this relationship to be moderated by organizational identity, such that the individuals with high levels of PsyCap, who identified highly with their organization, were the least likely to engage in deviance (Norman, Avey, Nimnicht, & Graber-Pigeon, 2010). PsyCap was also found to negatively influence absenteeism (Avey, Patera, & West, 2006) and job search behavior (Avey & Jensen, 2009; Chen & Lim, 2012). The negative relationship between PsyCap and job search behavior was partially mediated by the perceived symptoms of job stress (Avey & Jensen, 2009). Finally, in a study with displaced employees, Chen and Lim found evidence that high-PsyCap individuals consider themselves more employable, which in turn makes them more likely to seek employment assistance and financial support as well as to engage in active job search (Chen & Lim, 2012).

### 5.3. Other Effects

Recent research demonstrates that PsyCap has positive effects beyond desirable employee attitudes and behaviors. Employees with high levels of PsyCap have shown significantly lower levels of job stress than their colleagues with lower levels of PsyCap (Abbas & Raja, 2015; Siu et al., 2015). The authors suggest that one's positive approach and ability to recover from external events allows high-PsyCap individuals to handle stress well. In line with these results, Avey and Jensen found PsyCap to negatively influence one's perceived symptoms of stress (Avey & Jensen, 2009) and Roberts and her colleagues found PsyCap to buffer the effect of job stress on incivility, such as rudeness in communication with colleagues and customers (Roberts, Scherer, & Bowyer, 2011). Furthermore, recent work by Baron and his colleagues demonstrates that entrepreneurs' level of PsyCap is negatively related to stress but that stress in turn is negatively related to their well-being (Baron, Franklin, & Hmieleski, 2016). Further studies extending the research on PsyCap into the well-being domain also indicate that PsyCap is related to an individual's personal well-being (Avey, Luthans, Smith, & Palmer, 2010; Culbertson et al., 2010; Luthans et al., 2013), symptoms of depression (Liu et al., 2012), and burnout (Wang et al., 2012), and that it explains significant variance in well-being over time (Avey et al., 2010). Last, a study published in 2013 found PsyCap to be positively related with air traffic controllers' perceived safety climate (Bergheim et al., 2013).

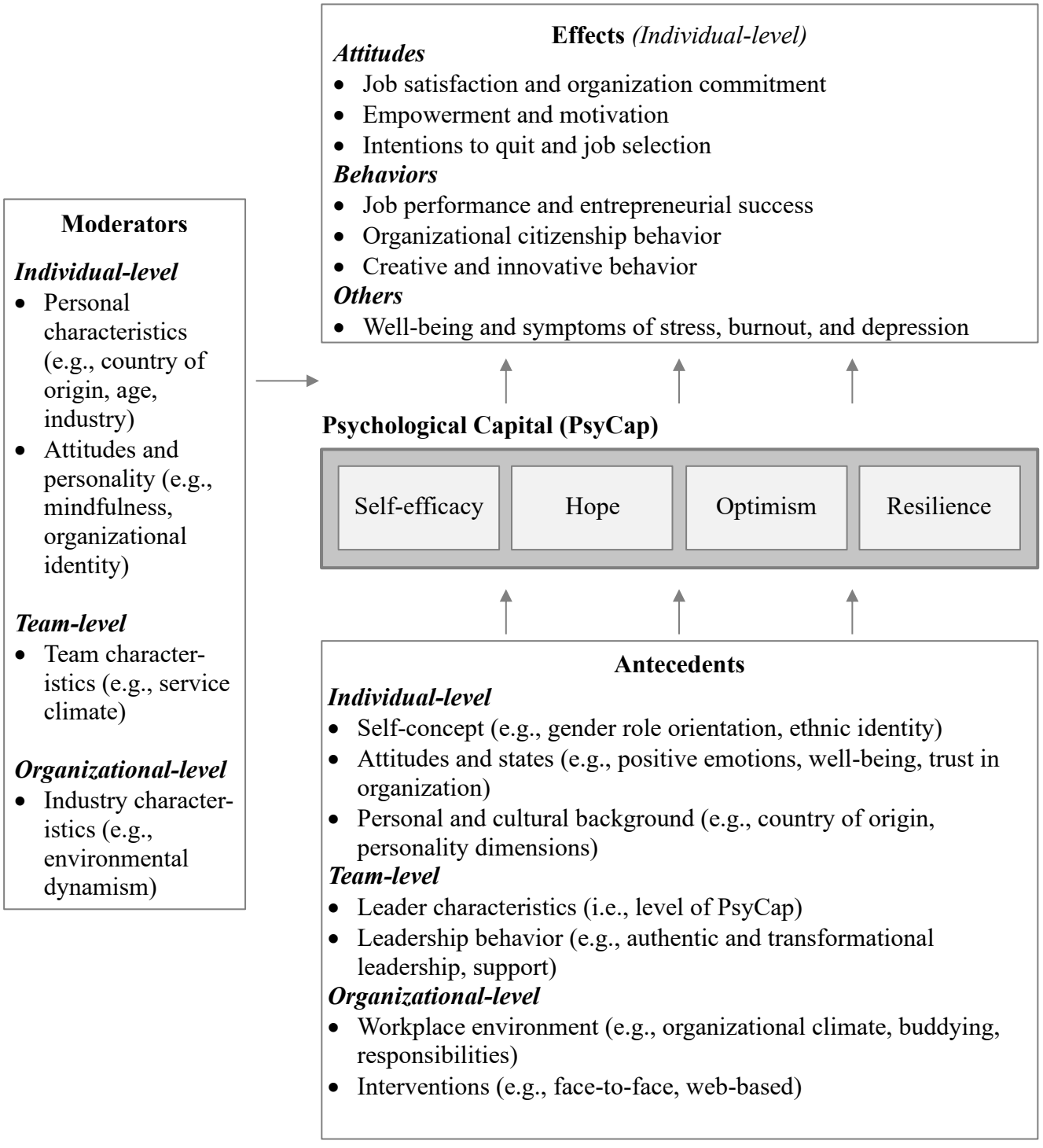
## 6. Discussion

In this paper, we have outlined a comprehensive view on the current state of scientific knowledge on the recently emerging concept of PsyCap. Since the concept of PsyCap was introduced in 2004, scholars have established a theoretical foundation, provided empirical evidence

for PsyCap as higher-order construct, and differentiated it from the concept of positive traits as well as other concepts of human resources (Avey, Luthans, & Youssef, 2010; Larson & Luthans, 2006; Luthans et al., 2005, 2007). Furthermore, scholars have published a significant number of articles on the antecedents and effects of PsyCap and have established the following relationships (see Fig. 2).

Antecedents of PsyCap have been identified on the individual-, team-, and organizational level. On the individual level, the demonstrated antecedents of PsyCap can be summarized in three categories. First, items of self-concept, including gender role orientation and ethnic identity, have been shown to positively influence PsyCap. Similarly, one's positive states and attitudes, like trust in the organization, are related to PsyCap. Last, significant differences in PsyCap have been found based on an individual's personal and cultural background. On the team-level, the majority of the studies has been concentrated on the influence of leader characteristics, especially leader PsyCap, and leadership behavior on follower-PsyCap. The leadership behavior that was found to be related to followers' PsyCap includes authentic and transformational leadership as well as supervisor support. On the organizational level, multiple dimensions of the workplace environment are predictors of employees' PsyCap, comprising organizational climate, buddying relationships, and employees' responsibilities. Further, it was shown that highly focused training sessions significantly increase employees' PsyCap level.

**Figure 2**: Summary of the existing literature on PsyCap



In addition, numerous studies have found PsyCap to be a significant predictor of positive employee attitudes, positive employee behavior, and other desirable work outcomes. The research on effects on attitudes has been predominantly focused on job satisfaction and other desirable attitudes, such as organization commitment and motivation. However, PsyCap has also been demonstrated to be negatively related to undesirable attitudes, including intentions to quit and cynicism. The positive behaviors predicted by PsyCap include behaviors within one's job profile, such as job performance, entrepreneurial success, and creative and innovative behavior. Furthermore, high-PsyCap individuals are also more likely to engage in organizational citizenship behavior. Recent research has also found PsyCap to be related to outcomes beyond attitudes and behavior, mainly one's well-being as well as symptoms of stress, burnout, and depression.

Last, the reviewed articles on PsyCap included multiple factors moderating the relationship between PsyCap and its outcomes. On the individual level, personal characteristics, such as country of origin and the industry one is employed in, significantly influence the effects PsyCap results in. Furthermore, one's attitudes, e.g., mindfulness, and personality dimensions, e.g., organizational identity, were shown to interact with PsyCap in predicting work-related outcomes. On the team- and organizational-level, service climate and environmental dynamism moderate the relationship between PsyCap and its effects.

Although the existing research on PsyCap has demonstrated the relationship with multiple antecedents and effects, there are still significant research gaps and opportunities, which we identified and outline in the following chapter.

### 6.1. Future Research

In this section of the paper, we outline research gaps in the existing literature on the higher-order construct of PsyCap and highlight opportunities to integrate and expand on existing knowledge. We encourage researchers to work on the following research gaps in order to integrate PsyCap in the recent developments in management and human resources literature and further strengthen its contribution to the positive organizational scholarship.

First, further research should analyze the effects of PsyCap in the context of one of the key research trends in international strategic management: strategic decision-making (White, Guldiken, Hemphill, He, & Khoobdeh, 2016). Even though research on the effects of PsyCap on an individual level has found PsyCap to be a significant predictor for a large number of desirable work outcomes and numerous papers applied the concept of PsyCap to a wide range of workplace-related research questions, its relevance for the study of managers and their decision-making behavior has not been examined. Strategic decision-making has been a central research topic within the field of strategic management (Eisenhardt & Zbaracki, 1992), yet most of these studies have failed to answer the questions of how strategic decision-makers think and which characteristics make one a good strategic decision-maker (Bonn, 2005; Powell, Lovallo, & Fox, 2011). Steptoe-Warren and her colleagues argue that the competencies, which make an individual a strategist, include not only knowledge and skills but also traits, one's self-image, and attitudes ((Steptoe-Warren, Howat, & Hume, 2011). In this context, other concepts on the trait-state-continuum have been applied to and analyzed with regards to strategic decision-making. For example, the role of the trait-like concept of core self-evaluations in strategic decision-making has been discussed by researchers (Hiller, 2005). However, even though PsyCap has already been found to be a significant predictor of

multiple positive outcomes of relevance for strategic decision-making, such as innovation (Abbas et al., 2014), problem solving (Luthans et al., 2011), and creativity (Rego et al., 2012a), PsyCap has not been discussed in the context of strategic decision-making. Furthermore, PsyCap appears to be a promising concept in the context of strategic decisions as executives tend to act "boundedly rational" when being confronted with more stimuli than they can adequately process (Mintzberg, 1973). In other words, executives making strategic decisions will draw on their experiences when analyzing information and choosing between different options (Hambrick, Finkelstein, & Mooney, 2005). Accordingly, their strategic decisions closely reflect their backgrounds, including their psychological capabilities (Miller & Dröge, 1986). Therefore, further research should analyze the relationship between managers' PsyCap and their strategic decision-making.

Building on the above outlined research gap, future research on PsyCap might also significantly contribute to another trend in management research: the effect of emotions on strategy and decision-making (Angie, Connelly, Waples, & Kligyte, 2011; Elfenbein, 2007; Hakonsson et al., 2016; Loewenstein & Lerner, 2003). While PsyCap as a moderating variable at the individual as the level of analysis has just recently become the subject to a number of studies, transparency on the interaction between PsyCap and emotions is still limited. Studies on the effect of negative emotions and strategic decision-making seem to be particularly promising as researchers have found evidence for PsyCap to buffer the negative effect of other variables on desirable work-related outcomes. For example, Abbas and his colleagues found the negative relationship between perceived politics at work and job satisfaction to be weaker for individuals high in PsyCap, indicating a moderating effect of PsyCap (Abbas et al., 2014). Similarly, Roberts and her colleagues found PsyCap to buffer the effect of job stress on incivility, such as rudeness in communication with colleagues and customers (Roberts et al., 2011). In addition, PsyCap was

found to moderate the negative relationship between emotional labor and job satisfaction/burnout in such way that the effect was weaker for high-PsyCap individuals (Cheung, Tang, & Tang, 2011). Moreover, other studies highlighting a relationship between positive affect, positive emotions, and PsyCap support a potential moderating effect of PsyCap on the relationship between emotions and strategic decision-making (Avey et al., 2008; Rego et al., 2012b, c). Specifically, PsyCap has been shown to trigger positive affective states, which in turn improve creative thinking (Luthans et al., 2011) and lead to a broader thought-action repertory (Fredrickson, 2001), both providing initial theoretical support for an effect of PsyCap on the emotion-decision-making relationship. Since emotions and decision-making in a strategic context remains a focus topic in management research (Angie et al., 2011), we want to encourage scholars to investigate how PsyCap interacts with emotions in effecting strategic decision-making.

Also, we want to encourage researchers to further analyze PsyCap in the context of strategic human resources management. PsyCap seems to have tremendous potential impact on how human resources can be matched to the strategic conditions of an enterprise. On the one hand, further transparency on how the work environment and characteristics of the job profile moderate the relationship between PsyCap and work-related outcomes will help assessing how PsyCap can be integrated in the employee selection process. In their meta-analysis, Judge and his colleagues concluded that self-efficacy was a significant predictor for performance in low-complexity jobs but not for jobs with medium or high complexity (Judge, Jackson, Shaw, Scott, & Rich, 2007). Thus, job characteristics might be expected to affect the influence PsyCap has on employee behaviors and attitudes. Future studies should clearly specify the job characteristics interacting with PsyCap in predicting job outcomes, which will have significant implications for corporate practice. On the other hand, future research on PsyCap might significantly contribute to a better understanding of

employees' adaptability or reaction to negative feedback when facing changes and challenges at the workplace. Self-enhancement theory suggests that negative feedback has a more harmful effect on individuals with low self-esteem by reinforcing one's preconceived self-appreciation, eventually leading to the adoption of less challenging goals and a decreasing effort invested in pursuing these goals (Ilies, Pater, & Judge, 2007). Drawing on that, PsyCap might be a reliable predictor of the effects of negative feedback on job performance and allow managers to adapt their feedback style to the employee's level of PsyCap. While negative feedback may be harmful for low-PsyCap individuals, high-PsyCap individuals might rather use negative feedback to further improve performance as they draw on their self-efficacy to intentionally set challenging goals and bring up the motivation to try to achieve them. In contrast, drawing on self-consistency theory, individuals will react most favorably to feedback matching their self-perception (Moreland & Sweeney, 1984). In other words, high-PsyCap individuals might reject negative feedback as it conflicts with their self-image. These contrasting implications for the interaction between PsyCap and negative feedback support our suggestion for further research in this direction.

Furthermore, future research should also strengthen the contribution of PsyCap to positive organizational scholarship research. Positive organizational development and change, and in particular appreciative inquiry, is one of the latest trends in organizational development (Greiner & Cummings, 2004) and one of the most researched topics within the field of positive organizational scholarship (Donaldson & Ko, 2010). Nevertheless, a lack of transparency exists on when appreciative inquiry is the most appropriate change process and which organizational factors influence success or failure of appreciative inquiry (Bushe, 2011). PsyCap may be a promising concept in the required exploration of moderators and mediators influencing the outcome of appreciative inquiry as past research has shown that an organization's position on a continuum

from negative to positive deviance impacts how the appreciative inquiry change process works (Bright & Cameron, 2009). PsyCap was found to predict positive emotions, which in turn were negatively related to negative deviance, a reaction often associated with organizational restructuring (Avey et al., 2008). Drawing on these findings, PsyCap, or the recently introduced organizational-level PsyCap (McKenny et al., 2013) may be particularly well suited for understanding for which organizations appreciative inquiry is the most adequate change process. In contrast, appreciative inquiry may be less impactful in organizations with high-PsyCap individuals or high organizational-level PsyCap as its transformation power diminishes as an organization is being shaped by strength and aspiration. Therefore, future research is needed to develop a better understanding of the moderating role of PsyCap in appreciative inquiry change processes.

Finally, we suggest further analyses on the mechanisms through which PsyCap operates to better understand why and how PsyCap is related to outcomes, rather than just being descriptive and predictive. A promising step towards better understanding how PsyCap is related to different outcomes might be the analysis of the relative importance of the four psychological capabilities when interacting with each other. While the convergent and discriminant validity of self-efficacy, hope, optimism, and resilience has been determined, past studies have not provided consistent results of the relative contribution of each of the four components on the effects of PsyCap (Avey et al., 2011). Building on these results, it may be insightful to evaluate whether different combinations of the PsyCap components differ in their explanatory power on the effects of PsyCap. Therefore, further research should analyze which factors drive the relative importance of different combinations of components within PsyCap on work-related outcomes.

## 6.2. Implications for Corporate Practice

Since PsyCap was introduced in 2004, scholars have been engaged in numerous studies investigating the concept. Their work on the antecedents and effects of PsyCap has provided various implications for practitioners as well. For example, researchers have established PsyCap as a significant predictor of desirable employee behaviors (Avey et al., 2011), which allows human resources practitioners to apply PsyCap as an additional criterion in their employee selection process. Furthermore, Saks and Gruman developed a new approach to organizational socialization that is designed to develop the PsyCap of new hires (Saks & Gruman, 2011) and Luthans and his colleagues developed the concept for a micro-intervention (Luthans et al., 2006) based on the definition of PsyCap as state-like and open for development (Luthans & Youssef, 2004). This highly focused training session allows practitioners in the field of human resources development to grow their employees' level of PsyCap.

However, researchers have pointed out that human resources practice would benefit from further research contributing to a better understanding of PsyCap (Ardichvili, 2011; Luthans, 2012). The above-mentioned research gap on job characteristics moderating the positive relationship between PsyCap and work outcomes prevents practitioners from deciding how much importance should be given to PsyCap in the employee selection process for a specific job profile. Depending on how the specific job profile influences the effects of PsyCap, the weight of PsyCap measures should differ in the overall measure of the job competence assessment. Additionally, the recommended further research on the direct as well as moderating effects of PsyCap will not only allow human resources professionals to further adjust the weight of PsyCap in the selection process for a specific job profile but also provides a clear indication for the type of business environment

in which the implementation of a PsyCap intervention will deliver the highest impact. For example, empirical support for a moderating effect of PsyCap on the negative relationship between negative emotions and work outcomes would allow the implication for corporate practice that PsyCap interventions have the highest impact when being conducted before situations related to negative employee emotions, e.g., restructuring.

### 6.3. Concluding Remarks

"We propose that positive psychological capital management in particular can effectively channel people's talents, strengths and psychological capacities toward achieving worthwhile productive, ethical, sustainable outcomes and result in competitive advantage" (Luthans & Youssef, 2004). In their introduction of PsyCap, Luthans and Youssef outline the potential benefits future research on the concept of PsyCap could bring to corporate practice. As outlined above, scholars have developed empirical and conceptual support for PsyCap as a higher-order construct, analyzed the antecedents of PsyCap, and demonstrated the effects PsyCap has on employee behaviors and attitudes. However, we have also identified research gaps in the existing literature on PsyCap and highlighted opportunities to expand on existing knowledge. Thus, it is essential to continue the scientific work on PsyCap to allow practitioners to maximize the benefit that this concept can bring to the field of human resources.

## References

Abbas, M., & Raja, U. (2015). Impact of psychological capital on innovative performance and job stress. ***Canadian Journal of Administrative Sciences***, 32, 128–138.

Abbas, M., Raja, U., Darr, W., & Bouckenooghe, D. (2014). Combined effects of perceived politics and psychological capital on job satisfaction, turnover intentions, and performance. ***Journal of Management***, 40(7), 1813–1830.

Ali, N., & Ali, A. (2014). The mediating effect of job satisfaction between psychological capital and job burnout of Pakistani nurses. ***Pakistan Journal of Commerce and Social Sciences***, 8(2), 399–412.

Alkire, T. D., & Avey, J. B. (2013). Psychological capital and the intent to pursue employment with developed and emerging market multinational corporations. ***Human Resource Development International***, 16(1), 40–55.

Angie, A. D., Connelly, S., Waples, E. P., & Kligyte, V. (2011). The influence of discrete emotions on judgement and decision-making: A meta-analytic review. ***Cognition & Emotion***, 25(8), 1393–1422.

Anjum, M. A., Ahmed, S. J., & Karim, J. (2014). Do psychological capabilities really matter? The combined effects of psychological capital and peace of mind on work centrality and in-role performance. ***Pakistan Journal of Commerce and Social Sciences***, 8(2), 502–520.

Ardichvili, A. (2011). Invited reaction: Meta-analysis of the impact of psychological capital on employee attitudes, behaviors, and performance. ***Human Resource Development Quarterly***, 22(2), 153–156.

Avey, J. B., Hughes, L. W., Norman, S. M., & Luthans, K. W. (2008). Using positivity, transformational leadership and empowerment to combat employee negativity. ***Leadership & Organization Development Journal***, 29(2), 110–126.

Avey, J. B., & Jensen, S. M. (2009). Psychological capital: A positive resource for combating employee stress and turnover***. Human Resource Management***, 48(5), 677–693.

Avey, J. B., Luthans, F., Smith, R. M., & Palmer, N. F. (2010). Impact of positive psychological capital on employee well-being over time. ***Journal of Occupational Health Psychology***, 15(1), 17–28.

Avey, J. B., Luthans, F., & Youssef, C. M. (2010). The additive value of positive psychological capital in predicting work attitudes and behaviors. ***Journal of Management***, 36(2), 430–452.

Avey, J. B., Nimnicht, J. L., & & Pigeon, N. G. (2010). Two field studies examining the association between positive psychological capital and employee performance. ***Leadership & Organization Development Journal***, 31(5), 384–401.

Avey, J. B., Patera, J. L., & West, B. J. (2006). The implications of positive psychological capital on employee absenteeism. ***Journal of Leadership & Organizational Studies***, 13(2), 42–60.

Avey, J. B., Reichard, R. J., Luthans, F., & Mhatre, K. H. (2011). Meta-analysis of the impact of positive psychological capital on employee attitudes, behaviors, and performance. ***Human Resource Development Quarterly***, 22(2), 127–152.

Avey, J. B., Wernsing, T. S., & Luthans, F. (2008). Can positive employees help positive organizational change?: Impact of psychological capital and emotions on relevant attitudes and behaviors. ***The Journal of Applied Behavioral Science***, 44(1), 48–70.

Baluku, M. M., Kikooma, J. F., & Kibanja, G. M. (2016). Psychological capital and the startup capital - Entrepreneurial success relationship. ***Journal of Small Business and Entrepreneurship***, 28(1-3), 27–54.

Bandura, A. (1997). ***Self-efficacy: The exercise of control***. New York, USA: W.H. Freeman.

Bandura, A., & Locke, E. A. (2003). Negative self-efficacy and goal effects revisited. ***The Journal of Applied Psychology***, 88(1), 87–99.

Baron, R. A., Franklin, R. J., & Hmieleski, K. M. (2016). Why entrepreneurs often experience low, not high, levels of stress: The joint effects of selection and psychological capital. ***Journal of Management***, 42(3), 742–768.

Becker, G. S. (1994). ***Human capital: A theoretical and empirical analysis, with special reference to education***. Chicago, USA: University of Chicago Press.

Bergheim, K., Eid, J., Hystad, S. W., Nielsen, M. B., Mearns, K., Larsson, G., & Luthans, B. (2013). The role of psychological capital in perception of safety climate among air traffic controllers. ***Journal of Leadership & Organizational Studies***, 20(2), 232–241.

Bonn, I. (2005). Improving strategic thinking: A multilevel approach. ***Leadership & Organization Development Journal***, 26(5), 336–354.

Brandt, T., Gomes, J. F. S., & Boyanova, D. (2011). Personality and psychological capital as indicators of future job success?: A multicultural comparison between three European countries. ***The Finnish Journal of Business Economics***, 60(3), 263–289.

Bright, D. S., & Cameron, K. S. (2009). Positive organizational change: What the field of positive organizational scholarship offers to OD practitioners. In W. J. Rothwell, R. L. Sullivan, J. M. Stavros, & A. Sullivan (Eds.), ***Practicing organizational development***. San Francisco: Jossey Bass.

Bryant, F. B., & Cvengros, J. A. (2004). Distinguishing Hope and Optimism: Two sides of a coin, or two separate coins? ***Journal of Social and Clinical Psychology***, 23(2), 273–302.

Bushe, G. R. (2011). Appreciative inquiry: Theory and critique. In D. Boje, B. Burnes, & J. Hassard (Eds.), ***The routledge companion to organizational change*** (pp. 87–103). Oxford, UK: Routledge.

Cameron, K. S., & Caza, A. (2004). Contributions to the discipline of positive organizational scholarship. ***The American Behavioral Scientist***, 47(6), 731–739.

Cameron, K. S., & Spreitzer, G. M. (2012). ***The Oxford handbook of positive organizational scholarship***. New York, Oxford: Oxford University Press.

Carifio, J., & Rhodes, L. (2002). Construct validities and the empirical relationships between optimism, hope, self-efficacy, and locus of control. ***Work***, 19(2), 125–136.

