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THREE ESSAYS ON LEADER INDIVIDUAL DIFFERENCES AND EFFECTIVENESS

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par

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Doctorat en Sciences Economiques
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Par la présente, je certifie avoir examiné la thèse de doctorat de

Daniel von WITTICH

Sa thèse remplit les exigences liées à un travail de doctorat.
Toutes les révisions que les membres du jury et le-la soussigné-e ont demandées durant le colloque de thèse ont été prises en considération et reçoivent ici mon approbation.

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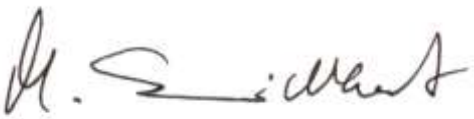
Signature :  Date : 21 août 2013

Prof. Marianne SCHMID MAST
Membre externe du jury

For SONILA, ELINA and LARA

my sunshine,

my calming pole in the hustle and bustle of life.

I love you.

"If you want to build a ship,

don't drum up people to collect wood

and don't assign them tasks and work, but rather

teach them to long for the endless immensity of the sea."

Antoine de Saint Exupéry

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INTRODUCTION

Three Essays on Leader Individual Differences and Effectiveness

1.1 Context of this study

A search on Amazon.com in autumn 2013 revealed 102'013 book results for the word 'leadership' alone, representing 95'228 more than in 2003 (Bolden, 2004). Based on numbers advanced by one of the big four consulting companies, organizations in the United States of America invest between $20 and $40 billion annually in leadership development (Day, 2012). Given these considerable investments, it seems that organizations resolutely believe that leadership matters and that it is a driving force of group and/or organizational performance. However, what is leadership? How is it measured? And, how is it linked to subjective or objective performance on the group or organizational level? There is a difference between believing or inferring that leadership is linked to performance and demonstrating it with hard data. Volume does not necessarily correlate with quality when it comes to the leadership literature (Avolio, Sosik, Jung & Berson, 2003) or when it comes to the plethora of tools that claim to capture the link between leadership and leader effectiveness. Given recent economic turmoil and tight budgets, it is important not get side tracked by intuitively appealing explanations about leadership or tools that claim to establish causal links between personal characteristics of leaders and leader effectiveness. Policy makers should instead make informed decisions and investment choices based sound data as well as coherent, methodological, and evidence-based analytical processes, which provide a deeper understanding into the dynamic interplay between leaders, followers as well as the contexts in which these interactions occur.

With my thesis, I do not set out to provide an overarching answer to the question what leadership is all about; my goal, focus and scope is more modest. It

rather highlights some elements of leadership effectiveness (e.g., objective outcome measures such as store-level sales performance, inventory shrinking, decision quality, and conformity at the group level and subjective outcomes such as supervisory ratings). In addition, I investigate how leader outcomes are explained by leader individual differences (i.e., leader traits and behaviors), the conceptual common denominator across the three papers.

From a theoretical perspective, Paper 1 aims to extent the current leadership research by focusing on important leader traits (e.g., honesty-humility) as well as leader behaviors (e.g., contingent punishment and non-contingent punishment) that have not been examined in relation to individual differences in real business settings. Paper 2 focuses on some essential psychometric properties of a widely used individual-difference measure whose uniqueness and utility for advancing theory in trait research is questionable. Whereas Paper 1 and 2 take a leader-centric approach by focusing on one-way effects associated with the personal distal and proximal traits of the leaders on followers, the third paper extends current leadership research by creating an experimental paradigm that allows for the analysis of situations where a leader is the source as well as the target of influence; such situations can either reduce or increase the decision performance.

1.2 Summary of findings

1.2.1 Paper 1: Effect of leader individual differences on leader behavior and business unit outcomes

In the first paper, we investigate which distal leader traits (e.g., personality and intelligence) predict (1) proximal leader behavior (e.g., transformational

leadership, contingent reward and punishment as well as non-contingent punishment), and (2) objective and supervisory ratings of leadership effectiveness (e.g., sales performance, inventory shrinkage, and supervisory ratings).

Using eight structural-equation models, we analyzed data from a large drug-store chain based in Switzerland whose management agreed to provide access to 111 business unit leaders and their 778 direct reports. We avoided problems related to endogeneity by (a) taking a multivariate approach and testing the relationships between multiple leader traits and outcomes simultaneously to reduce the risk of omitted variables; (b) using population reliabilities to correct for the effects of measurement error, (c) gathering independent and dependent variables from different sources in order to avoid common-method variance; and (d) controlling for contextual and microeconomic effects to ensure estimate consistency.

With regard to the relationship between distal leader traits and proximal leader behaviors our results contrast with previous findings. We show that some personality dimensions, in particular extraversion and honest-humility, are strongly predictive of leadership behaviors and outcomes. With regard to the relationship between distal leader traits and leader effectiveness, conscientiousness and intelligence also show strong results. We argue that the weak links between leader traits and leader behaviors and leader traits and leader effectiveness in previous meta-analytical findings and other studies may be attributed to the inclusion of parameter estimates from studies that may have had endogeneity issues.

1.2.2 Paper 2: The Kirton Adaption-Innovation Cognitive Style Inventory: Was it personality all along?

In the second paper we examine the uniqueness and utility of a widely used individual difference measure, the Kirton Adaption-Innovation (KAI) Cognitive Style Inventory, which is portrayed and sold as a measurement tool with excellent psychometric properties. The KAI is used in the training of managers and teams as part of change-management initiatives, for the enhancement of group cohesion and effectiveness, and for leadership development. In two multi-point-cross-sectional design studies we investigated if (a) we could predict KAI scores with the ‘‘big five’’ personality dimensions and (b) the KAI scores predicted leadership behavior when controlling for personality and intelligence. Correcting for measurement error, and including the full gamut of important individuals differences (to avoid omitted variable bias and to ensure consistency of estimates), we found that KAI scores were predicted mostly by personality and gender. KAI scores did not predict variance in leadership while controlling for established individual difference measures. Given that KAI does not discriminate from well-established personality measures and does not predict outcomes to which it should be theoretically linked, our results imply that the KAI's uniqueness and utility for predicting individual outcomes is very limited. However, we still encourage researchers to continue gathering data on cognitive style, personality, intelligence and outcomes in the hope that meta-analytic studies are conducted in order to see whether ‘‘style’’ measures are redundant or not.

1.2.3 Paper 3 - The effects of leader-pre-discussion preference and majority-minority influence on group-decision quality

In the third paper, I examine the extent to which leaders are generators of or subject to conformity pressures in small decision-making groups. In each of 44 three-person groups I instructed a randomly assigned leader to make a decision related to a hypothetical investment choice between two construction sites. In preparation of decision-making task and at the outset of the group discussion, each group member individually received positive or negative information cues. The information cues were distributed in a way that either one or none of the group members shared the leader's preference for an option. Furthermore, the leader's initial preference for an option was either optimal or suboptimal, thus, placing him or her into one out of four distinct experimental conditions: (a) shared preference for optimal option, (b) shared preference for suboptimal option, (c) unshared preference for optimal option; and (d) unshared preference for suboptimal option. The optimal investment choice was unknown to all group members and could only be determined if all group members pooled and discussed their information in an effective manner. We measured the extent to which leaders are generators of or subject to conformity pressures by analyzing group-decision quality as well as the degree to which the leader changed his or her preference for an option after the group discussion.

The results of my study show that group decision quality is enhanced if leaders enter group discussions with a preference for the optimal solution but suffers if they favor suboptimal solutions. Moreover, group-decision quality is also affected by leader individual differences (e.g., personality and intelligence).

1.3 Contribution of this study

The key contributions of the three papers are of both theoretical and methodological nature. In general, this thesis contributes to previous efforts to consolidate earlier findings from different research areas in order to open new avenues and to test more general theories of leadership. In particular, the application of newly developed process-type models of leadership as well as newer robust methodological procedures brings researchers a step further in their efforts to identify and separate leader traits and behaviors that matter in a given organizational setting from those that seem to matter less. It also contributes to the emergence of more conclusive results and helps to organize the trait literature, which, up until recently, has been progressed in a relatively unsystematic and fragmented manner (DeRue, Nahrgang, Wellman, & Humphrey, 2011).

With respect to the theoretical contributions, the results of Paper 1 challenge the generally accepted assumption that proximal leader behaviors show stronger effects to outcomes than do distal traits. It also furthers our knowledge with regard to (a) the effect size and (b) the positive as well as negative aspects of distal leadership traits on both leader behaviors and outcomes in a given business setting. Our integration of relatively unexplored leader traits and behaviors into our models can be useful in guiding researchers to operationalize leader traits and behaviors in a way that capture the different aspects of our theoretical development. Finally, researchers interested in comparing our results in similar or different organizational or cultural contexts can also use our models to capture fixed effects. The findings of Paper 2 challenges the commonly held believe of many researchers that a widely used measure of cognitive style, the Kirton Adaption-Innovation Inventory (KAI), is substantially different from well established big five personality factors. Paper 2 also

contributes to the exposition of potential problems related to a narrow focus on bivariate relationships. The failure to ignore multivariate relations, partial effects of demographic factors and measurement error will engender inconsistent estimates. Paper 3 furthers our understanding of leadership and majority/minority influence on decision quality in three-person-problem-solving groups. It provides a deeper insight into elements that generate influence (a)symmetries among leaders and followers and identifies two potential risks that will increase the likelihood of making suboptimal decisions.

With respect to the methodological contributions, Paper 1 and 2 highlight the importance of avoiding problems related to endogeneity by: (a) taking a multivariate approach and testing the relationships between multiple leader traits and outcomes simultaneously to reduce the risk of omitted variables; (b) using population reliabilities to correct for the effects of measurement error; (c) gathering independent and dependent variables from different sources to avoid common-method variance; and (d) controlling for contextual and microeconomic effects to ensure estimate consistency.

1.4 Cross-disciplinary focus of this study

I have employed a cross-disciplinary approach in developing the three papers. All papers are anchored in the field of leadership. In order to strengthen theoretical causal arguments and empirical analyses, concepts and methods from other disciplines such as cognitive and social psychology, psychometrics, and econometrics have been applied.

1.5 Implications for policy and practice

Getting a better understanding of how leadership outcomes are explained by the leader's dispositional characteristics, behaviors and the context in which the influencing process occurs is important for multiple reasons. From a policy perspective, identifying cause-and-effect relationships with scientific rigor is instrumental in developing and refining measurements of individual differences with excellent psychometric properties. These "tools" can be used in leadership-selection and training processes as well as succession-planning efforts and, therefore, assist its users to identify and increase efficiency, effectiveness and well-being on an individual, group and organizational level. On a practical level, it serves the function of personal development through the creation of self-awareness, the advancement of self-knowledge and the identification and improvement of social skills.

1.6 Future research

This thesis addresses a number of issues that could be subject to future investigations. Firstly, with regard to the relationship between leader traits and leader outcomes (Paper 1), future research should examine whether the weak links between leader traits and leader behaviors and leader traits and leader outcomes in previous meta-analytical findings and other studies are linked to endogeneity issues. Also, integrating other leader behaviors such as instrumental leadership, for example, would provide a broader understanding on the relationship between leader behaviors and leader outcomes. Moreover, future research could estimate complete contextualized models within and between firms and across different cultural contexts to determine how these leader individual differences predict leadership outcomes. Measuring and integrating cross-organizational (such as stress, cohesiveness, team conflict, trust, task

interdependence as well as the nature of the task) and cross-cultural contexts (such as organizational culture, climate, public- versus private-sector organizations, and/or organizational culture) into process-type trait models will help to identify traits that are expected by followers in a given situation, which, in turn, indicate appropriate behaviors or depict behaviors that are expected to be linked to performance. Secondly, with regard to KAI and other measures of cognitive style, more extensive validation studies should be conducted to confirm or disconfirm our findings and to show whether KAI or other measures of cognitive style fit into the nomological network of individual differences. Finally, with regard to group-decision making in contexts with information asymmetries, we suggest future researchers to focus on the effects of leadership and majority/minority influence in real business settings and to compare the results of groups with a leader to leaderless groups.

1.7 Concluding comments

I am convinced that the theoretical and empirical contributions of this thesis will bring both researchers and practitioners a small step further in their efforts to identify and separate leader traits and behaviors that matter in a given organizational setting from those that seem to matter less. In order to select, develop, and retain good leaders, it is important to base investment choices and decisions on data as well as on coherent methodological and evidence-based processes while factoring in the context in which these interactions occur. Therefore, both academicians and practitioners should work hand in hand in order to better understand the nature of leadership. I strongly believe that taking a scientist-practitioner approach on leadership will help to increase organizational performance and well-being. As Warren Bennis notes: “We still witness scandals, bankruptcies, war, misery, and suffering, mostly because of

corrupt and immoral leadership…only when we understand leaders will we be able to control them" (Bennis, 2012, p. 544).

1.8 References

Avolio, B., Sosik, J. J., Jung, D. I., & Berson, Y. (2003). Leadership models, methods, and applications. In W. C. Borman, D. R. Ilgen & R. J. Klimoski (Eds.), *Handbook of Psychology: Industrial and organizational psychology* (Vol. 12, pp. 277-307). Hoboken, NJ: John Wiley.

Bennis, Warren. (2012). The Crucibles of Authentic Leadership. In D. V. Day & J. Antonakis (Eds.), *The Nature of Leadership* (2 ed., pp. 543-556). Thousand Oaks, California: SAGE Publications, Inc.

Bolden, Richard. (2004). What is Leadership? (Vol. 1). Exeter, UK: University of Exeter.

Day, D. V. (2012). The Nature of Leadership Development. In D. V. Day & J. Antonakis (Eds.), *The Nature of Leadership* (2 ed., pp. 108-140). Thousand Oaks: Sage Publications, Inc.

DeRue, D. S., Nahrgang, J. D., Wellman, N., & Humphrey, S. E. (2011). Trait and Behavioral Theories of Leadership: An Integration and Meta-Analytic Test of Their Relative Validity. *Personnel Psychology, 64*(1), 7-52.

THESIS PAPERS

Effect of leader individual differences on leader behavior and business unit outcomes

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Effect of leader individual differences on leader behavior and business unit outcomes

Using a sample of 111 unit managers, we examined the effects of leader traits on (a) subordinate rated leader behaviors (n=466) as well as on (b) objective and supervisory ratings of leadership effectiveness. Extending previous individual-difference frameworks, we use the broader "big six" HEXACO inventory, modeling the multivariate effects of personality and intelligence, and correcting for measurement error. We also controlled for unit level as well as for contextual and microeconomic effects. We show quite strong effects for several of the individual differences on leadership behavior (the individual differences alone had average multiple correlations of .47). Extraversion showed particularly strong effects (standardized β's of .67, .75, and -.68, with transformational, contingent reward, and non-contingent punishment leader behavior respectively). Extraversion also predicted inventory shrinkage (standardized β of -.51). We also found strong direct effects of intelligence and conscientiousness on supervisory ratings of effectiveness (both variables having partial standardized β's of .47). In addition, honesty predicted sales volume (partial standardized β of .25). These results are very encouraging for the trait literature in general, and the HEXACO personality framework in particular.

Keywords: leadership, traits, big six model, HEXCO, intelligence, individual differences, transformational, transactional, contingent and non-contingent punishment.

What personal dispositions distinguish effective from ineffective leaders? Recent meta-analyses show that among the plethora of traits that have been investigated, only a few individual differences are consistent predictors of leadership effectiveness (DeRue, Nahrgang, Wellman, & Humphrey, 2011; Hoffman, Woehr, Maldagen-Youngjohn, & Lyons, 2011; Judge, Bono, Ilies, & Gerhardt, 2002; Judge, Colbert, & Ilies, 2004; Lord, Foti, & Devader, 1984; Schmidt & Hunter, 2004). Most of these predictors can be gathered under the umbrella of personality and general intelligence.

Despite the theoretical and applied value of these meta-analyses, trait theory in general has progressed in a relatively unsystematic and fragmented manner, which also may have affected the meta-analytic estimates for traits that predict leadership effectiveness (DeRue et al., 2011), making firm conclusions difficult (Zaccaro, 2007, 2012). In an attempt to organize this literature and to obtain more conclusive results, the application of a new genre of trait- or process-type models[1] of leadership and new robust methodological procedures have been proposed (Antonakis, Day, & Schyns, 2012; DeRue et al., 2011; Zaccaro, 2007). One central aspect of these modern frameworks is the distinction between proximal (e.g., behaviors such as transformational and transactional leadership behaviors) and distal (e.g., traits such as personality and intelligence) individual differences.

The process-type models have two important nuances that need brief mention. On one hand, Antonakis and colleagues (Antonakis, 2012; Antonakis, Bendahan, Jacquart, & Lalive, 2010; Antonakis et al., 2012) have suggested that because distal traits are stable and genetically determined to a large degree they should be used as

[1] In our paper, we use the term "process-type model" as it is referred to in the field of industrial-organizational psychology in order to describe how, in a particular context, a combination of multiple traits are influencing leader behaviors, where leader behaviors mediate the relationship between traits and leader outcomes. Therefore, we are not studying mental processes that affect behavior, which would fall into the domain of cognitive psychology.

"instruments" of proximal behaviors (i.e., as exogenous sources of variance to identify the causal effect of proximal differences on outcomes). That is, because proximal differences are endogenous, they may depend on outcomes or share a common unobserved cause with outcomes. For example, if a subordinate is not performing well, the leader may use a more corrective-transactional (quid-pro quo) style of leadership. Thus, predicting the outcome with leadership style will confound the relation due to simultaneous causation of style with outcome and thus engender inconsistent estimates (i.e., asymptotically, estimates will not converge to the true value). Because traits are stable, that portion of the variance of traits that overlaps with behaviors and outcomes will be isolated from omitted causes of the outcomes equation (i.e., the disturbance) and allow for consistent estimation of the effects of behaviors on outcomes.

This line of research thus suggests that the causal effect of leader styles on outcomes can only be identified if leader styles are modeled as outcomes in a two-stage least squares (instrumental variable) leadership model (Antonakis et al., 2010): traits→behaviors→outcomes, where the disturbances of behaviors and outcomes are correlated to ensure unconfounded interpretation. This causal research perspective also suggests that outcomes cannot be simultaneously regressed on traits and behaviors in a model where behaviors are let to correlate with traits (and where behaviors are not modeled as outcomes of traits). The endogeneity bias in the estimates of the behavior variables will be "passed on" to the traits via the modeled correlation structure (Antonakis et al., 2010).

On the other hand, researchers have suggested that the proximal differences will show stronger effects to outcomes than will the distal differences (DeRue et al., 2011). This may well be the case. However, these researchers modeled outcomes of

leadership as joint determinants of behaviors and traits, which, as discussed above should not be done because leader behaviors are endogenous. The correct way to model effects of behaviors on outcomes is to "instrument them" with traits (or with leader fixed/constant effects). Thus, the only ways to examine the impact of traits on outcomes can be (a) on outcomes via behaviors (where the behaviors act as mediators: traits→behaviors→outcomes), (b) directly on behaviors (traits→behaviors), or (c) on outcomes directly in a reduced form model that bypasses the hypothesized mediating mechanism (i.e., traits→outcomes). Given that traits are strongly exogenous, the effects of traits on behaviors or outcomes can thus be consistently estimated.

The focus in this study will be on estimating the effect of traits on behaviors and directly on outcomes, which are needed conditions for testing full process (mediator) models. That is, if behaviors predict outcomes and if traits predict behaviors, then traits must predict outcomes too. Examining these effects is important because it is still not clear whether the effects of traits on leader behaviors and outcomes are strong. For instance, even though the direct effects of traits (i.e., the big five in this case) on leadership have shown some promise (Judge, Bono, et al., 2002), predicting 28.09% of the variance in leader emergence and less so—15.21%—of the variance in effectiveness, their effects, particularly on full-range leader behaviors (i.e., transformational and transactional leadership), have not been reported to be strong (Judge & Bono, 2000). For example, in the Judge and Bono study, the big five predicted on average only 5.57% of the variance in factors of the full-range leadership model (transformational and transactional leadership), which is one of the models that currently dominates leadership research landscape (Gardner, Lowe, Moss, Mahoney, & Cogliser, 2010; Lowe & Gardner, 2000). Thus, the goal of this study is to build on recent frameworks and to include a broader range of distal leader traits in order to

investigate their effects on a broader range of proximal leader behavior as well as on subjective and objective measures of leadership effectiveness on a variant of the full-range model.

Our investigation contributes to the existing literature in several ways. First, with respect to predicting proximal individual differences, in addition to predicting transformational and transactional leadership, we extend the current leadership research by including important leadership behaviors that have not been examined as outcomes of traits: contingent punishment and non-contingent punishment, following recent calls in the literature (Atwater, Dionne, Camobreco, Avolio, & Lau, 1998).

Second, with respect to distal individual differences we modeled their multivariate effects including demographic variables such as gender and age, along with a measure of intelligence (Antonakis et al., 2012; Zaccaro, 2012). In addition, we did not use the big-five personality model but a broader six-factor model of personality, the HEXACO. Based on recent lexical studies (Ashton, Lee, & Goldberg, 2004; Ashton, Lee, Perugini, et al., 2004), the inclusion of a six cross-culturally corresponding factor, Honest-Humilty, has been found to be a better predictor of behavioral constructs and outcomes than big-five type personality inventories, which measure the big five dimensions (i.e. Emotional stability, Extraversion, Agreeableness, Openness, and Conscientiousness) (R. E. de Vries, de Vries, de Hoogh, & Feij, 2009; R. E. de Vries & van Kampen, 2010; K. Lee & Ashton, 2008; K. Lee, Ashton, Morrison, Cordery, & Dunlop, 2008; K. B. Lee & Ashton, 2005). We also add a measure of leader intelligence in our model to examine the incremental validity when both distal individual differences, personality and intelligence, are simultaneously modeled. Using intelligence in combination with personality is not common practice in trait-research (DeRue et al., 2011). We are not aware of studies

that examine the relationships between HEXACO and the punishment behaviors mentioned above.

Third, with respect to measures of leadership effectiveness, we contribute to the extant literature by including subjective and objective outcome measures. To date, only a very limited number of studies investigated the effects of personality as measured by the HEXACO inventory on subjective and objective measures of effectiveness in real business settings.

Finally, the resurgence of interest in the trait perspective of leadership has been driven by methodological advancements. Newer and more sophisticated meta-analyses and the use of fixed effects designs have helped to show that individual difference matters for leadership (DeRue et al., 2011; Hoffman et al., 2011; Judge, Bono, et al., 2002; Judge et al., 2004; Schmidt & Hunter, 2004; Zaccaro, Kenny, & Foti, 1991). Proponents of the new genre of trait models have started to follow the call to take a multivariate approach, that is, to test relationships between multiple leader traits and outcomes simultaneously (Zaccaro, 2012). Individual differences should be modeled simultaneously so that the incremental contribution of a particular trait can be correctly estimated beyond the inclusion of typical control variables such as gender and age (Antonakis et al., 2012). A narrow focus on bivariate relationships between leader traits and outcomes and the failure to robustly test traits against existing trait predictors by taking a multivariate approach and correcting for measurement error will engender inaccurate estimates (Antonakis et al., 2010). Following more recent methodological advancements, we use population reliabilities to correct for the effects of measurement error in traits to avoid endogeneity and attenuation of path coefficients (Antonakis et al., 2010; Antonakis et al., 2012; von Wittich & Antonakis,

2011). We also integrate contextual control variables (e.g., store-level as well as location-level factors) in our model (Liden & Antonakis, 2009).

Our paper is organized as follows. First, we provide a description of the new genre of trait models. Second, we explain the expected role of distal individual difference (i.e., personality and intelligence) on (a) proximal individual differences and (b) our measures of leadership effectiveness. Finally, we present the results of seven predictive models that outline the relative empirical validity of our distal traits on proximal leader behaviors and leadership effectiveness. We conclude with practical and theoretical implications.

A new genre of trait models

Recent trait-models of leadership (Mumford, Zaccaro, Harding, Jacobs, & Fleishman, 2000; Zaccaro, 2007; Zaccaro, Kemp, & Bader, 2004) group individual differences in two broad categories reflecting the distinction between distal individual difference (e.g., personality and intelligence) and proximal individual differences (e.g. leader behavior). Drawing on trait activation theory (Tett & Guterman, 2000), the distinction is based on the rationale that individuals can behave consistently across different situations (and that situations can cause different people to behave similarly). The behavioral expression of a trait requires arousal of that trait by trait-relevant situational cues but observing trait variance in situ requires arousal based on weak to moderate trait-relevant situational information (Mischel, 1973; Tett & Guterman, 2000). Distal individual differences such as cognitive ability and personality are more malleable in childhood but less so on adulthood. Hence, in adulthood they become temporally and situationally more stable and exert a constant and significant influence on leadership behavior (which may be partly situationally determined too) and distinguish leaders from non-leaders (Antonakis, 2011). In organizations, however,

which are highly formalized and governed by well-established role expectations, norms, rules, policies and procedures, there is less opportunity for individuals to behaviorally express their dispositional tendencies (House & Aditya, 1997), unless they have some degree of autonomy (Barrick & Mount, 1993). It follows that proximal individual differences are more malleable and somewhat situational bound. However, they are learned behaviors or acquired skills that are influenced by distal traits. Hence, the new genre of trait model integrates the evolution theory perspective of leadership that leadership is to a certain extent "in the genes" (Arvey, Rotundo, Johnson, Zhang, & McGue, 2006; Ilies, Gerhardt, & Le, 2004).

Because of their influence on proximal behaviors, traits are considered to have an indirect effect and act more distally on leadership effectiveness (Zaccaro, 2007; Zaccaro et al., 2004). However, the reduced form model of effectiveness on traits should thus still show predictive validity because traits are ultimate causes of leader outcomes. Schmidt and Hunter (1998), showed that intelligence exerts both a direct (i.e., reduced form) and an indirect effect on effectiveness measures. By reduced form we do not mean that distal traits have a direct effect when modeling proximal traits as mediators (i.e., showing partial mediation). Such models would be misspecified to the extent that proximal differences are endogeneous (Antonakis et al., 2010). That is, suppose *z* is the distal trait, *x* is the proximal (endogenous) behavior, and *y* is the outcome (for the purposes of demonstration and to keep the equations simple, we model one trait and one behavior), in a two stage framework we model the following:

$$x = \beta_0 + \beta_1 z + e \qquad \text{Eq. 1}$$

$$y = \gamma_0 + \gamma_1 + u \qquad \text{Eq. 2}$$

Where cov(*e,u*) is estimated to account for omitted common causes of *x* and *y*. The indirect effect of *z* on *y* is the non-linear test of $\beta_1 * \gamma_1$. Assuming correct model

specification, this non-linear combination of estimators will equal coefficient δ_1 in the following reduced form specification:

$$y = \delta_0 + \delta_1 z + w \quad \text{Eq. 3}$$

However, adding the proximal difference *x* next to *z* in Eq. 3 would not allow for consistent estimation because the endogeneity bias in *x* would affect the estimate of *z* via the correlation of *x* with *z*.

Our goal is thus to examine the direct effects of traits on behaviors as well as traits on outcomes. Consequently, as outlined in Figure 1, our framework models the direct effects of distal on proximal individual differences (Model 1-4) and on leadership effectiveness (Model 5-7).

[Insert Figure 1 here]

Proximal individual differences: Beyond transformational leadership

Among the many theories of leadership, none have been studied more in the last decade than transformational leadership (Gardner et al., 2010; Judge & Bono, 2000; Lowe & Gardner, 2000).The success of this school of thought can probably be linked to the fact that it provides an integrative framework for leadership that draws on aspects of the trait-, behavioral- and contextual school of leadership (Sashkin, 2004) as well as to the development of leadership measures with strong psychometric properties. One of the best-known models is the transformational and transactional leadership model (Judge & Piccolo, 2004), with the two most dominant models being the Bass-Avolio and the Posdaskoff models (Antonakis, 2012)

Transformational leadership provides followers with a heightened sense of positive self-image and reinforces their self-esteem, their self-worth and their self-confidence by outlining an appealing vision that makes followers understand how their current actions and the pursuit of their mission express a continuity between how

they construed themselves in the past and how they construe themselves as somebody they aspire to be in the future. By providing individual support and intellectually stimulating their followers, transformational leaders emphasize the person's uniqueness, reinforcing their followers' identification with the leader and triggering self-reflection as well as self-awareness (Bass, 1985, 1998). Transformational leaders also foster a collective identity, a shared sense of "we-ness", by outlining high performance expectations and stating common shared goals and values (Bass, 1985, 1998). In doing so, the appearance of leader influence becomes a reality through depersonalized social attraction processes that make followers agree and comply with the leader's ideas and suggestions (Hogg, 2001), conceding symbolic and referent power (French & Raven, 1968) to the leader.

