Ambivalence as an Asset:

Investigating Intra- and Interpersonal Benefits of Ambivalence

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Summary

This dissertation explores the benefits of trait and state ambivalence in both intra- and interpersonal contexts, challenging the traditionally negative view of ambivalence. While ambivalence is often associated with indecisiveness and cognitive conflict, recent research suggests that it can enhance associative breadth, improve judgment accuracy, and reduce bias in social judgments. Chapter 1 provides a comprehensive overview of the theoretical background and empirical literature on ambivalence, highlighting both its traditionally negative consequences and its potential adaptive value, and outlines the overarching research questions that guide the studies. Spanning Chapter 2 and 3, Part I focusses on intrapersonal decision-making. Chapter 2 investigates the relationship between trait ambivalence and confirmation—the tendency to seek out information that supports existing beliefs. Across multiple studies, trait ambivalence was consistently associated with reduced confirmation, suggesting more balanced information processing. Chapter 3 extends these findings by examining how both trait and state ambivalence affect the acquisition of decision-related information, a key part of confirmation, using a process-tracing approach. While preregistered analyses did not support our hypotheses, exploratory results suggest that different kinds of ambivalence may influence information acquisition in distinct ways. Part II consists of Chapter 4 and shifts to interpersonal dynamics, focusing on how ambivalence is perceived in organizational leadership. Specifically, Chapter 4 examines whether ambivalent leaders are seen as more cognitively flexible and responsive—qualities that could foster upward communication from followers. Three studies consistently showed that leaders perceived as ambivalent were seen as more cognitively flexible and, in turn, more responsive, encouraging followers to voice ideas and concerns. Taken together, this dissertation provides evidence that ambivalence, particularly at the trait level, can have adaptive benefits in both intrapersonal and interpersonal processes, challenging the assumption that ambivalence is primarily a hindrance and instead suggesting it can often be an asset.

Zusammenfassung

Diese Dissertation untersucht die Vorteile von trait (dispositioneller) und state (situativer) Ambivalenz in intra- und interpersonellen Kontexten und stellt die traditionell negative Sichtweise von Ambivalenz infrage. Obwohl Ambivalenz oft mit Unentschlossenheit und kognitivem Konflikt verbunden wird, deuten neuere Studien darauf hin, dass ambivalente Menschen mehr ungewöhnliche Assoziationen finden, genauere Urteile fällen und weniger Verzerrungen in sozialen Bewertungen zeigen. Kapitel 1 bietet einen umfassenden Überblick über Theorie und Forschung zu Ambivalenz, beleuchtet negative Folgen ebenso wie ihr adaptives Potenzial und skizziert die zentralen Forschungsfragen. Teil I der Dissertation umfasst Kapitel 2 und 3 und konzentriert sich auf intrapersonale Entscheidungsprozesse: Kapitel 2 untersucht den Zusammenhang zwischen dispositioneller Ambivalenz und Bestätigungsverzerrung—der Neigung, Informationen zu bevorzugen, die bestehende Überzeugungen stützen. Mehrere Studien zeigen, dass dispositionelle Ambivalenz mit geringerer kognitiver Bestätigungstendenz und ausgewogenerer Informationsverarbeitung einhergeht. Kapitel 3 erweitert dies und untersucht in einem Prozessanalyse-Experiment, wie dispositionelle und situative Ambivalenz die Aufnahme entscheidungsrelevanter Informationen beeinflussen. Während die präregistrierten Analysen die Hypothesen nicht stützten, deuten explorative Befunde auf differenzierte Effekte verschiedener Arten von Ambivalenz hin. Teil II umfasst Kapitel 4 und widmet sich interpersonellen Dynamiken und der Wahrnehmung ambivalenter Führung. Kapitel 4 untersucht die Frage, ob ambivalente Führungskräfte als kognitiv flexibler und reaktionsfähiger wahrgenommen werden—Eigenschaften, die Aufwärtskommunikation fördern. Drei Studien zeigen konsistent: Ambivalente Führungskräfte werden mit kognitiver Flexibilität und Ansprechbarkeit assoziiert, was Mitarbeitende zur Äußerung von Ideen und Bedenken ermutigt. Insgesamt zeigt diese Dissertation, dass Ambivalenz, insbesondere auf dispositioneller Ebene, adaptive Vorteile in intra- und interpersonellen Prozessen bietet. Dies widerspricht der Auffassung, Ambivalenz sei rein hinderlich und unterstreicht ihr Potenzial als wertvolle Ressource.