Chemers, M. M., Watson, C. B., & May, S. T. (2000). Dispositional affect and leadership effectiveness: A comparison of self-esteem, optimism, and efficacy. ***Personality and Social Psychology Bulletin***, 26(3), 267–277.

Chen, D. J. Q., & Lim, V. K. G. (2012). Strength in adversity: The influence of psychological capital on job search. ***Journal of Organizational Behavior***, 33(6), 811–839.

Cheung, F., Tang, K. S., & Tang, S. (2011). Psychological capital as a moderator between emotional labor, burnout, and job satisfaction among school teachers in China. ***International Journal of Stress Management***, 18(4), 348–371.

Coleman, J. S. (1988). Social capital in the creation of human capital. ***The American Journal of Sociology***, 94, 95-120.

Combs, G. M., Milosevic, I., Jeung, W., & Griffith, J. (2012). Ethnic identity and job attribute preferences: The role of collectivism and psychological capital. ***Journal of Leadership & Organizational Studies***, 19(1), 5–16.

Coutu, D. L. (2002). How resilience works. ***Harvard Business Review***, 80(5), 46-55.

Culbertson, S. S., Fullagar, C. J., & Mills, M. J. (2010). Feeling good and doing great: The relationship between psychological capital and well-being. ***Journal of Occupational Health Psychology***, 15(4), 421–433.

Dawkins, S., Martin, A., Scott, J., & Sanderson, K. (2013). Building on the positives: A psychometric review and critical analysis of the construct of psychological capital. ***Journal of Occupational and Organizational Psychology***, 86(3), 348–370.

Dello Russo, S., & Stoykova, P. (2015). Psychological capital intervention (PCI): A replication and extension. ***Human Resource Development Quarterly***, 26(3), 329–347.

Demerouti, E., van Eeuwijk, E., Snelder, M., & Wild, U. (2011). Assessing the effects of a "personal effectiveness" training on psychological capital, assertiveness and self-awareness using self-other agreement. ***Career Development International***, 16(1), 60–81.

Donaldson, S. I., & Ko, I. (2010). Positive organizational psychology, behavior, and scholarship: A review of the emerging literature and evidence base. ***The Journal of Positive Psychology***, 5(3), 177–191.

Du Plessis, Y., & Barkhuizen, N. (2012). Psychological capital, a requisite for organizational performance in South Africa. ***South African Journal of Economic and Management Sciences***, 15(1), 16–30.

Eisenhardt, K. M., & Zbaracki, M. J. (1992). Strategic decision making. ***Strategic Management Journal***, 13(S2), 17–37.

Elfenbein, H. A. (2007). Emotion in organizations: A review and theoretical integration. ***Academy of Management Annals***, 1(1), 315–386.

Ertosun, Ö. G., Erdil, O., Deniz, N., & Alpkan, L. (2015). Positive psychological capital development: A field study by the Solomon four group design. ***International Business Research***, 8(10), 102–111.

Fredrickson, B. L. (2001). The role of positive emotions in positive psychology: The broaden-and-build theory of positive emotions. ***The American Psychologist***, 56(3), 218–226.

George, J. M. (1991). State or trait: Effects of positive mood on prosocial behaviors at work. ***The Journal of Applied Psychology***, 76(2), 299–307.

Goldberg, L. R. (1990). An alternative "description of personality": The big-five factor structure. ***Journal of Personality and Social Psychology***, 59(6), 1216–1229.

Gooty, J., Gavin, M., Johnson, P., Frazier, L., & Snow, D. (2009). In the eyes of the beholder: Transformational leadership, positive psychological capital and performance. ***Journal of Leadership & Organizational Studies***, 15(4), 353–357.

Greiner, L. E., & Cummings, T. G. (2004). Wanted: OD more alive than dead! ***The Journal of Applied Behavioral Science***, 40(4), 374–391.

Hakonsson, D. D., Eskildsen, J. K., Argote, L., Monster, D., Burton, R. M., & Obel, B. (2016). Exploration versus exploitation: Emotions and performance as antecedents and consequences of team decision. ***Strategic Management Journal***, 37, 985–1001.

Hambrick, D. C., Finkelstein, S., & Mooney, A. C. (2005). Executive job demands: New insights for explaining strategic decisions and leader behaviors. ***Academy of Management Review***, 30(3), 472–491.

Harms, P. D., & Luthans, F. (2012). Measuring implicit psychological constructs in organizational behavior: An example using psychological capital. ***Journal of Organizational Behavior***, 33(4), 589–594.

Hiller, N. J. (2005). Conceptualizing executive hubris: The role of (hyper-) core self-evaluations in strategic decision-making. ***Strategic Management Journal***, 26, 297–319.

Hmieleski, K. M., & Carr, J. C. (2008). The relationship between entrepreneur psychological capital and new venture performance. ***Frontiers of Entrepreneurship Research***, 28(4), Article 1.

Hobfoll, S. E. (2002). Social and psychological resources and adaptation. ***Review of General Psychology***, 6(4), 307–324.

Ilies, R., Pater, I. E. de, & Judge, T. (2007). Differential affective reactions to negative and positive feedback, and the role of self-esteem. ***Journal of Managerial Psychology***, 22(6), 590‑609.

Jensen, S. M., & Luthans, F. (2006). Relationship between entrepreneurs' psychological capital and their authentic leadership. ***Journal of Managerial Issues***, 18(2), 254–273.

Judge, T. A., Jackson, C. L., Shaw, J. C., Scott, B. A., & Rich, B. L. (2007). Self-efficacy and work-related performance: The integral role of individual differences. ***The Journal of Applied Psychology***, 92(1), 107–127.

Judge, T. A., Locke, E. A., & Durham, C. C. (1997). The dispositional causes of job satisfaction: A core evaluations approach. ***Research in Organizational Behavior***, 19, 151–188.

Kaplan, M., & Bickes, D. M. (2013). The relationship between psychological capital and job satisfaction: A study of hotel businesses in Nevsehir. ***Journal of Management and Economics***, 20(2), 233–242.

Kim, J., & Noh, Y. (2016). The effects of psychological capital and risk tolerance on service workers' internal motivation for firm performance and entrepreneurship. ***International Entrepreneurship and Management Journal***, 12(3), 681–696.

Kwok, S., Cheng, L., & Wong, D. (2015). Family emotional support, positive psychological capital and job satisfaction among Chinese white-collar workers. ***Journal of Happiness Studies***, 16(3), 561–582.

Larson, M., & Luthans, F. (2006). Potential added value of psychological capital in predicting work attitudes. ***Journal of Leadership & Organizational Studies***, 13(1), 45–62.

Liao, Z., & Liu, Y. (2015). Abusive supervision and psychological capital: A mediated moderation model of team member support and supervisor-student exchange. ***Frontiers of Business Research in China***, 9(4), 576–607.

Liu, L., Chang, Y., Fu, J.: Wang, J., & Wang, L. (2012). The mediating role of psychological capital on the association between occupational stress and depressive symptoms among Chinese physicians: A cross-sectional study. ***BMC Public Health***, 12, 219–227.

Liu, Y. (2013). Mediating effect of positive psychological capital in Taiwan's life insurance industry. ***Social Behavior and Personality***, 41(1), 109–111.

Loewenstein, G., & Lerner, J. S. (2003). The role of affect in decision making. In R. Davidson, H. Goldsmith, & K. Scherer (Eds.), ***Handbook of affective science*** (pp. 619–642). Oxford, UK: Oxford University Press.

Luthans, B. C., Luthans, K. W., & Jensen, S. M. (2012). The impact of business school students' psychological capital on academic performance. ***Journal of Education for Business***, 87(5), 253–259.

Luthans, F. (2012). Psychological capital: Implications for HRD, retrospective analysis, and future directions. ***Human Resource Development Quarterly***, 23(1), 1–8.

Luthans, F., Avey, J. B., Avolio, B. J., Norman, S. M., & Combs, G. M. (2006). Psychological capital development: Toward a micro-intervention. ***Journal of Organizational Behavior***, 27, 387–393.

Luthans, F., Avey, J. B., Avolio, B. J., & Peterson, S. J. (2010). The development and resulting performance impact of positive psychological capital. ***Human Resource Development Quarterly***, 21(1), 41–67.

Luthans, F., Avey, J. B., Clapp-Smith, R., & Li, W. (2008). More evidence on the value of Chinese workers' psychological capital: A potentially unlimited competitive resource? ***International Journal of Human Resource Management***, 19(5), 818–827.

Luthans, F., Avey, J. B., & Patera, J. L. (2008). Experimental analysis of a web-based training intervention to develop positive psychological capital. ***Academy of Management Learning and Education***, 7(2), 209–221.

Luthans, F., Avolio, B. J., Avey, J. B., & Norman, S. M. (2007). Positive psychological capital: Measurement and relationship with performance and satisfaction. ***Personnel Psychology***, 60, 541–572.

Luthans, F., Avolio, B. J., Walumbwa, F., & Li, W. (2005). The psychological capital of Chinese workers: Exploring the relationship with performance. ***Management and Organization Review***, 1(2), 249–271.

Luthans, F., & Church, A. H. (2002). Positive organizational behavior: Developing and managing psychological strengths. ***The Academy of Management Executive***, 16(1), 57–75.

Luthans, F., Norman, S. M., Avolio, B. J., & Avey, J. B. (2008). The mediating role of psychological capital in the supportive organizational climate–employee performance relationship. ***Journal of Organizational Behavior***, 29(2), 219–238.

Luthans, F., & Youssef, C. M. (2004). Human, social, and now positive psychological capital management: Investing in people for competitive advantage. ***Organizational Dynamics***, 33(2), 143–160.

Luthans, F., & Youssef, C. M. (2007). Emerging positive organizational behavior. ***Journal of Management***, 33(3), 321–349.

Luthans, F., Youssef, C. M., & Avolio, B. J. (2007). ***Psychological capital: Developing the human competitive edge***. Oxford, UK: Oxford University Press.

Luthans, F., Youssef, C. M., & Rawski, S. L. (2011). A tale of two paradigms: The impact of psychological capital and reinforcing feedback on problem solving and innovation. ***Journal of Organizational Behavior Management***, 31(4), 333–350.

Luthans, F., Youssef, C. M., Sweetman, D. S., & Harms, P. D. (2013). Meeting the leadership challenge of employee well-being through relationship PsyCap and health PsyCap. ***Journal of Leadership & Organizational Studies***, 20(1), 118–133.

Luthans, K. W., & Jensen, S. M. (2005). The linkage between psychological capital and commitment to organizational mission. ***The Journal of Nursing Administration***, 35(6), 304–310.

Magaletta, P. R., & Oliver, J. M. (1999). The hope construct, will, and ways: their relations with self-efficacy, optimism, and general well-being. ***Journal of Clinical Psychology***, 55(5), 539–551.

Masten, A. S. (2001). Ordinary magic: Resilience processes in development. ***The American Psychologist***, 56(3), 227–238.

Masten, A. S., & Reed, M. J. (2002). Resilience in development. In C. R. Snyder & S. Lopez (Eds.), ***Handbook of positive psychology***. Oxford, UK: Oxford University Press.

Mathe, K., & Scott-Halsell, S. (2012). The effects of perceived external prestige on positive psychological states in quick service restaurants. ***Journal of Human Resources in Hospitality & Tourism***, 11(4), 354–372.

Maurer, T. J., & Pierce, H. R. (1998). A comparison of Likert scale and traditional measures of self-efficacy. ***The Journal of Applied Psychology***, 83(2), 324–329.

McKenny, A. F., Short, J. C., & Payne, G. T. (2013). Using computer-aided text analysis to elevate constructs. ***Organizational Research Methods***, 16(1), 152–184.

McMurray, A. J., Pirola-Merlo, A., & Sarros, J. C. (2010). Leadership, climate, psychological capital, commitment, and wellbeing in a non-profit organization. ***The Leadership & Organization Development Journal***, 31(5), 436–457.

Miller, D., & Dröge, C. (1986). Psychological and traditional determinants of structure. ***Administrative Science Quarterly***, 539–560.

Mintzberg, H. (1973). ***The nature of managerial work***. New York, NY: Harper & Row.

Moreland, R. L., & Sweeney, P. D. (1984). Self-expectancies and reactions to evaluations of personal performance. ***Journal of Personality***, 52(2), 156–176.

Newman, A., Ucbasaran, D., Zhu, F., & Hirst, G. (2014). Psychological capital: A review and synthesis. ***Journal of Organizational Behavior***, 35, 120–138.

Ngo, H. Y., Foley, S., Ji, M. S., & Loi, R. (2014). Linking gender role orientation to subjective career success: The mediating role of psychological capital. ***Journal of Career Assessment***, 22(2), 290–303.

Nguyen, T. D., & Nguyen, T. T. M. (2012). Psychological capital, quality of work life, and quality of life of marketers: Evidence from Vietnam. ***Journal of Macromarketing***, 32(1), 87–95.

Nigah, N., Davis, A. J., & Hurrell, S. A. (2012). The impact of buddying on psychological capital and work engagement: An empirical study of socialization in the professional services sector. ***Thunderbird International Business Review***, 54(6), 891–905.

Norman, S. M., Avey, J. B., Nimnicht, J. L., & Graber-Pigeon, N. P. (2010). The interactive effects of psychological capital and organizational identity on employee citizenship and deviance behaviors. ***Journal of Leadership & Organizational Studies***, 17(4), 380–391.

Parker, S. K. (1998). Enhancing role breadth self-efficacy: the roles of job enrichment and other organizational interventions. ***The Journal of Applied Psychology***, 83(6), 835–852.

Peterson, S. J., & Luthans, F. (2003). The positive impact and development of hopeful leaders. ***The Leadership & Organization Development Journal***, 24(1), 26–31.

Peterson, S. J., Luthans, F., Avolio, B. J., Walumbwa, F. O., & Zhang, Z. (2011). Psychological capital and employee performance: A latent growth modelling approach. ***Personnel Psychology***, 64(2), 427–450.

Pfeffer, J. (1998). ***The human equation: Building profits by putting people first***. Boston, USA: Harvard Business School Press.

Polatci, S., & Akdogan, A. (2014). Psychological capital and performance: The mediating role of work family spillover and psychological well-being. ***Business and Economics Research Journal***, 5(1), 1–15.

Pouramini, Z., & Fayyazi, M. (2015). The Relationship between positive organizational behavior with job Satisfaction, organizational citizenship behavior, and employee engagement. ***International Business Research***, 8(9), 57–66.

Powell, T. C., Lovallo, D., & Fox, C. R. (2011). Behavioral strategy. ***Strategic Management Journal***, 32, 1369–1386.

Qadeer, F., & Jaffery, H. (2014). Mediation of psychological capital between organizational climate and organizational citizenship behavior. ***Pakistan Journal of Commerce and Social Sciences***, 8(2), 453–470.

Qingshan, H., Le, L., & Xuansheng, C. (2014). Research of employees' psychological capital structure under the background of Chinese culture. ***International Business Research***, 7(7), 175–182.

Rego, A., Marques, C., Leal, S., Sousa, F., & Pina e Cunha, M. (2010). Psychological capital and performance of Portuguese civil servants: Exploring neutralizers in the context of an appraisal system. ***International Journal of Human Resource Management***, 21(9), 1531–1552.

Rego, A., Sousa, F., Marques, C., & Cunha, M. P. E. (2012a). Authentic leadership promoting employees' psychological capital and creativity. ***Journal of Business Research***, 65(3), 429–437.

Rego, A., Sousa, F., Marques, C., & Cunha, M. P. E. (2012b). Optimism predicting employees' creativity: The mediating role of positive affect and the positivity ratio. ***European Journal of Work and Organizational Psychology***, 21(2), 244–270.

Rego, A., Sousa, F., Marques, C., & Cunha, M. P. E. (2012c). Retail employees' self-efficacy and hope predicting their positive affect and creativity. ***European Journal of Work and Organizational Psychology***, 21(6), 923–945.

Roberts, S., Scherer, L., & Bowyer, C. (2011). Job stress and incivility: What role does psychological capital play? ***Journal of Leadership & Organizational Studies***, 18(4), 449–458.

Saks, A. M., & Gruman, J. A. (2011). Organizational socialization and positive organizational behaviour: Implications for theory, research, and practice. ***Canadian Journal of Administrative Sciences***, 29(1), 14–26.

Saruhan, N. (2013). Organizational change: The effects of trust in organization and psychological capital during change process. ***Journal of Business, Economics and Finance***, 2(3), 13–35.

Scheier, M. F., & Carver, C. S. (1985). Optimism, coping, and health: Assessment and implications of generalized outcome expectancies. ***Health Psychology***, 4(3), 219–247.

Scheier, M. F., & Carver, C. S. (1987). Dispositional optimism and physical well-being: The influence of generalized outcome expectancies on health. ***Journal of Personality***, 55(2), 169–210.

Seligman, M. E. P., & Csikszentmihalyi, M. (2000). Positive psychology: An introduction. ***The American Psychologist***, 55(1), 5–14.

Seligman, M. E. P., & Schulman, P. (1986). Explanatory style as a predictor of productivity and quitting among life insurance sales agents. ***Journal of Personality and Social Psychology***, 50(4), 832–838.

Seligman, M. E. P. (1998). ***Learned optimism***. New York, USA: Pocket Books.

Siu, O., Bakker, A., & Jiang, X. (2014). Psychological capital among university students: Relationships with study engagement and intrinsic motivation. ***Journal of Happiness Studies***, 5(4), 979–994.

Siu, O., Cheung, F., & Lui, S. (2015). Linking positive emotions to work well-being and turnover intention among Hong Kong police officers: The role of psychological capital. ***Journal of Happiness Studies***, 16(2), 367–380.

Snyder, C. R. (2000). ***Handbook of hope: Theory, measures & applications***. San Diego, USA: Academic Press Inc.

Snyder, C. R., Irving, L. M., & Anderson, J. R. (1991). Hope and health. In C. R. Snyder & D. R. Forsyth (Eds.), ***Handbook of social and clinical psychology*** (pp. 285–305). Elmsford, USA: Pergamon.

Snyder, C. R., Sympson, S. C., Ybasco, F. C., Borders, T. F., Babyak, M. A., & Higgins, R. L. (1996). Development and validation of the State Hope Scale. ***Journal of Personality and Social Psychology***, 70(2), 321–335.

Stajkovic, A. D., & Luthans, F. (1998a). Self-efficacy and work-related performance: A meta-analysis. ***Psychological Bulletin***, 124(2), 240–261.

Stajkovic, A. D., & Luthans, F. (1998b). Social cognitive theory and self-efficacy: Going beyond traditional motivational and behavioral approaches. ***Organizational Dynamics***, 26(4), 62–74.

Steptoe-Warren, G., Howat, D., & Hume, I. (2011). Strategic thinking and decision making: Literature review. ***Journal of Strategy and Management***, 4(3), 238–250.

Story, J. S. P., Youssef, C. M., Luthans, F., Barbuto, J. E., & Bovaird, J. (2013). Contagion effect of global leaders' positive psychological capital on followers: Does distance and quality of relationship matter? ***International Journal of Human Resource***, 24(13), 2534–2553.

Sun, T., Zhao, X. W., Yang, L. B., & Fan, L. H. (2012). The impact of psychological capital on job embeddedness and job performance among nurses: A structural equation approach. ***Journal of Advanced Nursing***, 68(1), 69–79.

Sweetman, D., Luthans, F., Avey, J. B., & Luthans, B. (2011). Relationship between positive psychological capital and creative performance. ***Canadian Journal of Administrative Sciences***, 28(1), 4–13.

Tierney, P., & Farmer, S. M. (2002). Creative self-efficacy: Its potential antecedents and relationship to creative performance. ***Academy of Management Journal***, 45(6), 1137–1148.

Tüzün, I. K., Cetin, F., & Basim, H. N. (2014). The role of psychological capital and supportive organizational practices in the turnover process. ***METU Studies in Development***, 41(2), 85–103.

Venkatesh, R., & Blaskovich, J. (2012). The mediating effect of psychological capital on the budget participation-job performance relationship. ***Journal of Management Accounting Research***, 24, 159–175.

Wagnild, G. M., & Young, H. M. (1993). Development and psychometric evaluation of the resilience scale. ***Journal of Nursing Measurement***, 1(2), 165–178.

Walumbwa, F. O., Peterson, S. J., Avolio, B. J., & Hartnell, C. A. (2010). An investigation of the relationship between leader and follower psychological capital, service climate and job performance. ***Personnel Psychology***, 63(4), 937–963.

Wang, H., Sui, Y., Luthans, F., Wang, D., & Wu, Y. (2014). Impact of authentic leadership on performance: Role of followers' positive psychological capital and relational processes. ***Journal of Organizational Behavior***, 35(1), 5–21.

Wang, Y., Liu, L., Wang, J., & Wang, L. (2012). Work–family conflict and burnout among Chinese doctors: The mediating role of psychological capital. ***Journal of Occupational Health***, 54(3), 232–240.

White, G. O., Guldiken, O., Hemphill, T. A., He, W., & Khoobdeh, M. S. (2016). Trends in international strategic management Research from 2000 to 2013: Text mining and bibliometric analyses. ***Management International Review***, 56(1), 35–65.

Wooley, L., Caza, A., & Levy, L. (2011). Authentic leadership and follower development: Psychological capital, positive work climate, and gender. ***Journal of Leadership & Organizational Studies***, 18(4), 438–448

# III. THE INFLUENCE OF PSYCHOLOGICAL CAPITAL AND INFORMATION PROCESSING ON THE QUALITY OF STRATEGIC DECISIONS

## Article B

Niklas Nolzen | Philip Meissner | Torsten Wulf

**Abstract**

This paper builds on behavioral strategy and the strategic decision-making literature to propose a stronger integration of executives' personal psychological characteristics in strategic decision-making research. We argue that decision-makers' level of psychological capital (PsyCap) will have a fundamental effect on the outcome of strategic decision-making, i.e., the quality of these strategic decisions. We posit that higher levels of PsyCap lead to a more systematic and less heuristic information processing as well as superior strategic decision-making quality, which is mediated by less heuristic information processing. Empirical results of a quasi-experimental field study with 49 executives from the financial services industry in Germany support our hypotheses. These results open new avenues for research on individual psychological capabilities of executives in strategic management that go beyond the process variables explaining differences in strategic decision-making that have been the focus of research thus far.

**Keywords**

Strategic decision-making, information processing, psychological capital, PsyCap

## 1. Introduction

Research has frequently highlighted the importance of information processing for the strategic decision-making outcome in terms of decision quality (Eisenhardt, 1989; Schwenk, 1984; Tversky & Kahneman, 1974). Generally, systematic, effortful information processing is assumed to be superior to heuristic processing in strategic decision-making (Kahneman & Frederick, 2002). More specifically, in situations of high uncertainty, such as strategic decision-making, the use of heuristics is particularly likely to result in biases, thus reducing decision quality (Bazerman & Moore, 2008; Das & Teng, 1999; Kahneman & Klein, 2009). More systematic processing styles have been found to reduce theses biases in the decision process, thus increasing decision quality (Hodgkinson, Bown, Maule, Glaister, & Pearman, 1999; McElroy & Seta, 2003). Also, systematic processing has been linked to higher decision-making competence (Bruine de Bruin, Parker, & Fischhoff, 2007). It remains unclear, however, how a more systematic and less heuristic processing style can be sustained among top managers (Milkman, Chugh, & Bazerman, 2009).

So far, research has identified situational variables such as stress (Yu, 2016), empowerment (Tomasi, Parolia, Han, & Porterfield, 2015), engagement, and intrinsic motivation (Chaiken, Liberman, & Eagly, 1989) as drivers of the information processing style applied in decision-making (Schwenk, 1984; Trumbo, 1999). Personal characteristics of the decision-maker, in contrast, have received less research attention. However, personal characteristics have been shown to play a crucial role in shaping executives' strategic decisions (Bonn, 2005; Schwenk, 1995). This line of research has mostly focused on demographic factors such as their tenure (Schwenk, 1995). Executives with longer industry tenure and higher age have been shown to be more committed to the status quo and less likely to adopt new strategies, thus, reducing the overall quality of the

decisions obtained in a rapidly changing business environment (Hambrick, Geletkanycz, & Fredrickson, 1993; Hitt & Tyler, 1991; Miller, 1991).

Decision-makers' individual psychological characteristics such as their psychological capital (PsyCap) (Luthans & Youssef, 2004) have received only limited attention in the context of strategic decisions and their outcomes. PsyCap comprises the psychological resources self-efficacy, hope, optimism, and resilience (Luthans & Youssef, 2004). A broad range of research in organizational behavior (Cameron & Spreitzer, 2012; Luthans & Church, 2002) has shown PsyCap to be a good predictor for workplace attitudes and performance (Avey, Luthans, & Youssef, 2010). However, PsyCap has also been linked to cognitive benefits. It has been shown to reduce stress (Abbas & Raja, 2015) and increase empowerment (Avey, Hughes, Norman, & Luthans, 2008) as well as motivation (Siu, Bakker, & Jiang, 2014). These cognitive benefits of PsyCap are also likely to influence executives' information processing behavior and thus positively affect their strategic decisions.