Transactional leadership focuses on social and economic exchanges and bases its influence on reward and coercive power (Bass, 1985, 1998).Transactional leaders establish a give-and-take relationship with their followers and provide employees with rewards in exchange for their performance or punish them when their followers do not perform effectively.

There is substantial evidence showing that transformational and transactional leadership predict subjective and objective performance measures, as the results of several meta-analyses indicate (e.g., Judge & Piccolo, 2004; Wang, Oh, Courtright, & Colbert, 2011). In line with the theoretical claims of Bass (1997), earlier studies found higher associations between transformational leadership and effectiveness than between transactional leadership and effectiveness (Bass, Avolio, Jung, & Berson, 2003; Judge & Piccolo, 2004; Lowe, Kroeck, & Sivasubramaniam, 1996).

Although the theory of transformational and transactional leadership has engendered much research, scholars have questioned whether there are styles beyond

those of transformational and transactional leadership that are omitted from this theory and which are essential for effective leadership, including contingent- and non-contingent punishment behaviors. Atwater et al. (1998, p. 560) state that "to date, much of the conceptual and empirical work regarding the use of punishment by leaders has focused on understanding subordinate reactions to punishment and the situational factors that moderate subordinate reactions to the leader's use of punishment . . . . However, there has been little attention focused on the characteristics of the leader who chooses to administer contingent and non-contingent punishment." These styles are part of transactional leadership and focus on contingent aversive reinforcement. They are also quite different from the management-by-exception active and passive component of the full-range models, which only focus on pointing out mistakes (but not on reprimanding).

Contingent punishment is the leader's reaction to an employee's failure to reach agreed-upon performance (Bass, 1985) or is delivered in response to poor performance or unacceptable behavior, with the intention of improving subsequent behavior (Atwater et al., 1998). Leaders who apply contingent punishment not only point out mistakes but show disapproval if follower performance is below their expectations. Non-contingent punishment is rather disconnected from courses of actions that aim to improve follower performance and to facilitate goal attainment and learning (and is not included in the Bass-Avolio "full-range model"). Non-contingent punishment describes the degree to which a leader uses punitive measures independent of the follower's performance level (P. M. Podsakoff, Bommer, Podsakoff, & MacKenzie, 2006; P. M. Podsakoff, Todor, & Skov, 1982). Leaders who exert punishments that are non-contingent upon performance are unlikely to be perceived as fair by their followers because the leaders' reprimands and social

disapproval are not visibly or logically linked to their followers' performance levels (P. M. Podsakoff et al., 2006).

Distal individual differences: The mainstay traits

Many traits have been linked to leadership effectiveness. However, meta-analytical findings (Bono & Judge, 2004; DeRue et al., 2011; Hoffman et al., 2011; Judge, Bono, et al., 2002; Judge et al., 2004; Judge & Piccolo, 2004; Lord et al., 1984; Schmidt & Hunter, 2004) showed that among the range of traits that have been investigated, there are only a few distal individual differences that stood the test of time. Most of the consistent predictors of leadership effectiveness can be gathered under the umbrella of personality and intelligence (Antonakis, 2011). Although personality and intelligence were discovered many decades ago and the latest meta-analytic results confirm that these distal individual differences are consistent predictors of leadership effectiveness, research has generally focused on a single trait at a time and usually does not consider all big five traits along with intelligence in a predictive model. With respect to personality and leadership effectiveness, the meta-analytic findings of Bono and Judge (Bono & Judge, 2004) indicated that transformational leadership positively correlates with Extraversion ($r = .24$), Conscientiousness ($r = .13$), Openness($r = .15$), Agreeableness ($r = .14$), and negatively correlates with Emotional stability ($r = -.17$). With respect to intelligence, (Judge et al., 2004) show that objective measures of intelligence predict leadership effectiveness ($r = .33$). Despite the theoretical and applied value of these meta-analyses, studies generally do not control for or compare the effects of personality and intelligence concurrently; nor do they control for other stable differences (e.g., age, sex) or contextual (i.e., microeconomic) factors (Liden & Antonakis, 2009). Not controlling or comparing the effects of personality and intelligence concurrently is

problematic because it remains unclear whether individual differences are incrementally valid (cf. DeRue et al., 2011). Moreover estimates that are reported without the omitted controls may be biased (downwards or upwards).

General intelligence

According to Gottfredson (1997), intelligence is the ability to deal with cognitive complexity, which, among other things, is linked to the process of sense-making (i.e., the identification, acquisition, organization, combination or comparison, and updating of information) and/or a process of sense-giving (i.e., the delivery of a fluent, sophisticated, flexible, and complex message with rich vocabulary, extensive use of analogies and arguments, and a more intricate and consistent logical structure, Simonton, 1985). On the basis of a comprehensive review, Schmidt and Hunter (1998) reported that intelligence is one of the best predictors of job performance and supervisory ratings (see also Schmidt & Hunter, 2004; Schmidt, Hunter, & Outerbridge, 1986). Although there is not much research showing the relation between intelligence and transformational leadership, a recent study conducted by Cavazotte, Moreno, and Hickmann, (2012) showed a significant positive effect of objectively-measured intelligence on observer ratings of transformational leadership (standardized $\beta = .38$), while controlling for personality as well as for demographics.

The primary way in which intelligence affects performance and supervisory ratings is through the acquisition of job knowledge, technical proficiency and work-sample performance (Borman, Pulakos, White, & Oppler, 1991). Considerable research has shown that higher levels of general intelligence are positively related to higher levels of knowledge acquisition (Chemers, Rice, Sundstrom, & Butler, 1975; Reber, Walkenfeld, & Hernstadt, 1991; Ruthsatz, Detterman, Griscom, & Cirullo, 2008; Vincent, Decker, & Mumford, 2002). Because expertise is valued by customers

(and supervisors for whom knowledge of the products is important) and which should be prototypical of good customer service, we expect that intelligence should be a determinant of both sales volume and supervisory ratings.

According to Simonton (1985), the probability of exerting personal influence in a group is directly proportional to a member's percentile placement along the intelligence scale. As a result, a leader with an IQ two standard deviations above the mean (or an IQ of 132) will be seen as having superior intelligence by almost 98% of the group members. If, in contrast, a leader with an IQ one standard deviation below the mean (or an IQ of 84) will be perceived as being intellectually inferior by approximately 84% of group members. Due to their reduced ability to acquire knowledge and to deliver a fluent and complex message with rich vocabulary, as compared to the average group member, we expect that leaders who are low in intelligence are less likely to draw on expert and symbolic power to influence their colleagues. Instead, they are more likely to use their position (legitimized by the organizational hierarchy) and make use of coercive power to make followers comply with their rules. Moreover, we expect that leaders low in intelligence are less likely to clarify roles and procedures, making it more difficult for followers to understand their responsibilities and, hence, face non-contingent punishments more often than would followers who work with leaders who score high in intelligence. Also, decreased levels of intelligence may be manifested in less efficient business practices (e.g., inventory control systems) and followers who are more likely to resist the leader's influence (cf. Darioly & Mast, 2011; Griffeth, Hom, & Gaertner, 2000). Thus, we expect to see the impact of these psychological states and attitudinal dispositions in an objective measure of unit performance; inventory shrinkage (cf. Greenberg, 1990).

Deviations from expected stock levels could be due to bad inventory management leading to stock expiry as well as pilferage both by customers and staff.

H1: Intelligence is positively related to transformational leadership, contingent punishment, sales volume and supervisory ratings of performance and negatively related to non-contingent punishment and inventory shrinkage.

Personality: From the big five to the big six

A resurgence of interest in the trait perspective of leadership has occurred primarily because the previously fragmented ways of describing personality have been regrouped into five big dimensions(Costa & McCrae, 1992; Goldberg, 1990; McCrae & Costa, 1997), providing a general organizing framework (Antonakis, 2011). These "big five" factors have been labeled as emotional stability (vs. neuroticism), extraversion, openness, agreeableness and conscientiousness. Based on recent lexical studies (Ashton, Lee, & Goldberg, 2004; Ashton, Lee, Perugini, et al., 2004) the inclusion of a sixth cross-culturally corresponding factor, honest-humility, into a personality inventory has been found to be a better predictor of behavioral constructs and outcomes than inventories that only measure the big five dimensions (R. E. de Vries et al., 2009; R. E. de Vries & van Kampen, 2010; K. Lee et al., 2008; K. B. Lee & Ashton, 2005).

The HEXACO inventory has been used to predict several outcomes including adult delinquency (Dunlop, Morrison, Koenig, & Silcox, 2012), academic performance (A. de Vries, de Vries, & Born, 2011), task performance (Meurs, Perrewe, & Ferris, 2011), and job performance ratings (Johnson, Rowatt, & Petrini, 2011). As concerns leadership, and given that the HEXACO inventory is so new, we are aware of only three studies that have used this extended personality inventory to investigate the relationship with leadership behaviors and leadership effectiveness.

Firstly,de Vries (2008), investigated the relations between personality and the charismatic, transactional, and passive leadership factors of the Multifactor-Leadership Questionnaire (MLQ) as well as the consideration and initiating structure facet of the Leader Behavior Description Questionnaire (LBDQ). Results showed that charismatic leadership and leader consideration are well captured by the HEXACO personality inventory. These results, however, are very limited in that all data came from a common source. Secondly, using an instrumental variable procedure, de Vries (2012) found strong direct effects of honesty-humility on ethical leadership, extraversion on charismatic leadership, agreeableness on supportive leadership, and conscientiousness on task-oriented leadership. He suggested that the relatively weak relations between personality and leadership styles in previous studies may have been due to relatively low levels of self-other agreement. Finally, Bakker-Pieper & de Vries (2013) found the HEXACO-personality dimensions to correlate with communication style, though, this study is limited by common-source variances issues.

Honesty-Humility: Describes an individual's tendency to be sincere, fair, greed avoidant, and modest. Honest and humble individuals are genuine in interpersonal relations, do not pretend to like others to obtain favors, and are unwilling to manipulate others or to take advantage of other individuals or society at large (Ashton & Lee, 2004). Furthermore, they do not enjoy displaying privilege, are modest and unassuming and do not consider themselves superior or as entitled to privileges that others do not have. Causal observation suggests that leaders who are honest or dishonest, humble or pretentious, ethical and unethical, articulate a vision that will be appealing to a broad range of followers. Individuals who are perceived by a subgroup of people as being an appropriate model to follow and who lead by

example do not necessarily lead for a cause that is perceived to be fair by a majority of people. By looking at the items in our transformational leadership measure, which is based on the Podsakoff model (P. M. Podsakoff, MacKenzie, & Bommer, 1996; P. M. Podsakoff, MacKenzie, Moorman, & Fetter, 1990), we do not see strong theoretical ground on which to build to show the link between Honesty-Humility Transformational leadership because our scale does not include the constructs of charismatic or ethical leadership that have been used in the R. E. de Vries (2008, 2012) studies. We expect that honesty-humility is related to follower perceptions of a leader's contingent reward or punishment behavior because a leader's integrity is established by fulfilling his or her transactional obligations (Antonakis & Atwater, 2002; Shamir, 1995).

Moreover, a leader who outlines the characteristics of honesty-humility is less likely to assign blame to others. Based on the tendency to be modest and unassuming, leaders might even be more likely to blame themselves when unexpected negative events occur in order to protect their followers. On the contrary, due to their genuine nature, leaders are more likely to attribute success to their employees and praise them more often in case positive events occur. Hence, we expect honest and humble leaders to be perceived by their followers as individuals who outline contingent reward but refrain from using punishment behaviors. Leaders who score low on the honesty-humility scale, however, are more likely to be perceived as leaders who engage in punishment behaviors because they are willing to take unfair means to achieve their personal objectives and pursue their personal agenda. The use of unfair means to achieve personal objectives at the expense of others is more readily linked to dark traits such as psychopathy and Machiavellianism (Judge, Piccolo, & Kosalka, 2009). Recent studies (Jonason & McCain, 2012; K. B. Lee & Ashton, 2005) have repeatedly

depicted very strong negative relations between the dark traits and honesty-humility, reinforcing our assumption that honesty-humility negatively predicts contingent- and non-contingent punishment.

Moreover, we expect honesty-humility to affect sales volume. Drawing on social learning theory (Bandura, 1986) and the falling dominoes effect (Bass, Waldman, Avolio, & Bebb, 1987; D. M. Mayer, Kuenzi, Greenbaum, Bardes, & Salvador, 2009), leaders who are honest and sincere in client relations provide a good model to follow. Hence, followers will also role model the behaviors of their superiors and outline the tendency to be genuine in dealings with coworkers and customers. Particularly in health-care settings (such as those examined our hypotheses), where compounds of a product are not well understood by the average client, trust in the vendor becomes important. Customers will tend to go to the vendor they consider more trustworthy. When customers trust a vendor, they tend to exert less effort in acquiring information about the product, which reduces the time it takes to complete a transaction. Of course, other factors such as price considerations will affect a customer's buying decisions, but we assume that trust plays an important role in explaining variance in sales volume. Our arguments above are in line with recent studies, which reveal that perceived trust has a stronger effect on purchase intentions for both potential and repeat customers than price considerations (Kim, Xu, & Gupta, 2012).

Leaders who score low on honesty-humility are more likely to take advantage of other individuals, pretend to like others to obtain favors and consider themselves as superior and entitled to privileges that others do not have. Following the premises of equity theory (Adams, 1965), followers of leaders who score low on the honesty-humility dimension will, sooner or later, experience inequity due to unfair treatment

and develop a negative attitude toward the leader. This perceived and felt inequity is likely to reduce the followers' job satisfaction as well as their commitment to the organization (Greenberg, 1990; Griffeth et al., 2000), which should be manifested in increased inventory shrinkage. Therefore, we test the following hypothesis:

H2: Honesty-humility is positively related to contingent reward, sales volume and supervisory ratings and negatively related to contingent punishment, non-contingent punishment and inventory shrinkage.

Emotionality: Describes the tendency of individuals to avoid risk and physical harm (Ashton & Lee, 2004). People high in emotionality (i.e., neuroticism) are anxious and stressed in response to difficulties. They are preoccupied even by relatively minor problems, are not self-assured and feel strong emotional attachments and an empathic sensitivity to the feelings of others (Ashton & Lee, 2004).

People high on emotions are more likely to have a lower self-esteem than people who are emotionally stable. The strong link between emotional stability and self-esteem has been depicted by a meta-analytical study conducted by (Judge, Erez, Bono, & Thoresen, 2002) showing a population correlation between emotional stability and self-esteem of .64. Atwater et al. (1998) found that individuals who are not self-assured and doubt their own competence are more likely to use non-contingent punishment as a means to increase the leader's sense of power and to boost their self-esteem and self-worth. According to Bono Judge (2004) and the Judge et al. (2002) meta-analysis, we should expect emotionality to negatively predict transformational leadership. Therefore, we test the following hypothesis:

H3: Emotionality is positively related to non-contingent punishment and negatively to transformational leadership.

Extraversion: Describes a person's tendency to be expressive, comfortable or confident within a variety of social situations, sociable and lively (Ashton & Lee, 2004). Extraverts are willing to approach strangers, to speak up within group settings and enjoy conversation and social interaction and outline the tendency to be enthusiastic, energetic and optimistic (Ashton & Lee, 2004).Given that extraverts have high social self-esteem (i.e., they have positive self-regard, are generally satisfied with themselves) and are confident within a variety of social situations, leaders who score high on extraversion are less likely to outline the tendency to apply unfair, non-contingent punishments. Leaders high in extraversion believe that they can exert influence or power over followers without resorting to unjust or unfair punishment (Atwater et al., 1998). In addition, due to their heightened self-esteem, coupled with their tendency to be enthusiastic and optimistic, extraverted leaders are more likely to outline the tendency to provide contingent rewards than leaders who score low on extraversion (Bono & Judge, 2004). Because of their confidence and their social approach, leaders high in extraversion probably have a propensity to administer contingent punishment more frequently than do leaders who score low on extraversion because introverts should shy away from situations that require confrontational conversations (even if the purpose is to provide constructive feedback).

Because confidence and cheerfulness, which are prototypical of good customer service in Western countries, are elements that are valued by customers (and supervisors to whom customer centricity is important), we expect extraversion to predict both sales volume and supervisory ratings. According to Antonakis and House (2002) as well as Bono and Judge (2004), extraversion positively predicts inspirational motivation and is the strongest and most consistent correlate of

transformational leadership. Finally, followers who are exposed to introverts, are theoretically more likely to have a negative attitude toward their leader, be more indifferent towards their work and less likely to follow the company's and the leader's policy; thus, we would expect to see a higher level of inventory shrinkage with lower extraversion. Hence, we test the following hypothesis:

H4: Extraversion is positively related to transformational leadership, contingent rewards, contingent punishment, sales volume and supervisory ratings of performance, and negatively related to non-contingent punishment and inventory shrinkage.

Agreeableness: These individuals tend to be forgiving, flexible and patient. They are gentle in dealing with other people (as opposed to being critical in their evaluations of others) and reluctant to judge others harshly (Ashton & Lee, 2004). They compromise and cooperate with others, are not stubborn and are not willing to argue, therefore, they accommodate others' suggestions even when they may be unreasonable (Ashton & Lee, 2004). According to Judge and Bono (2004), there are several leadership behaviors that might be exhibited by individuals high in agreeableness. First, because of their concern for others, they are likely to be concerned with individuals' growth and development needs (individualized consideration) and are likely to be sure that individuals are rewarded appropriately and praised "for work well done" (contingent reward). Moreover, leaders who score high on agreeableness may be seen as role models because of their trustworthiness and consideration for others. The aforementioned meta-analytic results indicate a positive relation between agreeableness and transformational leadership.

With regard to punishment behaviors, agreeable leaders are empathetic when delivering critical feedback and encourage a pleasant, friendly and fair work

environment (D. Mayer, Nishii, Schneider, & Goldstein, 2007). As with individuals who are high on affiliation it is unlikely they will engage in contingent punishment behaviors (Antonakis & House, 2002). Furthermore, leaders low in agreeableness tend to be impatient with others and have a low threshold for expressing anger (and are thus more likely to show non-contingent punishments). Based on our arguments mentioned above, we tested the following hypothesis:

H5: Agreeableness positively predicts transformational leadership, contingent reward as well as contingent punishment and is negatively related to non-contingent punishment.

Conscientiousness: Conscientious individuals tend to be organized, diligent, perfectionist, and prudent (Ashton & Lee, 2004). They prefer a structured approach to tasks, have high self-discipline, work hard, are strongly motivated to achieve, do not tolerate errors in their work and they carefully check for mistakes and potential improvements (Ashton & Lee, 2004). Following Judge & Bono (2004), who showed very weak effects of conscientiousness on transformational leadership, there is no particular reason to expect that conscientious individuals will exhibit vision, enthusiasm, or creativity, characteristics that are primarily linked to transformational leadership. Because contingent reward leadership entails defining constructive transactions whereby informal contracts are established between the leader and follower (Bass, 1985), conscientious leaders should better define and deliver on such contracts because of their propensity to be diligent. Thus, conscientiousness should predict contingent reward leadership. From a technical perspective Barrick, Mount, and Strauss (1993) found that individuals high in conscientiousness are more likely to set goals and are more likely to be committed to goals, which in turn should be associated with greater sales volume and higher supervisory ratings of job

performance. Individuals who score higher in conscientiousness develop higher levels of job knowledge, probably because highly conscientious people exert greater levels of effort on their jobs (Robbins, Judge, & Campbell, 2010). The higher levels of job knowledge then contribute to higher levels of job performance. Thus, leaders who are conscientious and well organized should also be able to better manage inventory systems. Barrick and Mount (1991) found that conscientiousness (r = .22) is a signification predictor of overall job performance as corroborated by Hurtz and Donovan (2000). People who are dependable and disciplined will be evaluated more positively than those who are not (J. Hogan & Holland, 2003).

Finally, given their high commitment to goals and their tendency to be perfectionists (e.g., to carefully check for mistakes and potential improvement), leaders high in conscientiousness are more likely to demonstrate contingent punishment than leaders who score low on conscientiousness. Based on our arguments and previous empirical results, we test the following hypothesis:
H6: Conscientiousness is positively related to contingent reward, contingent punishment, sales volume and supervisory ratings, and negatively related to inventory shrinkage.

Openness to experience: Individuals who are open to experience are inquisitive, creative, and imaginative and have an inclination for original thought (Ashton & Lee, 2004). They also have the tendency to be unconventional, accept the unusual and to be receptive to ideas that might seem strange or radical (Ashton & Lee, 2004). Because they are creative, individuals high in openness to experience are likely to approach problems from different angles and, therefore, to score high in intellectual stimulation, a dimension of transformational leadership. Moreover, due to their imagination, they may also exhibit inspirational leadership behaviors and be able

to see a vision for the organization's future (Bono & Judge, 2004). Consequently, we tested the following:

H7: Openness positively predicts transformational leadership.

Method

Sample and procedures

A large drug-store chain based in Switzerland agreed to provide access to 111 store managers and their 778 direct reports. Each manager (hereafter referred to as leader) was responsible for a store located in the French speaking (n=84) or German speaking (n=27) cantonal regions of Switzerland. From a total of 111 leaders, 84 completed all questionnaires. Therefore our response rate on the complete dataset was 79% (note, as we explain later, we exploit the n=111 dataset by using maximum likelihood estimation for missing data). On average, the leaders were 42.92 years old (SD = 8.73) having been on average 11.23 years (SD = 8.49) in their current positions. Fifty-eight percent of the leaders were female. A total of 466 direct reports (response rate of 60%) provided leadership evaluations for an average of over 4 respondents per leader; 97% of the leaders' direct reports were female.

In a 30 minute company-wide meeting in July 2012, we provided all leaders with the relevant information pertaining to our study. As an incentive to participate, the leaders were informed that they would receive detailed feedback reports on their personality and leadership style. The leaders were given two weeks' time to inform their direct reports about the study and the required 360 degree ratings. After two weeks, the leaders provided their personal information, their leadership and personality self-ratings. Their direct reports filled out the leadership questionnaire to describe the perceived leadership style of their leader. The questionnaires were administered online and anonymously via a secure server. We obtained data on the

leaders' fluid intelligence (i.e., information-processing speed) during another company meeting in January 2013. The drug-store chain's human resources directors provided supervisory ratings.

The objective outcome variables (i.e., sales volume and inventory shrinkage) were given to us by the headquarters for the 2012-2013 time period. The sales data included the 4th quarter of 2012 and the first two quarters of 2013 (except for June). Thus, the shrinkage measures partially overlapped with the time period of the psychometric measures[2]. It is noteworthy that the modeled independent variables were all strongly exogenous; that is, the individual differences are stable across time, as is the case with the other control variables (e.g., sales surface, location, and so forth, see below). Because the exogenous variables cannot possibly change as a function of the objective performance measure (i.e., inventory shrinkage), our estimator are consistent and the validity results we demonstrate can be interpreted as concurrent for shrinkage and predictive for sales volume.

Given the design, we avoided threats to validity due to common-source or common-method variance because all the independent and dependent variables in our models were obtained from different sources (e.g., leaders and followers), used different measures (psychometric measure, objective data) and at different times (P. M. Podsakoff, MacKenzie, & Podsakoff, 2012).

Measures

Intelligence: We measured the store leaders' fluid ability using the Zahlen-Verbindungs-Test (ZVT, Forms A, B, C, and D), a trail-making test, in which subjects draw lines to connect randomly positioned but adjacent numbers, ranging from 1 to

[2] Although the sales measure overlapped partially with the measure of fluid intelligence, whether we included the 4th quarter data of 2012 or not did not change results or interpretations. Thus, we retained the results that include the 4th quarter data.

90, in a numerical order in order to obtain an index of information-processing speed (Oswald & Roth, 1987). Performance is indicated by the number of connected number points within a given 30 second-time limit. Thus, individual differences in test scores are a function of the speed with which the subject responds to individual items (Rammsayer& Stahl, 2007). The faster the person is able to work, the more items will be completed. Proceeding from these considerations, a higher level of mental ability should be reflected by a larger number of completed items within a given time limit. We used the raw score as a proxy for intelligence.

The ZVT has high reliability (between 0.84 and 0.98; we modeled the scores with a reliability of .85 to correct for measurement errors). Findings provide considerable support for the notion that speed of information processing is an integral component of general intelligence (Vernon, 1993). Oswald and Roth (1987) referred to substantial correlations (.40–.83) with other measures of intelligence, as for example, Advanced Progressive Matrices, Cattell's Culture Fair Test, and the Wechsler Adult Intelligence Scale. More recent studies reported correlation coefficients ranging from .62 to .77 between ZVT performance and a *g* factor of intelligence extracted from 15 subtests assessing different aspects of intelligence such as verbal comprehension, word fluency, number, space, flexibility of closure, perceptual speed, reasoning as well as verbal, numerical, and spatial memory (Rammsayer& Stahl, 2007). Similarly, Bazana and Stelmack (2002) found that ZVT performance exhibited substantial factor loadings on the *g* intelligence factor of almost the same magnitude as the correlation coefficients obtained by Rammsayer (2007). Because people who do well on one kind of mental test tend to do well on all others (Gottfredson, 2002) and the fact that information-processing speed strongly

correlates with other measures of intelligence, the ZVT measure is a relatively good proxy for general mental intelligence.

Personality: We measured the participants' personality (i.e., Honesty-Humility, Emotionality, Extraversion, Agreeableness, Conscientiousness, and Openness to new experience) using the French, German, English, and Italian personality inventory, HEXACO (K. Lee & Ashton, 2004). The HEXACO exhibits good psychometric properties (R. E. De Vries, Lee, & Ashton, 2008). Cronbach's alpha reliabilities of the HEXACO facet scales are reported to range from .77 to .92 (R. E. de Vries, 2012; K. Lee & Ashton, 2004; K. Lee et al., 2008). We used the population reliabilities (reported in the HEXACO norms) of .83 for Honesty-Humility, .84 for Emotionality, .85 for Extraversion, .84 for Agreeableness, .82 for Conscientiousness, and .81 for Openness. Participants rated their own personality on a scale of 1 (strongly disagree) to 5 (strongly agree).

Leadership behavior: To obtain measures of leadership style we used the transformational leadership inventory, TLI(P. M. Podsakoff et al., 1996; P. M. Podsakoff et al., 1990). Because this inventory measures transformational and contingent reward leadership we also gathered data on contingent-punishment and non-contingent punishment, using well-validated scales (P. M. Podsakoff et al., 1982; Philip M. Podsakoff, Todor, Grover, & Huber, 1984). Overall the leader measures consisted of 33 items pertaining to *transformational leadership* (i.e., articulating a vision, providing an appropriate model, fostering the acceptance of group goals, communicating high-performance expectations, providing individual support, intellectual stimulation), and *transactional leadership* (i.e., contingent reward, contingent punishment, and non-contingent punishment). Given the relatively small sample size, following convention, we averaged the transformational leadership scales

into one factor. It is noteworthy that the leader was the only target of the leadership ratings and we only used the ratings of the followers and not the leader self-ratings because the latter are biased and self-serving (P. M. Podsakoff & Organ, 1986). The items were rated on a frequency scale from 1 (Not at all) to 5 (Frequently, if not always). The observed reliabilities were .88, .92, .83, .73 for transformational, contingent reward, contingent punishment, and non-contingent punishment respectively.

Sales volume: We obtained data on the unit level sales volumes from the 4th quarter of 2012 to the first two quarters of 2013 (excluding June).

Inventory shrinkage: This measure gauged how the observed inventory differed from the expected inventory (i.e., the inventory on hand based on actual sales and purchases) throughout 2012. We coded the data so that positive numbers of shrinkage indicated a larger deviation from the expect value of inventory.

Supervisory ratings: We used the eight functional dimensions of supervisory performance identified by Mahoney, Jerdee, and Carroll (1964) to evaluate current leadership effectiveness. The dimensions on which supervisory evaluations were based were *Planning* (e.g., determining goals, policies, and courses of action); *Investigating* (e.g., collecting and preparing information, usually in the form of records, reports, and accounts); *Coordinating* (e.g., exchanging information with people in the organization other than subordinates in order to relate and adjust programs); *Evaluating* (e.g., assessment and appraisal of proposals or of reported or observed performance); *Supervising* (e.g., directing, leading, and developing subordinates); *Staffing* (e.g., recruiting, interviewing candidates, selecting employees, placing employees, promoting employees, transferring employees); *Negotiating* (e.g., purchasing, selling, or contracting for goods and services), and *Representing* (e.g.,

advancing general organizational interests through speeches, consultation, and contacts with individuals or groups outside the organization). Using descriptions of the above, the superiors provided ratings on a seven-point scale (1 = Low performance to 7 = High performance) for each of the leaders. The corporate HR office provided these ratings and we controlled for the fixed evaluator effect. The observed reliability of the scale was .94.