Preface

The present dissertation has several empirical chapters: Two chapters (Chapter 2 and 4) are based on manuscripts which are published in peer-reviewed journals and one chapter is a manuscript prepared for submission for publication (Chapter 3). I composed the Introduction (Chapter 1) as well as the General Discussion (Chapter 5) specifically for this dissertation.

Author contributions to the empirical chapter are described below using the Contributor Role Taxonomy (CRediT) system.

Chapter 2 is based on the following article:

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To accommodate the dissertation's layout, modifications were made to headings, citation formats, and overall formatting. Additional supplementary materials may have been incorporated into the text. The content of the articles and manuscripts was not changed. All manuscripts are currently not used or designated for use in other dissertations.

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CHAPTER 1

INTRODUCTION

The world we live in is abundant in information about all kinds of important topics including politics, science, health, and social issues. It comes as no surprise then, that people frequently discover that there are multiple sides to a single issue, making it more difficult for them to form clear-cut, unequivocal attitudes. Imagine, for example, learning on social media that GMO foods could harm biodiversity, while also having read an article explaining how GMO crops could help meet the global food demand. In moments like this, people often hold both positive and negative thoughts and feelings at the same time toward a single attitude object. In other words: they are ambivalent (Thompson et al., 1995). Ambivalence is a common experience for people (Trampe et al., 2015)—both regarding controversial, news-breaking topics, such as the COVID-19 pandemic (Frank et al., 2022; L. Zheng et al., 2022) and the large-scale adoption of artificial intelligence (Berman et al., 2024), as well as ordinary aspects of their daily lives, such as food (Gillebaart et al., 2016) and parenthood (Zabin, 1999).

What does it mean for people to experience ambivalence? Arguably, being ambivalent has a negative connotation for most people. In everyday language for example, the adjective "ambivalent" is often used to express that one is conflicted or undecided about something (Merriam-Webster's unabridged Dictionary, n.d.). Similarly, in early psychological science, scholars have argued that ambivalence should be a negative state as it constitutes a consistency violation (i.e., a tension between the simultaneously positive and negative evaluation) that people are motivated to resolve (Festinger, 1957). As a result, research has long focused on the negative consequences of ambivalence: for example, thoughts and feelings of conflict as well as negative affect (e.g. Cunningham et al., 2004; McGregor et al., 1999a; Newby-Clark et al., 2002; Nohlen et al., 2014; Van Harreveld, Rutjens, et al., 2009; Van Harreveld, Van der Pligt, et al., 2009), biased information processing (Clark et al., 2008; Sawicki et al., 2011) and decreased readiness to make a decision (Hänze, 2001).

While it is important to understand how the experience of ambivalence may negatively affect individuals, this may only be half the story. The very nature of ambivalence—holding

contrasting evaluations simultaneously—can serve as a signal that the situation is complex or unusual, warranting a broadened perception to attend to a wider range of information (Fong, 2006; Forgas, 2000; Schwarz, 2011; Schwarz & Clore, 1983). This raises the question of whether ambivalence can also have functional consequences. This dissertation investigates this idea, focusing on positive effects of ambivalence on both intrapersonal and interpersonal processes.

First, ambivalence may broaden people's information processing. Prior research suggests that ambivalence is linked to broader associative ability (Fong, 2006), more accurate judgments (Rees et al., 2013), and greater consideration of different information when explaining others' behavior (Schneider et al., 2021). These findings indicate that ambivalence could serve as a counterweight to one of the most pervasive cognitive tendencies: confirmation. This describes people's inclination to selectively attend to and look for information that supports pre-existing beliefs (Butera et al., 2018; Klayman & Ha, 1987). As such, this cognitive tendency often culminates in what is referred to as confirmation bias (Nickerson, 1998) and has been observed in various fields, such as politics (Knobloch-Westerwick et al., 2015, 2020), science (Hergovich et al., 2010), and social media (H. Zhao et al., 2020). Extending the findings on ambivalence and broadened cognitive breadth, I propose and test the hypothesis that people who are dispositionally more ambivalent engage in more balanced information processing and show reduced confirmation in decision-making (Chapters 2 and 3).

Second, ambivalence may influence choices not only via intrapersonal processes but also via interpersonal ones—that is, through perceiving others' ambivalence. Recent findings suggest that observers can detect ambivalence in others and use it to make evaluative inferences (Han et al., 2023). However, empirical work on the downstream consequences of these inferences is still scarce. Theorizing has proposed that ambivalence may be perceived as a signal of cognitive flexibility and openness in leadership contexts, which in turn can elicit proactive behavior from observers (Rothman & Melwani, 2017). In this dissertation, I build on this theorizing by testing

new hypotheses about how dispositional ambivalence in others is perceived and how such perceptions shape observers' willingness to act (Chapter 4).