In this paper, we theorize that a decision-maker's level of PsyCap is linked with the quality of strategic decision-making as well as both systems of information processing according to Chaiken's heuristic-systematic model (Chaiken et al., 1989). Specifically, we argue that PsyCap is positively related to decision quality as an outcome of strategic decision-making. Furthermore, we hypothesize that higher levels of PsyCap are positively associated with systematic information processing and negatively associated with heuristic processing in strategic decisions. We posit that the relationship between PsyCap and strategic decision-making quality is mediated by heuristic information processing as heuristic information processing has been shown to bias information processing in a strategic context. To test our hypotheses, we perform a quasi-experimental field

study comprising a strategy simulation and two questionnaires based on a sample of 49 professionals from the financial services industry. The results support our hypotheses.

We contribute to strategic decision-making research by highlighting the role of personal characteristics for the strategic decision-making outcome. Specifically, we identify PsyCap as a driver of more systematic and less heuristic information processing and through that of the quality of strategic decisions. Additionally, we open a new perspective in research on PsyCap by outlining its positive effect not only in the organizational behavior field, but also in the strategic decision-making context.

## 2. Theoretical Background

Research on strategic decision-making has identified the information processing style as a key characteristic of decision-making affecting the outcome, i.e., quality, of these strategic decisions (Eisenhardt, 1989; Schwenk, 1984; Tversky & Kahneman, 1974). Most information processing models embrace a dual-process approach, positing two distinct cognitive mechanisms or modes which decision-making is based on (Epstein, 1994; Evans, 2008). While these dual-process information processing models differ to some extent, they all distinguish between an intuitive cognitive system that is assumed to be automatic, effortless, and associative, and an analytical system, assumed to be controlled, effortful, and rule governed (Kahneman, 2003). In his heuristic-systematic model of information processing, Chaiken refers to a heuristic and a systematic processing mode (Chaiken, 1980; Chaiken et al., 1989; Chen & Chaiken, 1999). Systematic information processing describes the process of carefully examining arguments in a structured way and relating those arguments to information previously acquired. In contrast, individuals applying heuristic information processing focus on the subset of available information

that enables them to use simple decision rules and past experiences to assess the validity of the information and formulate their decisions. Heuristic judgements are generated automatically and thus do not reflect conscious deliberations (Chaiken et al., 1989; Trumbo, 2002).

Individuals may use systematic or heuristic strategies, or both, when processing information to make a decision. These information processing strategies can be viewed as the two extremes on a continuum reflecting the amount of processing effort (Bohner, Moskowitz, & Chaiken, 1995). However, the use of one processing strategy does not preclude the use of the other. Accordingly, systematic and heuristic information processing can also be applied in parallel and effect judgement or decision-making in multiple ways. First, the two processing modes can have independent effects, which can happen in an additive or attenuating fashion. If the conclusions derived from the two information processing approaches are in agreement, the heuristic-systematic model suggests that the two processing modes exert direct, additive effects on decision-making. This is supported by Maheswaran and Chaiken (1991), who showed that attitude change was mediated by both, heuristic and systematic processing, when the implications of the two approaches were congruent. In contrast, research on the heuristic-systematic model found support that systematic processing attenuates the effect of heuristic processing on decision-making in cases where the implications of systematic and heuristic processing directly contradict each other (Chaiken & Maheswaran, 1994). Second, the two processing modes can have an interacting effect (Chaiken et al., 1989). The heuristic-systematic model's bias and contrast hypotheses state that heuristic processing can bias systematic processing in two ways. Implications of heuristic processing can directly bias systematic processing in such way, that information is interpreted in line with the expectations formed based on heuristics (Bohner, Chaiken, & Hunyadi, 1994). On the other side, heuristic-based expectations can also be used as a standard against which information is analyzed and can evoke more critical

and negative evaluation of it, thus a contrasting interpretation of information (Bohner et al., 1995). These types of interacting effects occur if the information input for systematic processing is amenable to varying interpretations, which is typical for the ambiguous setting of strategic decisions.

Recent research has shown that the effects of the two processing styles on the decision quality depend on the nature of the decision, i.e., the compatibility between information processing mode and task characteristic (Ayal et al., 2015; Rusou, Zakay, & Usher, 2013; Sloman, 1996). In decision tasks characterized by high familiarity, subjective measure, and the absence of an algorithm to integrate information in the decision process (Hammond, Hamm, Grassia, & Pearson, 1987), studies have demonstrated that the heuristic information processing mode yields better decision-making quality than the systematic one (Dijksterhuis, Bos, Nordgren, & van Baaren, 2006). However, in cases where the decision task is rather quantitative and characterized by an objective measure, studies show that the heuristic processing mode is inferior to the systematic one, rather leading to limited decision quality (MacGregor, Lichtenstein, & Slovic, 1988). Accordingly, in strategic decision-making, systematic, effortful information processing is assumed to be superior to heuristic processing (Kahneman & Frederick, 2002; Schwenk, 1984). Also, behavioral decision theory suggests that biases, resulting from the use of heuristics, are particularly likely to emerge in situations of high uncertainty and low validity, such as strategic decision-making (Das & Teng, 1999; Kahneman & Klein, 2009). These biases, limit rational choice and informed judgement in the decision-making process, thus, negatively affect the decision quality (Bazerman & Moore, 2008; Kahneman & Lovallo, 1993; Kahneman & Tversky, 1979). Furthermore, as strategic decisions are taken infrequently (Eisenhardt & Zbaracki, 1992), decision-makers are likely to face a lack of availability of appropriate heuristics, which in turn reduces the potential positive effects

of heuristics (Chen & Chaiken, 1999). Combining these arguments, prior research suggests that in the context of strategic decisions, heuristics-based information processing may be more likely to decrease decision quality.

It remains unclear, however, how a less heuristic processing style can be facilitated among top executives (Milkman et al., 2009). So far, research has identified situational factors that have a marked effect on the information processing style applied in decision-making (Schwenk, 1984; Trumbo, 1999). For example, time constraints (Zakay & Wooler, 1984), cognitive load (Hoffmann, Helversen, & Rieskamp, 2013) and stress (Yu, 2016) have been found to facilitate the use of more intuitive, heuristic thinking. Also, the availability, accessibility, and applicability of judgement-relevant heuristics fosters their application in information processing (Chen & Chaiken, 1999). In contrast, following the sufficiency theory, decision-makers tend to strive for a balance between minimizing cognitive effort while satisfying their current motivational concerns. In other words, the more engaged and motivated decision-makers are, the more willing they become to apply effortful, systematic processing (Chen & Chaiken, 1999). Similarly, Tomasi and colleagues found empowerment in the work-place to be positively related with systematic information processing (Tomasi et al., 2015). Emotions have been found to be related to both processing systems (Tiedens & Linton, 2001). On the one hand, anger, disgust, happiness, contentment, and other emotions characterized by certainty appraisals promote heuristic processing, i.e., resulted in greater reliance on the expertise of a source, more stereotyping, and less attention to argument quality. On the other hand, emotions characterized by uncertainty appraisals such as hope, surprise, fear, worry, and, to some extent, sadness result in systematic processing (Tiedens & Linton, 2001).

Personal characteristics of the decision-maker, in contrast, have received less research attention, even though they have been found to influence the strategic decision-making (Bonn, 2005; Schwenk, 1995). Executives with longer industry tenure and higher age haven been shown to be more committed to the status quo and less likely to adopt new strategies, thus, reducing the overall quality of the decisions obtained in a rapidly changing business environment (Hambrick, Geletkanycz, & Fredrickson, 1993; Hitt & Tyler, 1991; Miller, 1991). However, while researchers agree that individuals differ in their level of information processing ability or preference, it is yet unknown which personal characteristics are related to the individual information processing style (Trumbo, 2002). PsyCap might be such a personal characteristic of decision-makers that influences the information processing style. Compared to other constructs describing an individual's characteristic, such as CSE or the Big Five, PsyCap might be a particularly promising construct in the context of strategic decision-making research as its characteristics are closely linked to dimensions frequently studied in strategic decision-making research (Kahneman, 2003; Luthans, Avolio, Avey, & Norman, 2007).

PsyCap was introduced within the emerging positive organizational behavior movement and describes an individual's psychological capacity that can be measured, developed, and managed for performance improvement (Cameron & Spreitzer, 2012; Luthans, 2002; Luthans & Church, 2002; Luthans & Youssef, 2004). PsyCap is a higher-order construct comprising the psychological resources self-efficacy, hope, optimism, and resilience (Luthans & Youssef, 2004). It thus represents one's "positive appraisal of circumstances and probability for success based on motivated effort and perseverance" (Luthans et al., 2007).

Accordingly, high-PsyCap individuals tap their self-efficacy to set challenging goals and are motivated to try to achieve them (Bandura, 1997). Drawing on their hope and optimism, they positively assess their chances of success and identify and pursue different paths to realize their goals (Seligman, 1998; Snyder, Irving, & Anderson, 1991). When being faced with setbacks, resilience enables these individuals to recover and continue pursuing their goals (Masten, 2001). In combination, these four psychological capabilities form a synergistic resource set that provides individuals with the ability to uphold an internalized sense of control while successfully pursuing goals.

Empirical studies show that the higher-order construct PsyCap has a stronger effect on job-related measures like performance than its four components individually (Larson & Luthans, 2006; Luthans, Avolio, Walumbwa, & Li, 2005). Research on PsyCap in the organizational behavior field indicates significant positive relationships between PsyCap and positive employee attitudes, positive employee behavior, and other desirable work outcomes (Avey, Reichard, Luthans, & Mhatre, 2011; Nolzen, 2018). Research on the effects on employee attitudes has mainly focused on job satisfaction (Larson & Luthans, 2006) and other desirable attitudes, such as organization commitment (Luthans & Jensen, 2005), but PsyCap has also been shown to be negatively related to undesirable employee attitudes, including cynicism (Avey et al., 2010) and intentions to quit (Avey & Jensen, 2009). Additionally, PsyCap has been as associated with higher job performance (Luthans et al., 2005), entrepreneurial success (Baluku, Kikooma, & Kibanja, 2016), and innovative behavior (Abbas & Raja, 2015), as well as with increased organizational citizenship behavior (Gooty, Gavin, Johnson, Frazier, & Snow, 2009). In addition, recent research on outcomes beyond attitudes and behavior has found high-PsyCap individuals to be less likely to be affected

by symptoms of stress (Abbas & Raja, 2015), depression (Liu, Chang, Fu, Wang, & Wang, 2012), and burnout (Wang, Liu, Wang, & Wang, 2012).

In the context of information processing, PsyCap has been found to be related to empowerment (Avey et al., 2008), motivation (Siu et al., 2014), and other attitudes, which have been shown to be related to an individual's information processing style (Chaiken et al., 1989; Tomasi et al., 2015). Thus, PsyCap might be an important characteristic of decision-makers that impacts the information processing style applied as well as the quality of decisions as an outcome dimension of strategic decision-making.

## 3. Hypotheses

Prior research on individual strategic decision-making suggests that executives tend to make decisions based on bounded rationality when being confronted with more stimuli than they can adequately process (Simon, 1959). In other words, individual strategic decision-makers draw on their experiences when analyzing information and choosing between different options (Hambrick, Finkelstein, & Mooney, 2005). Accordingly, their strategic decisions closely reflect their backgrounds, including their psychological capabilities (Miller & Dröge, 1986). Abbas and Raja found evidence for a positive relationship between PsyCap and innovative behavior at the workplace (Abbas & Raja, 2015). High-PsyCap individuals were shown to be more creative in the idea generation process and more successful in their implementation at work. Also, high levels of PsyCap foster effective problem solving (Luthans, Youssef, & Rawski, 2011) and creativity at the workplace (Rego, Sousa, Marques, & Cunha, 2012). Furthermore, studies show that innovative thinking (Liedtka, 1998; Nuntamanop, Kauranen, & Igel, 2013), problem solving skills (Helfat & Peteraf, 2015; Paquette & Kida, 1988; Solem, 1992), and creativity (Mintzberg, 1994; Stacey,

1992) are associated with higher-quality outcomes in strategic decisions. In other words, High-PsyCap individuals might make higher-quality strategic decisions as a result of more innovative and creative thinking as well as more efficient problem-solving skills. Thus, we posit:

**Hypothesis 1**: PsyCap is positively associated with strategic decision quality.

Also, research on judgement and decision-making has found that the information processing approach applied in the decision-making process is influenced by an individual's attitudes and mental state at the time of the decision (Trumbo, 1999). Specifically, empowerment (Tomasi et al., 2015), engagement, and intrinsic motivation (Chaiken et al., 1989) have been found to be positively related to a rather systematic than heuristic information processing approach. Individuals with high decision autonomy and perceptions of high responsibility and drive were more likely to apply a systematic processing style to information than their counterparts. PsyCap has been shown to promote these attitudes in past research (Avey et al., 2008). Avey and colleagues found a positive relationship between employee PsyCap and perceptions of empowerment in the job (Avey et al., 2008), while Siu and colleagues suggested that PsyCap leads to higher levels of engagement and intrinsic motivation (Siu et al., 2014). Furthermore, Yu showed that for individuals making decisions under stress fast and effortless heuristics dominate over more effortful, systematic information processing (Yu, 2016). Research on PsyCap has found that high-PsyCap individuals not only show significantly lower levels of stress than their colleagues (Abbas & Raja, 2015; Siu, Cheung, & Lui, 2015), but also experience fewer symptoms of stress (Avey & Jensen, 2009) and better control the effects of stress on their behavior (Roberts, Scherer, & Bowyer, 2011). Given these perspectives, we posit that higher levels of PsyCap lead to a more systematic information processing approach in strategic decisions due to stronger perceptions of empowerment,

engagement, and intrinsic motivation. Also, we hypothesize that that higher levels of PsyCap lead to a less heuristic information processing approach in strategic decisions due to lower levels of perceived stress. Consequently, we argue:

**Hypothesis 2**: PsyCap is positively associated with systematic information processing.

**Hypothesis 3**: PsyCap is negatively associated with heuristic information processing.

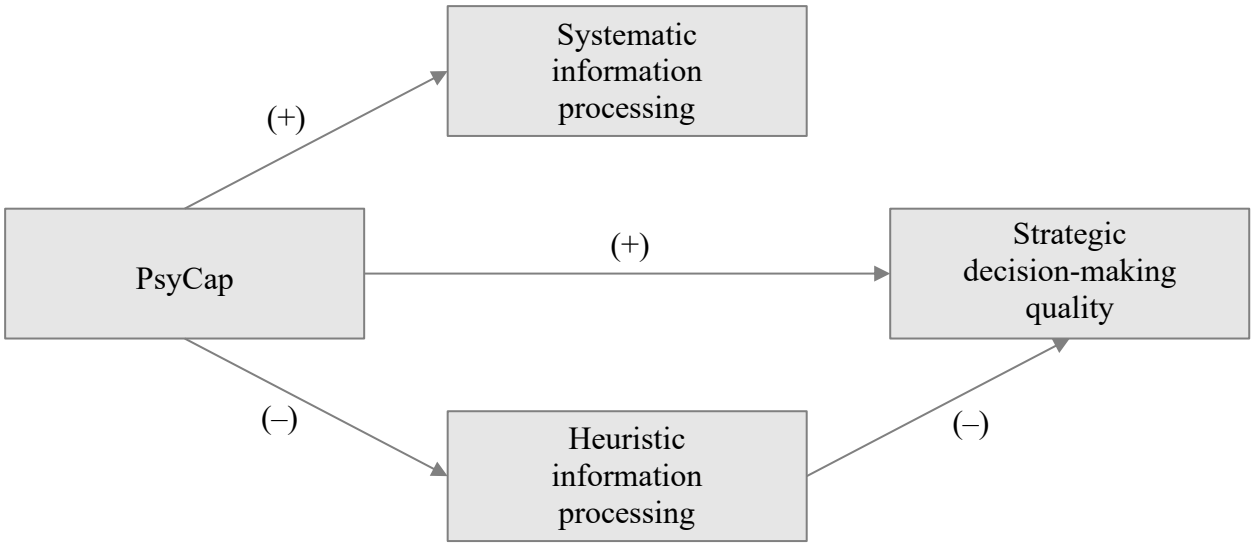
In addition, an individual's information processing style has been found to have a marked effect on the quality of decisions in a strategic context (Ayal et al., 2011; Ayal et al., 2015; Tversky & Kahneman, 1974). Strategic decisions are those fundamental decisions which shape the course of an organization and that are taken infrequently by its leaders. These decisions typically imply fundamental action and require substantial resources (Eisenhardt & Zbaracki, 1992; Mintzberg, Raisinghani, & Theoret, 1976). According to the least effort principle, heuristic processing is the default processing mode, which occurs widely when appropriate heuristic cues serve as triggering stimulus (Bohner et al., 1995). In the decision-making context, individuals rely on their past experiences and their subjective perception of the relevance and reliability of different information, thus, they are expected to apply heuristic information processing. Furthermore, the heuristic-systematic model's sufficiency principle suggests that in high-importance settings, heuristic processing alone is not perceived as sufficient, thus, individuals experiencing high levels of motivation and the ability to scrutinize the available information tend to apply systematic information processing (Bohner et al., 1995). Accordingly, individuals taking strategic decisions are also expected to apply systematic information processing. As this does not preclude the utilization of heuristic processing in parallel, both processing modes co-occur and have an effect on strategic decision-making. In general, effortful, systematic information processing is assumed

to be superior to heuristic processing when making strategic decisions (Kahneman & Frederick, 2002; Schwenk, 1984). While systematic information processing is required to comprehensively analyze the available information and exhaustively generate and evaluate alternative options, which in turn increases decision quality (Fredrickson, 1984), behavioral decision theory suggests that the use of heuristics has a significant negative effect. Research has shown that especially in situations of high uncertainty and low validity, such as strategic decision-making, heuristics are likely to lead to biases (Das & Teng, 1999; Kahneman & Klein, 2009), which limit rational choice and informed judgement, thus, negatively affect the decision quality (Bazerman & Moore, 2008; Kahneman & Lovallo, 1993; Kahneman & Tversky, 1979). Furthermore, in strategic decisions, heuristics are likely to bias judgement and hamper decision quality since strategic decisions are taken infrequently (Eisenhardt & Zbaracki, 1992), which leads to a lack of appropriate, helpful heuristics (Chen & Chaiken, 1999). In addition to these individual effects, the two processing modes might have an interacting effect on the strategic decision-making quality (Chaiken et al., 1989). Due to the amenability to varying interpretations of the information input in the strategic decision-making context and the absence of extreme heuristic cues, the implications of heuristic processing can directly bias systematic processing in such way, that information is interpreted in line with the expectations formed based on heuristics (Bohner et al., 1994). This interacting effect implies that a less heuristic processing might be more strongly related to higher strategic decision-making quality than a more systematic processing as it might else bias systematic processing and thus reduce its positive effect on the decision outcome. Accordingly, a less heuristic information processing style in particular might lead to an increased strategic decision quality. Thus, we hypothesize:

**Hypothesis 4**: The positive relationship between PsyCap and the quality in strategic decision-making is mediated by heuristic information processing.

The proposed relationships between PsyCap, strategic decision-making quality, and information processing can be seen in Figure 3.

**Figure 3**: Proposed relationships between study variables




## 4. Method

We performed a quasi-experimental field study to test our hypotheses. More specifically, we used two different sources for the data gathering, a strategy simulation and two questionnaires.

### 4.1 Sample

For our study, we relied on a sample of 49 professionals from the financial services industry in Germany. We restricted our sample to a single industry to implicitly control for the confounding factors that would impact results from a multi-industry, cross-sectional study. Although the

restriction of our sample to a single industry limits our ability to generalize the results, we believe that a single industry analysis has substantially higher internal validity than a multi-industry analysis when positing strong causal attributions (Bono & McNamara, 2011). The financial services industry was selected for this study because we expected that professionals at firms in financial services industry faced an environment characterized by a frequent need to make strategic decisions due to the changing nature of the industry (La Croix, Stone, & Komolafe, 2002; Mitchell, Shepherd, & Sharfman, 2011).

We sent invitations to 102 professionals from banks, insurance companies, and other financial services companies to participate in the experiment. These professionals were selected randomly from a list of clients that had previously been actively involved in at least one strategy project with a major international management consulting firm within the last 3 years as it was crucial for the validity of our study that the participants had gained experience in strategic decision-making. Non-respondents received one follow-up request. 50 respondents participated in the experiment, one participant was excluded from the analysis due to incomplete data, which yielded a final sample of 49 professionals.

Of the 49 participants, 55 percent were male, the average age was 28, and they graduated with an average A-level GPA of 1.6 (on a scale with 1.0 being the best achievable grade). The majority of participants – 67 percent – holds a masters or MBA degree and participants have been engaged with their current employer for an average of 33 months.

### 4.2 Procedure

The participants conducted a strategy simulation and completed two questionnaires. Following the approach taken by Chesney and Locke (1991), we performed a strategy simulation

to quantitatively measure the outcome of the individual strategic decision-making (Chatterji, Findley, Jensen, Meier, & Nielson, 2016). Each participant individually performed the "The Balanced Scorecard" strategy simulation, which was developed by Harvard Business School (Narayanan & Packard, 2014). At the start of the computer-based simulation, participants are assigned the role of the CEO of a struggling company in the automotive industry and given the task to maximize the company value. Participants begin with selecting one of four available strategies for their company which they then translate into a strategy map and balanced scorecard to assist in their firm's strategy implementation and performance evaluation. Over the following eight game periods, representing 4 game years, they implement their strategy by choosing initiatives and allocating their budget accordingly. After each period, participants are provided feedback on their company's performance in the form of financial statements and scorecard metrics, which can be used to assess the effectiveness of the initiative choice and adjust the budget allocation accordingly to optimize the implementation of their strategy. At the completion of the simulation, the company value is calculated based on the consistency between strategy and initiatives and the effectiveness of the initiatives chosen. The decisions participants have to take in the "The Balanced Scorecard" strategy simulation are characterized by a high degree of uncertainty as well as a large commitment of resources, thus, fulfilling the criteria for strategic decisions (Eisenhardt & Zbaracki, 1992).

Prior to the simulation, participants received a short introduction and were then given a briefing on the theoretical foundations of the balanced scorecard tool and the specifics of the strategy simulation, including goal, tasks, and process. Participants were then asked to fill out a questionnaire that tested for the control variables used in the study before starting the simulation. A second questionnaire measuring the individual's information processing approach was handed out after the completion of the simulation. In order to avoid social desirability bias, both

questionnaires were completed self-administered and anonymously and the purpose of the study was not revealed (Nederhof, 1985). Given the two different means of gathering data, we also limited the potential for common method bias in our study (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003).

## 4.3 Measures

### 4.3.1 Independent Variable

We measured *PsyCap* on an individual level using a self-report measure, the PsyCap questionnaire (PCQ) (Luthans et al., 2007). The PCQ is a 24-item questionnaire, was developed by Luthans and colleagues in 2007, and is acknowledged as the standard measure for PsyCap (Nolzen, 2018). It contains six items for each of the four components, which were taken from pre-existing measures for self-efficacy (Parker, 1998), hope (Snyder et al., 1996), optimism (Scheier & Carver, 1985), and resilience (Wagnild & Young, 1993). Reliability and validity of the PCQ was demonstrated across multiple samples (Luthans et al., 2007). Sample items include "I am confident helping to set targets/goals in my work area", addressing self-efficacy, "I can think of many ways to reach my current work goals", addressing hope, "When things are uncertain for me at work I usually expect the best", addressing optimism, and "I usually take stressful things at work in stride", addressing resilience. The Cronbach's alpha for the scale was .871, which indicates a high level of scale reliability.

### 4.3.2 Dependent Variables

We measured *decision quality* on an individual level, using an outcome-based perspective (Jones, Yurak, & Frisch, 1997). Following the argumentation by Nees (1983) and the approach

taken by Chesney and Locke (1991), we performed a strategy simulation to quantitatively measure the decision quality (Chatterji et al., 2016). Specifically, the company value, which is calculated at the completion of the simulation for each participant, is applied as measure for decision quality. The company value is calculated by an algorithm in the simulation based on key financial indicators such as return on equity and price-to-earnings ratio, which in turn depend on the consistency between strategy and initiatives and the effectiveness of the initiatives chosen.

*Information processing* was measured on an individual level based on a scale developed by Smerecnik et al (2012) following the heuristic-systematic model of information processing (Chaiken, 1980; Chaiken et al., 1989). The self-report measure is used to assess an individual's information processing style based on a *systematic processing* and a *heuristic processing* subscale. In the 10-item questionnaire, participants are asked to rate their approach applied for the processing of information presented in a previous task on a 7-point Likert scale (1 = completely disagree; 7 = completely agree). In our case the questionnaire referred to the processing of the information presented in the introduction and the performance indicators provided after each simulation period. Thus, we slightly adapted the wording of 6 items of the questionnaire to the context, e.g., "The scenario did not contain useful information on which I based my information" was adapted to "The provided material did not contain useful information on which I based my information". The Cronbach's alpha was .797 for the systematic processing scale and .785 for the heuristic processing measure, which indicates a high level of scale reliability.