Additional control variables: We included leader age, gender (female = 1, otherwise 0), first language (French = 1, otherwise = 0) and tenure with the company in the position of leader. Because we collected data on stores and regions, we used fixed-effects of the store location (integrated into a shopping mall = 1, otherwise 0) as well as cantonal region (French speaking Switzerland = 1, otherwise 0). We also controlled for the size of the population (i.e., potential customer base) using the postal code of the store, as well as the sales surface of each store measured in square meters. Finally, we included a dummy variable for the fixed-effects of data gathering.

Estimation strategy: We first estimated one-way ANOVA models to determine whether we could aggregate the follower ratings of leadership to the unit level. ICC1's for the leader scales were all very high, ranging from .21 to .31 (with a mean of .26) and all F-tests were highly significant ($p < .001$); ICC2's (reliability of the means) were also high, ranging from .56 to .66 (with a mean of .61).

For all analyses, we used Stata12 to fit structural-equation models with a robust variance estimator (White, 1980). As mentioned, because we had some missing data for some of the leaders, we used a maximum-likelihood estimator for missing data (MLMV) so as to exploit the variation in the whole dataset. To ensure that the missing data patterns were uncorrelated with the measured variables, we correlated a dummy variable indicating "missingness" with all outcome variables. Results showed

no significant correlation between the dummy variable and any of the outcome variables. The advantage of using the MLMV estimator (or what is also known as FIML) is that we maintain the full sample size and thus increase power to detect effects as compared to listwise deletion.

Given that the independent variables indicating personality and intelligence were not perfectly measured, we used population reliabilities to correct for the effects of measurement error by indicating a latent variable for the observed proxy, x, and constraining its disturbance to (1 – reliability) * Variance_x. Correcting for measurement error in this way is important to avoid biased estimates (Antonakis et al., 2010).

In terms of estimation, we modeled the direct influence of distal individual differences (personality and intelligence) on each of the proximal individual differences (transformational leadership, contingent reward, contingent punishment, and non-contingent punishment, i.e., models 1 to 5). Then we modeled the direct influence of distal individual differences on performance outcomes (number of transactions, employee turnover, and managerial evaluations, i.e., models 6 to 8.).

Results

Refer to Table 1 for the descriptive statistics and correlations of the variables used in this study.

[Table 1 here]

Table 2 and 3 report the estimated coefficients of the effects of distal leader traits on perceived proximal leader behaviors (Model 1 – 4) and on measures of leadership effectiveness (Model 5 – 7). Given our restricted sample size (n=111) relative to the number of independent variables and controls (7 individual difference variables plus 10 control variables), we tested whether the variance explained by our models is

significantly different from models that include randomly normal distributed independent variables (i.e., noise). Using 17 random variables and simulating the dataset 5000 times produces r-squares that range from .15 to .16 within a 95% confidence interval. The mean F-statistics for the regression equation using random variables is 1.03. However, at 17 and 93 numerator and denominator degrees of freedom respectively, a mean F-statistic of 1.73 is necessary to be significant at $p < .05$. Hence, given that the r-squares range between .31 and .59 with significant F-statistics indicate that our models do much better than chance would do (the upper confidence interval of the bootstrapped r-square does not overlap with the lower-bound r-square). The same holds true four our models that only included the 7 individual differences variables. Table outline a summary of the hypothesized direction of the relationships for Model 1-7 and reports the significant estimates. We report significance levels from $p < .10$ because of our somewhat small sample size.

[Table 2, 3, and 4 here]

Overall, the individual differences (personality and intelligence, without the controls) jointly predicted a significant amount of variance in the dependent variables (see $R^{2(a)}$ in Tables 2 and 3), except for Model 6. The individual differences simultaneously demonstrated incremental prediction beyond the control variables (see Incremental validity test$^{(c)}$ in Tables 2 and 3), except for Models 5 and 6, though some of the individual coefficients were significant.

In terms of specific hypothesis tests, our results provide some support for the theorized relations. More specifically, as regards Hypothesis 1, intelligence was strongly and significantly predictive of managerial ratings of performance (standardized $\beta = .47$). It was unrelated to the rest of the measures. For Hypothesis 2, honesty-humility strongly and negatively predicted contingent punishment

(standardized β= -.45). It also predicted sales volume (standardized β = .25) however, it did not predict other measures. As regards Hypothesis 3, emotionality negatively predicted non-contingent punishment (standardized β= -.41).

For Hypothesis 4, and in accordance with meta-analytic results, extraversion was the strongest predictor of the leadership behaviors, positively predicting transformational (standardized β= .67), and contingent reward leadership (standardized β= .75). It negatively predicted non-contingent punishment (standardized β= -.68). Extraversion also negatively predicted inventory shrinkage (standardized β = -.51).

With respect to Hypothesis 5, leaders high in agreeableness engaged in less non-contingent punishment (standardizedβ = -.31). For Hypothesis 6, conscientiousness strongly predicted supervisory ratings of performance (standardized β= .47). However, our results show no significant effects of conscientiousness on the other measures. Finally, for Hypothesis 7, and contrary to what we expected, we found that openness was negatively related to transformational leadership (standardized β= -.25).

Overall the results provide some support for the hypotheses. However, there were some unexpected findings particularly with respect to openness, which was positively predictive of non-contingent punishment (standardized β = .27) and negatively predictive of contingent reward (standardized β = -.26). Additionally, emotionality positively predicted sales volume (standardized β = .42) and negatively predicted inventory shrinkage (standardized β = -.51). Finally, agreeableness predicted managerial ratings of performance (standardized β = -.26).

Discussion

Our findings give some support to the assertion that leader behaviors and leader effectiveness are a function of distal leader traits. With regard to predicting leadership effectiveness, conscientiousness and intelligence showed strong results. We found a relatively high multiple correlation (multiple R = .46) for distal leader traits only predicting supervisory ratings (cf. Judge, Bono, et al., 2002; Schmidt & Hunter, 1998). Although there is evidence that subjective measures of leadership effectiveness converge with objective measures of work group performance (R. Hogan, Curphy, & Hogan, 1994), our results only showed significant effects of honesty on sales as well as extraversion and emotionality on inventory shrinkage. Although we had hoped to find several more individual difference predictors of objective performance, it is possible that our findings are explained by the fact that managerial ratings capture a broader and more complete picture of leader performance, including adherence to budgets, employee management, as well as other dimensions. The predictive effect of emotionality on sales and shrinkage was also an interesting outcome. Such results, however, have been shown before in terms of predicting effectiveness outcomes for difficult or complex jobs (Fortunato & Williams, 2002; Y. T. Lee, Stettler, & Antonakis, 2011; Sanna, Turley, & Mark, 1996).

With regard to the relationship between distal leader traits and proximal leader behaviors, extraversion outlined very strong effects on transformational leadership, contingent reward, contingent punishment and non-contingent punishment. The distal traits in our models predicted more variance on average in proximal leader behaviors (R-squared = .22; multiple R = .47) than in the Judge and Bono (2004) meta-analysis, which reported that the big five predicted on average an R-square of .05 (in the factors of the transformational and transactional leadership model). For the overall

transformational leadership composite they reported an R-square of .09 (to our R-square of .25). Hence, our results contrast with conclusions drawn by other researchers (Bono & Judge, 2004; Judge & Bono, 2000) that personality is rather weakly related to proximal leadership behaviors.

Perhaps the weak links between leader traits and leader behaviors and leader traits and leader outcomes in previous meta-analytical findings and other studies can be attributed to the inclusion of studies that had endogeneity issues (i.e., omitted variables, simultaneity, common-method variance, and measurement error). We avoided problems related to endogeneity by: (a) taking a multivariate approach and testing the relationships between multiple leader traits and outcomes simultaneously to reduce the risk of omitted variables; (b) using population reliabilities to correct for the effects of measurement error; (c) gathering independent and dependent variables from different sources to avoid common-method variance; and (d) controlling for contextual and microeconomic effects to ensure estimate consistency. It is also possible that our findings are explained by the fact that we used a more modern personality inventory and the Podsakoff transformational-transactional leadership model instead of the Bass-Avolio framework, which is more popular.

Implications

Our empirical contribution highlights the importance of bringing personality to the fore in leadership studies. Personality again showed that it is an important correlate of leadership behavior and thus useful for selection and assessment of leaders. Our results also highlight the practical utility of the HEXACO framework in predicting leadership. Consistent with recent literature on the distal antecedents to leadership effectiveness, traits manifest into expected behaviors particularly in situations where

leader discretion is high (Barrick & Mount, 1993), which was the case, to a certain degree, in our sample.

Are our results only specific to leaders? Although our study focuses on the relationship between leader individual differences and performance outcomes, some of our findings replicate previous research, which shows that the effect of traits on performance outcomes applies for all types and kinds of employees. Schmidt and Hunter's (1998) summary of cumulative empirical research and meta-analytic results involving millions of employees across all hierarchical levels, for example, show that general intelligence, integrity and conscientiousness are good predictors of future job performance. Similarly, focusing on the personality-performance relationship, Barrick and Mount (1991) and Barrick, Mount, & Judge (2001) showed in their summary of meta-analytic findings that conscientiousness is a valid predictor across performance measures (including, but not limited to supervisor ratings, sales performance, and managerial performance), occupations, and occupational groups and status (i.e., managers, skilled or semi-skilled workers, or job applicants). Because some of our findings, such as the positive relationship between intelligence as well as conscientiousness and supervisory ratings, replicate previous research, we can expect them to apply to both general and managerial populations.

Our finding that women are perceived to engage in contingent punishment behavior more often than men do is contrary to meta-analytic findings of Eagly, Johannesen-Schmidt, & van Engen, (2003) who found that "men, more than women, attend to subordinates' failures to meet standards" (Carli & Eagly, 2012, p. 445). How can these incongruent findings be explained? According to Heilman's (1983) lack of fit model, positive evaluations of leaders depend in part on the sex-typing of the context. If the target fits the ideal prototype that is expected in the context, a positive

evaluation will ensue (cf. Eagly, Karau & Makhijani, 1995). In addition, an incongruent context constraints what behaviors a leader can show, particularly agentic behaviors (Carli & Eagly, 2012). In our study the context is more feminine, that is, 97% of the leaders' direct reports were female; in such a context, the female prototype women may feel freer to show a wider range of behaviors, including range of behaviors, including contingent punishments, than would do men. The latter are now the ones that are out-of-role and have to use less contingent punishment behaviors. Hence, if the context is gender typed the leader, whose gender is congruent, has a right to demonstrate a greater behavioral repertoire.

In our study, we followed the call to take a multivariate approach (Zaccaro, 2012) and to test relationships between multiple leader traits and outcomes simultaneously, thus to correctly estimate the incremental contribution of a particular trait beyond the inclusion control variables (Antonakis et al., 2012). It was also important to control for a variety of contextual variables to ensure that all possible correlates of the outcomes were modeled. The fact that we were able to predict variance in leadership and outcomes beyond these controls attests to the explanatory power of our full models, which predicted on average 42.86% of the variance across all models (i.e., an average multiple correlation of .65).

The context of our study in Western Europe did not yield results that vary too significantly from those of other contexts, with the exception of openness (on leadership) and neuroticism (on inventory shrinkage), which had effects that were opposite to those we expected. Interestingly, in a large-scale Swiss sample (n = 460) of auditors, Y. T. Lee et al. (2011) also found that emotionality (i.e., neuroticism) had positive effects on outcomes and that openness had negative effects. Perhaps the Swiss context, with its rigorous precision to standards prefers individuals who are

more prosaic and conventional. Furthermore, it is possible that those who are high on emotionality (and via their worry) make sure to cross all "t's" and dot all "i's." Another commonality between our study and that of Y. T. Lee et al. (2011) is that both studies included many strong controls and had a strong design. It is possible that emotionality has different effects than we expected. Thus, it is important for future research to estimate complete contextualized models within and between firms and across different cultural contexts to determine just how these personality variables predict leadership outcomes. Measuring and integrating cross-organizational and cross-cultural contexts into process-type trait models will help to identify traits that are expected by followers in a given situation, which, in turn, indicate appropriate behaviors or depict behaviors that are expected to be linked to performance. Following leadership categorization theory (Lord et al., 1984), individuals attribute different traits to leaders depending on situational characteristics. In a healthcare environment such as a hospital, for example, followers might expect staff nurses to demonstrate more empathy or, in general, more relationship-oriented behaviors and less aggressive; in addition, their goal is to provide care that will contribute to a patient's general well-being or, if possible, a faster recovery. In a military setting, however, followers might expect leaders to demonstrate less empathy and more aggressive behaviors, because it will help leaders and followers alike to increase the chances of survival in critical- or life-threatening situations. Likewise, leaders in organizational contexts, which require the usage of integrative negotiation techniques in order ensure a higher sales performance in the long run might be expected by followers to outline more behaviors that are related to honesty and humility than would leaders in situations where the art of applying distributive negotiation techniques is key to short-term success. Hence, the effect size and the direction of our

model estimates might vary depending on the cross-organizational and/or cross-cultural context. Further research is necessary to understand these variations. The use of the new genre of leadership theory whilst applying the best practices for causal inferences should significantly further our understanding of the role and prediction power of leader-individual differences in different organizational settings, different contexts and different cultures. On the team level, context variables such as stress, cohesiveness, team conflict, trust, task interdependence as well as the nature of the task could be integrated in the model. Cross-organizational contextual variables such as organizational culture, climate, public- versus private-sector organizations, and/or organizational culture could provide valuable insights into the relationship between individual differences and leadership outcomes.

Limitations and Future Research

Although we obtained ratings on over 110 managers, the small sample size, coupled with the use of latent variables, limited testing an instrumental-variable process model (Antonakis et al., 2010); that is, we were unable to simultaneously estimate the causal chain of the effects of leader traits on behaviors and those of behaviors on outcomes. Another limitation of our study is that we only observed leadership in one organization and thus were unable to exploit how different organizational context may influence leader outcomes. However, we did control for microeconomic factors, which thus tempers this limitation. The fact that we focused on one organization holds many effects constant that would have otherwise been difficult to capture (e.g., staff pay, working conditions, etc.). Thus, any between unit variation cannot be due to organizational level factors but most likely to other contextual and microeconomic factors, including leadership. Given the significant findings, an advantage of having studied this organization is that they did not select leaders on the variables we used as

predictors. If they had been selected according to these variables, range restriction would have limited the findings.

Conclusion

The results of this study show some promises for the effects of traits on leader behaviors and outcomes, supporting recent suggestions that the field of leadership and individual difference is “on the cusp of a renaissance”. We hope that researchers continue to test and extend the new genre of process-type models in a more integrative and rigorous manner.

References

Adams, J. S. (1965). Inequity in Social-Exchange. *Advances in Experimental Social Psychology, 2*(4), 267-299.

Antonakis, John. (2011). Predictors of leadership: The usual suspects and suspect traits. In A. Bryman, D. Collinson, K. Grint, B. Jackson & M. Uhl-Bien (Eds.), *Sage Handbook of Leadership* (pp. 269-285). Thousand Oaks: CA: Sage.

Antonakis, John. (2012). Transformational and Charismatic Leadership. In D. V. Day & J. Antonakis (Eds.), *The Nature of Leadership* (2 ed., pp. 256-288). Thousand Oaks: Sage Publications, Inc.

Antonakis, John, & Atwater, L. (2002). Leader distance: a review and a proposed theory. *Leadership Quarterly, 13*(6), 673-704.

Antonakis, John, Bendahan, S., Jacquart, P., & Lalive, R. (2010). On making causal claims: A review and recommendations. *Leadership Quarterly, 21*(6), 1086-1120.

Antonakis, John, Day, D. V., & Schyns, B. (2012). Leadership and individual differences: At the cusp of a renaissance. *Leadership Quarterly, 23*(4), 643-650.

Antonakis, John, & House, R. J. (2002). An analysis of the full-range leadership theory: The way forward. In B. J. Avolio & F. J. Yammarino (Eds.), *Transformational and Charismatic Leadership: The Road Ahead* (pp. 3-34). Amsterdam: JAI Press.

Arvey, R. D., Rotundo, M., Johnson, W., Zhang, Z., & McGue, M. (2006). The determinants of leadership role occupancy: Genetic and personality factors. *Leadership Quarterly, 17*(1), 1-20.

Ashton, M. C., Lee, K., & Goldberg, L. R. (2004). A hierarchical analysis of 1,710 English personality-descriptive adjectives. *Journal of Personality and Social Psychology, 87*(5), 707-721.

Ashton, M. C., Lee, K., Perugini, M., Szarota, P., de Vries, R. E., Di Blas, L., . . . De Raad, B. (2004). A six-factor structure of personality-descriptive adjectives: Solutions from psycholexical studies in seven languages. *Journal of Personality and Social Psychology, 86*(2), 356-366.

Atwater, L. E., Dionne, S. D., Camobreco, J. F., Avolio, B. J., & Lau, A. (1998). Individual attributes and leadership style: predicting the use of punishment and its effects. *Journal of Organizational Behavior, 19*(6), 559-576.

Bakker-Pieper, A., & de Vries, R. E. (2013). The Incremental Validity of Communication Styles Over Personality Traits for Leader Outcomes. *Human Performance, 26*(1), 1-19.

Bandura, A. (1986). *Social Foundations of Thought and Action: A Social Cognitive Theory*. Englewood Cliffs: Prentice-Hall.

Barrick, M. R., & Mount, M. K. (1991). The Big 5 Personality Dimensions and Job-Performance - a Metaanalysis. *Personnel Psychology, 44*(1), 1-26.

Barrick, M. R., & Mount, M. K. (1993). Autonomy as a Moderator of the Relationships between the Big 5 Personality Dimensions and Job-Performance. *Journal of Applied Psychology, 78*(1), 111-118.

Barrick, M. R., Mount, M. K., & Strauss, J. P. (1993). Conscientiousness and Performance of Sales Representatives - Test of the Mediating Effects of Goal-Setting. *Journal of Applied Psychology, 78*(5), 715-722.

Bass, B. M. (1985). *Leadership and performance beyond expectations*. New York: Free Press.

Bass, B. M. (1997). Does the transactional-transformational leadership paradigm transcend organizational and national boundaries? *American Psychologist, 52*(2), 130-139.

Bass, B. M. (1998). *Transformational leadership: Industrial, military, and educational impact*. Mahwah, NJ: Erlbaum.

Bass, B. M., Avolio, B. J., Jung, D. I., & Berson, Y. (2003). Predicting unit performance by assessing transformational and transactional leadership. *Journal of Applied Psychology, 88*(2), 207-218.

Bass, B. M., Waldman, D. A., Avolio, B. J., & Bebb, M. (1987). Transformational Leadership and the Falling Dominoes Effect. *Group & Organization Studies, 12*(1), 73-87.

Bazana, P. G., & Stelmack, R. M. (2002). Intelligence and information processing during an auditory discrimination task with backward masking: An event-related potential analysis. *Journal of Personality and Social Psychology, 83*(4), 998-1008.

Bono, J. E., & Judge, T. A. (2004). Personality and transformational and transactional leadership: A meta-analysis. *Journal of Applied Psychology, 89*(5), 901-910.

Borman, W. C., Pulakos, E. D., White, L. A., & Oppler, S. H. (1991). Models of Supervisory Job-Performance Ratings. *Journal of Applied Psychology, 76*(6), 863-872.

Cavazotte, F., Moreno, V., & Hickmann, M. (2012). Effects of leader intelligence, personality and emotional intelligence on transformational leadership and managerial performance. *Leadership Quarterly, 23*(3), 443-455.

Chemers, M. M., Rice, R. W., Sundstrom, E., & Butler, W. M. (1975). Leader Esteem for Least Preferred Co-Worker Score, Training, and Effectiveness -

Experimental Examination. *Journal of Personality and Social Psychology, 31*(3), 401-409.

Costa, P. T., & McCrae, R. R. (1992). *NEO-PI professional manual*. Lutz: FL: Psychological Assessment Resources.

Darioly, A., & Mast, M. S. (2011). Facing an incompetent leader: The effects of a nonexpert leader on subordinates' perception and behaviour. *European Journal of Work and Organizational Psychology, 20*(2), 239-265.

de Vries, A., de Vries, R. E., & Born, M. P. (2011). Broad Versus Narrow Traits: Conscientiousness and Honesty-Humility as Predictors of Academic Criteria. *European Journal of Personality, 25*(5), 336-348.

de Vries, R. E. (2008). What are we measuring? Convergence of leadership with interpersonal and non-interpersonal personality. *Leadership, 4*, 403-417.

de Vries, R. E. (2012). Personality predictors of leadership styles and the self-other agreement problem. *Leadership Quarterly, 23*(5), 809-821.

de Vries, R. E., de Vries, A., de Hoogh, A., & Feij, J. (2009). More than the Big Five: Egoism and the HEXACO Model of Personality. *European Journal of Personality, 23*(8), 635-654.

De Vries, R. E., Lee, K., & Ashton, M. C. (2008). The dutch HEXACO personality inventory: Psychometric properties, self-other agreement, and relations with psychopathy among low and high acquaintanceship dyads. *Journal of Personality Assessment, 90*(2), 142-151.

de Vries, R. E., & van Kampen, D. (2010). The Hexaco and 5dpt Models of Personality: A Comparison and Their Relationships with Psychopathy, Egoism, Pretentiousness, Immorality, and Machiavellianism. *Journal of Personality Disorders, 24*(2), 244-257.

DeRue, D. S., Nahrgang, J. D., Wellman, N., & Humphrey, S. E. (2011). Trait and Behavioral Theories of Leadership: An Integration and Meta-Analytic Test of Their Relative Validity. *Personnel Psychology, 64*(1), 7-52.

Dunlop, P. D., Morrison, D. L., Koenig, J., & Silcox, B. (2012). Comparing the Eysenck and HEXACO Models of Personality in the Prediction of Adult Delinquency. *European Journal of Personality, 26*(3), 194-202.

Eagly, A. H., Karau, S. J., & Makhijani, M. G. (1995). Gender and the effectiveness of leaders: A meta-analysis. *Psychological Bulletin, 117*, 125–145.

Fortunato, V. J., & Williams, K. J. (2002). The moderating effects of dispositional affectivity on performance and task attitudes in a goal-setting context. *Journal of Applied Social Psychology, 32*(11), 2321-2353.

French, J., & Raven, B. H. (1968). The bases of social power. In D. Cartwright & A. F. Zander (Eds.), *Group dynamics: Research and Theory* (3 ed., pp. 259-270). New York: Harper & Row.

Gardner, W. L., Lowe, K. B., Moss, T. W., Mahoney, K. T., & Cogliser, C. C. (2010). Scholarly leadership of the study of leadership A review of The Leadership Quarterly's second decade, 2000-2009. *Leadership Quarterly, 21*(6), 922-958.

Goldberg, L. R. (1990). An Alternative Description of Personality - the Big-5 Factor Structure. *Journal of Personality and Social Psychology, 59*(6), 1216-1229.

Gottfredson, L. S. (1997). Why g matters: The complexity of everyday life. *Intelligence, 24*(1), 79-132.

Gottfredson, L. S. (2002). Where and why g matters: Not a mystery. *Human Performance, 15*(1/2), 25-46.

Greenberg, J. (1990). Employee theft as a reaction to underpayment inequity: The hidden cost of pay cuts. *Journal of Applied Psychology, 75*(5), 561-568.

Griffeth, R. W., Hom, P. W., & Gaertner, S. (2000). A meta-analysis of antecedents and correlates of employee turnover: Update, moderator tests, and research implications for the next millennium. *Journal of Management, 26*(3), 463-488.

Heilman, M. E. (1983). Sex bias in work settings: The lack of fit model. *Research in Organizational Behavior, 5*, 269-298.

Hoffman, B. J., Woehr, D. J., Maldagen-Youngjohn, R., & Lyons, B. D. (2011). Great man or great myth? A quantitative review of the relationship between individual differences and leader effectiveness. *Journal of Occupational and Organizational Psychology, 84*(2), 347-381.

Hogan, J., & Holland, B. (2003). Using theory to evaluate personality and job-performance relations: A socioanalytic perspective. *Journal of Applied Psychology, 88*(1), 100-112.

Hogan, R., Curphy, G. J., & Hogan, J. (1994). What We Know About Leadership - Effectiveness and Personality. *American Psychologist, 49*(6), 493-504.

Hogg, M. A. (2001). A social identity theory of leadership. *Personality and Social Psychology Review, 5*(3), 184-200.

House, R. J., & Aditya, R. N. (1997). The social scientific study of leadership: Quo vadis? *Journal of Management, 23*(3), 409-473.

Hurtz, G. M., & Donovan, J. J. (2000). Personality and job performance: The big five revisited. *Journal of Applied Psychology, 85*(6), 869-879.

Ilies, R., Gerhardt, M. W., & Le, H. (2004). Individual differences in leadership emergence: Integrating meta-analytic findings and behavioral genetics estimates. *International Journal of Selection and Assessment, 12*(3), 207-219.

Johnson, M. K., Rowatt, W. C., & Petrini, L. (2011). A new trait on the market: Honesty-Humility as a unique predictor of job performance ratings. *Personality and Individual Differences, 50*(6), 857-862.

Jonason, P. K., & McCain, J. (2012). Using the HEXACO model to test the validity of the Dirty Dozen measure of the Dark Triad. *Personality and Individual Differences, 53*(7), 935-938.

Judge, T. A., & Bono, J. E. (2000). Five-factor model of personality and transformational leadership. *Journal of Applied Psychology, 85*(5), 751-765.

Judge, T. A., Bono, J. E., Ilies, R., & Gerhardt, M. W. (2002). Personality and leadership: A qualitative and quantitative review. *Journal of Applied Psychology, 87*(4), 765-780.

Judge, T. A., Colbert, A. E., & Ilies, R. (2004). Intelligence and leadership: A quantitative review and test of theoretical propositions. *Journal of Applied Psychology, 89*(3), 542-552.

Judge, T. A., Erez, A., Bono, J. E., & Thoresen, C. J. (2002). Are measures of self-esteem, neuroticism, locus of control, and generalized self-efficacy indicators of a common core construct? *Journal of Personality and Social Psychology, 83*(3), 693-710.

Judge, T. A., & Piccolo, R. F. (2004). Transformational and transactional leadership: A meta-analytic test of their relative validity. *Journal of Applied Psychology, 89*(5), 755-768.

Judge, T. A., Piccolo, R. F., & Kosalka, T. (2009). The bright and dark sides of leader traits: A review and theoretical extension of the leader trait paradigm. *Leadership Quarterly, 20*(6), 855-875.

Kim, H. W., Xu, Y. J., & Gupta, S. (2012). Which is more important in Internet shopping, perceived price or trust? *Electronic Commerce Research and Applications, 11*(3), 241-252.

Lee, K., & Ashton, M. C. (2004). Psychometric properties of the HEXACO personality inventory. *Multivariate Behavioral Research, 39*, 329-348.

Lee, K., & Ashton, M. C. (2008). The HEXACO Personality Factors in the Indigenous Personality Lexicons of English and 11 Other Languages. *Journal of Personality, 76*(5), 1001-1053.

Lee, K., Ashton, M. C., Morrison, D. L., Cordery, J., & Dunlop, P. D. (2008). Predicting integrity with the HEXACO personality model: Use of self- and observer reports. *Journal of Occupational and Organizational Psychology, 81*, 147-167.

Lee, K. B., & Ashton, M. C. (2005). Psychopathy, Machiavellianism, and Narcissism in the Five-Factor Model and the HEXACO model of personality structure. *Personality and Individual Differences, 38*(7), 1571-1582.

Lee, Y. T., Stettler, A., & Antonakis, John. (2011). Incremental Validity and Indirect effect of Ethical Development on Work Performance. *Personality and Individual Differences, 50*(7), 1110-1115.

Liden, R. C., & Antonakis, J. (2009). Considering context in psychological leadership research. *Human Relations, 62*(11), 1587-1605.

Lord, R. G., Foti, R. J., & Devader, C. L. (1984). A Test of Leadership Categorization Theory - Internal Structure, Information-Processing, and Leadership Perceptions. *Organizational Behavior and Human Performance, 34*(3), 343-378.

Lowe, K. B., & Gardner, W. L. (2000). Ten years of the Leadership Quarterly: Contributions and challenges for the future. *Leadership Quarterly, 11*(4), 459-514.

Lowe, K. B., Kroeck, K. G., & Sivasubramaniam, N. (1996). Effectiveness correlates of transformational and transactional leadership: A meta-analytic review of the MLQ literature. *Leadership Quarterly, 7*(3), 385-425.

Mahoney, T., Jerdee, T., & Carroll, S. (1964). The Job(s) of Management.

Mayer, D. M., Kuenzi, M., Greenbaum, R., Bardes, M., & Salvador, R. (2009). How low does ethical leadership flow? Test of a trickle-down model. *Organizational Behavior and Human Decision Processes, 108*(1), 1-13.