### 4.3.3 Control Variables

We controlled for the variables outlined in this section because in past research on strategic management they have been shown to be factors affecting a decision-maker's attention, cognition,

and ultimately their strategic behavior (Hambrick, Geletkanycz, & Fredrickson, 1993; Hambrick & Mason, 1984; Wowak & Hambrick, 2010).

*Age* was measured in years and included as control variable as it has been found to influence strategic decision-making in the past (Wiersema & Bantel, 1992).

*Gender* (0 = male, 1 = female) was included as control variable to account for conceivable differences in the decision-making process between male and female participants (Nielsen & Huse, 2010).

Participants' *A-level grade point average* was included to measure general ability, which has been found to influence decision quality in strategic decisions (Staw & Barsade, 1993).

*Education level* (1 = B.A./Other, 2 = M.A./diploma/MBA, 3 = PhD) was noted to control for the influence of additional years spent on education on strategic decision-making (Hitt & Tyler, 1991).

*Tenure* was measured as the number of months spent with the current employer. It was included as it has been shown to significantly influence the process of strategic decision-making (Simsek, 2007).

*Automotive experience* was controlled for because industry-specific work experience has been shown to be related to decision quality (Brockmann & Simmonds, 1997) and the simulation played by participants is based in an automotive context (Narayanan & Packard, 2014). It was measured in number of months one had been working in that industry.

Finally, we controlled for participants' motivation to engage in the strategy simulation as motivation has been found to be a key driver of the outcome of simulation games (Sitzmann, 2011). To do so, we measured the *decision speed* to account for means-focused motivation (Touré-Tillery & Fishbach, 2014).

## 5. Results

The means, standard deviations, and correlations for all variables are presented in Table 4.

To test our hypotheses, we used six multiple regression models. The results of the regression analyses are shown in Table 5. In Model 1, we only included the control variables. In Models 2–6, we tested our three hypotheses. In Hypothesis 1, we propose that PsyCap is positively associated with the quality in strategic decision-making. The results of Model 1 support this and suggest a positive, highly significant relationship between PsyCap and strategic decision-making quality ($\beta = .448$, $p < .01$). Further, we propose that PsyCap will be associated with more systematic information processing in strategic decision-making in Hypothesis 2. The results of Model 3 support this hypothesis as the relationship between PsyCap and systematic information processing is positive and highly significant ($\beta = .787$, $p < .001$). Hypothesis 3 suggests that PsyCap will lead to a less heuristic information processing in strategic decision-making. In Model 4, we find that the relationship between PsyCap and heuristic information processing is negative and highly significant ($\beta = -.757$, $p < .001$). Thus, Hypothesis 3 is supported.

**Table 4:** Means, SDs, and correlations

| | Variable | Mean | SD | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Age | 28 | 2.6 | 1 | | | | | | | | | | |
| 2 | Gender | 0.4 | 0.5 | -.053 | 1 | | | | | | | | | |
| 3 | Education | 1.6 | 0.5 | -.100 | .072 | 1 | | | | | | | | |
| 4 | Education level | 1.8 | 0.5 | .518** | -.049 | -.147 | 1 | | | | | | | |
| 5 | Tenure | 33 | 19 | .468** | .123 | -.319* | .056 | 1 | | | | | | |
| 6 | Automotive Experience | 4 | 7 | .072 | .084 | -.179 | .076 | .199 | 1 | | | | | |
| 7 | Decision speed | 1964 | 514 | -.203 | -.030 | -.014 | .011 | -.060 | .300* | 1 | | | | |
| 8 | PsyCap | 4.6 | 0.5 | .178 | -.167 | -.292* | .046 | .302* | .375** | .109 | 1 | | | |
| 9 | Systematic information processing | 4.9 | 1.1 | .018 | -.108 | -.208 | .057 | .002 | .238 | .271 | .714** | 1 | | |
| 10 | Heuristic information processing | 2.9 | 1 | .056 | .056 | .106 | -.033 | -.039 | -.207 | -.206 | -.654** | -.723** | 1 | |
| 11 | Decision quality | 90.5 | 35.6 | .025 | -.089 | -.253 | .114 | .249 | .263 | .206 | .516** | .492** | -.583** | 1 |

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

**Table 5:** Regression model results

| **Variables** | **Model 1** | **Model 2** | **Model 3** | **Model 4** | **Model 5** | **Model 6** |
|---|---|---|---|---|---|---|
| | Decision quality | Decision quality | Systematic information processing | Heuristic information processing | Decision quality | Decision quality |
| **Control variables** | | | | | | |
| Age | -.199 | -.239 | .035 | .169 | -.167 | -.171 |
| Gender | -.128 | -.038 | .077 | -.082 | -.087 | -.079 |
| Education | -.118 | -.044 | .074 | -.068 | -.069 | -.066 |
| Education level | .164 | .195 | .015 | -.109 | .144 | .147 |
| Tenure | .288 | .209 | -.256 | .082 | .279 | .267 |
| Automotive experience | .159 | .017 | -.091 | .085 | .073 | .061 |
| Decision speed | .128 | .112 | .205 | -.112 | .040 | .046 |
| **Independent variable** | | | | | | |
| PsyCap | | .448** | .787*** | -.757*** | | .057 |
| **Mediators** | | | | | | |
| Systematic information processing | | | | | .120 | .093 |
| Heuristic information processing | | | | | -.436* | -.420* |
| N | 49 | 49 | 49 | 49 | 49 | 49 |
| $R^2$ | .195 | .342 | .604 | .499 | .447 | .448 |
| Adjusted $R^2$ | .057 | .210 | .525 | .399 | .320 | .303 |
| F | 1.416 | 2.594* | 7.633*** | 4.983*** | 3.507** | 3.088** |
| *** $p < .001$, ** $p < .01$, * $p < .05$ | | | | | | |
| Values are standardized regression coefficients | | | | | | |

Hypothesis 4 suggests that the positive relationship between PsyCap and the quality in strategic decision-making is mediated by heuristic information processing. To test the hypothesis, we applied the mediation approach developed by Baron and Kenny (1986), which is commonly used in management research (MacKinnon, Fairchild, & Fritz, 2007; Wood, Goodman, Beckmann, & Cook, 2008). In Model 2, we found support for the positive relationship between PsyCap and strategic decision-making quality ($\beta = .448$, $p < .01$), which may be mediated. In Models 4–6, we controlled for the three mediation conditions defined by Baron and Kenny (1986). The first condition, which states that variations in the level of the independent variable (PsyCap) significantly account for variations in the presumed mediator (heuristic information processing), is equivalent to our second hypothesis, for which we already have support ($\beta = -.757$, $p < .001$). Thus, we can confirm the first mediation condition. In Model 5, we tested whether variations in the dependent variable (decision-making quality) are significantly accounted for by variations in the presumed mediator (heuristic information processing). The results show that heuristic information processing is negatively and significantly linked to the strategic decision-making quality ($\beta = -.436$, $p < .05$). Hence, the second mediation condition can be confirmed. In Model 6, we tested whether the relationship between the independent and dependent variables remains significant when introducing the presumed mediator into the initial relationship. The results show that heuristic information processing continues to be negatively and significantly related to decision-making quality ($\beta = -.420$, $p < .05$), while the initial relationship between PsyCap and decision-making quality ceases to exist ($\beta = .057$, not significant). Together, the results of Models 3–6 provide consistent support for a complete mediation and for our third hypothesis. More specifically, less heuristic information processing mediates the positive relationship between PsyCap and strategic decision-making quality.

Following the recommendations by Shrout and Bolger (2002), support for the robustness of our results is provided by bootstrapping results using case resampling and 5,000 replications. The results of this additional analysis were in line with our findings.

## 6. Discussion

Research has made significant contributions to the field of strategic decision-making by identifying how the information processing style applied in strategic decision-making effects the decision outcome, i.e., quality (Ayal et al., 2011, 2015; Oppenheimer & Kelso, 2015). However, this research has largely neglected how the personal characteristics of the decision-maker influence the information processing style and thus the quality of the decision (Milkman et al., 2009). Prior research has already indicated that individuals differ in their level of information processing ability or preference (Trumbo, 2002). Our results support the argument that in strategic decision-making the individual's level of PsyCap influences the decision-making outcome, especially due to the information processing style applied.

In our study, we have concentrated on the effect of executives' individual level of PsyCap on their strategic decision-making quality. Our empirical results suggest that PsyCap is positively associated with the quality in strategic decision-making, which is in line with prior research highlighting the positive effects of PsyCap in organizational processes and decision-making (Rego et al., 2012; Luthans et al., 2011). Furthermore, the empirical results of our study indicate that PsyCap is positively associated with systematic information processing, while it is negatively associated with heuristic information processing. PsyCap has also been shown to reduce the experienced levels of stress and the related symptoms (Abbas & Raja, 2015; Avey & Jensen, 2009; Siu et al., 2015). Accordingly, high-PsyCap decision-makers might be less likely to apply heuristic

information processing as individuals under less stress tend to make less habitual responses, rely less on gut feelings, and are more likely to adjust their initial judgement (Yu, 2016). In addition, our results suggest a mediation effect of information processing in the relationship between PsyCap and decision quality further highlighting the importance of information processing in the strategic decision making process (Ayal et al., 2011, 2015; Eisenhardt, 1989; Oppenheimer & Kelso, 2015; Schwenk, 1984; Tversky & Kahneman, 1974).

These findings indicate new theoretical and empirical avenues for strategic decision-making research. On a theoretical level, our paper contributes to strategic decision-making research by highlighting the role of personal characteristics for the decision-making outcome. Specifically, our study sheds light on the decision-maker's psychological capabilities as a driver of more systematic and less heuristic information processing, which result in better strategic outcomes. Our paper thus opens multiple avenues for future research. Particularly, the effects of other constructs describing an individual's personal characteristics, such as traits, the Big Five personality dimensions (Goldberg, 1990), or core self-evaluations (Judge, Locke, & Durham, 1997), on different types of process and outcome variables in strategic decision-making could provide promising avenues for future research. In addition, future research could investigate how the characteristics of the decision-maker, and thus the information processing style, interact with different approaches and tools to increase the quality of strategic decisions, such as scenario planning (Schoemaker, 1993) and cognitive mapping (Hodgkinson, Maule, & Bown, 2016). Our results also open a new perspective in the research on PsyCap. They integrate a construct from the organizational behavior field into strategic decision-making research and highlight the potential positive effects of PsyCap in other research domains.

## 6.1 Implications for Corporate Practice

Our results also have implications for corporate practice. They show that the decision-maker's individual level of PsyCap can influence the way decisions are taken as well as the quality of the outcome. Accordingly, executives might be able to anticipate the information processing style they will apply in the decision-making process based on their PsyCap score.

Our results indicate that low PsyCap managers are generally more inclined to apply a heuristic information processing, which in decisions under uncertainty, such as strategic decisions, is prone to lead to biased judgement and thus inferior decision-making quality. Awareness of one's information processing preferences and capabilities is thus a crucial factor in assessing the process by which decisions are made in organizations. This does not mean that low-PsyCap executives will always use quick, heuristic information processing. However, the awareness of one's individual information processing preference and capability allows executives to decide about the tools and methods used in strategic decision-making applying a comprehensive cost-benefit consideration.

In addition, our results provide implications for practitioners in the field of human resources development. They show that high-PsyCap individuals tend to process information more systematically and make better strategic decisions. Thus, we argue that executive coaches might contribute to the quality of an organization's strategy by conducting PsyCap micro-interventions. These highly focused training sessions have been shown to significantly improve the participants' level of PsyCap and might help to equip managers with the required psychological capabilities to optimize their strategic decision-making.

## 6.2 Limitations and suggestions for future research

This study has three main limitations, which provide potential for future research in the domain. First, our study design relied on a strategy simulation to assess the participants' decision-making behavior. The decisions, that participants take in the "The Balanced Scorecard" simulation, are characterized by a high degree of uncertainty as well as large commitment of resources, thus fulfilling the criteria for strategic organizational decisions. However, even though this simulation fulfills all criteria for a strategic decision scenario and allows to single out the cause-and-effect relationship between PsyCap, information processing style, and decision quality, our study is not based on real-life observations of executives' strategic decision-making behavior. Thus, future research should replicate our study based on non-experimental boardroom observations to further increase validity and reliability of the results presented in this paper.

The second limitation of this study is that we used self-report measures for PsyCap and the information processing style. While both measures have been psychometrically validated and demonstrated adequate internal reliability in previous research, the use of those measures bears the potential issue of common method and social desirability biases. In order to avoid these biases, the questionnaires were completed self-administered and anonymously and the purpose of the study was not revealed. Furthermore, we also used the strategy simulation as a different source for our data gathering. Still, we call for future research to validate our findings using other measures like physiological or third-party-report measures.

Third, the sample used for our study clearly limits our analysis. All participants work in the financial services industry in Germany. While this restriction to a single industry and culture allows us to implicitly confounding factors that would impact results from a multi-industry, cross-cultural,

and cross-sectional study, it certainly limits the ability to generalize our results. Thus, we recommend for future research to us data gathered from other industries and cultures to further investigate the relationship between PsyCap, information processing, and strategic decision quality, and to increase generalizability of the findings.

Further, additional research in the field could more closely analyze other variables of the decision process, such as decision flexibility, comprehensiveness, and consistency. The integration of additional process variables into future analyses could provide new insights to the research domain by combining different important perspectives on the decision-making process, thus, yielding the potential for better explaining the mechanisms through which personal characteristics of the decision-maker, and PsyCap in particular, effect the decision quality.

Also, studying differences in the effects of PsyCap on information processing and decision quality in diverse cultural contexts may provide additional insights into executives' strategic decision-making behavior. Papadakis and colleagues, for example, outlined that the cultural context influences the decision-making process (Papadakis, Lioukas, & Chambers, 1998). Further investigation of the effects of these cultural context factors could further improve our understanding of the determinants of managerial judgement. Replicating this study in different cultural contexts might also provide first insights on the degree to which the effects of PsyCap depend on less malleable context factors.

In addition, prior research suggests that most strategic decisions in organizations are made by teams rather than individuals (Schwenk, 1995). Studying how executive teams consisting of members with different levels of PsyCap, either homo- or heterogenous constellations, make strategic decisions, may thus provide interesting additional avenues for research in the field. Such

research could for example not only include information processing variables but could also be extended to information sharing and validation between team members.

Such research would improve our understanding of the effects of personal characteristics on the quality in strategic decision-making. This could substantially improve our contribution to the strategic decision-making field by providing implications for the reduction of biased judgement, the improvement of strategic decisions, and thus supporting organizational prosperity.

## References


Abbas, M., & Raja, U. (2015). Impact of psychological capital on innovative performance and job stress. ***Canadian Journal of Administrative Sciences***, 32, 128–138.

Avey, J. B., Hughes, L. W., Norman, S. M., & Luthans, K. W. (2008). Using positivity, transformational leadership and empowerment to combat employee negativity. ***Leadership & Organization Development Journal***, 29, 110–126.

Avey, J. B., & Jensen, S. M. (2009). Psychological capital: A positive resource for combating employee stress and turnover. ***Human Resource Management***, 48, 677–693.

Avey, J. B., Luthans, F., & Youssef, C. M. (2010). The additive value of positive psychological capital in predicting work attitudes and behaviors. ***Journal of Management***, 36, 430–452.

Avey, J. B., Reichard, R. J., Luthans, F., & Mhatre, K. H. (2011). Meta-analysis of the impact of positive psychological capital on employee attitudes, behaviors, and performance. ***Human Resource Development Quarterly***, 22, 127–152.

Ayal, S., Hochman, G., & Zakay, D. (2011). Two sides of the same coin: Information processing style and reverse biases. ***Judgment and Decision Making***, 6, 295–306.

Ayal, S., Rusou, Z., Zakay, D., & Hochman, G. (2015). Determinants of judgment and decision making quality: The interplay between information processing style and situational factors. ***Frontiers in Psychology***, 6, 1088.

Baluku, M. M., Kikooma, J. F., & Kibanja, G. M. (2016). Psychological capital and the startup capital - Entrepreneurial success relationship. ***Journal of Small Business and Entrepreneurship***, 28, 27–54.

Bandura, A. (1997). ***Self-efficacy: The exercise of control***. New York, USA: W.H. Freeman.

Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. ***Journal of Personality and Social Psychology***, 51, 1173–1182.

Bazerman, M. H., & Moore, D. A. (2008). ***Judgment in managerial decision making*** (7th ed.). Hoboken, N.J.: John Wiley & Sons.

Bohner, G., Chaiken, S., & Hunyadi, P. (1994). The role of mood and message ambiguity in the interplay of heuristic and systematic processing. ***European Journal of Social Psychology***, 24, 207–221.

Bohner, G., Moskowitz, G. B., & Chaiken, S. (1995). The interplay of heuristic and systematic processing of social information. ***European Review of Social Psychology***, 6, 33–68.

Bonn, I. (2005). Improving strategic thinking: A multilevel approach***. Leadership & Organization Development Journal***, 26, 336–354.

Bono, J. E., & McNamara, G. (2011). Publishing in AMJ--Part 2: Research Design. ***Academy of Management Journal***, 54, 657–660.

Brockmann, E. N., & Simmonds, P. G. (1997). Strategic decision making: The influence of CEO experience and use of tacit knowledge. ***Journal of Managerial Issues***, 9, 454–467.

Bruine de Bruin, W., Parker, A. M., & Fischhoff, B. (2007). Individual differences in adult decision-making competence. ***Journal of Personality and Social Psychology***, 92, 938–956.

Camerer, C., & Lovallo, D. (1999). Overconfidence and excess entry: An experimental approach. ***The American Economic Review***, 89, 306–318.

Cameron, K. S., & Spreitzer, G. M. (2012). ***The Oxford handbook of positive organizational scholarship***. New York, Oxford: Oxford University Press.

Chaiken, S. (1980). Heuristic versus systematic information processing and the use of source versus message cues in persuasion. ***Journal of Personality and Social Psychology***, 39, 752–766.

Chaiken, S., Liberman, A., & Eagly, A. H. (1989). Heuristic and systematic information processing within and beyond the persuasion context. In J. S. Uleman & J. a. Bargh (Eds.), ***Unintended thought***. New York: Guilford.

Chaiken, S., & Maheswaran, D. (1994). Heuristic processing can bias systematic processing: Effects of source credibility, argument ambiguity, and task importance on attitude judgment. ***Journal of Personality and Social Psychology***, 66, 460–473.

Chatterji, A. K., Findley, M., Jensen, N. M., Meier, S., & Nielson, D. (2016). Field experiments in strategy research. ***Strategic Management Journal***, 37, 116–132.

Chen, S., & Chaiken, S. (1999). The heuristic-systematic model in its broader context. In S. Chaiken & Y. Trope (Eds.), ***Dual-process theories in social psychology*** (pp. 73–96). New York, USA: Guilford Press.

Chesney, A. A., & Locke, E. A. (1991). Relationship among goal difficulty, business strategies, and performance on a complex management simulation task. ***Academy of Management Journal***, 34, 400–424.

Das, T. K., & Teng, B.-S. (1999). Cognitive Biases and Strategic Decision Processes: An Integrative Perspective. ***Journal of Management Studies***, 36, 757–778.

Dijksterhuis, A., Bos, M. W., Nordgren, L. F., & van Baaren, R. B. (2006). On making the right choice: the deliberation-without-attention effect. ***Science***, 311, 1005–1007.

Duhaime, I. M., & Schwenk, C. R. (1985). Conjectures on cognitive simplification in acquisition and divestment decision making. ***Academy of Management Review***, 10, 287.

Eisenhardt, K. M. (1989). Agency theory: An assessment and review. ***Academy of Management Review***, 14, 57–74.

Eisenhardt, K. M., & Zbaracki, M. J. (1992). Strategic decision making. ***Strategic Management Journal***, 13, 17–37.

Epstein, S. (1994). Integration of the cognitive and the psychodynamic unconscious. ***The American Psychologist***, 49, 709–724.

Evans, J. S. (2008). Dual-processing accounts of reasoning, judgment, and social cognition. ***Annual Review of Psychology***, 59, 255–278.

Fredrickson, J. W. (1984). The comprehensiveness of strategic decision processes: Extension, observations, future directions. ***Academy of Management Journal***, 27, 445–466.

Goldberg, L. R. (1990). An alternative "description of personality": The big-five factor structure. ***Journal of Personality and Social Psychology***, 59, 1216–1229.

Gooty, J., Gavin, M., Johnson, P., Frazier, L., & Snow, D. (2009). In the eyes of the beholder: Transformational leadership, positive psychological capital and performance. ***Journal of Leadership & Organizational Studies***, 15, 353–357.

Hambrick, D. C., Finkelstein, S., & Mooney, A. C. (2005). Executive job demands: New insights for explaining strategic decisions and leader behaviors. ***Academy of Management Review***, 30, 472–491.

Hambrick, D. C., Geletkanycz, M. A., & Fredrickson, J. W. (1993). Top executive commitment to the status quo: Some tests of its determinants. ***Strategic Management Journal***, 14, 401–418.

Hambrick, D. C., & Mason, P. A. (1984). Upper echelons: The organization as a reflection of its top managers. ***Academy of Management Review***, 9, 193.

Hammond, K. R., Hamm, R. M., Grassia, J., & Pearson, T. (1987). Direct comparison of the efficacy of intuitive and analytical cognition in expert judgment. ***IEEE Transactions on Systems, Man, and Cybernetics***, 17, 753–770.

Helfat, C. E., & Peteraf, M. A. (2015). Managerial cognitive capabilities and the micro foundations of dynamic capabilities. ***Strategic Management Journal***, 36, 831–850.

Hitt, M. A., & Tyler, B. B. (1991). Strategic decision models: Integrating different perspectives. ***Strategic Management Journal***, 12, 327–351.

Hodgkinson, G. P., Bown, N. J., Maule, A. J., Glaister, K. W., & Pearman, A. D. (1999). Breaking the frame: An analysis of strategic cognition and decision making under uncertainty. ***Strategic Management Journal***, 20, 977–985.

Hodgkinson, G. P., Maule, A. J., & Bown, N. J. (2016). Causal cognitive mapping in the organizational strategy field: A comparison of alternative elicitation procedures. ***Organizational Research Methods***, 7, 3–26.

Hoffmann, J. A., Helversen, B. v., & Rieskamp, J. (2013). Deliberation's blindsight. ***Psychological Science***, 24, 869–879.

Jones, S. K., Yurak, T. J., & Frisch, D. (1997). The effect of outcome information on the evaluation and recall of individuals' own decisions. ***Organizational Behavior and Human Decision Processes***, 71, 95–120.

Judge, T. A., Locke, E. A., & Durham, C. C. (1997). The dispositional causes of job satisfaction: A core evaluations approach. ***Research in Organizational Behavior***, 19, 151–188.

Kahneman, D. (2003). A perspective on judgment and choice: Mapping bounded rationality. The ***American Psychologist***, 58, 697–720.

Kahneman, D., & Frederick, S. (2002). Representativeness revisited: Attribute substitution in intuitive judgment. In T. Gilovich, D. Griffin, & D. Kahneman (Eds.), ***Heuristics and biases*** (pp. 49–81). New York: Cambridge University Press.

Kahneman, D., & Klein, G. (2009). Conditions for intuitive expertise: A failure to disagree. ***The American Psychologist***, 64, 515–526.

Kahneman, D., & Lovallo, D. (1993). Timid choices and bold forecasts: A cognitive perspective on risk taking. ***Management Science***, 39, 17–31.

Kahneman, D., & Tversky, A. (1979). Prospect theory: an analysis of decision under risk. ***Econometrica: Journal of the Econometric Society***, 47, 263–291.

La Croix, K., Stone, M., & Komolafe, F. (2002). Managing change in the financial services industry. ***Journal of Change Management***, 3, 81–95.

Larson, M., & Luthans, F. (2006). Potential added value of psychological capital in predicting work attitudes. ***Journal of Leadership & Organizational Studies***, 13, 45–62.

Liedtka, J. M. (1998). Strategic thinking: Can it be taught? ***Long Range Planning***, 31, 120–129.

Liu, L., Chang, Y., Fu, J.: Wang, J., & Wang, L. (2012). The mediating role of psychological capital on the association between occupational stress and depressive symptoms among Chinese physicians: A cross-sectional study. ***BMC Public Health***, 12, 219–227.

Luthans, F. (2002). The need for and meaning of positive organizational behavior. ***Journal of Organizational Behavior***, 23, 695–706.

Luthans, F., Avolio, B. J., Avey, J. B., & Norman, S. M. (2007). Positive psychological capital: Measurement and relationship with performance and satisfaction. ***Personnel Psychology***, 60, 541–572.

Luthans, F., Avolio, B. J., Walumbwa, F., & Li, W. (2005). The psychological capital of Chinese workers: Exploring the relationship with performance. ***Management and Organization Review***, 1, 249–271.

Luthans, F., & Church, A. H. (2002). Positive organizational behavior: Developing and managing psychological strengths. ***The Academy of Management Executive***, 16, 57–75.

Luthans, F., & Youssef, C. M. (2004). Human, social, and now positive psychological capital management: Investing in people for competitive advantage. ***Organizational Dynamics***, 33, 143–160.

Luthans, F., Youssef, C. M., & Rawski, S. L. (2011). A tale of two paradigms: The impact of psychological capital and reinforcing feedback on problem solving and innovation. ***Journal of Organizational Behavior Management***, 31, 333–350.

Luthans, K. W., & Jensen, S. M. (2005). The linkage between psychological capital and commitment to organizational mission. ***The Journal of Nursing Administration***, 35, 304–310.

MacGregor, D., Lichtenstein, S., & Slovic, P. (1988). Structuring knowledge retrieval: An analysis of decomposed quantitative judgments. ***Organizational Behavior and Human Decision Processes***, 42, 303–323.

MacKinnon, D. P., Fairchild, A. J., & Fritz, M. S. (2007). Mediation analysis. ***Annual Review of Psychology***, 58, 593–614.

Maheswaran, D., & Chaiken, S. (1991). Promoting systematic processing in low-motivation settings: effect of incongruent information on processing and judgment. ***Journal of Personality and Social Psychology***, 61, 13–25.

Masten, A. S. (2001). Ordinary magic: Resilience processes in development. ***The American Psychologist***, 56, 227–238.

McElroy, T., & Seta, J. J. (2003). Framing effects: An analytic–holistic perspective. ***Journal of Experimental Social Psychology***, 39, 610–617.

Milkman, K. L., Chugh, D., & Bazerman, M. H. (2009). How can decision making be improved? ***Perspectives on Psychological Science***, 4, 379–383.

Miller, D. (1991). Stale in the saddle: CEO tenure and the match between organization and environment. ***Management Science***, 37, 34–52.

Miller, D., & Dröge, C. (1986). Psychological and traditional determinants of structure. ***Administrative Science Quarterly***, 539–560.

Mintzberg, H. (1973). ***The nature of managerial work***. New York, NY: Harper & Row.

Mintzberg, H. (1994). ***Rise and fall of strategic planning***. New York: Free Press.

Mintzberg, H., Raisinghani, D., & Theoret, A. (1976). The structure of "unstructured" decision processes. ***Administrative Science Quarterly***, 21, 246.

Mitchell, J. R., Shepherd, D. A., & Sharfman, M. P. (2011). Erratic strategic decisions: When and why managers are inconsistent in strategic decision making. ***Strategic Management Journal***, 32, 683–704.

Narayanan, V. G., & Packard, M. (2014). Strategy Simulation: The balanced scorecard. ***Harvard Business School Teaching Note***, 006.

Nederhof, A. J. (1985). Methods of coping with social desirability bias: A review. ***European Journal of Social Psychology***, 15, 263–280.

Nees, D. B. (1983). Simulation: A complementary method for research on strategic decision-making processes. ***Strategic Management Journal***, 4, 175–185.

Nielsen, S., & Huse, M. (2010). Women directors' contribution to board decision-making and strategic involvement: The role of equality perception. ***European Management Review***, 7, 16–29.

Nolzen, N. (2018). The concept of psychological capital: A comprehensive review. ***Management Review Quarterly***, 32, 128.

Nuntamanop, P., Kauranen, I., & Igel, B. (2013). A new model of strategic thinking competency. ***Journal of Strategy and Management***, 6, 242–264.

Oppenheimer, D. M., & Kelso, E. (2015). Information processing as a paradigm for decision making. ***Annual Review of Psychology***, 66, 277–294.

Papadakis, V. M., Lioukas, S., & Chambers, D. (1998). Strategic decision-making processes: The role of management and context. ***Strategic Management Journal***, 19, 115–147.

Paquette, L., & Kida, T. (1988). The effect of decision strategy and task complexity on decision performance. ***Organizational Behavior and Human Decision Processes***, 41, 128–142.

Parker, S. K. (1998). Enhancing role breadth self-efficacy: the roles of job enrichment and other organizational interventions. ***The Journal of Applied Psychology***, 83, 835–852.

Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: a critical review of the literature and recommended remedies. ***The Journal of Applied Psychology***, 88, 879–903.

Rego, A., Sousa, F., Marques, C., & Cunha, M. P. E. (2012). Authentic leadership promoting employees' psychological capital and creativity. ***Journal of Business Research***, 65, 429–437.

Roberts, S., Scherer, L., & Bowyer, C. (2011). Job stress and incivility: What role does psychological capital play? ***Journal of Leadership & Organizational Studies***, 18, 449–458.

Rusou, Z., Zakay, D., & Usher, M. (2013). Pitting intuitive and analytical thinking against each other: The case of transitivity. ***Psychonomic Bulletin & Review***, 20, 608–614.

Scheier, M. F., & Carver, C. S. (1985). Optimism, coping, and health: Assessment and implications of generalized outcome expectancies. ***Health Psychology***, 4, 219–247.

Schoemaker, P. J. H. (1993). Multiple scenario development: Its conceptual and behavioral foundation. ***Strategic Management Journal***, 14, 193–213.

Schwenk, C. (1984). Cognitive simplification processes in strategic decision-making. ***Strategic Management Journal***, 5, 111–128.

Schwenk, C. (1995). Strategic decision making. ***Journal of Management***, 21, 471–493.

Seligman, M. E. P. (1998). ***Learned optimism***. New York, USA: Pocket Books.

Shrout, P. E., & Bolger, N. (2002). Mediation in experimental and nonexperimental studies: New procedures and recommendations. ***Psychological Methods***, 7, 422–445.

Simon, H. A. (1959). Theories of decision-making in economics and behavioral science. ***The American Economic Review***, 49, 253–283.

Simsek, Z. (2007). CEO tenure and organizational performance: An intervening model. ***Strategic Management Journal***, 28, 653–662.

Sitzmann, T. (2011). A meta-analytic examination of the instructional effectiveness of computer-based simulation games. ***Personnel Psychology***, 64, 489–528.

Siu, O., Bakker, A., & Jiang, X. (2014). Psychological capital among university students: Relationships with study engagement and intrinsic motivation. ***Journal of Happiness*** Studies, 5, 979–994.

Siu, O., Cheung, F., & Lui, S. (2015). Linking positive emotions to work well-being and turnover intention among Hong Kong police officers: The role of psychological capital. ***Journal of Happiness Studies***, 16, 367–380.

Sloman, S. A. (1996). The empirical case for two systems of reasoning. ***Psychological Bulletin***, 119, 3–22.

Smerecnik, C. M. R., Mesters, I., Candel, M. J. J. M., Vries, H. de, & Vries, N. K. de. (2012). Risk perception and information processing: The development and validation of a questionnaire to assess self-reported information processing. ***Risk Analysis***, 32, 54–66.

Snyder, C. R., Irving, L. M., & Anderson, J. R. (1991). Hope and health. In C. R. Snyder & D. R. Forsyth (Eds.), ***Handbook of social and clinical psychology*** (pp. 285–305). Elmsford, USA: Pergamon.

Snyder, C. R., Sympson, S. C., Ybasco, F. C., Borders, T. F., Babyak, M. A., & Higgins, R. L. (1996). Development and validation of the State Hope Scale. ***Journal of Personality and Social Psychology***, 70, 321–335.

Solem, A. R. (1992). Some applications of problem-solving versus decision-making to management. ***Journal of Business and Psychology***, 6, 401–411.

Stacey, R. D. (1992). ***Managing the unknowable: Strategic boundaries between order and chaos in organizations*** (1st ed.). The Jossey-Bass management series. San Francisco: Jossey-Bass.

Staw, B. M., & Barsade, S. G. (1993). Affect and managerial performance: A test of the sadder-but-wiser vs. happier-and-smarter hypotheses. ***Administrative Science Quarterly***, 38, 304.

Tiedens, L. Z., & Linton, S. (2001). Judgment under emotional certainty and uncertainty: The effects of specific emotions on information processing. ***Journal of Personality and Social Psychology***, 81, 973–988.

Tomasi, S. D., Parolia, N. N., Han, C., & Porterfield, T. (2015). Exploring the impact of team rapport and empowerment on information processing and project performance in outsourced system development. ***International Journal of Project Organization and Management***, 7, 284.

Touré-Tillery, M., & Fishbach, A. (2014). How to measure motivation: A guide for the experimental social psychologist. ***Social and Personality Psychology Compass***, 8, 328–341.

Trumbo, C. W. (1999). Heuristic-systematic information processing and risk judgment. ***Risk Analysis***, 19, 391–400.

Trumbo, C. W. (2002). Information processing and risk perception: An adaptation of the heuristic-systematic model. ***The Journal of Communication***, 52, 367–382.

Tversky, A., & Kahneman, D. (1974). Judgment under uncertainty: Heuristics and biases. ***Science*** (New York, N.Y.), 185, 1124–1131.

Wagnild, G. M., & Young, H. M. (1993). Development and psychometric evaluation of the resilience scale. ***Journal of Nursing Measurement***, 1, 165–178.

Wang, Y., Liu, L., Wang, J., & Wang, L. (2012). Work–family conflict and burnout among Chinese doctors: The mediating role of psychological capital. ***Journal of Occupational Health***, 54, 232–240.

Wiersema, M. F., & Bantel, K. A. (1992). Top management team demographic and corporate strategic change. ***Academy of Management Journal***, 35, 91–121.

Wood, R. E., Goodman, J. S., Beckmann, N., & Cook, A. (2008). Mediation testing in management research. ***Organizational Research Methods***, 11, 270–295.

Wowak, A. J., & Hambrick, D. C. (2010). A model of person-pay interaction: How executives vary in their responses to compensation arrangements. ***Strategic Management Journal***, 31, 803-821.

Yu, R. (2016). Stress potentiates decision biases: A stress induced deliberation-to-intuition (SIDI) model. ***Neurobiology of Stress***, 3, 83–95.

Zacharakis, A. L., & Shepherd, D. A. (2001). The nature of information and overconfidence on venture capitalists' decision making. ***Journal of Business Venturing***, 16, 311–332.

Zakay, D., & Wooler, S. (1984). Time pressure, training and decision effectiveness. ***Ergonomics***, 27, 273–284.

# IV. THE RELATIONSHIP BETWEEN PSYCHOLOGICAL CAPITAL AND FLEXIBILITY IN STRATEGIC DECISION-MAKING

## Article C

Niklas Nolzen

**Abstract**

Past research leaves open which characteristics of a manager influence flexibility in the strategic decision-making process. In this paper, we suggest that an executive's level of psychological capital (PsyCap) may influence the process of strategic decision-making, in particular the flexibility applied in strategic decisions. We argue that there is a curvilinear, inverted u-shaped relationship between PsyCap and flexibility in strategic decision-making and that this relationship is moderated by industry experience. In this study we assess these hypotheses based on data from a quasi-experimental field study with 49 executives from the financial services industry in Germany. We find supporting evidence for the relationship between PsyCap and flexibility as well as the moderating role of industry experience. We also highlight implications for further research on the influence of individual characteristics on the process of strategic decision-making.

**Keywords**

Strategic decision-making, SDM, flexibility, industry experience, psychological capital, PsyCap

## 1. Introduction

Research on strategy and organization theory has identified flexibility in the strategic decision-making process as a key requirement for an organization's capability to adapt to environmental change (Sharfman & Dean Jr, 1997). Strategic decision-making is considered the core of an organization's adaption process as the procedures by which executives make strategic decisions have been found to have a marked effect on the degree to which the entire organization will be capable to adapt to change (Nutt, 1993). More specifically, the flexibility of top managers' strategic decision-making process, i.e., the extent to which new ideas are explored, new information is incorporated, and decisions are adapted accordingly, has been shown to result in major strategic change and performance improvement (Greiner & Bhambri, 1989). Furthermore, organizations lacking flexible strategic decision-making by their top management have rarely been found to adapt to environmental change (Mintzberg & McHugh, 1985; Normann, 1985).

There is still a lack of transparency, however, on how flexibility in strategic decision-making can be fostered among top managers. Thus far, research has mainly focused on cognitive, social, and contextual factors (Sharfman & Dean Jr, 1997). Based on past research highlighting that flexibility in the strategic decision-making process is often hampered by executives' mental barriers or cognitive limitations (Anderson & Paine, 1975), researchers have identified information processing as a driver of the degree of flexibility (Louis & Sutton, 1991). More specifically, the use of heuristics in information processing has been found to limit the screening, analysis, and interpretation of information, thus, hindering executives from evaluating potential innovative strategic possibilities. In addition, social structures including institutions (Scott, 1987) and culture (Schein, 1985) as well as contextual factors such as competitive threat and the level of uncertainty

(Sharfman & Dean Jr, 1997) have been shown to regulate and constrain strategic decision-making, which in turn leads to rigidity in the process. Also, success in the past has been shown to be related to a less comprehensive evaluation of alternative options and non-consideration of information contradicting the decision-maker's initial assumptions, which also leads to rigidity in the decision process (Donaldson & Lorsch, 1983). While researchers have shown that the personal characteristics influence one's strategic decision making in multiple ways (Bonn, 2005; Schwenk, 1995), little research attention has been attributed to the relationship between personal characteristics and the flexibility in these decision-making processes. Research on this relationship might be promising to provide first findings on potential measures that allow to foster flexibility in strategic decision-making among top managers.

One personal characteristic that might be particularly relevant in this context is psychological capital, hereafter PsyCap (Luthans & Youssef, 2004). PsyCap was introduced by Luthans and Youssef within the emerging positive organizational behavior movement (Cameron & Spreitzer, 2012; Luthans & Church, 2002) and describes an individual's psychological capacity that can be measured, developed, and managed for performance improvement. Research in the organizational behavior field has shown that PsyCap, comprising the psychological resources self-efficacy, hope, optimism, and resilience, is positively associated with broad cognitive capabilities such as a mastery-oriented mindset (Luthans, Youssef, & Rawski, 2011), organizational identity and commitment (Luthans & Jensen, 2005), performance (Luthans, Avolio, Avey, & Norman, 2007), and motivation (Kim & Noh, 2016). Thus, PsyCap has been shown to be significantly related to the intervening mechanisms of flexibility in decision-making. Accordingly, it might be an important characteristic of executives that impacts the degree of flexibility in the strategic decision-

making process. Also, this relationship between PsyCap and flexibility might be moderated by the decision-maker's level of industry experience.

Based on prior findings in research on strategic decision-making, flexibility, and PsyCap, we hypothesize that an individual decision-maker's level of PsyCap is correlated with the degree of flexibility applied in strategic decisions. We suggest that there is a curvilinear relationship between PsyCap and flexibility in strategic decision-making in such way that PsyCap may relate positively with flexibility, but this relationship may invert for excessively high levels of PsyCap. We also theorize that this curvilinear relationship between PsyCap and strategic decision-making flexibility is moderated by the decision-maker's level of industry experience. We examine these relationships based on a sample of 49 professionals from the financial services industry, who participated in a quasi-experimental field study consisting of a strategy simulation and two questionnaires. The statistical results support our hypothesis on the relationships between PsyCap and flexibility as well as the moderating role of industry experience.

We extend the existing research on strategic decision-making by exploring the effects of personal characteristics on the process of strategic decision-making. We identify PsyCap as a driver of the degree of flexibility applied in strategic decisions and contribute to the research on PsyCap by highlighting that excessively high levels of PsyCap might lead to undesirable effects. We also support our previous expansion of the research on PsyCap beyond the organizational behavior field, in particular the strategic decision-making context.

## 2. Theoretical Background

Flexibility in top managers' strategic decision-making process was found to be a key requirement for an organization's capability to adapt to environmental change (Sharfman & Dean Jr, 1997). Strategic decision-making is considered the core of an organization's adaption process as the procedures by which executives make strategic decisions have been found to have a marked effect on the degree to which the entire organization will be capable to adapt to change (Nutt, 1993).

Literature on flexibility in the organizational and strategic space has applied a great variety of definitions of the construct (Sharfman & Dean Jr, 1997). The various ideas in the decision-making literature that are referred to as flexibility or the opposite, rigidity, include process characteristics, i.e., the use of categories and routine responses, checks of assumptions, the integration of new information, and the solution space considered, as well as outcome characteristics, i.e., the ability to adapt. Alexander (1979) and Janis (1972), for example, focused on the consideration of a broad range of alternatives as part of flexible decision-making, while other researchers primarily described flexibility as the process of incorporating new ideas to challenge past assumptions and decisions (Staw, 1981). Researchers from the structured conflict field have further emphasized that the examination of key assumptions throughout the decision process is a key aspect of flexibility in decision-making (Schwenk, 1988). These process characteristics are necessary but not necessarily sufficient for actual flexibility in decision-making from an outcome perspective, thus, for our research we used an outcome-oriented definition of flexibility. More specifically, following the definition applied by Quinn (1980), we analyzed

flexibility as the ability to adapt throughout a sequential strategic decision-making process based on new information.

The flexibility of top managers' strategic decision-making process has been shown to be a crucial requirement for an organization's capability to adapt to change, in other words, if the strategic decision-making process itself is not flexible, it is unlikely the organization will be flexible enough to adapt (Nutt, 1993). In order to adapt, executives have to take multiple strategic decisions to respond to threats or opportunities (Sharfman & Dean Jr, 1997). Executives who apply a flexible style to these decisions are more likely to move beyond stereotyped responses and traditional ways of acting. Also, these executives are less likely to be distracted by the uncertainty and ambiguity inherent in strategic decision-making and more likely to make good decisions given the equivocality of the strategic challenges (Nutt, 1993). Thus, the flexibility applied by top executives in these decisions is strongly linked to entire adaption process and results in major strategic change and performance improvement (Greiner & Bhambri, 1989). Furthermore, a growing body of research has outlined how a lack of flexibility in strategic decision-making, i.e., rigidity, is related to severe negative implications for a company. Organizations lacking flexible strategic decision-making by their top management have rarely been found to adapt to environmental change (Mintzberg & McHugh, 1985; Normann, 1985). Multiple case studies have found these organizations to enter organizational decline, i.e., failure to match new environmental demands, and were not able to initiate strategic reorientation.

While past research on the antecedents of flexibility in individual strategic decision-making has identified cognitive, social, and contextual factors (Sharfman & Dean Jr, 1997), the question how a more flexible, thus less rigid, strategic decision-making process can be enforced among top

managers has not been entirely answered yet. Research on the relationship between executives' cognitive capacities and preferences and the flexibility in the strategic decision-making process has found that flexibility is often hampered by executives' mental barriers or cognitive limitations (Anderson & Paine, 1975). Furthermore, information processing has been identified by strategy scholars as a key driver of the degree of flexibility applied in strategic decision-making (Louis & Sutton, 1991). The use of heuristics in information processing has been found to hinder executives from evaluating potential innovative strategic possibilities and their implementation by limiting the screening, analysis, and interpretation of information. In addition, social structures including institutions (Scott, 1987) and culture (Schein, 1985) as well as contextual factors such as competitive threat and the level of uncertainty (Sharfman & Dean Jr, 1997) have been shown to regulate and constrain strategic decision-making, which in turn leads to rigidity in the process. For example, organizational culture and identity provides executives with a framework for thinking about complex and uncertain questions, which leads to well established intersubjective beliefs and makes it less likely for decision-makers to re-examine initial choices. Also, success in the past has been shown to be related to a less comprehensive evaluation of alternative options and non-consideration of information contradicting the decision-maker's initial assumptions, which leads to rigidity in the decision process (Donaldson & Lorsch, 1983).

Furthermore, in volatile macro environments, industry tenure and age were found to be negatively related to challenging the status quo and adjusting strategic initiatives to the new context (Hambrick, Geletkanycz, & Fredrickson, 1993; Hitt & Tyler, 1991; Miller, 1991). Other personal characteristics of the decision-maker beyond the above-mentioned role-specific factors have not been the focus of prior research on flexibility in strategic decision-making. These personal characteristics of an individual can be comprehensively described and measures using broader

personality constructs such as the Big Five personality dimensions (Goldberg, 1990), core self-evaluations, hereafter CSE (Judge, Locke, & Durham, 1997), and PsyCap (Luthans & Youssef, 2004). While the Big Five and CSE are defined as trait-based and hence relatively stable characteristics, PsyCap is considered as a state-like construct that it is adaptable and open for development (Luthans & Youssef, 2004). Furthermore, PsyCap has previously been shown to be significantly related to the intervening mechanisms of flexibility in decision-making (Nolzen, 2018; Sharfman & Dean Jr, 1997). Thus, analyzing PsyCap in the context of flexibility in the strategic decision-making process might help to better anticipate an individual's decision-making process and was therefore chosen for our research on flexibility.

PsyCap is a higher-order construct that was introduced in 2004 and is grounded in positive psychology, thus, focused on characteristics that enable an individual to thrive (Cameron & Spreitzer, 2012; Luthans & Church, 2002; Luthans & Youssef, 2004). The four positive psychological resources included in PsyCap are self-efficacy, hope, optimism, and resilience (Luthans & Youssef, 2004). These resources share a common underlying link that drives attitudes and behaviors towards goal achievement (Luthans et al., 2007). Self-efficacy promotes motivation to set and pursue challenging goals (Bandura, 1997; Stajkovic & Luthans, 1998) while optimism further encourages that by a positive assessment of successfully reaching these goals (Seligman, 1998). Hope and resilience provide the ability to identify and pursue different paths to achieve the target (Snyder, Irving, & Anderson, 1991) as well as the adaptability to work towards these goals (Masten, 2001). PsyCap and its resources are adaptable and open for development (Luthans et al., 2007), which differentiates them from relatively stable and difficult to change trait-like constructs, such as the Big Five (Goldberg, 1990) and CSE (Judge, Locke, & Durham, 1997).

Since its introduction, multiple studies on PsyCap have been published in the organizational behavior field. It has consistently been shown that PsyCap is positively associated with desirable work-related effects, including behaviors and attitudes (Avey, Reichard, Luthans, & Mhatre, 2011; Nolzen, 2018). For example, several researchers have shown that PsyCap is positively related to multiple job-related behaviors, such as performance (Luthans, Avolio, Walumbwa, & Li, 2005), entrepreneurial success (Baluku, Kikooma, & Kibanja, 2016), creativity (Sweetman, Luthans, Avey, & Luthans, 2011), and innovative behavior (Abbas & Raja, 2015). PsyCap has further been found to be a significant predictor of job satisfaction (Larson & Luthans, 2006) and other desirable attitudes, such as organization commitment (Luthans & Jensen, 2005), while decreasing negative attitudes, e.g., intentions to quit (Avey & Jensen, 2009). In addition to these attitudes and behavior, PsyCap was found to reduce negative job-related reactions such as stress (Abbas & Raja, 2015), depression (Liu, Chang, Fu, Wang, & Wang, 2012), and burnout (Wang, Liu, Wang, & Wang, 2012). However, most importantly for the context of flexibility in the strategic decision-making, PsyCap is positively associated with broad cognitive capabilities such as a mastery-oriented mindset (Luthans et al., 2011), organizational identity and commitment (Luthans & Jensen, 2005), performance (Luthans et al., 2007), and motivation (Kim & Noh, 2016), which in turn were demonstrated to be related to flexibility in strategic decision-making. Consequently, PsyCap might be an important attribute of decision-makers that impacts the degree of flexibility in the strategic decision-making process. Also, this relationship between PsyCap and flexibility might be moderated by the decision-maker's level of industry experience.

## 3. Hypotheses

In previous research, the degree of flexibility applied in strategic decision-making was shown to be higher for individuals with the confidence to make the right decisions, i.e., a mastery-oriented mindset (Wilson, Butler, Cray, Hickson, & Mallory, 1986), and the willingness and freedom to act accordingly, i.e., empowerment and motivation (Fombrun & Ginsberg, 1990). As Luthans and colleagues found high-PsyCap individuals to have a mastery-oriented mindset (Luthans et al., 2011), while Kim and Noh provided support that PsyCap leads to higher levels of motivation (Kim & Noh, 2016), these individuals might be more likely to apply a comprehensive search and have the confidence to adapt to new information throughout the decision process, thus, showing more flexible strategic decision-making. However, PsyCap, for high levels in particular, has also been found to be related to organizational identity and commitment (Luthans & Jensen, 2005) and job-related success (Luthans et al., 2007). In turn, these have been shown to lead to a more rigid, thus less flexible, decision-making process. While Dutton and Dukerich show how high levels of organizational identity frame a decision-maker's cognition and action in narrow ways (Dutton & Dukerich, 1991), Lant and colleagues suggest that past success biases executives' strategic thinking and limits the range of actions that are likely to be taken (Lant, Milliken, & Batra, 1992). Following the line of reasoning by Hiller and Hambrick in a similar context (Hiller & Hambrick, 2005), it can be argued, that individuals with supreme levels of hope, optimism, self-efficacy, and resilience have the conviction that they will prevail and might thus be less comprehensive and invest less time in the gathering, analysis, and discussion of information in the strategic decision-making process. Based on these previous results, PsyCap has the potential to foster flexibility in strategic-decision making up to a certain level beyond which the effect of PsyCap might invert and rather hinder flexibility in strategic decision-making, thus, implying a curvilinear relationship. This

hypothesis is further supported by Stone (1994) and Papenhausen (2010), who have shown that two of the underlying factors of PsyCap, i.e., self-efficacy and optimism, have a curvilinear relationship with information search, which is an antecedent of flexibility in decision-making. Drawing on these findings, we suggest that there is an inverted, u-shaped relationship between PsyCap and flexibility in strategic decision-making. While PsyCap to a certain level might result in a mastery-oriented mindset and motivation that are required to overcome restricted search and enable flexibility, PsyCap beyond that level might lead decision-makers to hold intersubjective believes in place and fail to question core believes, which in turn might foster rigidity. Thus, we expect a curvilinear, inverted u-shaped relationship between PsyCap and flexibility in strategic decision making in such way that PsyCap may relate positively with flexibility, but this relationship may invert for excessively high levels of PsyCap. Consequently, we argue:

**Hypothesis 1**: PsyCap has a curvilinear, inverted u-shaped relationship with flexibility in strategic decision-making.