Mayer, D., Nishii, L., Schneider, B., & Goldstein, H. (2007). The precursors and products of justice climates: Group leader antecedents and employee attitudinal consequences. *Personnel Psychology, 60*(4), 929-963.

McCrae, R. R., & Costa, P. T. (1997). Personality trait structure as a human universal. *American Psychologist, 52*(5), 509-516.

Meurs, J. A., Perrewe, P. L., & Ferris, G. R. (2011). Political Skill as Moderator of the Trait Sincerity-Task Performance Relationship: A Socioanalytic, Narrow Trait Perspective. *Human Performance, 24*(2), 119-134.

Mischel, W. (1973). Toward a Cognitive Social Learning Reconceptualization of Personality. *Psychological Review, 80*(4), 252-283.

Mumford, M. D., Zaccaro, S. J., Harding, F. D., Jacobs, T. O., & Fleishman, E. A. (2000). Leadership skills for a changing world: Solving complex social problems. *Leadership Quarterly, 11*(1), 11-35.

Oswald, W. D., & Roth, E. (1987). *Der Zahlen-Verbindungs-Test (ZVT)*. Göttingen: Hogrefe.

Podsakoff, P. M., Bommer, W. H., Podsakoff, N. P., & MacKenzie, S. B. (2006). Relationships between leader reward and punishment behavior and subordinate attitudes, perceptions, and behaviors: A meta-analytic review of existing and new research. *Organizational Behavior and Human Decision Processes, 99*(2), 113-142. doi: 10.1016/j.obhdp.2005.09.002

Podsakoff, P. M., MacKenzie, S. B., & Bommer, W. H. (1996). Transformational leader behaviors and substitutes for leadership as determinants of employee satisfaction, commitment, trust, and organizational citizenship behaviors. *Journal of Management, 22*(2), 259-298.

Podsakoff, P. M., MacKenzie, S. B., Moorman, R. H., & Fetter, R. (1990). Transformational leader behaviors and their effects on follower's trust in leader, satisfaction, and organizational citizenship behaviors. *The Leadership Quarterly, 1*(2), 107-142.

Podsakoff, P. M., MacKenzie, Scott B., & Podsakoff, Nathan P. (2012). Sources of Method Bias in Social Science Research and Recommendations on How to Control It. *Annual Review of Psychology, 63*(1), 539-569.

Podsakoff, P. M., & Organ, D. W. (1986). Self-Reports in Organizational Research - Problems and Prospects. *Journal of Management, 12*(4), 531-544.

Podsakoff, P. M., Todor, W. D., & Skov, R. (1982). Effects of Leader Contingent and Noncontingent Reward and Punishment Behaviors on Subordinate Performance and Satisfaction. *Academy of Management Journal, 25*(4), 810-821.

Podsakoff, Philip M., Todor, William D., Grover, Richard A., & Huber, Vandra L. (1984). Situational moderators of leader reward and punishment behaviors:

Fact or fiction? *Organizational Behavior and Human Performance, 34*(1), 21-63. doi: Doi: 10.1016/0030-5073(84)90036-9

Reber, A. S., Walkenfeld, F. F., & Hernstadt, R. (1991). Implicit and Explicit Learning - Individual-Differences and Iq. *Journal of Experimental Psychology-Learning Memory and Cognition, 17*(5), 888-896.

Robbins, S. P., Judge, T. A., & Campbell, T. T. (2010). *Organizational behavior*. United Kingdom: Pearson Educations STD.

Ruthsatz, J., Detterman, D., Griscom, W. S., & Cirullo, B. A. (2008). Becoming an expert in the musical domain: It takes more than just practice. *Intelligence, 36*(4), 330-338.

Sanna, L. J., Turley, K. J., & Mark, M. M. (1996). Expected evaluation, goals, and performance: Mood as input. *Personality and Social Psychology Bulletin, 22*(4), 323-335.

Sashkin, M. (2004). Transformational Leadership Approaches: A Review and Synthesis. In J. Antonakis, A. T. Cianciolo & R. J. Sternberg (Eds.), *The Nature of Leadership* (1 ed., pp. 171-196). Thousand Oaks: Sage Publications, Inc.

Schmidt, F. L., & Hunter, J. E. (1998). The validity and utility of selection methods in personnel psychology: Practical and theoretical implications of 85 years of research findings. *Psychological Bulletin, 124*(2), 262-274.

Schmidt, F. L., & Hunter, J. E. (2004). General Mental Ability in the world of work: occupational attainment and job performance. *Journal of Personality and Social Psychology, 86*(1), 162-173.

Schmidt, F. L., Hunter, J. E., & Outerbridge, A. N. (1986). Impact of Job Experience and Ability on Job Knowledge, Work Sample Performance, and Supervisory Ratings of Job-Performance. *Journal of Applied Psychology, 71*(3), 432-439.

Shamir, B. (1995). Social Distance and Charisma - Theoretical Notes and an Exploratory-Study. *Leadership Quarterly, 6*(1), 19-47.

Simonton, D. K. (1985). Intelligence and Personal Influence in Groups - 4 Nonlinear Models. *Psychological Review, 92*(4), 532-547.

Tett, R. P., & Guterman, H. A. (2000). Situation trait relevance, trait expression, and cross-situational consistency: Testing a principle of trait activation. *Journal of Research in Personality, 34*(4), 397-423.

Vernon, P. A. (1993). Der-Zahlen-Verbindungs-test and other trail-making correlates of general intelligence. *Personality and Individual Differences, 14*(1), 35-40.

Vincent, A. S., Decker, B. P., & Mumford, M. D. (2002). Divergent thinking, intelligence, and expertise: A test of alternative models. *Creativity Research Journal, 14*(2), 163-178.

von Wittich, D., & Antonakis, J. (2011). The KAI cognitive style inventory: Was it personality all along? *Personality and Individual Differences, 50*(7), 1044-1049.

Wang, G., Oh, I. S., Courtright, S. H., & Colbert, A. E. (2011). Transformational Leadership and Performance Across Criteria and Levels: A Meta-Analytic Review of 25 Years of Research. *Group & Organization Management, 36*(2), 223-270.

White, H. (1980). A Heteroskedasticity-Consistent Covariance-Matrix Estimator and a Direct Test for Heteroskedasticity. *Econometrica, 48*(4), 817-838.

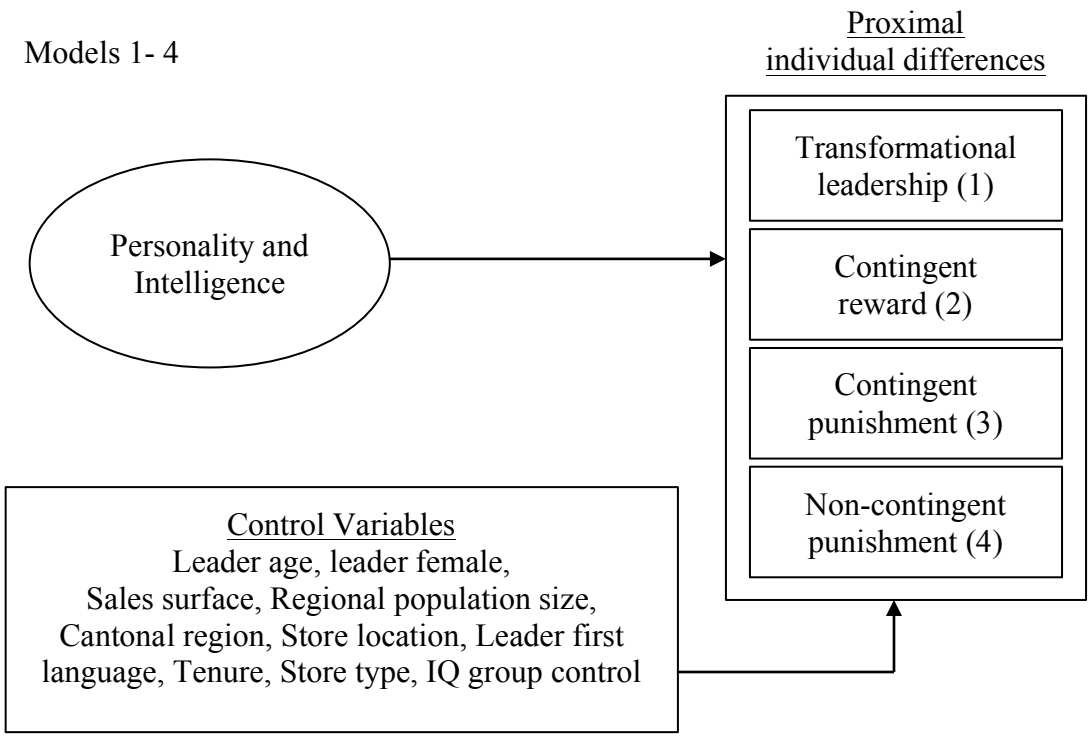
Zaccaro, S. J. (2007). Trait-based perspectives of leadership. *American Psychologist, 62*(1), 6-16.

Zaccaro, S. J. (2012). Individual differences and leadership: Contributions to a third tipping point. *Leadership Quarterly, 23*(4), 718-728.

Zaccaro, S. J., Kemp, C., & Bader, P. (2004). Leader Traits and Attributes. In J. Antonakis, A. T. Cianciolo & R. J. Sternberg (Eds.), *The Nature of Leadership* (1 ed., pp. 101-124). Thousand Oaks: Sage Publications, Inc.

Zaccaro, S. J., Kenny, D. A., & Foti, R. J. (1991). Self-Monitoring and Trait-Based Variance in Leadership - an Investigation of Leader Flexibility across Multiple Group Situations. *Journal of Applied Psychology, 76*(2), 308-315.

Figure 1
Effects of Distal- on Proximal Individual Differences (Model 1-5) and Distal Individual Differences on Leadership Effectiveness (Model 6-7)



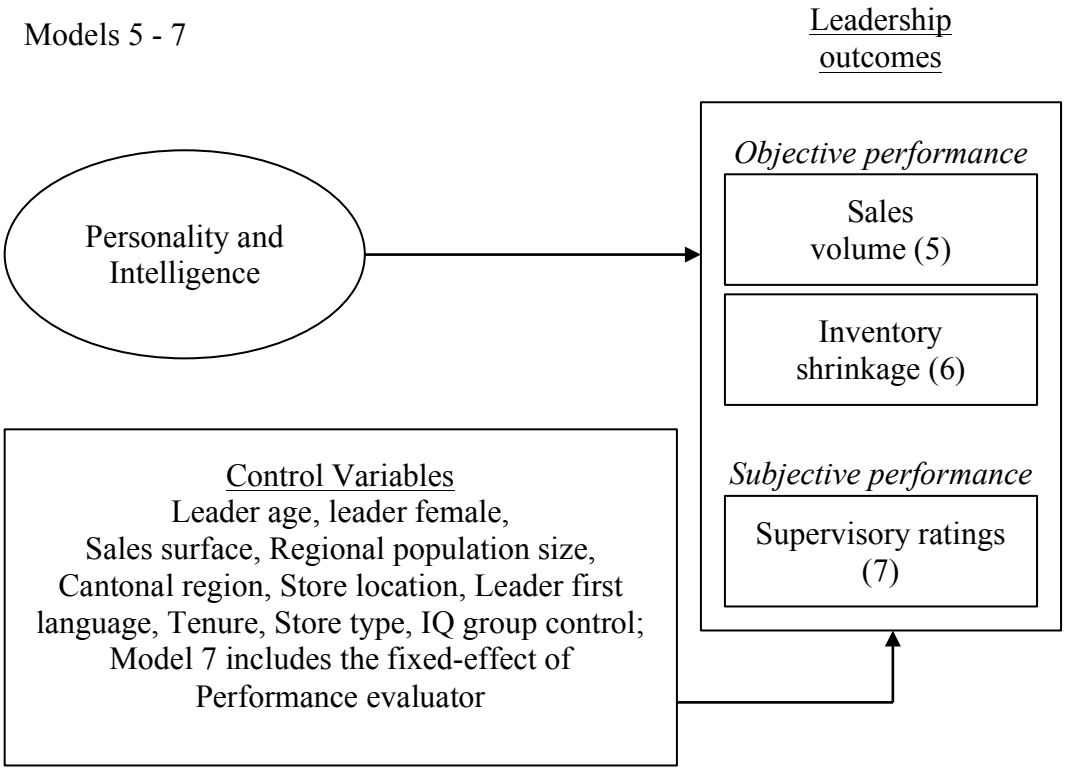


Table 1: Correlation matrix of key individual difference variables, perceived leadership behavior and outcome variables.

	Means	Std	1	2	3	4	5	6	7	8	9	10
1 Honesty	3.79	.46										
2 Emotionality	3.01	.59	-.14									
3 Extraversion	3.66	.54	.19	-.21								
4 Agreeableness	3.09	.44	.07	-.04	-.02							
5 Conscientiousness	3.85	.42	.15	.08	.51	-.22						
6 Openness	3.65	.45	.17	-.04	.13	.19	-.01					
7 Intelligence	44.10	10.78	-.03	-.09	-.05	-.27	-.14	-.06				
8 Transformational	3.34	.63	-.05	-.10	.36	-.11	.18	-.17	.17			
9 Contingent reward	3.50	.81	-.09	-.06	.38	.00	.11	-.12	.05	.82		
10 Contingent punishment	2.84	.64	-.20	.04	.20	-.18	.19	-.03	-.02	.42	.33	
11 Non-con punishment	1.55	.47	-.07	.07	-.31	-.13	-.07	.03	-.16	-.54	-.58	.17
12 Sales volume	3.00	1.80	.14	.09	.22	-.29	.32	.02	.01	-.01	.00	-.01
13 Inventory shrinkage	1.62	1.88	.03	-.06	-.05	-.06	.01	.08	-.12	-.18	-.11	-.14
14 Supervisory ratings	5.64	1.40	.06	-.06	.26	-.19	.27	-.09	.22	.29	.13	.21
15 Leader age	42.92	8.73	.16	-.32	.02	.12	-.07	.26	-.43	-.24	-.10	-.17
17 Leader female	.58	.49	.24	.33	.20	.06	.11	.03	-.18	.05	.10	.17
18 Sales surface	293.70	125.72	-.05	.18	.22	-.20	.22	.02	.04	.03	.14	.01
19 Regional population size	42.67	62.23	.08	-.06	-.05	-.05	-.17	.03	.01	.12	.15	.24
20 Canton region	.76	.43	.18	-.17	.31	-.17	.38	.06	.10	.09	.12	-.04
21 Store location	.67	.47	-.10	-.12	.16	-.06	.12	-.07	.01	.05	.04	.01
22 Leader first language	.56	.75	.12	.16	-.01	-.28	.23	-.04	.24	.16	.08	.04
23 Tenure	11.23	8.49	.08	-.32	.05	.00	-.01	.15	-.20	-.15	-.07	.01
24 Store type	.98	.13	-.03	.05	.05	.01	.01	-.04	.08	-.07	.04	-.03
25 IQ group control	.37	.48	.12	-.03	-.01	-.08	.06	-.08	.28	.06	.07	.08

Table 1 (continued)

	11	12	13	14	15	17	18	19	20	21	22	23	24
12 Sales volume	-.07												
13 Inventory shrinkage	-.06	.28											
14 Supervisory ratings	-.18	.26	.00										
15 Leader age	.16	.00	.02	-.15									
17 Leader female	.03	.05	-.02	.16	-.06								
18 Sales surface	-.10	.52	.16	.03	-.09	-.05							
19 Regional population size	-.09	.04	.22	.15	-.04	-.09	-.11						
20 Canton region	-.28	.43	.17	.03	-.02	.15	.16	-.10					
21 Store location	-.09	.30	.09	-.06	-.06	-.14	.38	-.11	.09				
22 Leader first language	-.12	.14	-.04	.16	-.12	.05	-.11	-.08	.64	-.05			
23 Tenure	.13	.16	-.04	.00	.78	-.06	.06	-.09	-.06	.00	-.10		
24 Store type	.06	.14	-.12	.17	.03	.16	.19	-.25	-.08	.05	.02	.03	
25 IQ group control	-.12	.04	.03	.00	-.13	-.01	-.01	-.01	.44	-.04	.34	-.13	-.04

Notes: n = 111 (ratings on leadership aggregated from 466 followers); estimates are maximum likelihood. r> |0.16|, $p < 0.10$; r > |0.19|, $p < .05$; r > |0.25|, $p < .01$; r > |31|, $p < .001$. Sales volume is rescaled (divided by 1'000,000); Regional population size is rescaled (divided by 1,000).

Table 2: Distal individual differences as predictors of proximal individual differences.

	Model 1 Transform. Leadership	Model 2 Contingent reward	Model 3 Contingent punishment	Model 4 Non-cont. punishment
Individual differences				
Honesty-Humility	-.15	-.23	-.45***	-.08
Emotionality	.06	.16	-.21	-.41*
Extraversion	.67***	.75***	.16	-.68**
Agreeableness	.08	.14	-.14	-.31**
Conscientiousness	-.14	-.28	.22	.35
Openness	-.25**	-.26**	.18	.27*
Intelligence	.13	.05	-.20	-.27
Controls				
Leader age	.00	.18	-.47**	-.15
Leader female	.03	.01	.35**	.28*
Sales surface	.03	.14	.00	.00
Regional population size	.12	.20	.32***	-.07
Cantonal region	-.30**	-.18	-.49***	-.22
Store location	-.02	-.05	.01	-.04
Leader first language	.42**	.39**	.24	-.25
Tenure	-.02	-.05	.37	.03
Store type	-.14*	-.03	-.02	.09
IQ group control	.03	.08	.29***	.09
Constant	6.29***	3.11**	6.12***	3.79***
$R^{2(a)}$	.25***	.25***	.15*	.23**
$R^{2(b)}$	.38***	.37***	.46***	.38***
Incremental validity test[(c)]	33.46***	32.05***	26.19***	13.92*

* = p < .10, ** = p < .05, *** = p < .01, *n* = 111. Note, estimates are standardized (standard errors are robust). [a]=personality and intelligence only; [b]=full model including all predictors and controls; [c]= Wald χ^2test (df = 7) of incremental validity of personality and intelligence over control variables.

Table 3: Distal individual differences as predictors of outcome variables.

	Model 5 Sales Volume	Model 6 Inventory Shrinkage	Model 7 Supervisory Evaluations
Individual differences			
Honesty-Humility	.25**	-.10	-.11
Emotionality	.42*	-.51***	-.15
Extraversion	.11	-.51**	.03
Agreeableness	-.14	-.11	.26*
Conscientiousness	-.11	.24	.47**
Openness	-.03	.16	-.12
Intelligence	-.08	-.15	.47**
Controls			
Leader age	-.12	.09	-.02
Leader female	-.22	.24	.28*
Sales surface	.19*	.25**	.09
Regional population size	.17**	.20**	.18
Cantonal region	.54***	.37*	-.06
Store location	.20**	-.01	-.01
Leader first language	-.04	-.40***	.20
Tenure	-.12	.09	-.02
Store type	.20**	-.05	.08
IQ group control	-.17	.04	-.14
Performance evaluator			.53***
Constant	-.96	.02	2.00*
$R^{2(a)}$	.22*	.10	.21*
$R^{2(b)}$	.51***	.31**	.59***
Incremental validity test[(c)]	14.81**	9.75	17.24**

* = p < .10, ** = p < .05, *** = p < .01, *n* = 111. Note, estimates are standardized (standard errors are robust). [a]=personality and intelligence only; [b]=full model including all predictors and controls; [c]= Wald χ^2test (df = 7) of incremental validity of personality and intelligence over control variables.

Table 4: Summary of hypothesized direction of relationship and results

		Proximal traits												Outcomes					
		Transformational leadership		Contingent Reward		Contingent Punishment		Non-Contingent Punishment		Sales volume		Inventory shrinkage		Supervisory Evaluations	
	Model	1		2		3		4		5		6		7	
Distal traits	Honesty-Humility			+		-	**-.45**	-		+	.25	-		+	
	Emotionality	-						-	*-.41*		*.42*		**-.51**		
	Extraversion	+	**.67**	+	**.75**	+		-	-.68	+		-	-.51	+	
	Agreeableness	+		+		+		-	-.31						*.26*
	Conscientiousness			+		+				+		-		+	.47
	Openness	+	-.25		-.26				*.27*						
	Intelligence	+				+		-		+		-		+	.47
	$R^{2(a)}$		**.25**		**.25**		*.15*		.23		**.22**				*.21*
	$R^{2(b)}$		**.38**		**.37**		**.46**		**.38**		**.51**		.31		**.59**
	Increm. validity test[(c)]		**33.46**		**32.05**		**26.19**		*13.92*		14.81				17.24

+/-: Hypothesized direction of relationship
Bold: $p < .01$, Normal: $p < .05$, Italics: $p < .10$, non-significant estimates are not included, $n = 111$. Std. estimates
[(a)] = personality and intelligence only; [(b)] = full model incl. predictors and controls
[(c)] = Wald χ^2 test (df = 7) of incremental validity of personality and intelligence over control variables.

THE KIRTON ADAPTION-INNOVATION COGNITIVE STYLE INVENTORY: WAS IT PERSONALITY ALL ALONG?

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THE KIRTON ADAPTION-INNOVATION COGNITIVE STYLE INVENTORY: WAS IT PERSONALITY ALL ALONG?

Abstract

Kirton's Adaption-Innovation Inventory (KAI) is a widely-used measure of "cognitive style." Surprisingly, there is very little research investigating the discriminant and incremental validity of the KAI, particularly with respect to current personality measures. Using a sample of 213 participants, we examined (a) the extent to which we could predict KAI scores with the NEO-PI "big five" personality dimensions and (b) whether the KAI predicted variance in leadership and academic achievement, beyond the variance accounted for by personality and ability. Accounting for measurement error with an errors-in-variables regression model, we found that KAI scores were almost wholly predicted by personality and gender; the multiple R was .80. As we hypothesized, KAI scores were significantly and negatively related to neuroticism, agreeableness, and conscientiousness, whereas they were significantly and positively related to extraversion and openness. As expected, KAI scores were unrelated to measures of academic achievement and ability. Finally, KAI scores did not predict variance in transformational and transactional leadership beyond that predicted by personality. Our results question the uniqueness and utility of the KAI construct.

Keywords: KAI, adaptors-innovators, cognitive style, personality, NEO-PI, psychometrics.

Personality and cognitive ability are well-established constructs and reliable predictors of organizational behaviors and outcomes. In an attempt to extend conventional individual-difference approaches, researchers have proposed measures of "cognitive style," among other measures. Research in this field has bloomed and many inventories have emerged to identify individual differences in cognition and information-processing styles (Kozhevnikov, 2007).

Research on style constructs has grown in a fragmented way, leading to large array of models (Riding, 1997), including, cognitive emotions (Scheffler, 1991), cognitive styles (Kirton, 1976), constructive metareasoning (Moshman, 1994), epistemic motivations (Kruglanski, 1990), habits of mind (Keating, 1990), inferential propensities (Kitcher, 1993), thinking styles (Sternberg, 1988), and thinking dispositions (Stanovich, 1999). Many of these models, though, are different conceptualizations of similar dimensions (Riding, 1997). More troubling, however, is that the discriminant properties of some of these models, particularly with respect to current models of personality, have not been closely investigated (Kozhevnikov, 2007).

Given the current status of research in personality, and in particular on the well-regarded big-five personality framework, we sought to determine how one popular cognitive style measure, the Adaptation-Innovation inventory (Kirton, 1976), fits into the nomological network of individual differences. Essentially we sought to answer the following: Does cognitive style discriminate from established individual-difference measures and in particular from personality? Does cognitive style predict incremental variance in outcomes measures (e.g., leadership)?

The Kirton Adaption-Innovation Inventory

The focus of our study is on a well-known measure of cognitive style, the Kirton Adaption-Innovation inventory (KAI). The KAI measures individual differences with respect to people's preferred way of solving problems, with particular implication to industrial settings

(Kirton, 1976). The premise is that individuals can be located on a continuum ranging from an extremely adaptive to an extremely innovative style. An adaptor has an orientation characterized by diligence and conformance to established rules, whereas the innovator is unconventional--an out-of-the-box thinker (Kirton, 1976, 1999, 2003). Since its appearance, Kirton's Adaption-Innovation Inventory has received considerable attention. Kirton's 1976 article has received close to 400 citations in Thompson's Web of Science. A simple internet search also shows that the KAI is used by many consultants for a variety of industrial purposes.

In terms of the psychometric properties of the KAI, Kirton (1976) stated it has high reliability (.88), and test-retest reliability (.82). Kirton (1976) also reported that the KAI only correlates with extraversion (mean correlation of .37 across the KAI scales); however, the KAI was only compared to two dimensions of personality, extraversion and neuroticism. Later, Tullett and Kirton (1995) stated that the KAI is only related to extraversion (with *r*'s between .16 to .46, depending on the inventory).

Given the fact that proponents of the theory suggest that the KAI does not measure personality, researchers probably have not been too concerned to control for personality when using the KAI. To determine whether Kozhevnikov's (2007) suggestion--that there is hardly any research examining the relation of cognitive style to the big five framework--is accurate, we reviewed journal articles listed in the Web of Science that cited Kirton's (1976) paper. Our selection criterion was twofold: First, we only considered empirical articles that used the original items of the KAI to measure cognitive style. Second, to ensure that the articles we reviewed were from solid journals, we only selected articles that were published in journals whose impact factors were greater than the mean impact factor in the category in which the journal is listed (we used data from Web of Science's 2007 Journal Citations Report). None of the 18 studies we

identified controlled for the big five (see Appendix). Two studies did administer the MBTI--whose psychometric properties have been strongly criticized (McCrae & Costa, 1989; Pittenger, 1993; Stricker & Ross, 1964)--though they did not control for it in their analyses.

If the KAI overlaps with established measures of personality, the results of the studies included in the appendix are questionable. This void in the literature thus provided us with the impetus to examine the discriminant and incremental validity of the KAI with respect to the five factor personality model of Costa and McCrae's (1990). We develop our hypotheses next.

Theoretical Relation of Cognitive Style to the "Big Five" Model

Kirton's (1976) describes adaptors and innovators using a variety of variables in ways that are conceptually related to the five-factor model. For Kirton (1976, 1999, 2003), adaptive individuals tend to be compliant, methodical, prudent, disciplined, conforming, timid in ideation, high self-doubters, sensitive to people, risk averse, and dogmatic. In contrast, those with an innovative style tend to be assertive, impractical, unconventional in their thinking, undisciplined, irreverent toward consensual views, nonconforming, bold in ideation, low self-doubters, insensitive to people, risk seeking, flexible, and abrasive. Given these descriptions, there may be substantial overlap between the KAI and five factor model, as we suggest below.

Extraversion. Among other descriptors, extraverts tend to be assertive, dominant, daring, and risk-takers; introverts tend to be acquiescent, passive, conventional, and avoid risks (Costa & McCrae, 1992). Theoretically, extraverts would have an innovative style given that extraverts like seeking risk and adventure, and are very self-assured. Extraverts do not shy away from novel situations and enjoy the thrill of the unknown.

Hypothesis 1: Extraversion is positively related to innovative style

Openness. Individuals high on openness are, among other things, creative, imaginative, artistic, have broad interests, are inquisitive and unconventional; individuals low on openness are unimaginative, prosaic, have narrow interests, are traditional and dogmatic and are not curious (Costa & McCrae, 1992). Theoretically, individuals high on openness would have an innovative style, because they are nonconforming, creative, like generating ideas, and embrace change.

Hypothesis 2: Openness is positively related to innovative style

Agreeableness. The agreeable person is generally accepting, considerate, compliant, and understanding; contrarily, the disagreeable person is skeptical, competitive, and stubborn (Costa & McCrae, 1992). Agreeable individuals like to avoid conflict; thus, theoretically, they would be more accepting of the status quo, particularly with respect to following rules, as compared to disagreeable individuals who are insensitive to others are hard-headed, and less likely to conform. Thus, we expected individuals low on agreeableness to have an innovative style.

Hypothesis 3: Agreeableness is negatively related to innovative style

Conscientiousness. Individuals who score high on the conscientiousness dimension are, among other things, very disciplined, orderly, cautious, and deliberate, whereas those low on conscientiousness are not well organized, unmethodical, hasty, and spontaneous (Costa & McCrae, 1992). Thus, given the fact that innovators are generally undisciplined, unmethodical, and challenge existing structures, we would expect them to be low on conscientiousness.

Hypothesis 4: Conscientiousness is negatively related to innovative style

Neuroticism. Individuals high on neuroticism tend to be, among other things, socially shy, inhibited, self-conscious, dependent and panicky; in contrast, individuals low in neuroticism tend to be well-adjusted and are usually socially-confident, self-confident, clear thinkers, and independent (Costa & McCrae, 1992). Theoretically, those who are high on neuroticism would

more likely have an adaptive style given that adaptors are usually high self-doubters (i.e., are shy and self-conscious) and would thus not seek novel situations or propose inventive solutions. Also, individuals high in neuroticism do not cope well with stressful situations and are panicky; thus, they would probably prefer structured to unstructured situations.