Several studies have stated that the strength of the relationship between PsyCap and attitudes and behaviors is context dependent, in other words, is moderated by a third factor (Nolzen, 2018). Industry experience has been identified as a central perspective for flexibility in strategic decision-making in prior research (Rosman, Lubatkin, & O'Neill, 1994). More specifically, decision behavior is formed by similar experiences in the past being applied as reference for processing information. Human capital theory suggests that individuals with higher human capital attributes, such as relevant experience, expect higher levels of work performance, organizational rewards, and compensation (Becker, 1994). Recent research supports that relevant work experience is strongly related to both, objective and subjective, career success (Kirchmeyer, 1998). Furthermore, Cohen

has found a significant link between an individual's industry experience and organizational commitment across occupational groups (Cohen, 1992). Both, career success and organizational commitment, being mediators of the proposed relationship between high levels of PsyCap and less flexible strategic decision-making. On the contrary, individuals with low levels of industry experience appear to be more likely to show high levels of motivation (Stamov-Roßnagel & Biemann, 2012), a mediator of the proposed positive relationship between PsyCap and decision-making flexibility. These individuals experience lower levels of adaptation and fewer habits, making them highly motivated employees (Warr, 2001). Accordingly, industry experience has been identified as a factor being positively related to career success and organizational commitment while being negatively related to work-related motivation. As such, it may affect the curvilinear relationship between PsyCap and flexibility in strategic decision-making through its effect on these mediators between PsyCap and flexibility in decision-making. Thus, executives with high levels of industry experience may experience a stronger relationship between specifically PsyCap and its negative effect on flexibility in strategic decision-making whereas executives with low levels of industry experience may experience a stronger relationship between PsyCap and its positive effect on flexibility in strategic decision-making. Following the line of argumentation outlined by Haans and colleagues (Haans, Pieters, & He, 2016), this moderating effect may lead to a 'shape-flip', i.e., it may change the shape of the curve to such an extent that the curvilinear, inverted u-shaped relationship between PsyCap and flexibility in strategic decision-making for low and medium levels of industry experience (as described in Hypothesis 1) flips to a u-shaped relationship for high levels of industry experience. This 'shape-flip' effect has been found in strategy research before. For example, Uotila and colleagues found that technological dynamism as a moderator leads to a 'shape-flip' effect on the relationship between exploration and firm performance (Uotila,

Maula, Keil, & Zahra, 2009). Therefore, as a moderator within the proposed non-linear relationship between PsyCap and flexibility in strategic decision-making, we posit:

**Hypothesis 2**: Industry experience moderates the curvilinear relationship between PsyCap and flexibility in strategic decision-making such that the shape of the curve flips from an inverted u-shape to a u-shape for high levels of industry experience.

## 4. Method

To test our hypotheses, we based our analyses on the data collected in a quasi-experimental field study including two different sources for data collection, a strategy simulation and two questionnaires, to avoid common method bias (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003).

### 4.1. Sample

We involved 49 professionals from the financial services industry in Germany in our quasi-experimental field study and restricted our sample to one industry to strengthen internal validity by avoiding potentially confounding systematic industry effects (Dess, Ireland, & Hitt, 1990). All participants worked for banks, insurance, or other financial services companies and had previously gained experience in strategic decision-making in at least one strategy project with a global strategy consulting firm.

Out of 102 approached professionals, 50 individuals agreed to participate in the study in person after one follow-up request had been sent to all non-respondents. One additional participant had to be excluded from the final sample due to incomplete data. 22 of these 49 participants were female (i.e., 45 percent) and their age ranged from 23 to 35 with an average of 28. The participants

had graduated with an average A-level GPA of 1.6 and had been working with their current employer for an average of nearly 3 years.

### 4.2. Procedure

In line with Chesney and Locke (1991) and following the suggestion by Hambrick (2007), we used a computer-based task, Harvard Business School's "Strategy Simulation: The Balanced Scorecard" (Narayanan & Packard, 2014), to study the influence of PsyCap on the strategic decision-making process.

In this simulation, participants act as CEO of an automotive company with the objective to maximize the company value, being indicated by a purchase offer from a private equity company at the end of the simulation. The company value is directly linked to company performance being the result of the match between the strategy chosen at the beginning of the simulation and the initiatives being implemented throughout the simulation. Hence, participants first decide for one of four potential strategies and the key performance indicators to monitor success through the simulation. Then, a budget of USD 25 million must be allocated to initiatives in eight consecutive periods based on the perceived match to the selected strategy. After each period, the participants receive performance feedback based on their selected key performance indicators as well as additional standard financials, which can be used to further adjust and optimize the budget-allocation. These decisions match the characteristics of strategic decision-making processes (Mintzberg, Raisinghani, & Theoret, 1976; Schwenk, 1984) as they are complex, need to be taken under uncertainty, and require significant resource commitments (Narayanan & Packard, 2014).

The use of the computer-based simulation reduced common method bias as it allows to use process measures from the computer-based simulation rather than self-reported information, thus,

providing a different source than for the independent variable (Podsakoff et al., 2003). Furthermore, these computer-generated measures and not disclosing them to participants also mitigated social desirability bias (Fisher, 1993).

Before the start of the simulation, we provided participants with a verbal briefing on the procedure, the theoretical foundations of the balanced scorecard, and the particularities of the strategy simulation. The information was also provided as a print-out to all participants. Before starting the simulation, participants were handed out the first questionnaire measuring PsyCap and the control variables. After the completion of the simulation, participants filled-out the second questionnaire that measured the information processing approach. We ensured anonymity and did not reveal the purpose of the study to further reduce the risk of social desirability bias (Nederhof, 1985).

### 4.3. Measures

For this study, we used measures that had been psychometrically validated and had demonstrated adequate internal reliability in previous research.

#### 4.3.1. Independent Variables

We used the PsyCap questionnaire (PCQ), to measure *PsyCap* (Luthans et al., 2007). The PCQ contains six items for each of the four components of PsyCap measured on a 6-point Likert scale. The items were derived from existing measures for self-efficacy (Parker, 1998), hope (Snyder et al., 1996), optimism (Scheier & Carver, 1985), and resilience (Wagnild & Young, 1993). The Cronbach's alpha for the scale was .871, which indicates a high level of scale reliability and

is in line with the results from multiple studies where the PCQ had previously been applied (Nolzen, 2018).

### 4.3.2. Dependent Variables

*Decision flexibility* was measured on an individual level, using an outcome-oriented definition of flexibility. More specifically, following the definition applied by Quinn (1980), we analyzed flexibility as the ability to adapt throughout a sequential strategic decision-making process based on new information. Drawing on the argumentation by Nees (1983) and the approach taken by Chesney and Locke (1991), we used the strategy simulation to quantitatively measure the degree of flexibility applied throughout the strategic decision-making process. Specifically, the average share of budget that is reallocated to new measures compared to the previous game period in percent is applied as measure for decision flexibility. This measure, which draws on the approach taken by Rosman and colleagues (Rosman, Lubatkin, & O'Neill, 1994), allows to quantify the degree to which each participant adapted throughout the 8-period sequential decision-making process based on the new information that is provided at the closing of each period.

### 4.3.3. Moderating Variables

We measured *industry experience* on an individual level. Due to the automotive context of the simulation applied (Narayanan & Packard, 2014), the number of months each participant had been working in the automotive industry prior to participating in the study was used.

### 4.3.4. Control Variables

We included 7 control variables in our analysis due to their significance in past strategic decision-making research (Hambrick & Mason, 1984; Hambrick, Geletkanycz, & Fredrickson 1993; Wowak & Hambrick, 2010).

We controlled for *age* to account for seniority-driven differences in strategic decision-making (Chatterjee & Hambrick, 2011). We measured age in years.

As gender can also affect strategic decision-making processes (Jeong & Harrisson, 2017), we included *gender* (0 = male, 1 = female) as control variable.

Further, participants' general ability (Staw & Barsade, 1993) was found to influence the strategic decision-making process. Thus, we measured *education* based on each individual's A-level grade point average.

To account for the influence of a participant's *educational level* (Hitt & Tyler, 1991), we included the individual's highest educational degree (i.e., training, bachelor's degree, master's degree, doctoral degree, or their equivalents) as additional control variable.

The process of strategic decision-making has been show to evolve in the course of an individual's personal career (Simsek, 2007). Thus, *tenure* as the number of months spent with the current employer was measured and included as control variable.

*Decision speed* was included as control variable to measure a participant's means-focused motivation (Touré-Tillery & Fishbach, 2014). We measured decision speed as the total time that it

took a participant to finish the strategy simulation, i.e., to analyze performance feedback and (re-)allocate budget to the initiatives over a total of eight periods.

Finally, we controlled for the quality of the participants' previous decision throughout the sequential decision-making process in the simulation as it significantly affects the amount of budget reallocated, thus, our measure for flexibility. To do so, we used the average delta of value per share of the company after each game period compared to the previous period in percent as measure for the *interim decision quality*.

## 5. Results

In Table 6, the means, standard deviations, and correlations for all variables are presented. Support for the robustness of our results is provided by bootstrapping results using case resampling and 5,000 replications following the recommendations by Shrout and Bolger (2002).

Table 7 shows the results of the regression analyses that we used to test our first hypothesis. Model 1 is the control model. In Model 2, we add the main independent variable (PsyCap and $PsyCap^2$). In Model 3, we add the moderating variable (industry experience), and the interactions are added in Model 4. The F-statistics are significant in all models, so are the changes in F-statistics, when we add PsyCap and $PsyCap^2$ in Model 2 and the interactions in Model 4. In Hypothesis 1, we propose that there will be a curvilinear, inverted u-shaped relationship between PsyCap and flexibility in strategic decision-making. The results of Model 2 support this hypothesis as the relationship between the linear PsyCap component and decision flexibility is positive and significant ($\beta = 4.905$, $p < .05$) and $PsyCap^2$ is negatively and highly significantly related to decision flexibility ($\beta = -5.143$, $p < .01$). Furthermore, we found further supporting evidence in the joint significance of the direct and the squared terms of PsyCap (delta $F = 4.474$, $p < 0.05$) and

estimated the turning point at 4.3, which indicates that the PsyCap value is within the limits of the data.

Hypothesis 2 suggests that industry experience moderates the curvilinear relationship between PsyCap and flexibility in strategic decision-making such that the shape of the curve flips from an inverted u-shape to a u-shape for high levels of industry experience. Following the approach outlined by Dawson (2014) and Haans and colleagues (Haans, Pieters, & He, 2016), Model 4 provides support for the hypothesis as the interaction of industry experience with the linear component of PsyCap is negative and highly significant ($\beta = -18.767$, $p < .01$) and the interaction with the quadratic component is positive and highly significant ($\beta = 18.553$, $p < .01$). Figure 4 depicts the interaction.

**Table 6:** Means, SDs, and correlations

| Variable | Mean | SD | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 Age | 28 | 2.6 | 1 | | | | | | | | | |
| 2 Gender | 0.4 | 0.5 | -.053 | 1 | | | | | | | | |
| 3 Education | 1.6 | 0.5 | -.100 | .072 | 1 | | | | | | | |
| 4 Education level | 1.8 | 0.5 | .518** | -.049 | -.147 | 1 | | | | | | |
| 5 Tenure | 33 | 19 | .468** | .123 | -.319* | .056 | 1 | | | | | |
| 6 Decision speed | 1964 | 514 | -.203 | -.030 | -.014 | .011 | -.060 | 1 | | | | |
| 7 Interim decision quality | 49 | 21 | .028 | -.099 | -.269* | .144 | .243* | .148 | 1 | | | |
| 8 PsyCap | 4.6 | 0.5 | .178 | -.167 | -.292* | .046 | .302* | .109 | .398** | 1 | | |
| 9 Industry Experience | 4 | 7 | .072 | .084 | -.179 | .076 | .199 | .300* | .175 | .375** | 1 | |
| 10 Decision flexibility | 33 | 22 | .173 | .131 | .276* | .060 | -.242* | -.053 | -.552** | -.408** | -.104 | 1 |

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

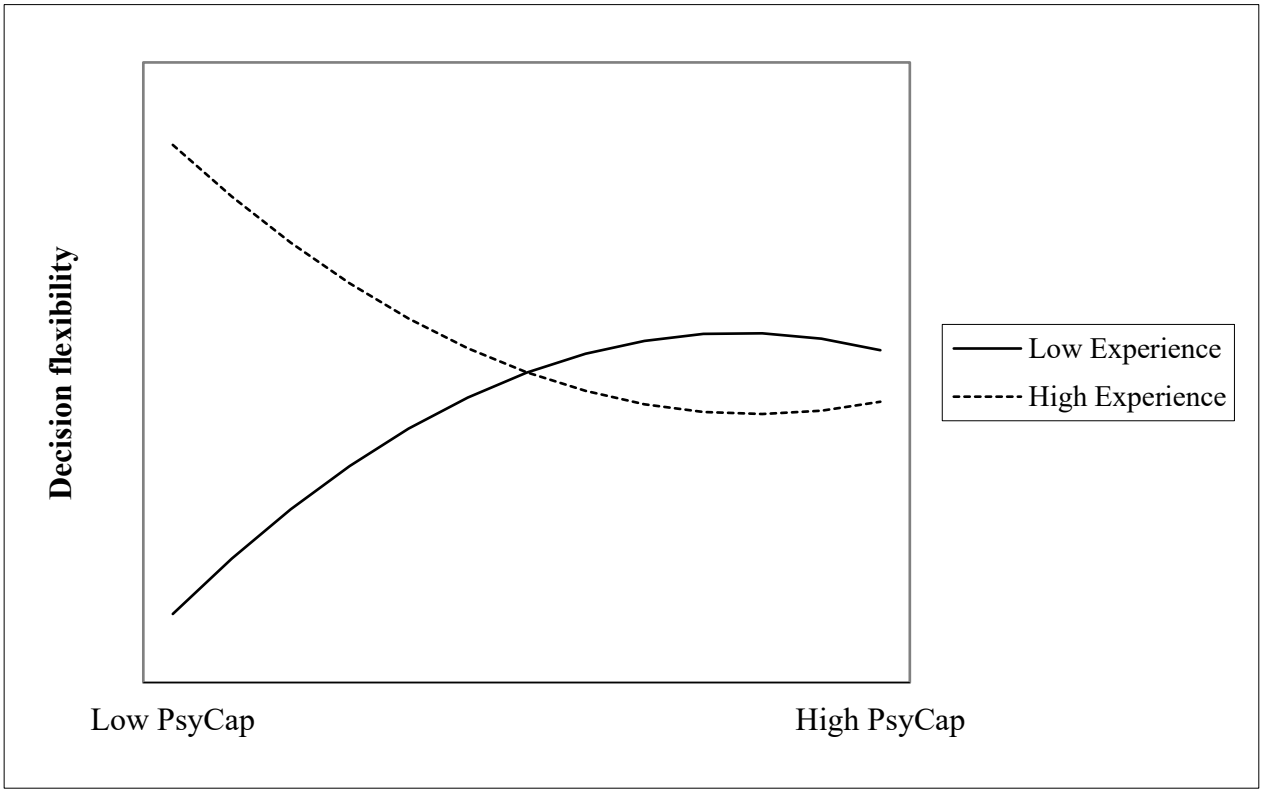
**Table 7:** Regression model results

| **Variables** | **Model 1** | **Model 2** | **Model 3** | **Model 4** |
|---|---|---|---|---|
| | Decision flexibility | Decision flexibility | Decision flexibility | Decision flexibility |
| **Control variables** | | | | |
| Age | .364* | .466** | .469** | .436** |
| Gender | .134 | .076 | .057 | -.046 |
| Education | .084 | .084 | .094 | .156 |
| Education level | -.028 | .058 | .060 | .210 |
| Tenure | -.283 | -.264 | -.273 | -.244 |
| Decision speed | .078 | .191 | .165 | .160 |
| Interim decision quality | -.465** | -.428** | -.426** | -.530*** |
| **Independent variable** | | | | |
| PsyCap | | 4.905* | 5.198* | .233 |
| $PsyCap^2$ | | -5.143** | -5.478* | -.851 |
| **Moderator** | | | | |
| Industry experience | | | .117 | .334 |
| **Interaction terms** | | | | |
| PsyCap X Industry experience | | | | -18.767** |
| $PsyCap^2$ X Industry experience | | | | 18.553** |
| N | 49 | 49 | 49 | 49 |
| $R^2$ | .423 | .531 | .541 | .651 |
| Adjusted $R^2$ | .325 | .422 | .420 | .535 |
| F | 4.296** | 4.901*** | 4.474*** | 5.601*** |

*** $p < .001$, ** $p < .01$, * $p < .05$

Values are standardized regression coefficients

**Figure 4**: Moderation effect of industry experience



## 6. Discussion

Research on strategy and organization theory has suggested that flexibility in the strategic decision-making process is a key requirement for an organization's capability to adapt to environmental change (Sharfman & Dean Jr, 1997). Prior research has already indicated that cognitive, social, and contextual factors influence the degree of flexibility applied throughout strategic decision-making processes. Yet, so far little research attention had been attributed to the relationship between personal characteristics and the flexibility in these decision-making processes. In an effort to close this existing gap, this paper proposes that the decision-maker's level of PsyCap and industry experience might be particularly relevant in this context. For this purpose, professionals from the financial services were asked to participate in a strategy simulation.

The findings from this study provide strong support for the proposition that, beyond cognitive, social, and contextual factors, the individual level of PsyCap and industry experience can explain differences in strategic decision-making leading to multiple important theoretical and practical implications. Specifically, we find that up to a certain point, the individual level of PsyCap is positively related to flexibility in strategic decision-making. Beyond that turning point, however, the level of PsyCap is negatively related to decision-making flexibility; in other words, excessive levels of PsyCap or "hyper-PsyCap" might lead to rigidity in the decision process. It seems, that up to a certain level, PsyCap provides individuals with the mastery-oriented mindset and the motivation that is required to overcome restricted search and enable flexibility, while PsyCap beyond that level might lead decision-makers to hold intersubjective believes in place and fail to question core believes, which in turn might foster rigidity. Furthermore, we find that relationship to significantly differ between individuals depending on their degree of industry experience, i.e.,

executives with high levels of industry experience may experience a stronger relationship between PsyCap and its negative effect on flexibility in strategic decision-making whereas executives with low levels of industry experience may experience a stronger relationship between PsyCap and its positive effect on flexibility in strategic decision-making.

The main contribution of our paper is the introduction of PsyCap into research on the strategic decision-making process. By introducing PsyCap we offer a new and potentially more differentiated explanation for the impact of individual characteristics on strategic decision-making. While research thus far has been mainly focused on cognitive, social, and contextual drivers (Sharfman & Dean Jr, 1997), the results of this paper suggest that an individual's personal characteristics, such as PsyCap (Luthans & Youssef, 2004), might be a significant driver of flexibility in strategic decision-making. In addition, our study sheds further light on the effects industry experience has on the strategic decision-making process. While research has mainly focused on the direct effects, such as career success (Kirchmeyer, 1998) or motivation (Stamov-Roßnagel & Biemann, 2012), we show how an individual's degree of industry experience can influence the relationship between individual characteristics and the strategic decision-making process. More specifically, our study extends the existing research by outlining how industry experience influences the PsyCap-decision flexibility-relationship. Our results also open a new perspective in the research on PsyCap. We outline that "hyper-PsyCap" executives, who possess supreme levels of self-confidence, hope, optimism, and resilience, will manifest this trait in their strategic decision-making behavior. While past research on PsyCap in the organizational behavior field has been focused on linear relationships with work-related outcomes (Luthans & Youssef-Morgan, 2017), our results imply that there might be a specific level of PsyCap beyond which the effect turns from positive to negative or the other way around.

## 6.1 Implications for Corporate Practice

Beyond the contribution to research, the results of our study also allow to derive considerations for corporate practice. They show that the decision-maker's individual level of PsyCap can influence the level of flexibility applied in strategic decisions. Thus, we argue that executives might be able to anticipate the level of flexibility or rigidity they will be applying in sequential decisions based on their PsyCap score. This might be particularly relevant for "hyper-PsyCap" executives that might be more inclined to disregard new available information throughout the decision process. Instead of incorporating contradictory information in their analysis and adopting the decision accordingly, they might be less responsive, more likely to seek confirming information, and hold on to the initial decision. While this does not imply that "hyper-PsyCap" individuals will always make rigid strategic decisions, we argue that executives should be aware of their level of PsyCap when making strategic decisions and potentially revise their approach to dealing with new information.

Our results also provide insights for executives with regards to team compilation. While mid-PsyCap employees might tend to over-adopt strategic decisions based on new information, low- and high-PsyCap employees might tend to stick to their initial decision independent from the implications of the new information. Therefore, compiling PsyCap-diverse teams might prevent teams from misadjusting sequential strategic decisions based a new set of information.

## 6.2 Limitations and Suggestions for Future Research

Our study is constrained by limitations that point to opportunities for future research. First, we used a computerized strategy simulation (Narayanan & Packard, 2014) to gather the data for the analyses presented in this paper. While the simulation reflects the characteristics of strategic decision-making (Mintzberg, Raisinghani, & Theoret, 1976; Schwenk, 1984), we recommend for future research to further investigate the proposed relationships based on alternative research designs.

Second, the definition of decision flexibility applied constitutes another limitation. For our research we used an outcome-oriented definition of flexibility. More specifically, following the definition applied by Quinn (1980), we analyzed flexibility as the ability to adapt throughout a sequential strategic decision-making process based on new information. While this definition allows to assess actual flexibility from an outcome-perspective, it does not allow to further analyze the process preceding it. Thus, we recommend for future research to analyze the suggested relationships based on process-oriented definitions of flexibility including characteristics such as the use of categories and routine responses, checks of assumptions, the integration of new information, and the solution space considered. Even though these process characteristics are necessary but not necessarily sufficient for actual flexibility in decision-making from an outcome perspective, they might help to provide further evidence on the underlying factors leading to flexibility in strategic decision-making.

Third, additional research in the field could study differences in the effects of PsyCap on flexibility in strategic decision-making based on differences in the underlying four components, i.e., self-efficacy, hope, optimism, and resilience. Further investigation of these relationships may

provide additional insights into executives' strategic decision-making behavior by singling out the effects of single factors that we did not identify on an aggregate level. Especially with regards to the negative relationship for PsyCap beyond a certain level, single components, e.g., self-efficacy, might be more significantly related, thus, an analysis on that granular level could further improve our understanding of the determinants of managerial judgement.

In addition to these limitations, there are other opportunities for future research building on the findings outlined in this paper. For example, we recommend a more comprehensive analysis of how flexibility and other variables of the decision process, e.g., comprehensiveness, interact and jointly affect the outcome, i.e., the quality of strategic decisions. The integration of findings from previous research into a broader perspective on strategic decision-making could yield the potential for comprehensively explaining how and with which outcome individuals make strategic decisions.

Also, researchers suggest that strategic decision-making is significantly influenced by other factors beyond the personal characteristics of the individual decision-maker, such as emotions at the time of decision-making (Hodgkinson & Healey, 2011). Replicating this study under different emotional states of the decision-maker might provide new insights and identify potential further moderating influences.

Our results create the foundation for additional research on the effects of personal characteristics on decision flexibility. Improving the understanding of how individual executives make strategic decisions will not only contribute to research in the strategic decision-making field but also support research on organizations' adaptability to change as the procedures by which executives make strategic decisions have been found to have a marked effect on that.

## References


Abbas, M., & Raja, U. (2015). Impact of psychological capital on innovative performance and job stress. ***Canadian Journal of Administrative Sciences***, 32, 128–138.

Alexander, E. R. (1979). The design of alternatives in organizational contexts: A pilot study. ***Administrative Science Quarterly***, 24(3), 382.

Anderson, C. R., & Paine, F. T. (1975). Managerial perceptions and strategic behavior. ***Academy of Management Journal***, 18(4), 811–823.

Artinger, F., Petersen, M., Gigerenzer, G., & Weibler, J. (2015). Heuristics as adaptive decision strategies in management. ***Journal of Organizational Behavior***, 36(1), 33-52.

Avey, J. B., & Jensen, S. M. (2009). Psychological capital: A positive resource for combating employee stress and turnover. ***Human Resource Management***, 48(5), 677–693.

Avey, J. B., Luthans, F., & Youssef, C. M. (2010). The additive value of positive psychological capital in predicting work attitudes and behaviors. ***Journal of Management***, 36(2), 430–452.