Hypothesis 5: Neuroticism is negatively related to innovative style

Theoretical Relation of Cognitive Style to Academic Achievement and Intellectual Ability

We also sought to determine whether KAI scores were unrelated to conceptually distinct measures. We tested the KAI's discriminant validity with measures of intellectual ability and academic achievement, given that measures of cognitive style should be unrelated to such measures (Cools & Van den Broeck, 2007; Kirton, 1999; Sadler-Smith, 1998) we expected the following nil hypothesis:

Nil hypothesis 6: Innovative style is unrelated to measures of intellectual ability or academic achievement.

Theoretical Relation of Cognitive Style to Leadership

There is not much research that has examined the relation between the KAI and leadership (Church & Waclawski, 1998)**,** though Sadler-Smith (1998) has suggested that characteristics of leaders are closely aligned with an innovative style. Because the importance of leadership for organizational success is well-established, we thought it useful to examine whether KAI scores predicted effective styles of leadership in a decision-making setting.

Church and Waclawski (1998) found that an innovative style was positively and significantly associated (*r's* between .10 to .44) with five of six factors from the Leadership Assessment Inventory (leader measures were based on ratings of direct reports). Although the psychometric properties of this model of leadership are unclear to us (i.e., we were unable to

locate studies published in journals on this model), individuals with an innovative style were more likely to be perceived as transformational, as opposed to transactional leaders (cf. Bass, 1985). Using leader self-measures, Isaksen, Babij, and Lauer (2003), found that being innovative was positively and significantly associated with two of five factors of the Kouzes and Posner Leadership Practices Inventory (*r*'s between -.02 to .58).

Despite the limitations of these two studies, an innovative style should be associated with active, change-oriented leadership styles. Thus, we sought to determine whether the KAI would predict measures of well-known leadership model, the full-range leadership model. This model of leadership has drawn considerable attention from scholars (Lowe & Gardner, 2000) and has strong predictive validity (Judge & Piccolo, 2004; Lowe, Kroeck & Sivasubramaniam, 1996). Theoretically, leaders, particularly those who are change-oriented, visionary, inspiring, or charismatic leaders (i.e., transformational leaders, Bass, 1985) should fall more on the innovative side of the KAI continuum. Those who are more passive avoidant leaders or stability focused--clarifying role and task requirements and ensuring that standards are met (i.e., transactional leaders, Bass, 1985), should fall more on the adaptive side of the KAI continuum.

Hypothesis 7: Innovative style is positively related to transformational leadership and negatively related to transactional leadership

Method

Participants

Participants were 213 students who served as subjects in exchange for course credit. Participants, who were mostly male (62%), were enrolled in an undergraduate organizational behavior course at a major state university in Switzerland. The age of the participants ranged from 18 to 29 years with a mean of 20.89 years. The majority of participants were Swiss (73%);

the rest were mostly from European countries. All participants spoke fluent French, which was the first language of the majority of the subjects (79%) and the official language of instruction of the university and organizational behavior course. All measures were administered in French.

Procedure

We undertook data gathering in four stages. All participants first completed the KAI. Ten days later they filled out a full demographic questionnaire as well as the personality questionnaire. Two weeks later, we gathered the leadership data on a subset of participants (n=53) during an experimental session (von Wittich, paper 3 in this thesis). Finally, five weeks after the experiment, we administered the test of intellectual ability. We used the final grades the students obtained in the organizational behavior course as a measure of academic achievement.

Measures

We administered the following three French-version tests to all participants: the KAI (32 items, Kirton, 1999), the NEO-PI (240 items, Costa & McCrae, 1992), and the Wonderlic Personnel Test (2002). As for academic achievement, we used the final grades the students obtained in the organizational behavior course.

For leadership ratings we used three measures. The first was a French version of the Multifactor Leadership Questionnaire (Bass & Avolio, 1995), which we used to measure the transactional and transformational leader style of leader; we only used the ratings of the team members and the observers and not the leader self-ratings given that they are biased (Podsakoff & Organ, 1986). We measured twenty transformational leadership items reflecting a highly proactive, idealized, visionary, challenging, and inspirational form of leadership, four contingent rewards items reflecting structuring and rewarding leadership (transactional leadership), four management-by-exception active items reflecting active vigilance to ensure that standards are

met (transactional leadership), and four management-by-exception passive items, reflecting a reactive form of leadership where the leader intervenes after mistakes have occurred (transactional leadership).

Results

Relation of KAI to personality, ability, and achievement

We first present the results concerning Hypotheses 1-5. Refer to Table 1 for descriptive statistics and correlations among the key variables.

[Insert Table 1 here]

In line with our hypotheses, KAI scores correlated significantly with personality; an innovative style was positively correlated with extraversion and openness, and negatively correlated with neuroticism, agreeableness, and conscientiousness. KAI scores were also slightly higher for males, in line with previous research (Tullett & Kirton, 1995). Bivariate correlations, however, do not present a full picture of the relations because they ignore the multivariate relations of the big five (cf. Judge, Bono, Ilies, & Gerhardt, 2002) as well as the partial effects of the demographic factors. They also ignore the effects of measurement error.

We thus modeled the KAI scores as a dependent variable, which we regressed on personality and the control variables. We estimated two regression models, an ordinary least squares regression model, as well as one in which we modeled measurement error. We accomplished the latter by modeling reliabilities using the Cronbach alpha reliabilities noted in Table 1 (as well as a conservative estimate of .73 for the Wonderlic) in Stata's errors-in-variables regression module. Note that apart from biasing coefficient estimates in the problematic variables, measurement error also biases coefficient estimates in the other regressors (see Bollen, 1989; Kennedy, 2003). We thus obtained estimates that would be similar to a traditional

structural-equation latent variable modeling without having the computational difficulties and sample size requirements. We ran the usual regression diagnostics (e.g., test for skewness, heteroskedasticity, and Ramsey's, 1969, regression specification-error test for omitted variables) to ensure that the models were correctly specified.

As indicated in Table 2 whether using the ordinary least squares (OLS) or the errors-in-variable (EIV) estimator, the KAI scores depended largely on personality. That is, an innovative style was positively predicted by extraversion and openness, and negatively predicted by neuroticism, agreeableness, and conscientiousness. These results provide strong support for Hypotheses 1 to 5. A summary of hypothesized direction of relationships and results is provided in Table 3.

[Insert Table 2 here]

[Insert Table 3 here]

The variance accounted for by the OLS estimator was 50.45% (multiple R of .71); however, the variance accounted for by the EIV estimator was 66.61% (multiple R of .82)--a rather substantial difference. The variance accounted for in the KAI scores was hefty and largely attributed to personality and gender (i.e., alone, the variance they accounted was 63.31%, or multiple R of .80). Also, apart from the changes in partial regression coefficient estimates, gender became a significant predictor of KAI scores, but this time its sign changed to being positive (i.e., the partial coefficient indicated that females had higher KAI scores than did males). These results show the importance of conducting discriminant validity tests in a multivariate manner and also to take into account measurement error (cf. Schulte, Ree, & Carretta, 2004).

Turning to the Nil hypothesis 6, as indicated in Table 1, KAI scores did not correlate with intellectual ability; these results were also corroborated by the regression results indicating that

intellectual ability did not predict the KAI scores (though the coefficient estimate in the EIVREG model approached significance). We also modeled academic achievement as a dependent variable and regressed it on the KAI scores and the rest of the individual difference measures. Regression diagnostics indicated violations of regression assumptions (i.e., regarding skewness and residuals). Thus, we used median regression, which is robust to these violations; this modeling approach approximates the conditional median and not the mean (Koenker & Hallock, 2001). Results using median regression (with 1000 bootstrap replications on standard errors) indicated that KAI scores were not associated with academic achievement. These results collectively provide strong support for the Nil hypothesis 6. Note that despite the range restriction (i.e., high scores) in intellectual ability, which is in line with U.S. data for college students, it was the only variable that was significantly predictive of achievement: $\beta = .02$ (95% confidence interval .00 to .04), $SE = .01$, $t = 2.31$, $p < .05$; the regression model predicted 4.78% of the variance in academic achievement.

Relation of KAI to transactional and transformational leadership

We then modeled the full-range leadership styles of the leaders as dependent variables of the leader individual-difference factors and controls (i.e., KAI, personality, age, sex, nationality, first language, intellectual ability. Because leader styles were (a) correlated and (b) observations of leadership style within the experimental groups were not independent (i.e., raters nested in groups rated one target leader), and the psychological variables were measured with error, we used Mplus to model latent variables (Bollen, 1989) with cluster-corrections to the standard errors. Refer to Table 4 for descriptive statistics and correlations among the key variables.

[Insert Table 4 here]

Because management-by-exception passive had low reliability (i.e., .47) we dropped this scale from analyses. Results indicated that from the individual-difference factors, only conscientiousness significantly predicted transformational leadership, standardized $\beta = .23$, $SE = .11$, $z = 2.07$, $p < .05$; the model predicted 8.4% of the variance. Also, conscientiousness predicted contingent reward leadership, standardized $\beta = .19$, $SE = .09$, $z = 2.01$, $p < .05$; the model predicted 7.8% of the variance. Finally, for management-by-exception active, only leader extraversion and agreeableness were significant: standardized $\beta(extraversion) = -.19$, $SE = .11$, $z = 1.71$, $p < .10$; standardized $\beta(agreeableness) = -.17$, $SE = .09$, $z = 1.83$, $p < .10$. The model predicted 9.3% of the variance. Contrary to Hypothesis 7, these results showed that controlling for personality and ability, the KAI scores predicted neither transformational nor transactional leadership.

Discussion

We found that the KAI inventory can be largely predicted (corrected multiple R = .80) by personality and gender. Furthermore, the KAI did not predict variance in leadership measures in ways that would be in line with the tenets of the theory. That the KAI overlaps with personality was expected; close scrutiny of the KAI items suggests that they have much in common with the items from the big five model. Our results imply that the KAI's uniqueness and utility for predicting individual differences and outcomes in industrial settings may be limited.

Why have results such as ours not surfaced sooner? Indeed, Kozhevnikov (2007, p. 478), who is sympathetic to this stream of research mentioned "almost no research has been done recently to examine the relations among cognitive styles and the five basic personality factors," and this despite earlier suggestions to examine the discriminant validity of the KAI model with respect to this model of personality (Bagozzi & Foxhall, 1995).

Because of such voids, situations might be created where practice runs ahead of research, particularly when it concerns extending personality or intelligence models (Antonakis, Ashkanasy, & Dasborough, in press). Such situations invariably cause a science-practice divide (Zaccaro & Horn, 2003). Constructs must be thoroughly tested before they can assume their rightful place in the nomological network of individual differences.

Discussions regarding the utility of cognitive style have occurred before; however, they were oftentimes conceptual or based on minimal tests of discriminant and incremental validity. Many researchers have suggested that cognitive style is different from intelligence and personality (e.g., Messick, 1996; Riding, 1997) or that it bridges personality and cognition (e.g., Messick, 1996; Sternberg & Grigorenko, 1997). Kirton (1999, p. 120) also noted that "whether style is [or is not] a wholly integral part of personality theory is still a scholarly issue."

Perhaps it is still a scholarly issue and will remain so for some time; however, researchers should always use the best-validated controls to test whether style constructs are different from better-established and well-validated personality or intelligence models. We know we will not have the final say in this matter and expect that more extensive validation studies will be conducted to either confirm or disconfirm our findings.

Until those validation studies are conducted, we urge researchers to take precautionary measures when using the KAI questionnaire by controlling for personality in any predictive model and also to take into account the effects of measurement error either using latent-variable modeling or errors-in-variables regression; as we demonstrated, traditional OLS models and bivariate correlations severely understate the true relations between constructs measured with error. Also, not controlling for personality might produce specious results.

Conclusions and limitations

Our findings should be taken in light of certain limitations. First, we used students to examine whether the KAI could predict leadership outcomes. Although individual differences predict leader outcomes both in student and non-student samples (Judge, Bono, Ilies & Gerhardt, 2002) there are qualitative differences between students and employed adults, which might not provide comparable findings.

Also, despite the fact that the experimental task under which we put the groups was challenging (von Wittich, paper 3 in this thesis), the short duration of the experiment and the experimental setting did not fully mimic the types of dynamics that occur between actual leaders and their teams. For instance, it is possible that only conscientiousness was related to transformational leadership because the nature of the task was such that only leaders who were precise and systematic in their information search and integration strategies would succeed in influencing team members on the decision-making task. Perhaps field studies (in similar decision-making situations) will contradict our results; however, we doubt this, given that experimental results are more congruent with field experiments than what is generally thought (Anderson, Lindsay, & Bushman, 1999). Although we are confident that the results regarding the relation of personality to cognitive style will hold in other settings, we hope that future research will use robust tests in industrial settings where leadership is observed in a more natural environment to establish if cognitive style predicts leadership. Finally, our sample was mostly French-speaking European. Even if we have reported similar data to the norms of the personality and KAI inventories we used, future research conducted in other settings should attempt to

replicate our findings. We expect that our findings will be confirmed because the KAI and NEO-PI inventories have shown good cross-country stability.

To conclude, research in the cognitive style domain appears to have reached an "impasse" (Kozhevnikov, 2007, p. 464) and our findings are certainly not making the situation more optimistic. Still, our intention is not to call for a moratorium on this line of research. Perhaps research on style constructs will be wound down if our results are replicated in larger-scale research. Thus, we encourage researchers to continue gathering data on cognitive style, personality, and outcomes so that cumulative, meta-analytic studies can be conducted. Perhaps then the scientific community might be able to definitively answer the title of Sternberg and Grigorenko's (1997) article: "Are cognitive styles still in style?"

References

Amabile, T. M., Hill, K. G., Hennessey, B. A., & Tighe, E. M. (1994). The Work Preference Inventory - Assessing intrinsic and extrinsic motivational orientations. *Journal of Personality and Social Psychology, 66*, 950-967.

Anderson, C. A., Lindsay, J. L., & Bushman, B. J. (1999). Research in the psychological laboratory: Truth or triviality? *Current Directions in Psychological Science, 8*, 3-9.

Antonakis, J., Ashkanasy, N. M., & Dasborough, M. (in press). Does leadership need emotional intelligence? *The Leadership Quarterly*.

Baer, M., Oldham, G. R., & Cummings, A. (2003). Rewarding creativity: when does it really matter? *The Leadership Quarterly, 14*, 569-586.

Bagozzi, R. P., & Foxall, G. R. (1995). Construct-validity and generalizability of the Kirton Adaption-Innovation Inventory. *European Journal of Personality, 9*, 185-206.

Bass, B. M. (1985). *Leadership and performance beyond expectations*. New York: Free Press.

Bass, B. M., & Avolio, B. J. (1995). *MLQ Multifactor leadership questionnaire for research: Permission set*. Redwood City, CA: Mindgarden.

Bollen, K. A. (1989). *Structural equations with latent variables*. New York: John Wiley & Sons.

Chan, D. (1996). Cognitive misfit of problem-solving style at work: A facet of person-organization fit. *Organizational Behavior and Human Decision Processes, 68*, 194-207.

Chilton, M. A., Hardgrave, B. C., & Armstrong, D. J. (2005). Person-job cognitive style fit for software developers: The effect on strain and performance. *Journal of Management Information Systems, 22*, 193-226.

Church, A. H., & Waclawski, J. (1998). The relationship between individual personality orientation and executive leadership behaviour. *Journal of Occupational and Organizational Psychology, 71*, 99-125.

Cools, E., Van Den Broeck, H. (2007). Development and validation of the cognitive style indicator. *Journal of Psychology, 141,* 359-387.

Costa, P. T., & McCrae, R. R. 1992. *NEO-PI professional manual.* Lutz, FL: Psychological Assessment Resources.

Dawes, P. L., Lee, D. Y., & Dowling, G. R. (1998). Information control and influence in emergent buying centers. *Journal of Marketing, 62*, 55-68.

Farmer, S. M., Tierney, P., & Kung-McIntyre, K. (2003). Employee creativity in Taiwan: An application of role identity theory. *Academy of Management Journal, 46*, 618-630.

Gallivan, M. J. (2003). The influence of software developers' creative style on their attitudes to and assimilation of a software process innovation. *Information & Management, 40*, 443-465.

Garfield, M. J., Taylor, N. J., Dennis, A. R., & Satzinger, J. W. (2001). Research report: Modifying paradigms - Individual differences, creativity techniques, and exposure to ideas in group idea generation. *Information Systems Research, 12*, 322-333.

Gould, W., Pitblado, J., & Sribney, W. (2007). *Maximum likelihood estimation with Stata* (3rd ed.). College Station, TX: Stata Press.

Isaksen, S. G., Babij, B. J., & Lauer, K. J. (2003). Cognitive styles in creative leadership practices: Exploring the relationship between level and style. *Psychological Reports, 93,* 983-994

James, L. R., Demaree, R. G., & Wolf, G. (1984). Estimating within-group interrater reliability with and without response bias. *Journal of Applied Psychology, 69*, 85-98.

Janssen, O., de Vries, T., & Cozijnsen, A. J. (1998). Voicing by adapting and innovating employees: An empirical study on how personality and environment interact to affect voice behavior. *Human Relations, 51*, 945-967.

Jehn, K. A., & Mannix, E. A. (2001). The dynamic nature of conflict: A longitudinal study of intragroup conflict and group performance. *Academy of Management Journal*, *44*, 238-251.

Judge, T. A., Bono, J. E., Ilies, R., & Gerhardt, M. W. (2002). Personality and leadership: A qualitative and quantitative review. *Journal of Applied Psychology, 87,* 765-780.

Judge, T. A. & Piccolo, R. F. (2004). Transformational and transactional leadership: A meta-analytic test of their relative validity. *Journal of Applied Psychology, 89,* 755-768.

Keating, D. P. (1990). Charting pathways to the development of expertise. *Educational Psychologist, 25*, 243-267.

Keller, R. T. (1986). Predictors of the performance of project groups in research-and-development organizations. *Academy of Management Journal, 29*, 715-726.

Keller, R. T., & Holland, W. E. (1978). Individual characteristics of innovativeness and communication in research and development organizations. *Journal of Applied Psychology, 63*, 759-762.

Keller, R. T., & Holland, W. E. (1983). Communicators and innovators in research and development organizations. *Academy of Management Journal, 26*, 742-749.

Kennedy, P. (2003). *A guide to econometrics*. (5th ed.) Cambridge, MA: MIT Press.

Kent, R. L., & Moss, S. E. (1994). Effects of sex and gender role on leader emergence. *Academy of Management Journal, 37*, 1335-1346.

Kirton, M. J. (1976). Adaptors and Innovators: A description and measure. *Journal of Applied Psychology, 61*, 622-629.

Kirton, M.J. (1999). *Kirton Adaption-Innovation Inventory: User's Manual*. (1999). Suffolk, UK: Occupational Research Centre.

Kirton; M. J. (2003). *Adaption-Innovation in the context of diversity and change*. East Sussex: Routledge.

Kitcher, P. (1993). *The advancement of science*. New York: Oxford University Press.

Koenker, R., & Hallock, K. F. Quantile regression. *Journal of Economic Perspectives, 15,* 143-156.

Kozhevnikov, M. (2007). Cognitive styles in the context of modem psychology: Toward an integrated framework of cognitive style. *Psychological Bulletin, 133*, 464-481.

Kruglanski, A. W. (1990). Lay epistemics theory in social-cognitive psychology. *Psychological Inquiry, 1*, 181-197.

Kubes, M. (1998). Adaptors and innovators in Slovakia: Cognitive style and social culture. *European Journal of Personality, 12*, 187-198.

Lowe, K. B., & Gardner, W. L. (2000). Ten years of *The Leadership Quarterly*: Contributions and challenges for the future. *The Leadership Quarterly, 11*, 459-514.

Lowe, K. B., Kroeck, K. G., & Sivasubramaniam, N. (1996). Effectiveness correlates of transformational and transactional leadership: A meta-analytic review of the MLQ literature. *The Leadership Quarterly, 7,* 385-425.

McCrae, R. R., & Costa, P. T. (1989). Reinterpreting the Myers-Briggs Type Indicator from the perspective of the Five-Factor Model of Personality. *Journal of Personality, 57*, 17-40.

Messick, S. (1996). Bridging cognition and personality in education: The role of style in performance and development. *European Journal of Personality, 10*, 353-376.

Moshman, D. (1994). Reasoning, metareasoning, and the promotion of rationality. In A. Demetriou & A. Efklides (Eds.), *Intelligence, mind, and reasoning: Structure and development* (pp. 135-150). Amsterdam: Elsevier.

Ones D. S., Viswesvaran C., & Reiss, A. D. (1996). Role of social desirability in personality testing for personnel selection: The red herring. *Journal of Applied Psychology, 81*, 660-679.

Palmer, J. (1991). Scientists and information II personal factors in information behavior. *Journal of Documentation, 47*, 254-275.

Pittenger, D. J., (1993). The utility of the Myers-Briggs Type indicator. *Review of Educational Research, 63*, 467-488.

Podsakoff, P. M., & Organ, D. W. (1986). Self-reports in organizational research: Problems and prospects. *Journal of Management, 12*, 531-544.

Ramsey, J. B. (1969). Tests for specification errors in classical linear least-squares regression analysis. *Journal of the Royal Statistical Society, Series B 31,* 350-371.

Riding, R. J. (1997). On the nature of cognitive Style. *Educational Psychology, 17*, 29-49.

Sadler-Smith, E. (1998). Cognitive style: Some human resource implications for managers. *International Journal of Human Resource Management, 9,* 185-202.

Scheffler, I. (1991). *In praise of cognitive emotions*. New York: Routledge.

Schulte, M. J., Ree, M. J., & Carretta, T. R. (2004). Emotional intelligence: Not much more than *g* and personality. *Personality and Individual Differences, 37,* 1059-1068.

Stanovich, K. E. (1999). *Who is rational? Studies of individual differences in reasoning*. Mahwah, N.J.: Lawrence Erlbaum Associates.

Stasser, G., & Titus, W. (1985). Pooling of unshared information in group decision making: Biased information sampling during discussion. *Journal of Personality and Social Psychology, 48*, 1467-1478.

Sternberg, R. J. (1988). Mental self-government - a theory of intellectual styles and their development. *Human Development, 31*, 197-221.

Sternberg, R. J., & Grigorenko, E. L. (1997). Are cognitive styles still in style? *American Psychologist, 52,* 700-712.

Stricker, L. J., & Ross, J. (1964). An assessment of some structural properties of the Jungian personality typology. *Journal of Abnormal and Social Psychology*, *68*, 62–71.

Tierney, P., Farmer, S. M., & Graen, G. B. (1999). An examination of leadership and employee creativity: The relevance of traits and relationships. *Personnel Psychology, 52*, 591-620.

Tullett, A. D. (1995). The Adaptive-Innovative (A-I) cognitive styles of male and female project managers: Some implications for the management of change. *Journal of Occupational and Organizational Psychology, 68*, 359-365.

Tullet, A. D. and Kirton, M. J. (1995). Further evidence for the independence of Adaptive-Innovative (A-I) cognitive style from national culture. *Personality and Individual Differences*, *19,* 393-396.

Vishwanath, A. (2005). Impact of personality on technology adoption: An empirical model. *Journal of the American Society for Information Science and Technology, 56*, 803-811.

Wonderlic Personnel Test & Scholastic Level Exam: User's manual. (2002). Libertyville, IL: Wonderlic Personnel Test, Inc.

Zaccaro, S. J., Foti, R. J. & Kenny, D. A. (1991). Self-monitoring and trait-based variance is leadership: An investigation of leader flexibility across multiple group situations. *Journal of Applied Psychology, 76*, 308-315.

Zaccaro, S. J., & Horn, Z. N. J. (2003). Leadership theory and practice: Fostering an effective symbiosis. *The Leadership Quarterly, 14*, 769-806.

Table 1: Descriptive Statistics and Correlations among KAI, Personality, and Key Variables

		M	SD	1	2	3	4	5	6	7	8	9	10	11
1.	KAI	91.15	15.67	.88***										
2.	Neuroticism	89.93	21.49	-.19***	.83									
3.	Extraversion	120.71	17.80	.38***	-.23**	.70								
4.	Openness	113.94	19.36	.40***	.07	.30***	.68							
5.	Agreeableness	107.55	18.05	-.22***	.18*	-.03	.16	.74						
6.	Conscientiousness	121.56	19.61	-.32***	-.36***	.12	-.20**	-.15	.83					
7.	Gender	0.38	0.49	-.11‡	.34***	-.09	.04*	.26***	-.02	-				
8.	Age	20.89	1.40	.03	-.02	-.20*	.01	.06	-.05	.04	-			
9.	Language	0.79	0.41	-.08	.05	-.01	-.07	.04	.03	-.06	-.24**	-		
10.	Nationality	0.73	0.45	-.03	-.05	-.04	-.06	.06	.01	-.11	.00	.28***	-	
11.	Ability	28.66	5.35	.01	-.15***	-.09	-.01	-.19**	.06	-.09	-.14*	.09	.22***	-
12.	Acad. Achievement	4.56	.73	.05	-.05	.11	-.03	.03	.06	-.01	-.25***	.08	-.01*	.07*

Notes. N = 210. Numbers on the diagonals are Cronbach Alpha reliabilities. Gender is coded 1 for females (else 0), Nationality is coded 1 for Swiss (else 0), French language is coded 1 for French (else 0). Increasing KAI scores indicate an innovative style whereas decreasing scores indicate an adaptive style.

‡ $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$.

Table 2: Regression of KAI scores on personality factors and control variables

Independent variables	Coef.	Std. Err.	*t*	*p*-value	95% Conf. Interval	
Neuroticism	-0.29	0.05	-5.49	0.00	-0.40	-0.19
	-0.21	*0.04*	*-4.72*	*0.00*	*-0.29*	*-0.12*
Extraversion	0.26	0.08	3.14	0.00	0.10	0.42
	0.23	*0.05*	*4.66*	*0.00*	*0.13*	*0.33*
Openness	0.32	0.07	4.60	0.00	0.19	0.46
	0.23	*0.04*	*5.19*	*0.00*	*0.14*	*0.32*
Agreeableness	-0.45	0.06	-7.82	0.00	-0.56	-0.34
	-0.29	*0.05*	*-6.32*	*0.00*	*-0.38*	*-0.20*
Conscientiousness	-0.43	0.05	-8.87	0.00	-0.52	-0.33
	-0.33	*0.04*	*-7.57*	*0.00*	*-0.42*	*-0.24*
Gender	4.37	1.59	2.75	0.01	1.24	7.50
	1.87	*1.78*	*1.05*	*0.30*	*-1.65*	*5.39*
Age	0.41	0.54	0.76	0.45	-0.65	1.47
	0.48	*0.60*	*0.81*	*0.42*	*-0.70*	*1.67*
Nationality	2.20	1.60	1.38	0.17	-0.95	5.34
	1.23	*1.86*	*0.66*	*0.51*	*-2.45*	*4.91*
French language	1.26	1.71	0.74	0.46	-2.11	4.62
	-0.17	*2.05*	*-0.08*	*0.94*	*-4.22*	*3.88*
Ability	-0.30	0.21	-1.43	0.15	-0.71	0.11
	-0.10	*0.16*	*-0.63*	*0.53*	*-0.41*	*0.21*
Constant	145.55	24.59	5.92	0.00	97.06	194.03
	118.19	*20.25*	*5.84*	*0.00*	*78.25*	*158.14*

Notes: The first line of estimates refers to EIV results, $F(10, 199) = 30.07$, $p < .001$, R-square = .67. The second line (italicized) refers to OLS results, $F(10, 199) = 20.26$, $p < .001$, R-square = .50; Gender is coded 1 for females (else 0), Nationality is coded 1 for Swiss (else 0), French language is coded 1 for French (else 0). N = 210.

Table 3: Summary of hypothesized direction of relationship and results

		Dependent variables			
		KAI	Transformational leadership	Contigent reward	Managemen-by-exception active
	Model	1	2	3	4
Personality	Neuroticism	- -.29			
	Extraversion	+ .26			-.19
	Openness	- .32			
	Agreeableness	- -.45			-.17
	Conscientiousness	+ .43	.23	.19	
KAI					
Controls	Gender				
	Age				
	Nationality				
	French language				
	Ability	0			-.03
	Academic achievement				
	R^2	.80			
	Increm. validity test				

+/-: Hypothesized direction of relationship

The estimates and the R^2 in model 1 are based on errors-in-variable (EIV) regressions. Estimates of model 2-4 are based on Mplus model.

Table 4: Descriptive Statistics and Correlations among KAI, Personality, Leadership, and Key Variables for Rated Leaders

		N	M	SD	1	2	3	4	5	6	7	8	9	10
1.	Transformational lead.	160	1.66	0.61	.80									
2.	Contingent rewards lead.	160	1.31	0.73	.61	.60								
3.	Mgt. by Except. Active	159	1.25	0.83	.52	.35	.72							
4.	Leader KAI	53	87.81	16.00	.06	-.10	.04	.89						
5.	Leader Neuroticism	53	90.19	19.84	-.01	-.03	.05	-.09	.79					
6.	Leader Extraversion	53	121.00	18.45	-.05	.00	-.10	.44	-.07	.75				
7.	Leader Openness	53	113.96	18.02	.07	.07	-.01	.39	.02	.34	.73			
8.	Leader Agreeableness	53	109.57	18.34	-.03	.08	-.11	-.28	.16	-.02	.20	.69		
9.	Leader Conscientiousness	53	120.68	20.56	.10	.18	.03	-.49	-.20	-.08	-.19	-.06	.82	
10.	Leader Gender	53	0.34	0.48	-.05	-.02	-.03	-.17	.42	-.21	.03	.30	-.03	-
11.	Leader Ability	53	27.79	5.57	.01	-.04	-.07	-.13	-.25	-.33	-.09	-.14	.21	-.09

Notes: 160 Participants rated 53 leaders (N = 213). Numbers on the diagonals are Cronbach Alpha reliabilities. Gender is coded 1 for females (else 0). We do not report bivariate significance levels because they are not corrected for data nestings (i.e., clustering); we control for clustering in the regression analyses.

Appendix: Overview of Articles using KAI in high-impact peer-reviewed journals

Journal Name	Authors	Variables studied
Academy of Management Journal	Farmer, Tierney, & Kung-McIntyre, 2003	Employee creativity; Creativity role identity; Perceived coworker creativity expectations; Self-views of creative behavior; Exposure to U.S. culture; Educational level; Psychological job complexity; Perceived organizational valuing of creativity
Academy of Management Journal	Keller & Holland, 1983	Communication of information; Innovation ; Self-esteem; Need for clarity; Patents; Publications; Education; Periodicals read; Job level; Centrality
Academy of Management Journal	Keller, 1986	Project performance ; Group cohesiveness; Physical Distance; Job satisfaction; Type of R&D
European Journal of Personality	Bagozzi & Foxall, 1995	Confirmatory factor analysis
European Journal of Personality	Kubes, 1998	Factor analysis
Human Relations	Janssen, de Vries, & Cozijnsen, 1998	Employee likelihood to voice ideas; Work satisfaction; Voice manager's effectiveness
Information & Management	Gallivan, 2003	Job performance; Job satisfaction; Job need; Job interest, Job fit; Attitude to innovation;
Information Systems Research	Garfield, Taylor, Dennis, & Satzinger, 2001	No. of novel ideas; MBTI; Creativity technique; Contribution from others; Overall creativity
Journal of Applied Psychology	Keller & Holland, 1978	Innovativeness/technological communication; Administrative communication; Existence need desire; Relatedness desire; Growth need desire; Need for clarity; Self-esteem; Locus of control
Journal of Documentation	Palmer, 1991	Information behavior; Learning Styles
Journal of Management Information Systems	Chilton, Hardgrave, & Armstrong, 2005	Strain; Performance; Person-Job fit

Table 1 continued to next page

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Journal of Marketing	Dawes, Lee, & Dowling, 1998	Manifest influence on the selection of a supplier Control over the flow of interpersonal information; Formalization; Decentralization; Stakeholding; Participation in the buying process;
Journal of Occupational and Organizational Psychology	Chan, 1996	Job performance; Turnover ; Work context; Cognitive misfit
Journal of Occupational and Organizational Psychology	Tullett, 1995	Job function
Journal of Personality and Social Psychology	Amabile, Hill, Hennessey, & Tighe, 1994	Work Preference; Social desirability; Motivation: Causality orientation, Student interest and experience; Orientation toward the past; Need for Cognition; SII; MBTI; Adult playfulness; and Cognitive playfulness; Environment perception: CEI; WEI; WES; Creativity measures; Creative personality;
Journal of the American Society for Information Science and Technology	Vishwanath, 2005	Likelihood of adoption; Technological innovativeness; Prior technology ownership; Cosmopolite; Integrated social networks; Information search strategies; Media use; Global innovativeness; Tolerance for novelty; Tolerance for complexity; Tolerance for Insolubility
The Leadership Quarterly	Baer, Oldham, & Cummings, 2003	Creativity; Extrinsic rewards; Education; Organizational Tenure; Sex; Race; Position; Job complexity
Personnel Psychology	Tierney, Farmer, & Graen, 1999	Employee creative performance; Intrinsic motivation; LMX; Leader; Leader intrinsic motivation; Educational level; Organizational tenure; Division; Hierarchical level; LMX ; Intrinsic motivation; Leader intrinsic motivation

The effects of leader-pre-discussion preference and majority-minority influence on group-decision quality

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The effects of leader-pre-discussion preference and majority-minority influence on group-decision quality

In an experimental study I created partial-hidden profile environments for three-person groups to investigate the effects of (a) a randomly assigned leader's pre-discussion preference for either an optimal or suboptimal decision, and (b) whether the leader's preference was shared by one or none of the group members at the outset of a discussion. The results show that leadership pre-discussion preference and leader support enhances pressures for conformity for good and for bad. Group decision quality is enhanced if leaders enter group discussions with a preference for the optimal solution but suffers if they favor suboptimal solutions. Overall, leadership status countervails conformity pressures exerted by pre-discussion preference majorities on dissenting leaders but increases conformity pressures on group members who were not assigned as group leaders. Leader intelligence and age are positively related to group-decision quality. Leader neuroticism and extraversion are negatively related. Results suggested that leaders can benefit from identifying whether they are in a preference majority or minority at the outset of the discussion. Being in a preference majority or minority can act as an early warning signal that could signal which leadership behavior is likely to increase the chance of making optimal decisions in hidden- or partially hidden-profile environments.

Keywords: leadership, decision-making, majority and minority influence, partially-hidden profile, conformity, group decision quality

Influence is the essence of leadership (Yukl, 2001). In order to compensate for system deficiencies, leader influence, among others, serves the function of either maintaining or changing the status quo. Influence, however, is not always unidirectional. Rather than flowing from the authority figure to followers, leaders and followers can be both source and recipients of influence. Oftentimes, the relative strength of leader over follower influence determines a leader's success in exerting social change or social control. Nevertheless, the success of leaders in making individuals or groups accept (or comply with) their view may be the source of failure or suboptimal group performance.

In this study I examine the effect of a randomly assigned leader's pre-discussion preference for an optimal or suboptimal decision alternative on group-decision quality and generate situations where the leader's preference for an option places him or her in either a preference majority or in a preference minority. I am interested in whether assigned leaders can countervail conformity pressures exerted by pre-discussion preference majorities if, throughout a discussion, the leader has reason to belief that the majority's choice for an option is sub-optimal. Furthermore, I observe whether leaders who are in a majority reinforce conformity pressures on dissenting minority group members more than leaderless majorities would do on dissenting leaders. Ideally, a leader should ensure that the team members pool information so as to make an optimal choice. Thus, to undertake an information-sharing process in an effective and efficient manner, a "good" leader should carefully listen to team members, stimulate a discussion so that unshared information emerges, reconcile discrepant information and hold back their own judgment until all information have been pooled appropriately to make an informed decision.

To provide some context for this investigation, I organized the paper as follows: First, I provide a brief overview of the research streams that are important to this study. Second, I explain the expected role of leader assignment (in this article I use the word status to describe the assigned leader's position power) on group-decision quality and follower compliance by drawing on some of the major theories on social influence. Third, I present the results 2x2 information-distribution-factorial design in which I manipulated (a) a leader's pre-discussion preference for either an optimal or suboptimal decision alternative, and (b) whether the leader's pre-discussion preference is shared (or not) with another group members. Finally, I conclude with practical and theoretical implications.

Majority and minority influence, information sharing, and leadership in group-decision-making contexts

Majority influence, minority influence and group-decision quality

Research suggests that group performance in decision-making is often suboptimal (Brodbeck, Kerschreiter, Mojzisch, Frey, & Schulz-Hardt, 2002). Early research on majority influence and conformity indicates that ineffective group decisions are made because majorities impose conformity pressures (Festinger, 1950, 1954). The first empirical studies of social influence that substantiate theories of conformity typically involved objective judgment tasks (e.g., judging the length of lines; for more information on the classical Asch-line-judgment paradigm, see Asch 1961), where participants are exposed to the erroneous responses of a numerical majority. In a meta-analytic review of the classical Asch line-judgment paradigm, Bond and Smith (1996) showed that individuals conform to the judgment of a numerical majority even when the majority gave the obviously wrong response. Most of the subsequent theories in this area build on the idea that people conform to the majority either

because the majority provides what is perceived to be a valid source of information (i.e., informational influence) and/or because majority membership is desirable and protects against group rejection (i.e., normative influence) (Martin & Hewstone, 2009). To further investigate the phenomenon of conformity, scholars focused on variables such as the size of the majority and the minority (S. Asch, 1961; Gerard, Wilhelmy, & Connolley, 1968; Horowitz & Rothschild, 1970), face-to-face versus anonymous responses (Deutsch & Gerard, 1955), verbal versus written response (S. E. Asch, 1956), self-blame (Costanzo, 1970), gender (Costanzo & Shaw, 1966; Lamb & Alsikafi, 1980; Larsen, 1974), race (Long, 1970), in-group out-group majority (Abrams, Wetherell, Cochrane, Hogg, & Turner, 1990), as well as incentives for accuracy or task importance (Baron, Vandello, & Brunsman, 1996).

With regard to leadership characteristics, Larsen, Triplett, Brant, and Langenberg (1979) were among the first to use the Asch line-judgment task in order to explore whether a single person (i.e., the minority) is more likely to be influenced by majorities consisting of group members with high status than by majority group members with low status. The results of Larson et al.'s laboratory experiment show that subjects in the minority position are more likely to adapt the opinion of high-status group members than of low-status group members. However, influence in the study of Larsen et al. (1979), which is the only empirical study I am aware of that manipulates perceived status differentials in the Asch line-judgment paradigm, was only unidirectional, flowing from the majority to the minority member. The authors have not addressed whether minorities with high status can influence majorities. Also, because of the nature of the task, subjects were requested to provide a single answer without having the opportunity to discuss the option during the experiment, making it

difficult to evaluate conformity in problem solving tasks, and, therefore, to generalize the results to real world situations (i.e. problem solving groups).

In the late 1960s, research by the French social psychologist Serge Moscovici challenged the traditional view of a unidirectional influence emanating form the majority and suggested that both the majority and the minority can be simultaneously the source and target of social influence (Martin & Hewstone, 2009). In his genetic model, Moscovici (1976) proposed that "all attempts of social influence create conflict between the source and the recipient of influence. Minorities can create conflict because they challenge the dominate majority view and, in doing so, offer a new and different perspective. Since people wish to avoid conflict, they will often dismiss the minority position. If, however, the minority refuses to be dismissed and is certain, confident, and committed to its position, majority members face two types of conflict: one cognitive (from an increase in response diversity) and the other social (from threatened interpersonal relations). The majority members resolve this conflict by questioning their own position and considering the minority's position as a valid alternative" (Martin & Hewstone, 2009, p. 316). After the publication of Moscovici's Genetic model, many models have followed and empirical evidence has demonstrated that even non-elite minorities (those lacking special expertise or power) can be successful in modifying majority norms (Martin & Hewstone, 2009). Nevertheless and maybe because the minority stream of research focused on minorities that lacked power I could not find a process model of minority influence that explicitly integrated and tested individual characteristics such as leadership, status or position power. One exception constitutes Latené and Wolf's (1981) social-impact theory. Social impact theory suggests that individual characteristics such as status, power, ability etc. of the source person (which can be a minority or a majority member) will increase the social

impact experienced by the target of influence. The greater the social impact, the greater is the level of influence. Unfortunately, social impact-theory has not generated much research testing its predictions with respect to minority influence (Martin & Hewstone, 2009). Although theoretical approaches in the minority stream of research suggest that both the majority and the minority can be simultaneously the source and target of social influence, there are very few studies about minority dissent with real groups (as compared to bogus groups with confederates) that investigate both minority influence and majority influence at the same time (see also Brodbeck, Kerschreiter, Mojzisch, Frey, & Schultz-Hard, 2002).

Information sharing, pre-discussion preference and group-decision quality

Research on information sharing in group-decision making contexts, initiated by Stasser and Titus (1985, 1987), shows that much more shared information (i.e. information known by all group members prior to a group discussion) is pooled during group discussions than unshared information (i.e. information previously known by only a single group member), leading to lost opportunities to integrate decision-relevant information and, ultimately, to a reduced decision quality (Brodbeck et al., 2002; Schulz-Hardt, Brodbeck, Mojzisch, Kerschreiter, & Frey, 2006; Stasser, 1992; Stasser & Stewart, 1992; Stasser, Stewart, & Wittenbaum, 1995; Stewart & Stasser, 1995; Winquist & Larson, 1998). A situation where shared and unshared information favor different decision alternatives and the superior decision alternative is unknown to all group members at the outset of a discussion is called a *hidden profile*. A simple example of a hidden profile with two decisional options A or B in a three person group holding equally important information cues prior to group discussion is described in Table 1.

[Insert Table 1 here]

In this simple example it is assumed that there are no neutral information cues (i.e. information which is not relevant to the decision at hand) and no negative information cues with regard to option A or B. The information items known to all group members are A_1, B_1, B_2, B_3. Information cues A_2, A_3, and A_4 are unshared. At the outset of the discussion, each of the three group members hold only two information cues, A_1 and A_2, that support option A but three information cues, B_1, B_2, and B3, that support option B. Hence, each group member is likely to have a predisposition or pre-discussion preference for option B. Ideally, group members should pool their information and realize during the discussion that option A - the hidden profile - is the best choice because the distribution of information cues favors option A at the group level. Previous research has consistently shown, however, that groups often fail to uncover hidden profiles (Stasser & Titus, 1985, 1987, 2003). Stasser and Titus (1985) provide two major explanations for the sub-optimal group choices in hidden profile situations. First and at the individual level, information sampling is biased by the member's current preference because "preference consistent information is more salient and more likely to be recalled during discussion" (Stasser & Titus, 1985, p. 1470). Second and at the level of the group, "information sampling is biased by the number of members who are cognizant of a given piece of information. The more group members who can recall one piece of information and mention it, the higher the probability that this piece of information will actually be discussed" (Stasser & Titus, 1985, p. 1470).

Several factors that increase the group-decision quality in hidden-profile situations have been investigated. Hollingshead (1996), for example, showed that groups are more likely to chose the best option when the group members are instructed to rank alternative options rather than mentioning a single option. Stasser

and Stewart (1992) demonstrated that if group members belief that their task has a demonstrably correct answer, group-decision quality is higher than if groups were led to believe that they had insufficient evidence to identify the best option. Other elements that affect group-decision quality in hidden-profile situations are member familiarity (Gruenfeld, Mannix, Williams, & Neale, 1996), expert role assignment (Stasser et al., 1995; Stewart & Stasser, 1995), task importance and group decision training (Larson, Fosterfishman, & Keys, 1994). Although the effects of minority influence and dissent in situations of hidden profile have been investigated (McLeod, Baron, Marti, & Yoon, 1997; Stewart & Stasser, 1998), Brodbeck et al. (2002) indicate that several drawbacks in design and analysis of McLeod et al's study preclude firm conclusions. One major drawback that has been emphasized is that the minority group members were fully informed about all pre-discussion information, which the majority group members received in a distributed manner. Having one group member who received the full information introduces a potential confound between minority dissent and task expertise. Hence, in order to avoid the thread of confounding task expertise and minority dissent, I followed Brodbeck et al. (2002) by creating a partially-hidden-profile information environment and by using an experimental paradigm that omits fully informing the designated minority member.

A partially-hidden profile refers to a situation where, based on the information distribution, a majority of the group members prefers an inferior decision alternative at the outset of a discussion, while a minority (and at least one) of the group members prefers the superior decision alternative. A simple example of a partially-hidden profile with two decisional options A or B in a three person group holding equally important information cues prior to group discussion is described in Table 2.

[Insert Table 2 here]

Establishing a partially-hidden profile introduces dissent into the group discussion. It also allows me to analyze the extent to which a leader's (a) pre-discussion preference for either an optimal or suboptimal decision alternative, and (b) affiliation to either a numerical minority or majority affiliation impacts group decision quality.

Leadership and group-decision quality

Following Day and Antonakis (2012), "leadership can be defined in terms of (a) an influencing process – and its resultant outcomes – that occurs between a leader and followers and (b) how this influencing process is explained by the leader's dispositional characteristics and behaviors, follower perceptions and attributions of the leader, and the context in which the influencing process occurs". In the context of problem-solving tasks, what are the main influencing mechanisms related to leadership that affect a group's decision-making process? What dispositional characteristics and behaviors of a leader are more or less likely to change the opinion of one or more group members or which characteristics make leaders more resistant to conformity pressures?

Research on leadership also shows that individual characteristics, such as status differentials, affect the quality of group decisions. However, findings are not as unequivocal or unidirectional as the findings in the research streams on majority influence and hidden- or partially-hidden profiles. On one hand there is evidence that status differentials can inhibit information exchange (Levine & Moreland, 1990; Silver, Cohen, & Crutchfield, 1994; Yukl, 2001). Low-status members, for example, are usually reluctant to criticize or disagree with high-status members, care more about acceptance by high-status members and may conform more readily to their views (Humphreys & Berger, 1981). Reluctance to criticize high-status members is

detrimental in situations in which lower-status members possess expertise and information that could aid the group to make optimal decisions because their expertise and insights are not likely to be fully utilized, thus reducing the group's overall performance (Twenge, 2001). High status people, in turn, tend to inhibit diversity of ideas and opinions in groups because they are more assertive, they speak out, criticize and interrupt others group members more often than low status people who tend to be less active group members discussions (Robbins, Judge, & Campbell, 2010). Moreover, the opinions and ideas of high-status members have more influence and tend to be evaluated more favorably, even when the basis of their status is irrelevant to the decision problem (Berger, Zelditch, & Cohen, 1972; Harvey, 1953). On the other hand, there is evidence that a leader can focus the group's attention, facilitate communication, stimulate member contributions, and ensure that critical information brought out during discussion is "kept alive" and factored into the group's final decision (Larson, Christensen, Abbott, & Franz, 1996; Larson, Christensen, Franz, & Abbott, 1998; Larson, Foster-Fishman, & Franz, 1998; Stasser & Titus, 2003). In their study that integrate both information sampling bias and leadership style, Larson et al. (1998, p. 482) indicate "that groups with a participative leader discuss more information (both shared and unshared) than groups with a directive leader, but that directive leaders were more likely to repeat information (especially unshared) than participative leaders". A limitation of the aforementioned studies that investigated leadership on group-decision quality in hidden profile situations is, however, that leaders could only increase group performance but not decrease it (Cruz, Henningsen, & Smith, 1999). Therefore, I created an experimental paradigm that allows a leader to be the source as well as the target of influence and to improve and/or reduce group-decision performance.

Why should leadership assignment in decision-making tasks give leaders more influence over followers?

Following the argumentation of Melamed and Savage (2013), who extended status characteristics theory, "disagreement between group members introduces uncertainty into the social situation and this uncertainty motivates people to use status characteristics to evaluate the merits of a particular opinion" (Melamed & Savage, 2013, p. 1085). When group members all have the same opinion and favor one option over the other at the outset of the discussion, the group members are likely to experience no or little uncertainty about the correctness of a particular choice (Melamed & Savage, 2013). Hence, pressure to change their opinions should be relatively low. When there is disagreement among the members of the group, however, uncertainty about the correct decision will be higher and group members will rely on the number of people who hold an opinion as well as their perceived status "to reduce uncertainty about the correctness of a particular position" (Melamed & Savage, 2013, p. 1088). As a result, followers in three person groups who realize that their opinion is at odds with the opinion of the numerical majority will be more likely to conform to that majority than dissenting leaders because position power might preserve or partially shield the leader from normative or informational influence exerted by the numerical majority.

The research streams of majority and minority influence, information sharing and the status characteristics model show that group-decision making is a very complicated process with normative and informational or cognitive factors that can both reduce or enhance group decision quality. Table 3 outlines the experimental design. A very general scheme that explains the combination of influencing factors that correspond to each experimental condition is outlined in Figure 1.1 and 1.2.

[Insert table 3 here]

The table shows four group-decision-making situations or conditions to which a leader can be exposed[1]. In condition 1 and 2, the leader is in a preference majority, that is, one of the two group members shares the leader's preference for a decision alternative at the outset of the discussion. The leader's pre-discussion preference supports the optimal decision alternative in condition 1; however, it supports the suboptimal decision alternative in condition 2. In condition 3 and 4, the leader is in a preference minority, that is, the other two group members do not share the leader's pre-discussion preference for either an optimal decision alternative (condition 3) or a suboptimal decision alternative (condition 4).

Although a leader can advocate or challenge the opinion of his or her group members and the group members can advocate or challenge the opinion of the leader, I argue that the information distribution and whether the leader is part of the numerical majority or not will determine which influencing factors will increase or decrease a) group decision quality or b) the degree of group-member compliance to the leader's pre-discussion preference for an option.

Given the four experimental conditions outlined above, the influencing factors that increase the likelihood that the group members conform to the leader's pre-discussion preference is outlined in Figure 1.1.

[Insert Figure 1.1 here]

In condition 1, where the leader is in a preference majority, the influencing factors that are likely to increase the group member's conformity to the leader's pre-

[1] Table 3 is a highly simplified representation of reality. A leader can be exposed to more than four situations described in Table 3. Leaders, for example, simply can have no opinions with regard to decisions depending on the relative importance they attach to decisions in the process of reaching organizational goals. Also, there might be a multitude of options to be considered during a group discussion where numerical majorities cannot be identified. Moreover, time pressure can play an important role in decision-making, etc.

discussion preference for the optimal decision alternative are 1) *status*, 2) *number of cues*, and 3) *conformity pressures* exerted by the majority. According to status characteristics theory, the first influencing factor, *status*, increases the group member's certainty about the correctness of the preference outlined by the leader during the group discussion (Melamed & Savage, 2013). Based on stereotypical believes about leaders held by group members, the leader is accorded higher competence in solving the task and, hence, more likely to make his followers conform to his or her preference for a decision alternative. The second influencing factor, *number of cues*, comprises the information-sampling bias, that is, a higher probability to discuss shared pieces of information that support the optimal decision alternative, and the fact that preference consistent information is more salient and more likely to be recalled during discussion (Stasser & Titus, 1985). Moreover, the initial preference of the leader supports the decision alternative with the highest sum score in a unit weight linear model that assigns the same weight to each available information item at the group level and which would be chosen by an omniscient group member (Reimer & Hoffrage, 2005, 2006). In other words, it would become apparent that the leader has more arguments for his or her initially preferred decision alternative than the dissenting minority group member if all cues were to be discussed and factored into the group decision. The third influencing factor, conformity pressure, refers to the normative or informational influence exerted by a majority. If the minority group member believes that the majority provides a valid source of information and/or that majority membership is desirable and protects against group rejection he or she is likely to conform more readily to the leader's/majority's preference for the optimal decision alternative.

In condition 2, the leader is in a majority with a pre-discussion preference for a suboptimal decision alternative. Only two influencing factors, *status* and *conformity pressures* increase the likelihood that the dissenting group member will conform to the leader's pre-discussion preference (or preventing the leader and/or the majority group member to change their opinion during the group discussion). Unlike in condition 1, the influencing factor *number of cues* in condition 2 can strengthen the arguments of the dissenting minority who, contrary to the leader in the majority, prefers the optimal decision alternative. In this particular situation, group decision quality can only be enhanced if the leader is attentive to the dissenting group member, reconciles discrepant information, suspends his or her own opinion, and integrates positions in fair and cohesive manner. Given that I gave the leader the position power to run the group-decision-making task and to guide the group members, I expect that the perceived responsibility for good decision outcomes is higher for the leader than that of the other group members and anticipate that the leader pays more attention to discrepant information. That leaders pay more attention to discrepant information is in line with the results of studies conducted by Larson et al. (1996, 1998). The authors show that participative leaders discuss more information (shared and unshared) than groups with a directive leader, but that directive leaders were more likely to repeat information (especially unshared) than participative leaders. Hence, I expect leaders to focus more on the convincing arguments of the dissenting group member and, therefore, to increase the group-decision quality by changing his or her own opinion as well as the opinion of his or her ally. Knowing, however, that the number of cues is the only factor that plays in favor of the dissenting group member and that uncovering the optimal solutions requires an intensive discussion as well as that the dissenting minority has to overcome the initial pressures exerted by the majority and the status

of the leader, the chances are still high that the dissenting group member complies with the leader's pre-discussion preference before all unshared information can be discussed. In other words, given that the two influencing factors, *status* and *conformity pressure* reinforce the likelihood to follow the majority/leader, I assume that many dissenting group members will conform to the leader's opinion already at the beginning at the group discussion, making it difficult for the leader to discover the optimal solution. Hence, compliance to the leader's incorrect pre-discussion preference will only be slightly reduced.

In condition 3, where the leader is in a preference minority with a pre-discussion preference for an optimal decision alternative, the influencing factors that are likely to make the majority conform to the leader's preference are *status* and *number of cues.* In this particular situation, the leader will come to realize that his or her preference for an option is in opposition with the preference held by the other two group members. The two influencing elements that are on the leader's "side" are contrasted with *conformity pressure,* which is attributed to the majority group members. In comparison with situation two, I expect that the leader's status and the number of cues for an optimal decision held by the leader will give him or her more influence than the dissenting group member without leadership status but less than in condition 2.

In condition 4, the leader can only count on his status in order to make the majority conform to his or her pre-discussion preference. It is likely that the group members realize that the leader does not have enough arguments that would support his initial preference (unlike in situation 3). Therefore, the stereotypical perception of competence accorded to the leader at the outset of the discussion is likely to wane during the discussion. At the same time, the leader is likely to succumb to the

influencing factors, which are inherent to other two group members. Therefore, I expect compliance to the leader's pre-discussion preference to be smallest (i.e., smaller than in condition 2 and 3). Assuming that all influencing factors have the same weight in the group-decision-making process and given that (a) all three influencing factors "play in favor" of the leader in condition 1, (b) the leader can only draw on two influencing factors in condition 2 and 3, and (c) can only rely on his status in condition 4, I test the following joint hypothesis:

Hypothesis 1a: Conformity to leader pre-discussion preference condition 1 > condition 2 = condition 3 > condition 4.

[Insert Figure 1.2 here]

Instead of focusing on conformity to the leader, the influencing factors in Figure 1.2 are rearranged to compare and predict the likelihood of the group to choose the optimal decision alternative (i.e., group-decision quality) in each experimental condition. In condition 1, the optimal decision alternative is preferred by the majority, which consists of the leader and a group member. Hence, the influencing factors that increase the likelihood of group-decision quality are *number of* cues, *status*, and *conformity pressure*. In condition 2, the only influencing factor that supports the minority-group member with a pre-discussion preference for an optimal decision alternative is the *number of cues*. In condition 3, the influencing factor *number of cues* and *status* are playing in favor of optimal group decision-making if the leader is in minority with a pre-discussion preference for an optimal decision alternative. Finally, in condition four, the majority enters the discussion with a preference for the optimal decision alternative. Unlike in condition 1, however, the majority in condition 2 consists of two group members. With the leader being in the preference minority, only the influencing factors *number of cues* and *conformity pressure* are playing in favor of

optimal group decision-making. Following the arguments mentioned above, the joint hypothesis could be rewritten as follows:

Hypothesis 1b: Group-decision quality in condition 1 > condition 4 = condition 3 > condition 2

Method

Subjects

Two hundred thirty students, enrolled in an undergraduate organizational behavior course at a major state university in Switzerland, served as subjects in exchange for course credit. Sixty-two percent of the subjects were male. The age of the participants ranged from 18 to 29 years with a mean of 20.89 years. The majority of participants were Swiss (73%); the rest were mostly from European countries. All participants spoke fluent French, which was the first language of the majority of the participants (79%).