Avey, J. B., Reichard, R. J., Luthans, F., & Mhatre, K. H. (2011). Meta-analysis of the impact of positive psychological capital on employee attitudes, behaviors, and performance. ***Human Resource Development Quarterly***, 22(2), 127–152.

Baluku, M. M., Kikooma, J. F., & Kibanja, G. M. (2016). Psychological capital and the startup capital - Entrepreneurial success relationship. ***Journal of Small Business and Entrepreneurship***, 28(1-3), 27–54.

Bandura, A. (1997). ***Self-efficacy: The exercise of control***. New York, USA: W.H. Freeman.

Becker, G. S. (1994). ***Human capital: A theoretical and empirical analysis, with special reference to education***. Chicago, USA: University of Chicago Press.

Bonn, I. (2005). Improving strategic thinking: A multilevel approach. ***Leadership & Organization Development Journal***, 26(5), 336–354.

Brockmann, E. N., & Simmonds, P. G. (1997). Strategic decision making: The influence of CEO experience and use of tacit knowledge. ***Journal of Managerial Issues***, 9(4), 454–467.

Cameron, K. S., & Spreitzer, G. M. (2012). ***The Oxford handbook of positive organizational scholarship***. New York, Oxford: Oxford University Press.

Chaiken, S. (1980). Heuristic versus systematic information processing and the use of source versus message cues in persuasion. ***Journal of Personality and Social Psychology***, 39(5), 752–766.

Chaiken, S., Liberman, A., & Eagly, A. H. (1989). Heuristic and systematic information processing within and beyond the persuasion context. In J. S. Uleman & J. a. Bargh (Eds.), ***Unintended thought***. New York: Guilford.

Chatterjee, A. & Hambrick, D. C. (2011). Executive personality, capability cues, and risk taking. ***Administrative Science Quarterly***, 56(2), 202–237.

Chesney, A. A., & Locke, E. A. (1991). Relationship among goal difficulty, business strategies, and performance on a complex management simulation task. ***Academy of Management Journal***, 34(2), 400–424.

Cohen, A. (1992). Antecedents of organizational commitment across occupational groups: A meta‐analysis. ***Journal of Organizational Behavior***, 13(6), 539-558.

Coleman, J. S. (1988). Social capital in the creation of human capital. ***The American Journal of Sociology***, 94, 95-120.

Dawson, J. F. (2014). Moderation in management research: What, why, when, and how. ***Journal of Business and Psychology***, 29(1), 1–19.

Dess, G. G., Ireland, R. D., & Hitt, M. A. (1990), Industry effects and strategic management research. ***Journal of Management***, 16(1), 7–27.

Donaldson, G., & Lorsch, J. W. (1983). ***Decision making at the top***. New York: Basic Books.

Dutton, J. E., & Dukerich, J. M. (1991). Keeping an eye on the mirror: Image and identity in organizational adaptation. ***Academy of Management Journal***, 34(3), 517–554.

Eisenhardt, K. M., & Zbaracki, M. J. (1992). Strategic decision making. ***Strategic Management Journal***, 13(S2), 17–37.

Fisher, R. J. (1993). Social desirability bias and the validity of indirect questioning. ***Journal of Consumer Research***, 20(2), 303–315.

Fombrun, C. J., & Ginsberg, A. (1990). Shifting gears: Enabling change in corporate aggressiveness. ***Strategic Management Journal***, 11(4), 297–308.

George, J. M. (1991). State or trait: Effects of positive mood on prosocial behaviors at work. The ***Journal of Applied Psychology***, 76(2), 299–307.

Goldberg, L. R. (1990). An alternative "description of personality": The big-five factor structure. ***Journal of Personality and Social Psychology***, 59(6), 1216–1229.

Gooty, J., Gavin, M., Johnson, P., Frazier, L., & Snow, D. (2009). In the eyes of the beholder: Transformational leadership, positive psychological capital and performance. ***Journal of Leadership & Organizational Studies***, 15(4), 353–357.

Greiner, L. E., & Bhambri, A. (1989). New CEO intervention and dynamics of deliberate strategic change. ***Strategic Management Journal***, 10(S1), 67–86.

Haans, R. F. J., Pieters, C., & He, Z.-L. (2016). Thinking about U: Theorizing and testing U- and inverted U-shaped relationships in strategy research. ***Strategic Management Journal***, 37(7), 1177–1195.

Hambrick, D. C. (2007). Upper echelons theory: An update. ***Academy of Management Journal***, 32(2), 334–343.

Hambrick, D. C., Geletkanycz, M. A., & Fredrickson, J. W. (1993). Top executive commitment to the status quo: Some tests of its determinants. ***Strategic Management Journal***, 14(6), 401–418.

Hambrick, D. C., & Mason, P. A. (1984). Upper echelons: The organization as a reflection of its top managers. ***Academy of Management Review***, 9(2), 193.

Hiller, N. J., & Hambrick, D. C. (2005). Conceptualizing executive hubris: The role of (hyper-) core self-evaluations in strategic decision-making. ***Strategic Management Journal***, 26, 297–319.

Hitt, M. A., & Tyler, B. B. (1991). Strategic decision models: Integrating different perspectives. ***Strategic Management Journal***, 12(5), 327–351.

Hodgkinson, G. P., & Healey, M. P. (2011). Psychological foundations of dynamic capabilities: Reflexion and reflection in strategic management. ***Strategic Management Journal,*** 32(13), 1500-1516.

Janis, I. L. (1972). ***Victims of groupthink***. Boston, USA: Houghton-Mifflin.

Jeong, S.-H. & Harrison, D. A. (2017). Glass breaking, strategy making, and value creating: Meta-analytic outcomes of women as CEOs and TMT members. ***Academy of Management Journal***, 60(4), 1219–1252.

Judge, T. A., Locke, E. A., & Durham, C. C. (1997). The dispositional causes of job satisfaction: A core evaluations approach. ***Research in Organizational Behavior***, 19, 151–188.

Kim, J., & Noh, Y. (2016). The effects of psychological capital and risk tolerance on service workers' internal motivation for firm performance and entrepreneurship. ***International Entrepreneurship and Management Journal***, 12(3), 681–696.

Kirchmeyer, C. (1998). Determinants of managerial career success: Evidence and explanation of male/female differences. ***Journal of Management***, 24(6), 673-692.

Lant, T. K., Milliken, F. J., & Batra, B. (1992). The role of managerial learning and interpretation in strategic persistence and reorientation: An empirical exploration. ***Strategic Management Journal***, 13(8), 585–608.

Larson, M., & Luthans, F. (2006). Potential added value of psychological capital in predicting work attitudes. ***Journal of Leadership & Organizational Studies***, 13(1), 45–62.

Liu, L., Chang, Y., Fu, J.: Wang, J., & Wang, L. (2012). The mediating role of psychological capital on the association between occupational stress and depressive symptoms among Chinese physicians: A cross-sectional study. ***BMC Public Health***, 12, 219–227.

Louis, M. R., & Sutton, R. I. (1991). Switching cognitive gears: From habits of mind to active thinking. ***Human Relations***, 44(1), 55–76.

Luthans, F., Avolio, B. J., Avey, J. B., & Norman, S. M. (2007). Positive psychological capital: Measurement and relationship with performance and satisfaction. ***Personnel Psychology***, 60, 541–572.

Luthans, F., Avolio, B. J., Walumbwa, F., & Li, W. (2005). The psychological capital of Chinese workers: Exploring the relationship with performance. ***Management and Organization Review***, 1(2), 249–271.

Luthans, F., & Church, A. H. (2002). Positive organizational behavior: Developing and managing psychological strengths. ***The Academy of Management Executive***, 16(1), 57–75.

Luthans, F., & Youssef, C. M. (2004). Human, social, and now positive psychological capital management: Investing in people for competitive advantage. ***Organizational Dynamics***, 33(2), 143–160.

Luthans, F., & Youssef, C. M. (2007). Emerging positive organizational behavior. ***Journal of Management***, 33(3), 321–349.

Luthans, F., Youssef, C. M., & Rawski, S. L. (2011). A tale of two paradigms: The impact of psychological capital and reinforcing feedback on problem solving and innovation. ***Journal of Organizational Behavior Management***, 31(4), 333–350.

Luthans, F., & Youssef-Morgan, C. M. (2017). Psychological capital: An evidence-based positive approach. ***Annual Review of Organizational Psychology and Organizational Behavior***, 4(1), 339–366.

Luthans, K. W., & Jensen, S. M. (2005). The linkage between psychological capital and commitment to organizational mission. ***The Journal of Nursing Administration***, 35(6), 304–310.

Masten, A. S. (2001). Ordinary magic: Resilience processes in development. ***The American Psychologist***, 56(3), 227–238.

Miller, D. (1991). Stale in the saddle: CEO tenure and the match between organization and environment. ***Management Science***, 37(1), 34–52.

Mintzberg, H., & McHugh, A. (1985). Strategy formation in an adhocracy. ***Administrative Science Quarterly***, 30(2), 160.

Mintzberg, H., Raisinghani, D., & Theoret, A. (1976). The structure of "unstructured" decision processes. ***Administrative Science Quarterly***, 21, 246.

Narayanan, V. G., & Packard, M. (2014). Strategy Simulation: The balanced scorecard. ***Harvard Business School Teaching Note***, 006.

Nederhof, A. J. (1985). Methods of coping with social desirability bias: A review. ***European Journal of Social Psychology***, 15(3), 263–280.

Nees, D. B. (1983). Simulation: A complementary method for research on strategic decision-making processes. ***Strategic Management Journal***, 4(2), 175–185.

Nolzen, N. (2018). The concept of psychological capital: A comprehensive review. ***Management Review Quarterly***, 32(7), 128.

Normann, R. (1985). Developing capabilities for organizational learning. In J. M. Pennings (Ed.), ***Organizational strategy and change*** (pp. 217–248). San Francisco: Jossey-Bass.

Nutt, P. C. (1993). The formulation processes and tactics used in organizational decision making. ***Organization Science***, 4(2), 226–251.

Papenhausen, C. (2010). Managerial optimism and search. ***Journal of Business Research***, 63(7), 716–720.

Parker, S. K. (1998). Enhancing role breadth self-efficacy: the roles of job enrichment and other organizational interventions. ***The Journal of Applied Psychology***, 83(6), 835–852.

Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. ***The Journal of Applied Psychology***, 88(5), 879–903.

Quinn, J. B. (1980). ***Strategies for change: Logical incrementalism***. Homewook, IL: Irwin.

Rosman, A., Lubatkin, M., & O'Neill, H. (1994). Rigidity in decision behaviors: A within-subject test of information acquisition using strategic and financial informational cues. ***Academy of Management Journal***, 37(4), 1017–1033.

Scheier, M. F., & Carver, C. S. (1985). Optimism, coping, and health: Assessment and implications of generalized outcome expectancies. ***Health Psychology***, 4(3), 219–247.

Schein, E. H. (1985). ***Organizational culture and leadership***. Englewood Cliffs, NJ: Prentice-Hall.

Schwenk, C. R. (1984). Cognitive simplification processes in strategic decision-making. ***Strategic Management Journal***, 5(2), 111–128.

Schwenk, C. (1988). ***The essence of strategic decision making***. Lexington, MA: Lexington Books.

Schwenk, C. (1995). Strategic decision making. ***Journal of Management***, 21(3), 471–493.

Scott, W. R. (1987). The adolescence of institutional theory. ***Administrative Science Quarterly***, 32(4), 493.

Seligman, M. E. P. (1998). ***Learned optimism***. New York, USA: Pocket Books.

Sharfman, M. P., & Dean Jr, J. W. (1997). Flexibility in Strategic Decision Making: Informational and Ideological Perspectives. ***Journal of Management Studies***, 34(2), 191–217.

Shrout, P. E., & Bolger, N. (2002). Mediation in experimental and nonexperimental studies: New procedures and recommendations. ***Psychological Methods***, 7(4), 422–445.

Simsek, Z. (2007). CEO tenure and organizational performance: An intervening model. ***Strategic Management Journal***, 28(6), 653–662.

Sitzmann, T. (2011). A meta-analytic examination of the instructional effectiveness of computer-based simulation games. ***Personnel Psychology***, 64(2), 489–528.

Smerecnik, C. M. R., Mesters, I., Candel, M. J. J. M., Vries, H. de, & Vries, N. K. de (2012). Risk perception and information processing: The development and validation of a questionnaire to assess self-reported information processing. ***Risk Analysis***, 32(1), 54–66.

Snyder, C. R., Irving, L. M., & Anderson, J. R. (1991). Hope and health. In C. R. Snyder & D. R. Forsyth (Eds.), ***Handbook of social and clinical psychology*** (pp. 285–305). Elmsford, USA: Pergamon.

Snyder, C. R., Sympson, S. C., Ybasco, F. C., Borders, T. F., Babyak, M. A., & Higgins, R. L. (1996). Development and validation of the State Hope Scale. ***Journal of Personality and Social Psychology***, 70(2), 321–335.

Stajkovic, A. D., & Luthans, F. (1998). Self-efficacy and work-related performance: A meta-analysis. ***Psychological Bulletin***, 124(2), 240–261.

Stamov-Roßnagel, C., & Biemann, T. (2012). Ageing and work motivation: a task-level perspective. ***Journal of Managerial Psychology***. 27(5), 459–478.

Staw, B. M. (1981). The escalation of commitment to a course of action. ***Academy of Management Review***, 6(4), 577.

Staw, B. M., & Barsade, S. G. (1993). Affect and managerial performance: A test of the sadder-but-wiser vs. happier-and-smarter hypotheses. ***Administrative Science Quarterly***, 38(2), 304.

Stone, D. N. (1994). Overconfidence in initial self-efficacy judgments: Effects on decision processes and performance. ***Organizational Behavior and Human Decision Processes***, 59(3), 452–474.

Sweetman, D., Luthans, F., Avey, J. B., & Luthans, B. (2011). Relationship between positive psychological capital and creative performance. ***Canadian Journal of Administrative Sciences***, 28(1), 4–13.

Touré-Tillery, M., & Fishbach, A. (2014). How to measure motivation: A guide for the experimental social psychologist. ***Social and Personality Psychology Compass***, 8(7), 328–341.

Uotila, J., Maula, M., Keil, T., & Zahra, S. A. (2009). Exploration, exploitation, and financial performance: analysis of S&P 500 corporations. ***Strategic Management Journal***, 30(2), 221-231.

Wagnild, G. M., & Young, H. M. (1993). Development and psychometric evaluation of the resilience scale. ***Journal of Nursing Measurement***, 1(2), 165–178.

Wang, Y., Liu, L., Wang, J., & Wang, L. (2012). Work–family conflict and burnout among Chinese doctors: The mediating role of psychological capital. ***Journal of Occupational Health***, 54(3), 232–240.

Warr, P. (2001). Age and work behaviour: physical attributes, cognitive abilities, knowledge, personality traits, and motives. In C. L. Cooper & I. T. Robertson (Eds.), ***International Review of Industrial and Organizational Psychology*** (pp. 1–36). London: Wiley.

Wilson, D. C., Butler, R. J., Cray, D., Hickson, D. J., & Mallory, G. R. (1986). Breaking the Bounds of Organization in Strategic Decision Making. ***Human Relations***, 39(4), 309–331.

Wowak, A. J., & Hambrick, D. C. (2010). A model of person-pay interaction: How executives vary in their responses to compensation arrangements. ***Strategic Management Journal***, 31(8), 803-821.

# V. PSYCHOLOGICAL CAPITAL IN STRATEGIC DECISION-MAKING: ASSESSING THE RISK FOR BIASED DECISIONS

## Article D

Niklas Nolzen | Philip Meissner | Torsten Wulf

**Abstract**

Strategic decisions are prone to biases that systematically limit the quality of the decisions obtained in the strategy process. While researchers have developed active intervention techniques to reduce biases, i.e., de-biasing tools, there is a lack of pragmatic approaches for practitioners to make a cost-benefit-assessment for the use of de-biasing tools, in other words, to decide when the use of de-biasing tools is (most) useful. In this paper, we provide a simple and pragmatic approach to allow a decision-maker to assess one's individual probability of biased decision-making in a specific decision situation. Based on our research on PsyCap and strategic decision-making, we have developed a checklist of situational and personal factors, so that decision-makers are made aware of their individual risk of biased decision-making and can decide on the use of de-biasing tools more deliberately. Accordingly, executives will be able to apply de-biasing tools when most impactful for the value of the company. We have validated the tool using a sample of 14 respondents.

**Keywords**

Strategic decision-making, SDM, bias, de-biasing, psychological capital, PsyCap

## 1. The Use of De-biasing Tools in Strategic Decision-Making

When making strategic decisions under uncertainty, executives rely on judgmental rules, or heuristics, to reduce the complexity of the decision situation (Schwenk 1984; Tversky & Kahneman, 1974). While these heuristics are often useful and necessary, they also lead to cognitive biases systematically limiting the quality of the decisions obtained in the strategy process (Das & Teng, 1999; Hodgkinson, Bown, Maule, Glaister, & Pearman, 1999; Kahneman & Tversky, 1979; Milkman, Chugh, & Bazerman, 2009). These biases in strategic decision-making lead to significant economic loss. One study has estimated the actual hard costs of biases in strategic decision up to USD 550 bn per year for US companies only (Caprino, 2017).

Researchers have increasingly started to investigate how executives can avoid or overcome these severe and systematic errors in decision-making (Milkman et al., 2009). This line of research, which is of great interest for practitioners, has focused on active intervention techniques. They have developed methods and tools for overcoming and reducing the negative effects of cognitive biases, i.e., de-biasing techniques (Arkes, 1991) including cognitive mapping (Hodgkinson, Maule, & Bown, 2016) and scenario planning (Schoemaker, 1993). The positive value of these de-biasing tools has also been shown in practice. In one article published by McKinsey Quarterly, the authors estimate that companies with a less bias-prone decision-making process generate a ROI that is 6.9 percentage points higher than for the others (Lovallo & Sibony, 2010). Yet, while behavioral economics has become mainstream in some areas, such as asset management, very few executives or corporate strategists consider the cognitive biases or apply de-biasing tools when making strategic decisions.

One reason for that is the lack of pragmatic approaches for practitioners that allow them to decide when the use of these debiasing tools is (most) useful. More specifically, to support the use of de-biasing tools in practice, executives need to be provided a toolkit that allows them to make a cost-benefit-assessment for the use of de-biasing tools. Therefore, we provide a simple and pragmatic approach to allow a decision-maker to assess one's individual probability of biased decision-making in a specific decision situation. Based on our research on PsyCap and strategic decision-making, we have developed a checklist of situational and personal factors, so that decision-makers are made aware of their individual risk of biased decision-making and can decide on the use of de-biasing tools more deliberately. Accordingly, executives will be able to apply de-biasing tools when most impactful for the value of the company.

## 2. The Theoretical Background on Biases in Strategic Decisions

Executives' judgement in an organizational context is affected by numerous cognitive biases (Das & Teng, 1999). Cognitive biases are systematic tendencies to deviate from rationality in human thinking (Kahneman, 2003), which result from the use of heuristics that reduce the quality and comprehensiveness of judgement and choice in the decision-making process (Bazerman & Moore, 2008; Kahneman & Tversky, 1979). One example of a bias in decision-making is the illusion of control bias, in other words, the decision-maker's tendency to systematically overestimate the own influence on the outcome and consequences of the respective decision (Langer, 1975). Judgment in decision-making is particularly likely to be influenced by biases in situations characterized by high degrees of uncertainty, such as strategic decision-making (Kahneman & Klein, 2009). Furthermore, biased judgement has been shown to reduce the quality

of these strategic decisions, which in turn negatively affects the company's performance (Hodgkinson et al., 1999; Milkman et al., 2009).

Researchers from the de-biasing field have invested great effort to investigate how executives can avoid or overcome these severe and systematic errors in decision-making (Milkman et al., 2009). They have developed methods and tools which can be applied by executives to reduce the negative effects of biases in strategic decisions. These de-biasing methods and tools are active intervention techniques that aim at influencing executives' cognitive processes. i.e., the ways in which they perceive and interpret information in the decision-making process (Arkes, 1991). They can be differentiated in purely cognitive or process-based approaches (Larrick, 2004). Cognitive strategies for de-biasing decision-making include the use of multiple reference points for the examination of strategic decisions (Wright & Goodwin, 2002), the consideration of previously excluded hypotheses (Larrick, 2004), the explicit formulation of potential alternatives (Lovallo & Sibony, 2010), as well as the evaluation of the opposite of the default position (Mussweiler, Strack, & Pfeiffer, 2000). Compared to these cognitive techniques for de-biasing strategic decisions, process-based approaches are more holistic and reduce biases though their specific design attributes. For example, cognitive mapping (Hodgkinson et al., 1999) and scenario planning (Schoemaker, 1993) have been shown to alter the structure and content of the cognitive processes driving an executive's strategic decision-making in such way that they reduce biases (Bradfield, 2008; Huff, 1990).

Yet, while both, cognitive and process-based de-biasing techniques have been found to have significant positive effects on the quality of the strategic decision (Phadnis, Caplice, Sheffi, & Singh, 2015) and consequently the companies' economic success (Lovallo & Sibony, 2010), very

few executives or corporate strategists consider the cognitive biases or apply de-biasing tools when making strategic decisions.

One reason for that is the lack of pragmatic approaches for practitioners that allow them to decide when the use of these debiasing tools is (most) useful. More specifically, to support the use of de-biasing tools in practice, executives need to be provided a toolkit that allows them to make a cost-benefit-assessment for the use of de-biasing tools. In order to do so, one needs to understand the factors leading to biases in strategic decision-making as a foundation for the assessment of the individual risk of exposure to biases. Researchers have identified that both, individual characteristics of the decision-maker as well as situational factors of the decision-making situation at hand, influence whether one applies a systematic or heuristic information processing approach, and thus, the risk of biased decision-making. One personal characteristic of the decision-maker that has been shown to be significantly related to the information processing style is psychological capital, hereafter PsyCap. PsyCap describes an individual's psychological capacity that can be measured, developed, and managed for performance improvement (Cameron & Spreitzer, 2012; Luthans, 2002; Luthans & Church, 2002; Luthans & Youssef, 2004) and comprises the psychological resources self-efficacy, hope, optimism, and resilience (Luthans & Youssef, 2004). PsyCap leads to a more systematic information processing approach due to stronger perceptions of empowerment, engagement, and intrinsic motivation while leading to a less heuristic information processing approach in strategic decisions due to lower levels of perceived stress. Furthermore, behavioral decision theory suggests that heuristic information processing is particularly likely to result in biases in situations of high uncertainty, low validity, and limited frequency, such as strategic decision-making (Das & Teng, 1999; Kahneman & Klein, 2009). Also, decision-makers are likely to face a lack of availability of appropriate heuristics, which in turn reduces the potential

positive effects of heuristics (Chen & Chaiken, 1999), as strategic decisions are taken infrequently (Eisenhardt & Zbaracki, 1992).

## 3. Assessment of Risk of Exposure to Biases in Strategic Decision-Making

Based on these past findings in the research on biases and de-biasing tools in the strategic decision-making context, we provide a simple and pragmatic 2-factor approach to allow a decision-maker to assess one's individual probability of biased decision-making in a specific situation. As behavioral decision theory suggests, the above-mentioned factors rather unconsciously influence the strategic decision-making process and are thus rarely incorporated in the decision on the use of de-biasing tools. Therefore, we have developed a checklist of situational and personal factors so that decision-makers are made aware of their individual risk of biased decision-making and can decide on the use of de-biasing tools more deliberately. By creating awareness on the decision-maker's level of PsyCap at the time of the decision and the degree of uncertainty, validity, and frequency of the decision situation, executives will be able to approximate their individual risk of a biased decision-making process and can derive the value-add of using de-biasing tools accordingly. We have outlined a few guiding questions along those two dimensions in Table 8.

**Table 8:** Risk Taking Checklist

| | Checklist Items | Yes | No | Score |
|---|---|---|---|---|
| **Personal factors (PsyCap)** | I feel confident contributing to discussions about my current employer's strategy | | | 1 |
| | I do not feel confident contributing to discussions about my current employer's strategy | | | -1 |
| | Right now I see myself as being pretty successful in my job | | | 1 |
| | Right now I do not see myself as being pretty successful in my job | | | -1 |
| | I usually take stressful things at work in stride | | | 1 |
| | I usually no not take stressful things at work in stride | | | -1 |
| | I am optimistic about my professional future | | | 1 |
| | I am pessimistic about my professional future | | | -1 |
| **Situational factors (Uncertainty, validity, frequency)** | Considering the given decision situation, the consequences of each alternative option are certain at the time of the decision | | | -1 |
| | Considering the given decision situation, the consequences of each alternative option are uncertain at the time of the decision | | | +1 |
| | Considering the given decision situation, the available fact base is valid at the time of the decision | | | -1 |
| | Considering the given decision situation, the available fact base is invalid at the time of the decision | | | +1 |
| | Considering the given situation for the decision at hand, I have made similar decisions in the past | | | -1 |
| | Considering the given situation for the decision at hand, I have not made similar decisions in the past | | | +1 |
| | From similar decisions in the past, I can leverage my experience for the given decision situation at the time of the decision | | | -1 |
| | From similar decisions in the past, I can not leverage my experience for the given decision situation at the time of the decision | | | +1 |

### 3.1. The Dimensions of the 'Bias-Probability-Checklist'

The first set of questions aims at the effect of the individual characteristics of the decision-maker at the time of the decision on the probability of engaging in a bias-prone decision-making process. Based on these first eight questions outlined in Table 8, executives can approximate their level of PsyCap, which gives an indication on the information processing approach they are most likely to engage in. These guiding questions are derived from the self-rater short form of the PsyCap questionnaire developed by Luthans and colleagues (Luthans, Avolio, Avey, & Norman, 2007), which we further shortened and transformed into a nominal (yes/no) scale to make it more applicable for the practical use. Also, we slightly adopted the wording of the questions to make it more generally viable and pragmatic.