Design

The design of the study was an information distribution factorial with four conditions where the assigned leader was: (a) in a majority with a pre-discussion preference for the optimal solution, (b) in a majority with a pre-discussion preference for the suboptimal solution, (c) in a minority with a pre-discussion preference for the optimal solution, and (d) in a minority with a pre-discussion preference for the suboptimal solutions. I manipulated two variables: (a) the ratio of favorable versus unfavorable information the leader received on the two sites and (b) whether the information the leader received was shared (or not) with one other group member (i.e., the leader was either alone in the information he/she had received and the remaining two members received the same information, or the leader received the same information as one of the group member whereas the remaining member was alone in the information

received). Crossing these two factors created information asymmetries and power dynamics for leaders and team members. I anticipated that these manipulations would engender debate and conflict, which would make the experimental task more realistic and hence create an information "coordination" vacuum that would be filled by the leader. Ideally, the leader's role was to ensure that the team members pooled information so as to uncover the partially hidden information profile. Thus, to undertake this information-sharing process in an effective and efficient manner, an ideal leader had to question and carefully listen to the other group members in order to pool and integrate all relevant pieces of information effectively before making the final decision.

Students were assigned to 57 groups three-person groups. Fifty-nine additional independent observers were randomly assigned to the groups. The independent observers did not interact with the group members; they had to provide ratings on the target leader and to indicate their preference the decision alternatives based on the total number of cues at the group level. Hence, twenty-six groups had five members, 7 groups had four members, and 24 groups had three members. I randomly assigned roles to the group members and controlled for category of participant (i.e., active group member or independent observer) in the regression models predicting leadership.

The information distribution across these conditions is outlined in Table 4.

[Insert Table 4 here]

Covariates

I used Gender (1 if female, else 0), Mother tongue (1 if French, else 0), Mark (the final grades the students obtained in the organizational behavior course) and the "Big Five" personality dimensions (Neuroticism, Extraversion, Agreeableness,

Conscientiousness, and Openness) as control variables. To determine whether the treatments correlated with the measured covariates, I used maximum likelihood estimation, specified the covariates as dependent variables and regressed each covariate on the manipulated factors majority-minority, optimal-suboptimal and the interaction minority-majority x optimal-suboptimal.

Task

The experiment concerned a group-decision making task (i.e., a hidden profile task, cf. Stasser & Titus, 1985) on a hypothetical investment choice between two factory sites, Delta and Gamma. The leaders' main task was to coordinate discussions between the team and provide the experimenters with a decision on which of the two sites was the better one for locating the factory. I provided the appointed leader with opportunities to act leader-like by giving them the authority to ensure that the other members correctly followed the experimental procedure. I instructed leaders to ensure that the decision had to be given to the researchers within 45 minutes of the start of the experiment. The constraints I imposed created some parallels between the experimental setting and a real-life work setting. One of the sites was clearly the better site; however, the way in which I distributed information made it difficult for a specific participant to know which of the two sites was the better one if the particular individual used only the information he/she had received from us.

Before the group members were allowed to enter the group-decision process, each group member was given time to individually memorize descriptions of two hypothetical developed sites, Gamma and Delta. Subsequent to the memorization phase of the information, the three group members convened to discuss and outline their preferences for either site Delta or Gamma. After the discussion a choice had to be made between Delta and Gamma. The leader had the full decision-making

authority and, therefore, was given the authority to go along with or overrule the decision of the majority. The final decision had to be announced to all group members by the leader after the deliberation.

Procedure

The experiment was divided into several phases to reduce bias associated with common source/method variance in the data-gathering process. Three weeks before the experiment, all participants completed a demographic questionnaire and a personality inventory. Three days before the experiment, all participants received a document that informed them about their status (leader, group member A or B, or observer 1 or 2) as well as the time and the location, indicating when and where they should meet. The experimental sessions were video recorded to verify whether the students followed their tasks seriously. In addition to the information received by the group members A and B, each leader obtained a more detailed description of his or her role as well as detailed indications they were expected to give to their group members.

During the experiment, I gathered data on the subjects pre-discussion preference and group-discussion quality.

All leaders were instructed to meet and welcome the other two group members A and B in front of their designated classroom 5 minutes before the start of their session. If all group members were on time, the leader accompanied them into the classroom and invited the participants to take a seat at the tables that were designated to them. The arrangement of the tables in all of the 20 rectangular classrooms was identical.

On each table, a number of envelopes have been placed by one of the experimenters prior to every group session. Whereas three envelopes, each marked

with a number going from one up to three, were placed on the leader's table, two envelopes, each marked with a number one and two, were deposited on the table of group member A and B respectively. All envelopes with a number one contained a brief description of the participants' role, the general task, and a description of the two hypothetical sites for the new radiator-thermostat factory. The envelopes marked with a number two included a sheet that asked each group member to indicate their preference either for the emplacement Delta or Gamma. It also contained a sheet that requested all group members to write down as many information they could recall for each of the two emplacements Delta and Gamma. Finally, the third envelope deposited on the leader's table included an answer sheet that instructed the leader to indicate the location that had been chosen for the construction of the new radiator-thermostat factory. All tables were separated so that none of the group members could see any information that were placed on the other group members' tables.

Once all group members were seated, the leader opened the first envelope and requested both group members to do likewise. The leader stopped the time and told the group that they had exactly 15 minutes to read and follow the instructions contained in the envelope without engaging in any kind of communication. After precisely 15 minutes, the leader put the instructions with the site descriptions into the envelope number one, sealed it, put it back on the table, opened the second envelope and asked the other group members to do the same. This time, the leader indicated that they had 5 minutes to silently read and follow the instructions that were contained in the second envelope before sealing it and putting it back on the table. Once, all group members had sealed the second envelope, the leader invited group member A and B to sit at his or her table for a group discussion. As before, group member A was asked to take a seat to the leaders left. Group member B was reserved a chair at the

right-hand side of the leader's table. The discussion could last up to 20 minutes before the leader was instructed to open the third envelope in order to indicate the emplacement that had been chosen for the construction of the new radiator-thermostat factory. After the decision had been made, the leader collected all envelopes and led the group to a separate room where they were received by the experimenter. The experimenter collected all envelopes, asked all participants to fill out some final questionnaires, thanked each group member for his or her participation, and told them that a detailed feedback will be given to them at the semester's last course session.

Finally, seven weeks after the experimental session, I used the grades the participants received on the final exam of the course as the outcome measure of academic achievement. Note, I assumed that the course mark is exogenous in my manipulation, and that it is largely a reflection of the cognitive ability of the students. As I note later, including this covariate or not did not alter the patterns of results.

Manipulation of the information environment

Perceived relative importance of information items

The site descriptions were based on a pool of positive and negative information about economic, political, demographic and social issues. In order to create a pool of information of perceived similar importance, an independent sample of 25 raters has been selected before the start of the experiment. The independent raters, which were not part of the subjects in our study, evaluated the information items advocated for the construction site descriptions on a 7-point scale anchored by 0 = *Not at all important*, 2 = *Somewhat important,* 4 = *Fairly important* and 6 = *Very important*. Furthermore, the raters indicated whether the information was perceived as being positive or negative. Only information items (a) with an average equal to or above 3 and below 5, (b) with a standard deviation smaller than 1.3, and (c) that have been unanimously

perceived as being positive or negative were used. On the basis of these ratings, I formed two descriptions of the two construction sites Delta and Gamma, each containing 11 nearly equally weighted pieces of information. Examples of information items given to participants are: "Taxes are high", "The workforce in the area is qualified", and "There are difficulties with the local administration". Finally, within each description, I did not use information items that implied contradictory or inconsistent views.

Superiority of Decision Alternative

Superiority of decision alternative was assessed by 59 independent observers who were asked to indicate their preference for Delta or Gamma based on a complete description of the two developed sites. The positive and negative descriptions of the construction sites Delta and Gamma were presented in a two-column table. Overall, each observer's descriptions contained 11 negative and only 7 positive information items for the construction site Delta as opposed to 11 positive and 7 negative information items only for the construction site Gamma. For 30 observers, the names of the developed sites Delta and Gamma in the two column headings have been inverted to control for the order effect. Due to the fact that the description of one construction site contained more positive and less negative information items, I expected that the developed site that contained more positive than negative information will be perceived by the independent observers as being the superior decision alternative. All of the independent raters indicated a preference for the superior decision alternative.

Measures and manipulation checks

Leadership preference

I used Zaccaro, Foti, and Kenny's (1991) leadership preference measure to examine whether appointed leaders were seen more leader-like than were team members. Therefore, participants were asked to imagine the following situation "If you were asked to meet a second time with this same group to work on the same kind of task, please rank your preference for a group leader. Indicate your choice by putting the number assigned to each group member in the space provided. Please include yourself in the ranking" (the last instructions did not concern observers). A rank of 1 indicated a top choice for the leadership position and rank of 3 indicated that the rated individual was ranked last. I averaged each group member's rating for the leader, group member A as well as group member B and excluded self-ratings.

Leadership emergence

To obtained ratings of the extent to which each member assumed a leadership role, led the conversation, and influenced group goals and decisions, I used Kent and Moss's (1994) 3-item emergent leadership measure. Therefore, participants were asked to rate the extent to which themselves and each member of their group (1) assumed a leadership role, (2) led the conversation, and (3) influenced group goals and decisions" (1 = Never, 7 = Always).

Results

Of the 57 groups, 11 groups had to be discarded due to late arrivals of one or more subjects. From the remaining 46 groups in the sample, two groups (from all experimental conditions) had to be discarded because at least one of the three group members outlined a pre-discussion preference that was not in line with the manipulation and the information that have been given.

Although the leaders had full decision-making authority and could have overruled the decision outlined by the majority toward the end of the decision task, all group members made a unanimous decision.

With regard to the manipulation check of leader preference and leader emergence, within-group rater agreement (James, Demaree, & Wolf, 1984) was very high for both the rating of leadership preference (mean r_{wg} across leaders and team-members = .94, *SD* = .06) and for the rating of leader emergence (mean r_{wg} across leaders and team-members = .93, *SD* = .08). Because (a) ratings of preference and emergence were not independent (i.e., measures were repeated/clustered within groups) and (b) leader preference and emergence (Cronbach alpha .73) were correlated (r = -.52, recall preference was coded from 1, best, to 3, worst) suggesting that they shared a common cause, I used Stata's maximum likelihood seemingly-unrelated estimation. This estimation procedure allows correlated disturbances across equations (like MANOVA) with the added advantage that one can also correct standard errors for clustering (i.e., non-independent observations) within groups (Gould, Pitblado, & Sribney, 2007). I regressed the two dependent variables on the leader indicator variable (coded 1 to indicate the leader of the group or 0 to indicate a team member). Results indicated that the leader indicator variable significantly predicted both preference β = -.35 (95% confidence -.58 to -.13), *SE* = .12, z = -3.08, $p < .01$ (the indicator variable predicted 8.23% of the variance in preference) and emergence, β = .32 (95% confidence interval .07 to .57), *SE* = .13, z = 2.55, $p < .05$ (the indicator variable predicted 5.05% of the variance in emergence). I then added the two hidden profile task manipulated factors to the regression model: (a) the ratio of favorable versus unfavorable information the leader received on the two sites and (b) whether the information the leader received was shared (or not) with one other group member.

These two factors, as well as their interaction did not change the preference and emergence estimates, which remained significant as well when adding the control variables. Thus, leaders were seen as more leader-like irrespective of experimental conditions. Although the effects of my manipulation check may seem modest, the individuals who I appointed as leaders were rated as significantly more leader-like, and this after a relatively short experimental interaction, which is notable given that the team members also attempted to influence each other and the leader. Also, I do not believe that the effects I found were due to social desirability. If it were the case, rater neuroticism and conscientiousness should have been significantly correlated with emergence and preference ratings (cf. Ones, Viswesvaran, & Reiss, (1996); however, correlations and partial regression coefficients indicated no significant effects.

A robust Wald test indicated that the covariates were significantly correlated with the treatments, indicating that random assignment did not work perfectly: chi-square (27) = 107.57, $p < .001$. Thus, I controlled for all covariates in the predictive models. Given that some of the covariates significantly correlated with the treatments, I will briefly discuss the role of these control variables in the context of leadership, majority-minority influence and group decision-making even though the control variables did not form a part of my hypotheses.

Personal leader dispositions, social influence and group-decision quality

Intelligence

Intelligence is the ability to deal with cognitive complexity, which, among other things, is linked to the process of knowledge acquisition, i.e., the identification, acquisition, organization, combination or comparison, and updating of information (Chemers, Rice, Sundstrom, & Butler, 1975; Reber, Walkenfeld, & Hernstadt, 1991;

Ruthsatz, Detterman, Griscom, & Cirullo, 2008; Vincent, Decker, & Mumford, 2002) and/or a process of knowledge dissemination, that is, the delivery of a fluent, sophisticated, flexible, and complex message with rich vocabulary, extensive use of analogies and arguments, and a more intricate and consistent logical structure (Simonton, 1985). Given that the acquisition and dissemination of knowledge is vital to undertake information-sharing processes in an effective and efficient manner, leaders who score high on intelligence are more likely to increase the group decision quality than leaders who score low on intelligence.

Another reason why intelligence should positively predict group-decision quality can be derived from Nemth's (1986, 1995) convergent-divergent theory and Fiedler and Garcia's (1987) cognitive resource theory. According to Nemeth (1986, 1995) stress narrows the focus of attention and leads to convergent thinking or damages the leader's ability to think logically and analytically (Fiedler & Garcia, 1987). Fiedler and Garcia (1987) argue that leader intelligence can lessen the influence of stress on his or her actions. Also, following the Elaboration likelihood model (Petty & Cacioppo, 1984), people high in intelligence will devote more cognitive effort to processing a message and chose a central route of thinking (i.e. they use logic, reasoning, example, and facts) than people low in intelligence who are more likely to chose a peripheral route of thinking (i.e. they superficially process information and are more likely to focus on surface features such as the communicator's attractiveness). Hence, intelligence typically confers resistance to non-substantiated messages or influence attempts. Based on a meta-analytic review, Rhodes and Wood (1992) showed that recipients of higher intelligence were more resistant to conformity than those of lower intelligence.

Extraversion and Neuroticism

Extraverted people have the tendency to be talkative and assertive (Costa & McCrae, 1992). Whereas being talkative and being assertive helps people to reinforce their opinion, it is not necessarily helpful for leaders who have to be attentive to the team members, reconcile discrepant information, suspend their own opinions, and integrate positions in a fair and cohesive manner in order to solve partially-hidden profile tasks. Rather than being a careful listener, I expect leaders high in extraversion to impose their opinion more often than people who score low on the extraversion scale.

People high in neuroticism are more impulsive and more vulnerable to stress (Costa & McCrae, 1992). We expect leaders who score higher in neuroticism to experience more stress in situations where their own preference is not in line with the preference of the majority group members. As mentioned above, perceived stress narrows the focus of attention (Nemeth, 1995). This narrowed focus of attention will be detrimental for leaders in situations were he or she is in a minority or when a dissenting group member can advance a lot of arguments against the leader's preferred option at the outset of the discussion.

Age

Finally, we expect that leaders higher in age to feel more responsible for decision outcomes. We expect leaders with a higher perceived responsibility for group outcomes to devote more cognitive effort to processing a message and, therefore, to be attentive to the team members, reconcile discrepant information, suspend their own opinions, and integrate positions in a fair and cohesive manner.

Summary statistics and the correlation matrix of the measures are reported in Table 5. A series of nested probit-regression estimates is presented in table 6.

[Insert Table 5 here]

[Insert Table 6 here]

Model 1 presents the results of a specification that includes only the leader's main socio-demographic control variables. Model 2 includes the big 5 dimensions of personality (Neuroticism, Extraversion, Openness, Agreeability, Conscientiousness) and the final grade of his or her exam (Mark) as a proxy for the leader's intelligence. Model 3 includes the two factors indicating the experimental conditions as well as the interaction of these factors. Although there is no reason to believe that the experiment could have affected marks of the students, I added Model 4 to see whether I find the same general pattern as in model 3 if our proxy for intelligence "Marks" is excluded. Model 4 indicates that the interaction of our experimental conditions was still significant. Because I assume Marks to be exogenous and generally stable over time, I use model 3 because Marks removes variance from the outcome variable (i.e., Group-decision quality) due to leader intelligence. As can be seen in table 6, model 3 fits the data better than the other models. The factor Majority-Minority main effect was significant ($p < 0.01$), the factor Optimal-Suboptimal main effect was non-significant ($p = 0.283$) and the factor Maj-Min*Opt-Sub interaction was also significant ($p < 0.01$). Model 5 presents the results that only include the factors indicating the experimental condition, also showing that the factor Maj-Min*Opt-Sub interaction was significant ($p < .05$) when all other control variables were excluded. As compared to model 5, the signs of the coefficients for the manipulations in Model 3 did not change and the effect size of the interaction was greater than in Model 5.

The coefficient of Mark is significantly different from zero ($p < 0.01$). Coefficients of Gender, and Mother tongue are marginally significant with p taking values of 0.051, and 0.054 respectively. Overall, the coefficients of Mark, Gender, Age and Mother tongue are positive, suggesting that the likelihood of group decision

quality increases when the leader's mark as well as his or her age is relatively high, leaders are female, and their mother tongue is French (i.e. the most commonly spoken language in the region). Two coefficients of the leaders' "big five" personality dimension, Neuroticism ($p < 0.05$) and Extraversion ($p < 0.01$), are negative and significant, specifying that the chances of making optimal decisions in my information environment decreases when a leader score relatively high on these dimensions. Although extraversion and neuroticism negatively and significantly predict group-decision quality, its effect size is very small. The coefficients of the remaining three personality dimensions, Openness ($p = 0.465$), Agreeability ($p = 0.894$), and Conscientiousness ($p = 0.601$), are not significantly different from zero.

Given that the magnitude and statistical significance of the interaction effect varies by observation in nonlinear models, I corrected the estimate of the magnitude and standard errors of the interaction effect in nonlinear models as suggested by Ai and Norton (2003). Results show that my interaction effect is positive for all observations with predicted values of making an optimal decision. The statistical significance of the interaction effect is stronger at predicted probabilities that are inferior to .5.

Finally, the size of my sample (n=44) relative to the number of independent variables and controls was small. Hence, I tested whether the variance explained by our models is significantly different from models that include random and normally distributed independent variables (i.e., noise). Using 12 random variables and simulating the dataset 5000 times produces pseudo r-squares that are not higher than .18 within a 95% confidence interval and where the Wald test for all regressors simultaneously equaling zero is not significant ($p = .40$). My model 3 has a pseudo-r of .41 and the results of the Wald test show that the hypothesis of all regressors

simultaneously equaling zero has been rejected. Therefore, model 3 predicts decision quality much better than chance (i.e., 12 normally distributed variables that have been randomly generated) would do.

Marginal Effects, leader influence and planned comparisons

The results of Figure 2.1 and 2.2 are based on the predicted outcomes of Model 3. Both figures are based on the same data but represented differently in order to facilitate comparisons and interpretations of the results.

The results in Figure 2.1 show that, in condition 1, 2, 3 and 4, the leader asserted his or her authority and made people adapt to his or her pre-discussion preference in, on average, 97%, 61%, 65%, and 23% of groups, respectively. In line with my joint hypothesis 1a, compliance to the leader's pre-discussion preference is highest (97%) in condition 1 and is significantly different from condition 2 , in which 61% of dissenting non-leaders comply the leader's pre-discussion preference, χ^2 (1, N = 44) = 555.23, p < .001. Compliance to the leader's pre-discussion preference in condition 2 (61%) is not significantly different from condition 3 (65%), χ^2 (1, N = 44) = .22, p = 1.00. Compliance to the leader's pre-discussion preference in condition 3, however, is significantly different from condition 4 (23%), χ^2 (1, N = 44) = 25.53, p < .001.

[Insert Figure 2.1 here]

The y-axis of Figure 2.2 indicates the percentage of optimal group decisions. The x-axis depicts the constituencies who held the optimal preference for one of the two options at the outset of the group discussion.

[Insert Figure 2.2 here]

As compared to 97% of all leader-containing majorities with optimal pre-discussion preferences (condition 1), only 77% of all majorities that consist of two

group members who have an optimal pre-discussion preference choose the optimal decision alternative (condition 4). It follows that a leader and a group member who constitute a majority based on their pre-discussion preference for the optimal solution (condition 1) are 1.26 (.97 divided by .77) times more likely to reach an optimal group decision than two non-leaders in a pre-discussion-majority who face a dissenting leader (condition 4). Thus, dissenting leaders reduce the likelihood of making an optimal decision by 20% (.97 - .77) if they 'confront' group members who initially outline a preference for the optimal solution. Similarly, as compared to 65% of all dissenting minority leaders with optimal pre-discussion preferences (condition 3), dissenting minority group members with an optimal pre-discussion preference change the majorities' opinion in 39% of the groups (condition 4). It follows that dissenting leaders (i.e., leaders in an optimal pre-discussion-preference minority) are 1.7 (.65 divided by .39) times more likely to change the majority's public opinion than dissenting non-leaders. Dissenting leaders who have an optimal pre-discussion preference increase the likelihood of making an optimal group decision by 26% (.65 - .39) as compared to dissenting group members whose initial preference for an option is optimal. In support of hypothesis 1b, comparison tests between conditions 1 and 4 as well as conditions 3 and 2 with regard to the percentage of optimal group decisions were significant, χ^2 (1, N = 44) = 7.47, p < .01 and χ^2 (1, N = 44) = 4.80, p <.05, respectively. Group decision quality in condition 4 (77%) is not significantly different from condition 3 (65%), χ^2 (1, N = 44) = 1.02, p = 0.31.

Discussion, limitations and practical implications

Group-decision-making teams is a complex undertaking. Several influencing factors, such as commonly held preferences for an option at the outset of a discussion, the information distribution of positive, neutral and negative cues with regard to

decisional options, and individual characteristics such as status affect the quality of group decisions.

In my research, I recognized and attempted to show the multi-directionality of social influence by focusing on the ability of the 'minority' leader to influence the majority and vice versa. If influence flows from the majority to the minority as well as from those with authority to those with less authority, what happens when normative and informational influence originating from leadership and the majority collide (i.e. leaders are in dissent with a numerical majority)? In line with the arguments of Moscovici and Faucheux (1972), I contended that leaders in minorities are not just passive agents and that their originally deviant views can come to prevail. Based on the fact that I found a significant difference between the predicted margins of condition 1 (Leader Majority – Optimal) and 4 (Non-leader Majority – Optimal) as well as condition 2 (Leader Majority – Suboptimal) and condition 3 (Non-leader Majority – Suboptimal), one might conclude that leaders are more likely to resist to conformity pressures than non-leaders. Unfortunately, the leader versus non-leader situation is not really comparable because leaders in the minority are not exposed to the same nature of conformity pressures than non-leaders are in my four experimental conditions. Unlike leaders who are only subject to the influence that emanates from the majority, non-leaders, in addition to the conformity pressures exerted by the majority, are also subject to the influence wielded by the assigned leader. Hence, a drawback of my study is that I cannot disentangle the effect of leadership assignment on group decision quality from the effect that would emanate from a leaderless decision group. Neither does my study tell whether group decision quality or conformity to a leader is a linear or non-linear function of majority influence, information-sampling bias, status and the number of favorable of unfavorable

arguments for an option. Moreover, I did not answer to which extent minority group members conform to a leader because they believe that following the leader is desirable, protects against group rejection and/or because the leader provides a valid source of evidence about the reality. Nevertheless, although my study does not clearly show to which extent leadership assignment enhances conformity pressures, I expect that the combined influence emanating from the leader and the majority is stronger than the influence exerted by a leaderless group. Research conducted by Schulz-Hardt et al. (2006) seems to support my claim. In their study, the authors created information distributions that generated pre-discussion preferences among group members that were similar to my experimental conditions except that no leader was assigned to their three-person groups. Their results show that 65% of twenty leaderless-three-person groups opted for an optimal solution. By taking Schulz-Hardt et al's (2006) finding as a benchmark, my results point into the direction that decision quality differs if an assigned leader or status figure resides in a majority. As compared to a leaderless-three-person group, group decision quality significantly increases from 65% to 97% when the leader has an optimal pre-discussion preference for an option but significantly decreases from 65% to 39% when the leader is in a preference majority that favors the suboptimal option at the outset of the group discussion. However, when comparing Schulz-Hardt et al's (2006) findings with my results of condition 3 and 4 (i.e., when the leader is in the minority) it appears that (a) dissenting leaders seem to be equally successful (or unsuccessful) in changing the majority's opinion, independent on their initial preference for an option at the outset of the discussion, and (b) in terms of influence, dissenting leaders do seem to be 'reduced' to non-leaders as they are equally likely (or unlikely) to affect decision outcomes than minority members in leaderless groups (i.e., group-decision quality in condition 3 and

4 does not significantly differ from Schulz-Hardt et al's threshold of 65%). Therefore, I tentatively conclude[2] that the leadership effect on group decision quality might be significant only if an assigned leader is part of the majority. Interestingly, the tentative suggestion that status only increases pressures to conformity if the leader is in the majority would restrain the applicability of status-characteristic theory to situations where leaders are part of the numerical majority. Moreover, from this hypothetical perspective, there is a positive and negative aspect to this loss of influence for assigned leaders in pre-discussion-preference minorities. On the upside, there is little room for minority leaders with a suboptimal pre-discussion preference to make matters worse (unlike leaders in the majority-suboptimal situation) as they do not reduce group-decision quality more than leaderless groups would do. On the downside, there is little room for leaders to improve group-decision quality. More research is necessary to obtain more evidence on the aforementioned.

Considerable research on conformity and social influence supports the notion that the mechanisms of majority and minority influence work differently (Martin & Hewstone, 2009), implying different prescriptions as well as possible pitfalls for the leader. Knowing that the leader in the minority lacks power and the means to exact change of the majority's opinion, the leader has to negotiate his or her influence on the majority. Based on the work by Moscovici, Lage, and Naffrechoux (1969), Mugny (1975) identified two types of negotiation styles. On the one hand, a more rigid style where the minority refuses to compromise on any issue (from a leadership research perspective, this rigid style relates to Vroom and Jetton's directive leadership

[2] I am aware that it is not optimal to compare the percentages of two different experimental studies because the conditions as well as the experimental procedure are never identical. Nevertheless, I find the comparison of results interesting in the discussion section (not in the results section) for the purpose of elaborating new hypotheses. Future research is necessary to accept or reject my tentative conclusion.

style in their normative decision-making model; Yukl, 2001). According to the Path-Goal theory of leadership, however, directive behavior is acceptable to subordinates when a task is ambiguous, assuming that the leader has the technical competence to provide assistance. If the leader's level of task competence does not exceed that of his or her subordinates, directive behavior will be unacceptable (House, 1971). On the other hand, a flexible style where the minority is prepared to adapt to the majority position and accepts certain compromises, which is in line with Vroom and Yetton's normative decision model that prescribes a participative leadership style if the leader lacks knowledge or needs the group members to accept the decision (Yukl, 2001). Evidence suggests that a minority that uses the flexible style is more likely to influence the majority than one that uses the rigid style (Mugny & Papastamou, 1982).

Based on the arguments and evidence mentioned above, I can identify two potential risks that will increase the likelihood of making suboptimal decisions. First, leaders in minority positions might be tempted to use their status and confront the majority in an authoritarian or directive manner. As noted above, this behavior will be less effective in making the majority receptive to accommodate the leader's unshared information and finding the optimal solution. As leaders are often and directly held responsible for outcomes, they have an interest to act like the dissenting jury member in the film 12 angry men who frequently intellectually stimulated the other jury members by questioning their underlying assumptions whilst emphasizing the importance of their decisions on the outcomes. Second, leaders in the majority positions might be tempted to reach consensus too early. As they have the power and the means to exact dependency, the leader should not negotiate but be directive by requesting the group members to think about reasons that speak against the view adopted by the majority. In this situation, leaders should follow the example of

General Motors' Board Director Sloan, who is reported to have said, "Gentlemen, I take it we are all in complete agreement on the decision here." Everyone around the table nodded assent. "Then," continued Sloan, "I propose we postpone further discussion of this matter until our next meeting to give ourselves time to develop disagreement and perhaps gain some understanding of what the decision is all about." (Drucker, 1975, p. 472).

Hence, the fact that leaders find themselves in a majority or minority position can act as a warning signal that potentially helps leaders to make optimal decisions in hidden- or partially hidden profile environments. As it is relatively easy to identify group member's preference and, whether the leader is in a majority or minority position becomes apparent early on in discussions, leaders can use this information as a tool that indicates whether to act in a participative or directive manner. I am not aware of any research that uses these majority-minority indicators as an intervention to increase group-decision quality. I follow Schultz et al. (2006 p. 1081) who state that "if groups consistently perform sub-optimally in situations in which their use should be beneficial, interventions are called for that enable groups to deal with this particular type of decision problem more successfully". Using the leader's position as an indicator for subsequent action might proof successful to solve this issue.