Research on judgement and decision-making has found that PsyCap is a significant indicator of the information processing approach applied in the strategic decision-making process. Specifically, high-PsyCap individuals were found to show high decision autonomy and perceptions of high responsibility, which is related to a rather systematic than heuristic information processing approach (Avey, Hughes, Norman, & Luthans, 2008; Chaiken, Liberman, & Eagly, 1989; Siu, Bakker, & Jiang, 2014; Tomasi, Parolia, Han, & Porterfield, 2015). Furthermore, these individuals not only show significantly lower levels of stress than their colleagues (Abbas & Raja, 2015; Siu, Cheung, & Lui, 2015) but also experience fewer symptoms of stress (Avey & Jensen, 2009) and better control the effects of stress on their behavior (Roberts, Scherer, & Bowyer, 2011). Since Yu showed that for individuals making decisions under stress, fast end effortless heuristics dominate over more effortful, systematic information processing (Yu, 2016), this further supports our

decision to use the decision-maker's level of PsyCap as an indicator for the information processing approach that will be applied.

While the first set of questions provides an indication on the information processing approach the decision-maker is most likely to engage in, the second set of questions is included to deliver an approximation for the relationship between the processing style and biases. Based on questions 9-16 outlined in Table 8, executives can assess the degree of uncertainty, validity, and frequency of the decision situation. These guiding questions are derived from previously used and validated questionnaires and were slightly adopted in wording and transformed into a nominal (yes/no) scale to make it applicable for the use by practitioners. For uncertainty, we referred to the questionnaire applied by Dean and Sharfman (1993), Auster and Choo (1994) were used for validity, and for frequency, we leveraged the items developed by Papadakis and colleagues (Papadakis, Lioukas, & Chambers, 1998).

These guiding questions were developed to provide executives a quick check to assess how familiar they are with the decision to be made and how certain they feel about the outcome of the alternative choices. Research has shown that especially in situations of high uncertainty and low validity, such as strategic decision-making, heuristics are likely to lead to biases (Das & Teng, 1999; Kahneman & Klein, 2009), which limit rational choice and informed judgement (Bazerman & Moore, 2008; Kahneman & Lovallo, 1993; Kahneman & Tversky, 1979). Furthermore, in strategic decisions, heuristics are likely to bias judgement since strategic decisions are taken infrequently (Eisenhardt & Zbaracki, 1992), which leads to a lack of appropriate, helpful heuristics (Chen & Chaiken, 1999). Accordingly, the degree of uncertainty, validity, and frequency of the

decision situation is used as an indicator for the probability of the specific information processing approach to lead to biases in the decision-making.

### 3.2. How to Use the Checklist

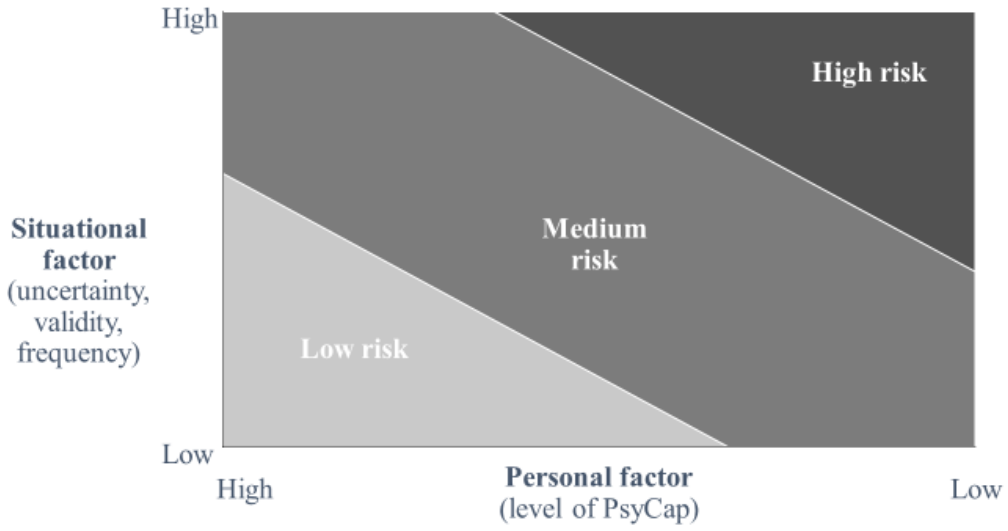
The 'bias-probability-checklist' is intended to be applied by executives before deciding about the use of de-biasing tools for a strategic decision they must make. It allows the user to create awareness about the individual probability to be exposed to biases in the specific decision context, which in turn will allow a judgement about the potential value-add of the use of de-biasing tools.

The executive or decision-maker is expected to answer the guiding questions outlined in the checklist him- or herself. While it might initially seem counter-intuitive that one is best-suited to assess the own probability of exposure to biases in the decision-making process, it is critical for an insightful implementation of the checklist. On the first dimension, the personal characteristics of the decision-maker, PsyCap is pre-dominantly measured using the self-rated PsyCap questionnaire in previous research (Nolzen, 2018). Thus, rather the decision-maker's psychological self-perceptions than an objective assessment of the psychological capabilities by a third party are relevant to derive an indication for the information processing approach that will be applied in the decision-making process. Furthermore, the situational factors of the decision at hand that are evaluated in the checklist are rather to be subjectively assessed by the individual decision-maker than objectively. While degree of uncertainty and validity depend on the information available as well as the capabilities to process them and derive implications, for the decision-maker at the specific point in time, the frequency of the decision is even more specific to the individual as it captures one's experience with the concrete decision at hand. Accordingly, the checklist should be applied by the decision-maker rather than a third party.

The bias-probability-checklist is intended to be applied in a 3-step-process. In the first step, the decision-maker assesses one's level of PsyCap and the degree of uncertainty, validity, and frequency of the decision situation by answering the guiding questions of the bias-probability-checklist. The questions are designed in such way that they can be answered efficiently with a yes or no. Also, they should be answered within a relatively short timeframe before the actual decision takes place to ensure that the assessment is still valid at the time of the decision. This is particularly important as PsyCap has been shown to be relatively malleable over time and the situational factors are changeable by definition. Next, the answers are scored for each dimension which results in a value between 0 and 8, whereas 0 stands for a low level of PsyCap or uncertainty, validity, and frequency respectively. In the third step, these two scores, one for the personal characteristics and one for the situational factors, are mapped on the bias-probability-matrix outlined in Figure 5. The first score, the level of PsyCap is displayed on the horizontal axis, while the second score, the degree of uncertainty, validity, and frequency, is displayed on the vertical axis. Accordingly, the results of the guiding questions in the checklist will fall within one of the three distinct clusters highlighted in Figure 5 – either low, medium, or high probability to be exposed to biases in the decision-making process for the specific situation. This translates into high, medium, or low potential value-add of the use of de-biasing tools. However, while these three different potential outcomes provide a first indication for the decision on the use of de-biasing tools, depending on the decision at hand it might be required to incorporate further considerations in the decision.

The questions, on both dimensions, are formulated in more general terms to allow the user to apply the checklist in a variety of different situations. Furthermore, the wording of the guiding questions outlined in Table 8 can be adapted to the context specifics of the decision at hand.

**Figure 5:** Bias-Probability-Matrix




### 3.3. Results from the Use of the Checklist

By applying the bias-probability-checklist following the 3-step-approch outlined in the previous chapter, the user is provided with a score that falls within one of the three distinct clusters outlined in Figure 5 from the bottom left to the top right corner of the matrix – either low, medium, or high probability to be exposed to biases in the decision-making process for the specific situation. These clusters translate into high, medium, or low potential value-add of the use of de-biasing tools.

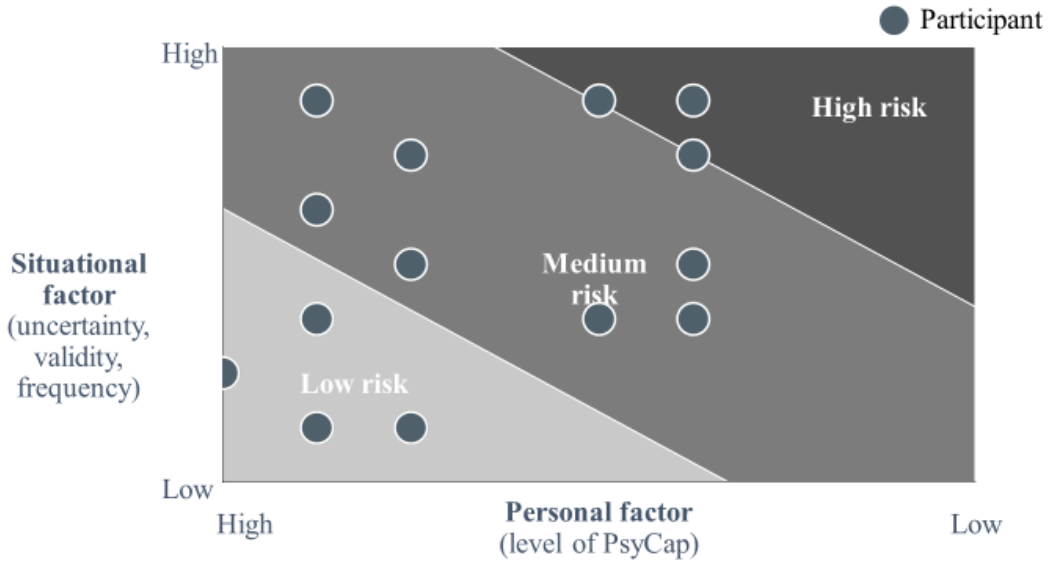
In the bottom left corner, the scoring indicates a high level of PsyCap, which translates into a rather systematic than heuristic information processing, as well as a low degree of uncertainty, validity, and low frequency of the decision at hand, which translates into a low probability of heuristic information processing to lead to biases. Hence, the decision-maker is not very likely to

be exposed to biases in the specific decision-making process and should very carefully consider whether the cost for applying de-biasing tools, e.g., the time invest required, is worth the potential limited additional value it can bring to the decision outcome. On the contrary, a score in the top right cluster suggests a relatively high probability to make a biased decision. Both, the relatively low level of PsyCap as well as the relatively high degree of uncertainty, validity, and low frequency of the decision situation, support biases in the decision-making process. The low levels of PsyCap leading to a rather heuristic information processing approach that is very likely to lead to biases because of the characteristic of the decision situation. Accordingly, the decision-maker should be aware that there is a rather high probability for a biased decision-making process and outcome. Thus, it might be worthwhile for the decision-maker to at least carefully consider the use of de-biasing tools to avoid systematic deviations from rationality in the decision-making process. In case the score falls within the cluster in-between, both dimension of the bias-probability-checklist are less pronounced. This middle cluster indicates a medium probability to make a biased decision, thus, the indication for the use of de-biasing tools is rather to adhere to the usual decision-mechanism for the use of de-biasing tools than a recommendation to use or restrain from the use of de-biasing tools.

To confirm the validity of the risk-probability-checklist, we invited 14 employees of a leading international strategy consultancy to our premises and asked them to apply the checklist for a strategic decision they had recently taken or were about to take in the near future. All invited consultants fielded the guiding questions and the scores were analyzed subsequently. Out of this group, 4 respondents were provided a score that falls within the low-risk cluster at the bottom left, which equals 29%, another 7 respondents scored within the medium-risk cluster, accounting for

50%, and 3 respondents received a score that falls within the high-risk cluster at the top right, which equals the remaining 21%.

**Figure 6:** Bias-Probability-Matrix – Results




These results, presented in Figure 6, suggest that the assessment of individual characteristics of the decision-maker, i.e., PsyCap, and the situational factors of the decision at hand, i.e., uncertainty, validity, and frequency, provide an indication for a potential (re-)consideration of the use of de-biasing tools for the respective decision for 50% of the respondents. The 29% of respondents that fall within the low-risk cluster might be more inclined to carefully consider whether the benefits of the use of de-biasing tools outweigh the costs for the respective situation after having applied the bias-probability-checklist. On the contrary, the 21% of respondents that fall within the high-risk cluster receive an indication that it might be worthwhile to at least double-check if de-biasing tools could be incorporated in the decision-making. Overall, the results show

that the bias-probability-checklist can be a valuable support tool in the decision on the use of de-biasing tools for a significant share of strategic decision-makers.

### 3.4. Further Development Potentials

The bias-probability-checklist is a first step towards providing executives the possibility to efficiently perform cost-benefit-assessments for the use of de-biasing tools. Nevertheless, there are opportunities to further develop the checklist and increase its value-add for practitioners. We have outlined three of these development areas in the following.

First, our assessment of the risk of being exposed to biases in the decision-making process solely relies on two dimensions, the characteristics of the decision-maker captured through PsyCap and the context of the decision situation measured through the degree of uncertainty, validity, and frequency. These two criteria were chosen for the guiding questions as they have been shown to be significantly related to biases in the past and depend on the specific decision-maker and the situation at hand. However, even though those two criteria are well-suited for the intended assessment, there are further criteria that have been shown to be reliable predictors of biases in strategic decision making. Thus, the checklist could be enhanced by including additional criteria, e.g., the available resources, such as time (Zakay & Wooler, 1984). Still, while increasing the predictability of the checklist by adding further significant criteria, it needs to be ensured that the application of it remains actionable and efficient.

Secondly, there is optimization potential with regards to the delivery mechanism of the checklist, which will also help to address the above-mentioned side-constrained of an efficient applicability. We delivered the checklist in a survey-based format when we assessed its validity with consultants. While this approach allows for an efficient practical implementation of the

checklist, it subsequently requires a manual calculation of the scores and transfer into the risk-probability-matrix. Thus, we recommend digitizing the guiding questions and automate the calculation and analysis of the scores to make it more efficiently applicable for day-to-day-use by executives.

The third opportunity for further development that we want to highlight refers to the incorporation of the checklist and its results into the broader decision processes within an organization. In our current approach we focus on the translation of the individual scores into three clusters that indicate whether the risk of making a biased decision is low, medium, or high. This allows an easy interpretation into high, medium, and low potential value-add of the use of de-biasing tools and provides a clear recommendation for the decision-making process. Nevertheless, an integration of the outcome of the risk-probability-checklist into the broader organizational decision processes could be supported by a translation of the scores into a quantitative economic up- or downside potential. Hence, it would be possible to quantify whether an investment in the use of de-biasing tools for a specific situation would add or subtract economic value in the decision-making process for a specific strategic decision.

## 4. Concluding Remarks

The global economic macro-environment is increasingly characterized by change and disruption. Accordingly, the ecosystems companies operate in become more and more complex and require companies to efficiently adapt to remain competitive. Strategic decision-making is considered the core of an organization's adaption process as the procedures by which executives make strategic decisions have been found to have a marked effect on the degree to which the entire organization will be capable to adapt to change (Nutt, 1993). Thus, executives face the challenge

to have to make strategic decisions more frequently and at the same time cope with the fact that economic consequences of those decisions become more drastic in an environment characterized by increasingly fast change.

Hence, executives are well-advised to optimize the decision-making process for those strategic decisions. Considering that executives rely on judgmental rules, or heuristics, to reduce the complexity of the decision situation (Schwenk, 1984; Tversky & Kahneman, 1974), which also leads to cognitive biases systematically limiting the quality of the decisions obtained in the strategy process (Das & Teng, 1999; Hodgkinson et al., 1999; Kahneman & Tversky, 1979; Milkman et al., 2009), they ought to make use of support tools such as the above-introduced risk-probability-checklist to decide on the use of de-biasing tools more deliberately. By applying the checklist, executives can assess their probability of biased decision-making based on their personal characteristics and the situational factors of the decision at hand. While this approach does not guarantee to make the right decision about the use of de-biasing tools, it will certainly add another valuable input that should be weighted into the decision.

## References


Abbas, M., & Raja, U. (2015). Impact of psychological capital on innovative performance and job stress. ***Canadian Journal of Administrative Sciences***, 32, 128–138.

Arkes, H. R. (1991). Costs and benefits of judgment errors: Implications for debiasing. ***Psychological Bulletin***, 110(3), 486–498.

Auster, E., & Choo, C. W. (1994). CEOs, Information, and Decision Making: Scanning the Environment for Strategic Advantage. ***Library Trends***, 43(2), 206–225.

Avey, J. B., Hughes, L. W., Norman, S. M., & Luthans, K. W. (2008). Using positivity, transformational leadership and empowerment to combat employee negativity. ***Leadership & Organization Development Journal***, 29(2), 110–126.

Avey, J. B., & Jensen, S. M. (2009). Psychological capital: A positive resource for combating employee stress and turnover. ***Human Resource Management***, 48(5), 677–693.

Bazerman, M. H., & Moore, D. A. (2008). Judgment in managerial decision making (7th ed.). Hoboken, N.J.: John Wiley & Sons.

Bradfield, R. M. (2008). Cognitive barriers in the scenario development process. ***Advances in Developing Human Resources***, 10(2), 198–215.

Cameron, K. S., & Spreitzer, G. M. (2012). ***The Oxford handbook of positive organizational scholarship***. New York, Oxford: Oxford University Press.

Caprino, C. (2017). New data reveals the hard costs of bias and how to disrupt it. Retrieved from ***https://www.forbes.com/sites/kathycaprino/2017/10/26/new-data-reveals-the-hard-costs-of-bias-and-how-to-disrupt-it/#5ce5997c4595***

Chaiken, S., Liberman, A., & Eagly, A. H. (1989). Heuristic and systematic information processing within and beyond the persuasion context. In J. S. Uleman & J. a. Bargh (Eds.), ***Unintended thought***. New York: Guilford.

Chen, S., & Chaiken, S. (1999). The heuristic-systematic model in its broader context. In S. Chaiken & Y. Trope (Eds.), ***Dual-process theories in social psychology*** (pp. 73–96). New York, USA: Guilford Press.

Das, T. K., & Teng, B.-S. (1999). Cognitive Biases and Strategic Decision Processes: An Integrative Perspective. ***Journal of Management Studies***, 36(6), 757–778.

Dean, J. W., & Sharfman, M. P. (1993). Procedural rationality in the strategic decision-making process. ***Journal of Management Studies***, 30(4), 587–610.

Eisenhardt, K. M., & Zbaracki, M. J. (1992). Strategic decision making. ***Strategic Management Journal***, 13(S2), 17–37.

Hodgkinson, G. P., Bown, N. J., Maule, A. J., Glaister, K. W., & Pearman, A. D. (1999). Breaking the frame: An analysis of strategic cognition and decision making under uncertainty. ***Strategic Management Journal***, 20(10), 977–985.

Hodgkinson, G. P., Maule, A. J., & Bown, N. J. (2016). Causal cognitive mapping in the organizational strategy field: A comparison of alternative elicitation procedures. ***Organizational Research Methods***, 7(1), 3–26.

Huff, A. S. (1990). ***Mapping strategic thought***. Chichester.

Kahneman, D. (2003). A perspective on judgment and choice: Mapping bounded rationality. ***The American Psychologist***, 58(9), 697–720.

Kahneman, D., & Klein, G. (2009). Conditions for intuitive expertise: A failure to disagree. ***The American Psychologist***, 64(6), 515–526.

Kahneman, D., & Lovallo, D. (1993). Timid choices and bold forecasts: A cognitive perspective on risk taking. ***Management Science***, 39(1), 17–31.

Kahneman, D., & Tversky, A. (1979). Prospect theory: an analysis of decision under risk. ***Econometrica: Journal of the Econometric Society***, 47(2), 263–291.

Langer, E. J. (1975). The illusion of control. ***Journal of Personality and Social Psychology***, 32(2), 311–328.

Larrick, R. P. (2004). Debiasing. In D. J. Koehler & N. Harvey (Eds***.), Blackwell handbook of judgment and decision making***. Oxford.

Lovallo, D., & Sibony, O. (2010). The case for behavioral strategy. Retrieved from ***https://www.mckinsey.com/business-functions/strategy-and-corporate-finance/our-insights/the-case-for-behavioral-strategy?cid=eml-app***

Luthans, F. (2002). The need for and meaning of positive organizational behavior. ***Journal of Organizational Behavior***, 23(6), 695–706.

Luthans, F., Avolio, B. J., Avey, J. B., & Norman, S. M. (2007). Positive psychological capital: Measurement and relationship with performance and satisfaction. ***Personnel Psychology***, 60, 541–572.

Luthans, F., & Church, A. H. (2002). Positive organizational behavior: Developing and managing psychological strengths. ***The Academy of Management Executive***, 16(1), 57–75.

Luthans, F., & Youssef, C. M. (2004). Human, social, and now positive psychological capital management: Investing in people for competitive advantage. ***Organizational Dynamics***, 33(2), 143–160.

Milkman, K. L., Chugh, D., & Bazerman, M. H. (2009). How can decision making be improved? ***Perspectives on Psychological Science***, 4(4), 379–383.

Mussweiler, T., Strack, F., & Pfeiffer, T. (2000). Overcoming the inevitable anchoring effect: Considering the opposite compensates for selective accessibility. ***Personality & Social Psychology Bulletin***, 26(9), 1142–1150.

Nolzen, N. (2018). The concept of psychological capital: a comprehensive review. ***Management Review Quarterly***, 68(3), 237–277.

Nutt, P. C. (1993). The formulation processes and tactics used in organizational decision making. ***Organization Science***, 4(2), 226–251.

Papadakis, V. M., Lioukas, S., & Chambers, D. (1998). Strategic decision-making processes: The role of management and context. ***Strategic Management Journal***, 19(2), 115–147.

Phadnis, S., Caplice, C., Sheffi, Y., & Singh, M. (2015). Effect of scenario planning on field experts' judgment of long-range investment decisions***. Strategic Management Journal***, 36(9), 1401–1411.

Roberts, S., Scherer, L., & Bowyer, C. (2011). Job stress and incivility: What role does psychological capital play? ***Journal of Leadership & Organizational Studies***, 18(4), 449–458.

Schoemaker, P. J. H. (1993). Multiple scenario development: Its conceptual and behavioral foundation. ***Strategic Management Journal***, 14(3), 193–213.

Schwenk, C. (1984). Cognitive simplification processes in strategic decision-making. ***Strategic Management Journal***, 5(2), 111–128.

Siu, O., Bakker, A., & Jiang, X. (2014). Psychological capital among university students: Relationships with study engagement and intrinsic motivation. ***Journal of Happiness Studies***, 5(4), 979–994.

Siu, O., Cheung, F., & Lui, S. (2015). Linking positive emotions to work well-being and turnover intention among Hong Kong police officers: The role of psychological capital. ***Journal of Happiness Studies***, 16(2), 367–380.

Tomasi, S. D., Parolia, N. N., Han, C., & Porterfield, T. (2015). Exploring the impact of team rapport and empowerment on information processing and project performance in outsourced system development. ***International Journal of Project Organization and Management***, 7(3), 284.

Tversky, A., & Kahneman, D. (1974). ***Judgment under uncertainty: Heuristics and biases***. Science (New York, N.Y.), 185(4157), 1124–1131.

Wright, G., & Goodwin, P. (2002). Eliminating a framing bias by using simple instructions to 'think harder' and respondents with managerial experience: comment on 'breaking the frame'. ***Strategic Management Journal***, 23(11), 1059–1067.

Yu, R. (2016). Stress potentiates decision biases: A stress induced deliberation-to-intuition (SIDI) model. ***Neurobiology of Stress***, 3, 83–95.

Zakay, D., & Wooler, S. (1984). Time pressure, training and decision effectiveness. ***Ergonomics***, 27(3), 273–284.

## EIDESSTATTLICHE VERSICHERUNG

**Versicherung nach §9 Abs. 1b der Promotionsordnung des Fachbereichs Wirtschaftswissenschaften der Philipp-Universität Marburg vom 8. Juni 2009**

Hiermit versichere ich, dass ich die vorliegende Dissertation selbst und ohne fremde Hilfe verfasst habe. Eventuelle Beiträge von Co-Autoren habe ich dokumentiert. Weiterhin versichere ich, dass ich keine anderen als die hier angegebenen Quellen und Hilfsmittel benutzt habe. Alle vollständig oder sinngemäß übernommenen Zitate habe ich als solche gekennzeichnet. Die Dissertation wurde bisher weder im Inland noch im Ausland in gleicher oder ähnlicher Form anlässlich eines Promotionsgesuchs oder zu anderen Prüfungszwecken eingereicht.

München, 04. April 2021

Niklas Nolzen, B.A.