Conclusion

Leaders are generators of or subject to conformity pressures in small decision-making groups. Overall, leadership assignment or status countervails conformity pressures exerted by pre-discussion preference majorities on dissenting leaders but increases conformity pressures on group members. Group decision quality is enhanced if leaders enter group discussions with a preference for the optimal solution but suffers if they favor suboptimal solutions. Although influence is at the heart of leadership,

more research is necessary to determine the effects of leadership on decision-making processes and decisional implications.

References

Abrams, D., Wetherell, M., Cochrane, S., Hogg, M. A., & Turner, J. C. (1990). Knowing What to Think by Knowing Who You Are - Self-Categorization and the Nature of Norm Formation, Conformity and Group Polarization. *British Journal of Social Psychology, 29*, 97-119.

Ai, C. R., & Norton, E. C. (2003). Interaction terms in logit and probit models. *Economics Letters, 80*(1), 123-129. doi: Doi 10.1016/S0165-1765(03)00032-6

Asch, S. E. (1956). Studies of Independence and Conformity .1. A Minority of One against a Unanimous Majority. *Psychological Monographs, 70*(9), 1-70.

Asch, Solomon. (1961). Effects of group pressure upon the modification and distortion of judgment. In M. Henle (Ed.), *Documents of Gestalt Psychology* (pp. 222-235). London: Cambridge University Press.

Baron, R. S., Vandello, J. A., & Brunsman, B. (1996). The forgotten variable in conformity research: Impact of task importance on social influence. *Journal of Personality and Social Psychology, 71*(5), 915-927.

Berger, J., Zelditch, M., & Cohen, B. P. (1972). Status Characteristics and Social Interaction. *American Sociological Review, 37*(3), 241-&.

Bond, R., & Smith, P. B. (1996). Culture and conformity: A meta-analysis of studies using Asch's (1952b, 1956) Line judgment task. *Psychological Bulletin, 119*(1), 111-137.

Brodbeck, F. C., Kerschreiter, R., Mojzisch, A., Frey, D., & Schulz-Hardt, S. (2002). The dissemination of critical, unshared information in decision-making groups: the effects of pre-discussion dissent. *European Journal of Social Psychology, 32*(1), 35-56.

Chemers, M. M., Rice, R. W., Sundstrom, E., & Butler, W. M. (1975). Leader Esteem for Least Preferred Co-Worker Score, Training, and Effectiveness - Experimental Examination. *Journal of Personality and Social Psychology, 31*(3), 401-409.

Costa, P. T., & McCrae, R. R. (1992). *NEO-PI professional manual*. Lutz: FL: Psychological Assessment Resources.

Costanzo, P. R. (1970). Conformity Development as a Function of Self-Blame. *Journal of Personality and Social Psychology, 14*(4), 366-&.

Costanzo, P. R., & Shaw, M. E. (1966). Conformity as a Function of Age Level. *Child Development, 37*(4), 967-&.

Cruz, M. G., Henningsen, D. D., & Smith, B. A. (1999). The impact of directive leadership on group information sampling, decisions, and perceptions of the leader. *Communication Research, 26*(3), 349-369.

Day, D. V., & Antonakis, J. (2012). Leadership: Past, Present, and Future. In D. V. Day & J. Antonakis (Eds.), *The Nature of Leadership* (2 ed., pp. 3-25). Thousand Oaks: Sage Publications, Inc.

Deutsch, M., & Gerard, H. B. (1955). A study of normative and informational influences upon individual judgment. *Journal of Abnormal Psychology, 51*, 629-636.

Drucker, P. F. (1975). *Management: Tasks, Responsibilities, Practices*. India: Allied Publishers Pvt.

Festinger, L. (1950). Informal Social Communication. *Psychological Review, 57*(5), 271-282.

Festinger, L. (1954). A Theory of Social Comparison Processes. *Human Relations, 7*(2), 117-140.

Gerard, H. B., Wilhelmy, R. A., & Connolley, E.S. (1968). Conformity and Group Size. *Journal of Personality and Social Psychology, 8*(1P1), 79-&.

Gould, W., Pitblado, J., & Sribney, W. (2007). *Maximum likelihood estimation with Stata* (3 ed.). College Station, TX: Stata Press.

Gruenfeld, D. H., Mannix, E. A., Williams, K. Y., & Neale, M. A. (1996). Group composition and decision making: How member familiarity and information distribution affect process and performance. *Organizational Behavior and Human Decision Processes, 67*(1), 1-15.

Harvey, O.J. (1953). An experimental approach to the study of status relations in informal groups. *American Sociological Review, 18*, 357-367.

Hollingshead, A. B. (1996). The rank-order effect in group decision making. *Organizational Behavior and Human Decision Processes, 68*(3), 181-193.

Horowitz, I. A., & Rothschild, B. H. (1970). Conformity as a Function of Deception and Role Playing. *Journal of Personality and Social Psychology, 14*(3), 224-&.

Humphreys, P., & Berger, J. (1981). Theoretical Consequences of the Status Characteristics Formulation. *American Journal of Sociology, 86*(5), 953-983.

James, L. R., Demaree, R. G., & Wolf, G. (1984). Estimating within-Group Interrater Reliability with and without Response Bias. *Journal of Applied Psychology, 69*(1), 85-98.

Kent, R. L., & Moss, S. E. (1994). Effects of Sex and Gender-Role on Leader Emergence. *Academy of Management Journal, 37*(5), 1335-1346.

Lamb, T. A., & Alsikafi, M. (1980). Conformity in the Asch Experiment - Inner Other Directedness and the Defiant Subject. *Social Behavior and Personality, 8*(1), 13-16.

Larsen, K. S. (1974). Conformity in Asch Experiment. *Journal of Social Psychology, 94*(Dec), 303-304.

Larsen, K. S., Triplett, J. S., Brant, W. D., & Langenberg, D. (1979). Collaborator Status, Subject Characteristics, and Conformity in the Asch Paradigm. *Journal of Social Psychology, 108*(2), 259-263.

Larson, J. R., Christensen, C., Abbott, A. S., & Franz, T. M. (1996). Diagnosing groups: Charting the flow of information in medical decision-making teams. *Journal of Personality and Social Psychology, 71*(2), 315-330.

Larson, J. R., Christensen, C., Franz, T. M., & Abbott, A. S. (1998). Diagnosing groups: The pooling, management, and impact of shared and unshared case information in team-based medical decision making. *Journal of Personality and Social Psychology, 75*(1), 93-108.

Larson, J. R., Foster-Fishman, P. G., & Franz, T. M. (1998). Leadership style and the discussion of shared and unshared information in decision-making groups. *Personality and Social Psychology Bulletin, 24*(5), 482-495.

Larson, J. R., Fosterfishman, P. G., & Keys, C. B. (1994). Discussion of Shared and Unshared Information in Decision-Making Groups. *Journal of Personality and Social Psychology, 67*(3), 446-461.

Latane, B., & Wolf, S. (1981). The Social Impact of Majorities and Minorities. *Psychological Review, 88*(5), 438-453.

Levine, J. M., & Moreland, R. L. (1990). Progress in Small-Group Research. *Annual Review of Psychology, 41*, 585-634.

Long, H. B. (1970). Relationships of Selected Personal and Social Variables in Conforming Judgment. *Journal of Social Psychology, 81*(2), 177-&.

Martin, Robin, & Hewstone, Miles. (2009). Social-Influence Processes of Control and Change: Conformity, Obedience to Authority, and Innovation. In M. A. Hogg & J. Cooper (Eds.), *The Sage Handbook of Social Psychology* (pp. 312-332). London: Sage Publications Inc.

McLeod, P. L., Baron, R. S., Marti, M. W., & Yoon, K. (1997). The eyes have it: Minority influence in face-to-face and computer-mediated group discussion. *Journal of Applied Psychology, 82*(5), 706-718.

Melamed, D., & Savage, S. V. (2013). Status, Numbers and Influence. *Social Forces, 91*(3), 1085-1104.

Moscovici, S., & Faucheux, C. (1972). Social Influence, Conformity Bias and the Study of Active Minorities. In L. Berkowitz (Ed.), *Advances in Experimental Social Psychology* (pp. 149-202). New York: Academic Press.

Moscovici, S., Lage, E., & Naffrechoux, M. (1969). Influence of a Consistent Minority on Responses of a Majority in a Color Perception Task. *Sociometry, 32*(4), 365-380.

Mugny, G. (1975). Negotiations, Image of Other and Process of Minority Influence. *European Journal of Social Psychology, 5*(2), 209-228.

Mugny, G., & Papastamou, S. (1982). Minority Influence and Psychosocial Identity. *European Journal of Social Psychology, 12*(4), 379-394.

Nemeth, C. J. (1986). Differential Contributions of Majority and Minority Influence. *Psychological Review, 93*(1), 23-32.

Nemeth, C. J. (1995). Dissent as driving cognition, attitudes, and judgments. *Social Cognition, 13*(3), 273-291.

Ones, D. S., Viswesvaran, C., & Reiss, A. D. (1996). Role of social desirability in personality testing for personnel selection: The red herring. *Journal of Applied Psychology, 81*(6), 660-679.

Petty, R. E., & Cacioppo, J. T. (1984). Source Factors and the Elaboration Likelihood Model of Persuasion. *Advances in Consumer Research, 11*, 668-672.

Reber, A. S., Walkenfeld, F. F., & Hernstadt, R. (1991). Implicit and Explicit Learning - Individual-Differences and Iq. *Journal of Experimental Psychology-Learning Memory and Cognition, 17*(5), 888-896.

Reimer, T., & Hoffrage, U. (2005). Can simple group heuristics detect hidden profiles in randomly generated environments? *Swiss Journal of Psychology, 64*(1), 21-37.

Reimer, T., & Hoffrage, U. (2006). The ecological rationality of simple group heuristics: Effects of group member strategies on decision accuracy. *Theory and Decision, 60*(4), 403-438.

Rhodes, N., & Wood, W. (1992). Self-Esteem and Intelligence Affect Influenceability - the Mediating Role of Message Reception. *Psychological Bulletin, 111*(1), 156-171.

Robbins, S. P., Judge, T. A., & Campbell, T. T. (2010). *Organizational behavior*. United Kingdom: Pearson Educations STD.

Ruthsatz, J., Detterman, D., Griscom, W. S., & Cirullo, B. A. (2008). Becoming an expert in the musical domain: It takes more than just practice. *Intelligence, 36*(4), 330-338.

Schulz-Hardt, S., Brodbeck, F. C., Mojzisch, A., Kerschreiter, R., & Frey, D. (2006). Group decision making in hidden profile situations: Dissent as a facilitator for

decision quality. *Journal of Personality and Social Psychology, 91*(6), 1080-1093. doi: Doi 10.1037/0022-3514.91.6.1080

Silver, S. D., Cohen, B. P., & Crutchfield, J. H. (1994). Status Differentiation and Information Exchange in Face-to-Face and Computer-Mediated Idea Generation. *Social Psychology Quarterly, 57*(2), 108-123.

Stasser, G. (1992). Information Salience and the Discovery of Hidden Profiles by Decision-Making Groups - a Thought Experiment. *Organizational Behavior and Human Decision Processes, 52*(1), 156-181.

Stasser, G., & Stewart, D. (1992). Discovery of Hidden Profiles by Decision-Making Groups - Solving a Problem Versus Making a Judgment. *Journal of Personality and Social Psychology, 63*(3), 426-434.

Stasser, G., Stewart, D. D., & Wittenbaum, G. M. (1995). Expert Roles and Information Exchange during Discussion - the Importance of Knowing Who Knows What. *Journal of Experimental Social Psychology, 31*(3), 244-265.

Stasser, G., & Titus, W. (1985). Pooling of Unshared Information in Group Decision-Making - Biased Information Sampling during Discussion. *Journal of Personality and Social Psychology, 48*(6), 1467-1478.

Stasser, G., & Titus, W. (1987). Effects of Information Load and Percentage of Shared Information on the Dissemination of Unshared Information during Group Discussion. *Journal of Personality and Social Psychology, 53*(1), 81-93.

Stasser, G., & Titus, W. (2003). Hidden profiles: A brief history. *Psychological Inquiry, 14*(3-4), 304-313.

Stewart, D. D., & Stasser, G. (1995). Expert Role Assignment and Information Sampling during Collective Recall and Decision-Making. *Journal of Personality and Social Psychology, 69*(4), 619-628.

Stewart, D. D., & Stasser, G. (1998). The sampling of critical, unshared information in decision-making groups: the role of an informed minority. *European Journal of Social Psychology, 28*(1), 95-113.

Twenge, J. M. (2001). Changes in women's assertiveness in response to status and roles: A cross-temporal meta-analysis, 1931-1993. *Journal of Personality and Social Psychology, 81*(1), 133-145. doi: Doi 10.1037//0022-3514.81.1.133

Vincent, A. S., Decker, B. P., & Mumford, M. D. (2002). Divergent thinking, intelligence, and expertise: A test of alternative models. *Creativity Research Journal, 14*(2), 163-178.

Winquist, J. R., & Larson, J. R. (1998). Information pooling: When it impacts group decision making. *Journal of Personality and Social Psychology, 74*(2), 371-377.

Yukl, Gary A. (2001). *Leadership in Organizations*. New Jersey: Prentice Hall.

Zaccaro, S. J., Kenny, D. A., & Foti, R. J. (1991). Self-Monitoring and Trait-Based Variance in Leadership - an Investigation of Leader Flexibility across Multiple Group Situations. *Journal of Applied Psychology, 76*(2), 308-315.

Table 1: Hidden-profile example

	Items favoring option A	Items favoring option B	Item distribution	Decisional implication
Individual level				
X	A_1, A_2	B_1, B_2, B_3	2 A < 3 B	**B**
Y	A_1, A_3	B_1, B_2, B_3	2 A < 3 B	**B**
Z	A_1, A_4	B_1, B_2, B_3	2 A < 3 B	**B**
Group level				
X ∪ Y ∪ Z	A_1, A_2, A_3, A_4	B_1, B_2, B_3	4 A > B	**A**

Note: Choice of alternative B is implied by each of the group member's partial item pools: X : = A_1, A_2,B_1, B_2, B_3; Y: = A_1, A_3,B_1, B_2, B_3; Z: = A_1, A_4,B_1, B_2, B_3. Choice of alternative A is implied by the group's total item pool: X ∪ Y ∪ Z: = A_1, A_2, A_3, A_4, B_1, B_2, B_3. According to a unit weight linear model that assigns the same weight to each information item and where an omniscient group member, based on the total item pool available at the group level, decides in favor of the decision alternative with the highest sum score, alternative A is superior to alternative B.

Table reproduced from Brodbeck, Kerschreiter, Mojzisch, Frey, Schulz-Hardt (2002), The dissemination of critical, unshared information in decision-making groups: the effects of pre-discussion dissent. European Journal of Social Psychology 32, 35-56, 2002, p. 36, Table 1 Example of a hidden profile. © John Wiley and Sons, with kind permission from John Wiley and Sons.

Table 2: Partially-hidden-profile example

	Items favoring option A	Items favoring option B	Item distribution	Decisional implication
Individual level				
X	A_1, A_2, A_5	B_1, B_2	3 A > 2 B	**A**
Y	A_1, A_3	B_1, B_2, B_3	2 A < 3 B	**B**
Z	A_1, A_4	B_1, B_2, B_3	2 A < 3 B	**B**
Group level				
X ∪ Y ∪ Z	A_1, A_2, A_3, A_4, A_5	B_1, B_2, B_3	5 A > B	**A**

Table 3: 2x2 Information-distribution-factorial design

	Leader in MAJORITY	Leader in MINORITY
Leader prefers (prior to discussion) the OPTIMAL decision alternative	Condition 1	Condition 3
Leader prefers (prior to discussion) the SUBOPTIMAL decision alternative	Condition 2	Condition 4

Figure 1.1: Distribution of influencing factors among conditions affecting influence (a)symmetries

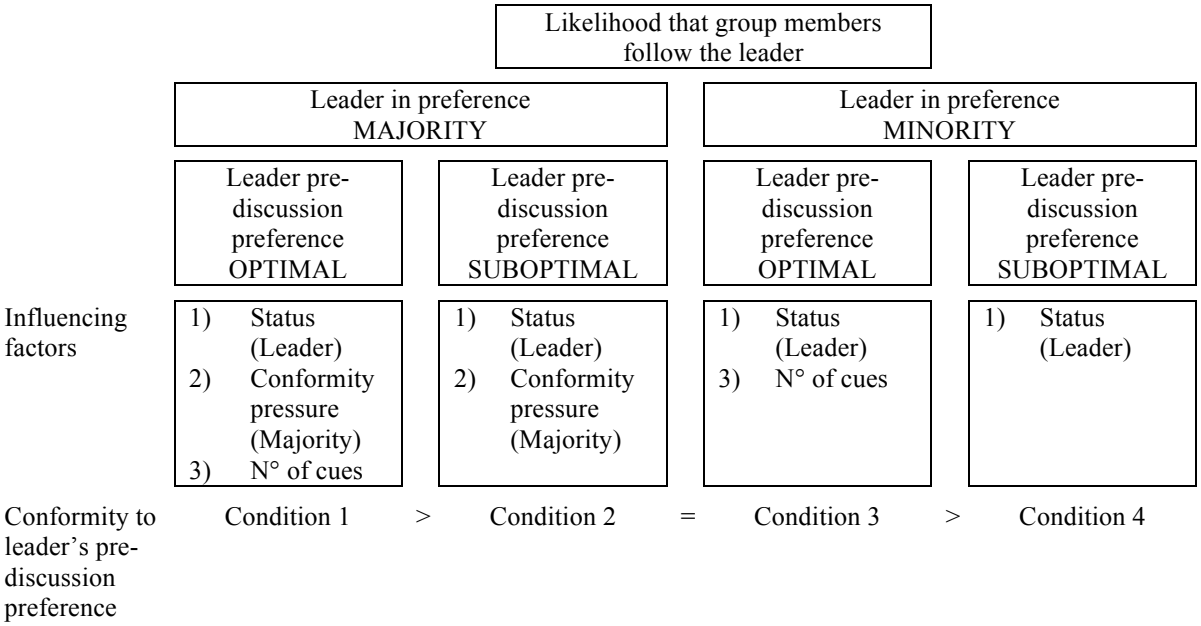

Figure 1.2: Distribution of influencing factors among conditions affecting influence (a)symmetries

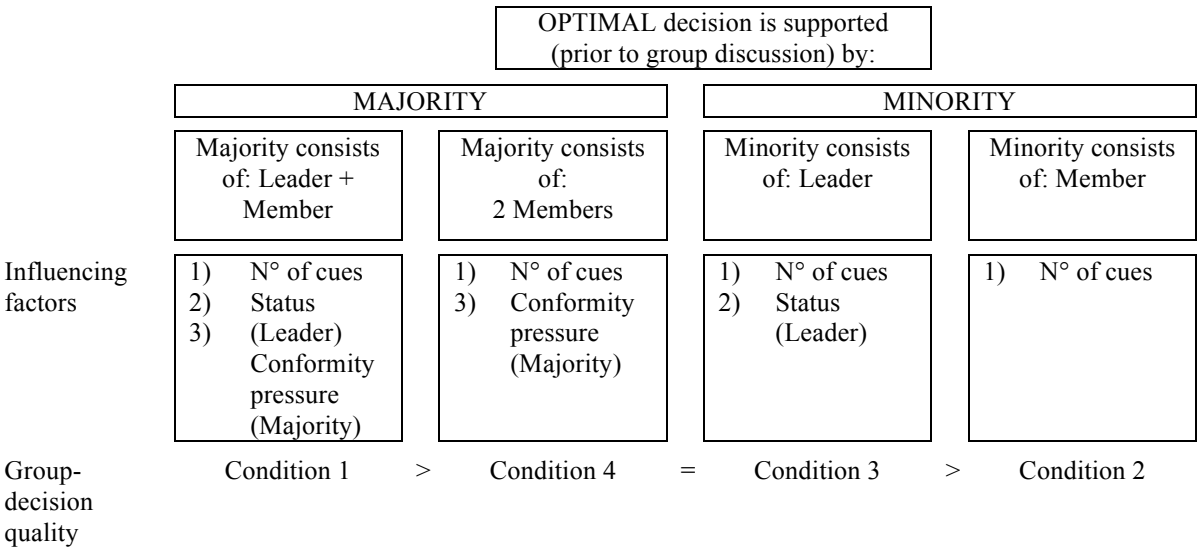

Table 4: Distribution of information across conditions before group discussion

Condition 1 Leader in Majority with a pre-discussion preference for the GAMMA

Group members/ Options	Cue valence	DELTA (suboptimal choice)	GAMMA (optimal choice)
Leader & Group member	+	12,13,14,15	01,02,03,04,05,06,07
A	-	*08,09,10,11,12,13,14*	*01,02,03,04*
Group member B	+	12,13,14,15,16,17,18	08,09,10,11
	-	*15,16,17,18*	*01,02,03,04,05,06,07*
Total number of	+	7	11
information items	-	*11*	*7*

Condition 2 Leader in Majority with a pre-discussion preference for the DELTA

Group members/ Options	Cue valence	DELTA (suboptimal choice)	GAMMA (optimal choice)
Leader & Group member	+	12,13,14,15,16,17,18	01,02,03,04
A	-	*08,09,10,11*	*01,02,03,04,05,06,07*
Group member B	+	12,13,14,15	05,06,07,08,09,10,11
	-	*12,13,14,15,16,17,18*	*01,02,03,04*
Total number of	+	7	11
information items	-	*11*	*7*

Condition 3 Leader in Preference Minority opting for the favorable site

Group members/ Options	Cue valence	DELTA (suboptimal choice)	GAMMA (optimal choice)
Group member A & B	+	12,13,14,15,16,17,18	01,02,03,04
	-	*08,09,10,11*	*01,02,03,04,05,06,07*
Leader	+	12,13,14,15	05,06,07,08,09,10,11
	-	*12,13,14,15,16,17,18*	*01,02,03,04*
Total number of	+	7	11
information items	-	*11*	*7*

Condition 4 Leader in Preference Minority opting for the unfavorable site

Group members/ Options	Cue valence	DELTA (suboptimal choice)	GAMMA (optimal choice)
Group member A & B	+	12,13,14,15	01,02,03,04,05,06,07
	-	*08,09,10,11,12,13,14*	*01,02,03,04*
Leader	+	12,13,14,15,16,17,18	08,09,10,11
	-	*15,16,17,18*	*01,02,03,04,05,06,07*
Total number of	+	7	11
information items	-	*11*	*7*

Full information set given to the observers

Group member/ Options	Cue valence	DELTA (suboptimal choice)	GAMMA (optimal choice)
Observers	+	12,13,14,15,16,17,18	01,02,03,04,05,06,07, 08,09,10,11

	-	*08,09,10,11,12,13,14, 15,16,17,18*	*01,02,03,04, 05,06,07*
Total number of information items	+	7	11
	-	*11*	*7*

Numbers that share the same value but differ with regard to their font (e.g., 01 and *01*, the second number being outlined in italics) represent different pieces of information. Numbers in normal font and written in italics indicate positive and negative cue valences, respectively.

Table 5: Correlation matrix

	Mean	S.D.	1	2	3	4	5	6	7	8	9	10	11	12
1. Group choice	.68	.47												
2. Gender	.36	.49	.11											
3. Age	21	1.52	-.03	-.03										
4. Mother tongue	.73	.45	.24	.04	**-.44**									
5. Mark	4.43	.95	.17	-.04	**-.39**	.25								
6. Neuroticism	91.7	21.31	-.09	**.54**	.05	.07	.03							
7. Extraversion	119.95	16.58	-.18	-.10	.09	-.04	.15	-.18						
8. Openness to experience	114.41	18.17	-.06	.08	.07	.13	.03	.04	**.34**					
9. Agreeableness	110.89	18.51	.11	**.43**	.00	.26	-.19	.26	-.14	.13				
10. Conscientiousness	117.27	21.17	.07	-.08	-.07	-.10	.14	-.21	-.08	**-.30**	-.07			
11. Majority-Minority	.41	.50	.07	.14	-.15	-.01	-.17	-.02	**-.30**	-.18	.14	.12		
12. Optimal-Suboptimal	.45	.50	-.16	**-.31**	.18	-.06	-.21	.12	**.29**	.26	-.04	-.18	-.11	
13. Maj-Min*Opt-Sub	.16	.37	.16	-.07	.12	-.01	**-.34**	.07	.07	.10	.19	-.03	**.52**	**.48**

For $r > |.28|$, $p < .05$; $r > |.37|$, $p < .01$; $r > |.52|$, $p < .001$; Gender = 1(if female, else 0), Mother tongue = 1(if French, else 0); n=44.

Table 6: Nested probit regression results

Model	(1)	(2)	(3)	(4)	(5)
Dependent variable					
Group decision quality / Conformity to the leader's pre-discussion preference					
Independent Variables					
Gender	.27	.70	1.46*	.88	
	(.63)	(1.02)	(1.95)	(1.24)	
Age	.08	.32*	.58**	.06	
	(.56)	(1.68)	(1.97)	(.39)	
Mother tongue	.78	.90	1.14*	1.04**	
	(1.63)	(1.59)	(1.92)	(2.01)	
Mark		.49**	1.36***		
		(1.99)	(3.32)		
Neuroticism		-.02	-.04**	-.02*	
		(1.32)	(2.44)	(-1.65)	
Extraversion		-.02*	-.08***	-.03**	
		(1.81)	(3.06)	(-2.08)	
Openness to experience		-.00	-.01	-.00	
		(.41)	(.73)	(-.35)	
Agreeableness		.00	.00	-.01	
		(.35)	(.13)	(-.91)	
Conscientiousness		.00	-.01	.00	
		(.18)	(.52)	(.00)	
Majority-Minority			-1.96***	-1.27**	-.67
			(2.71)	(-2.18)	(1.16)
Optimal-Suboptimal			-.68	-.70	-1.12**
			(1.07)	(-1.09)	(2.02)
Maj-Min*Opt-Sub			5.16***	2.64**	1.92**
			(3.02)	(2.52)	(2.16)
Constant	-1.80	-4.65	-3.16	6.41	1.02**
	(.58)	(.92)	(.39)	(1.43)	(2.39)
Observations	44	44	44	45	45
Pseudo-R^2	.06	.18	.41	.25	.11
Sig. of ΔR^2 change (Wald test)		$p > .10$	$p < .05$	$p < .05$	

Robust z statistics in parentheses

Figure 2.1: Marginal effects across experimental conditions

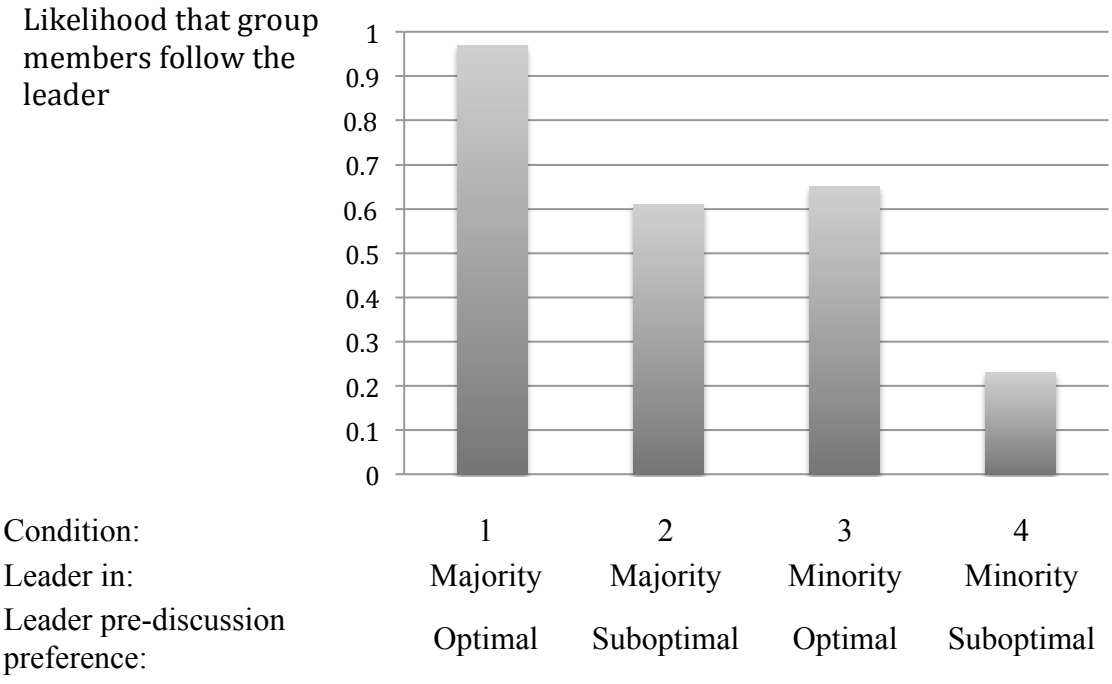

Figure 2.2: Marginal effects across experimental condition