Bringing together both intra- and interpersonal perspectives, this dissertation seeks to move beyond the traditional framing of ambivalence as an evaluative liability and instead positions ambivalence as a potential asset. Crucially, it distinguishes between ambivalence as a momentary experience and a stable individual difference. While previous work has mostly focused on immediate, situational experiences of ambivalence (i.e., state ambivalence), less is known about whether such effects generalize to more enduring tendencies—a construct referred to as trait ambivalence (Schneider et al., 2021, 2022; Sincoff, 1990). By examining both forms of ambivalence across intra- and interpersonal contexts in this dissertation, I aim to clarify the broader implications of ambivalence as a psychological construct and contribute to a more comprehensive understanding of how it operates within individuals and between them.

In the remainder of this introductory chapter, I will begin with defining the concept of ambivalence and how it can be differentiated from other phenomena it is often confused with. Having outlined what ambivalence is, I will turn to the antecedents of ambivalence that have been discussed in the literature. Subsequently, I will differentiate state (i.e., ambivalence experienced in the moment) and trait (i.e., dispositional) ambivalence in more depth, as well as how they can be measured. Next, I will give a short summary of the theoretical assumptions and existing findings on the positive and negative consequences of ambivalence in both intrapersonal cognitive processes and interpersonal dynamics. Finally, I will end with a brief synopsis of the empirical chapters presented in this dissertation (Chapters 2-4).

1.1 The Origins of Ambivalence and How it Differs from Other Related Phenomena

The term ambivalence has its etymological roots in the early twentieth century and originates from the German word "Ambivalenz", which itself is derived from the two Latin words ambi ("both") and valentia ("strength"; Wissenschaftlicher Rat der Dudenredaktion, 2007). Ambivalence has not always been understood as a common—let alone a nonclinical—human

experience. In fact, the term goes back to the Swiss psychiatrist Ernst Bleuler who considered ambivalence to be one of the symptoms of schizophrenia (Bleuler, 1950 [original work published 1911]; Scholtz et al., 2022). With its scientific investigation in psychiatry, the word ambivalence entered English through the International Scientific Vocabulary in the early 20th century (Merriam-Webster's unabridged Dictionary, n.d.). Ever since then, ambivalence has become a broader—and importantly, a depathologized—phenomenon that has made its way into nonclinical psychological research.

It was Scott (1959, 1969) who introduced the concept of ambivalence into social psychology by expressing the idea that not all attitudes that people hold are comprised of only positive or only negative evaluations (i.e., therefore it is possible to feel ambivalent) and that this is not necessarily tied to negative consequences. Against the backdrop of the predominant understanding that attitudes are univalent, meaning that an attitude entails *only* a degree of positivity *or* negativity, this seemingly simple but profound realization helped launch research on attitudinal ambivalence.

This focus on attitudes as being either positive or negative, which is arguably an oversimplification of attitudes (Conner & Armitage, 2008), has had wider implications for distinguishing ambivalence as a unique concept. One reason is that ambivalence cannot be measured with common methods that assess people's attitudes because these measures have the underlying assumption that attitudes are either positive or negative (Gardner, 1987). This assumption is reflected in early attitude measurement approaches, such as Likert's bipolar rating scales (selecting one's response on a 5- or 7-point scale ranging for example from "Strongly Disagree" to "Strongly Agree"; Likert, 1932), and Osgood's semantic differential scales (selecting one's response on a continuum with opposing ends such as "Bad"/"Good" or "Unhelpful"/ "Helpful"; Osgood et al., 1957). These methods, while foundational, were designed to capture attitudes along a single continuum ranging from negative to positive. However, their unidimensional structure implicitly frames attitudes as univalent, making them poorly suited to

capture the coexistence of both positive and negative evaluations which defines ambivalence (Kaplan, 1972; Priester & Petty, 1996; Thompson et al., 1995).

For instance, attitudes are often assessed using bipolar scales, where participants indicate their evaluation of an object—such as a policy, product, or political candidate—on a scale ranging from very negative to very positive. But how can someone who is ambivalent express their co-occurring evaluations on such a scale? Imagine being ambivalent about social media—you appreciate its ability to connect you with friends but also feel uneasy about privacy concerns and time-wasting habits. Such contrasting, co-occurring views could lead you to select the midpoint on a bipolar scale, trying to do both evaluations justice. By contrast, someone who is indifferent to social media—seeing it as irrelevant or unimportant—might select the same midpoint to reflect their neutrality. Consequently, bipolar measures cannot distinguish between ambivalence and indifference, treating both as evaluative neutrality (Kaplan, 1972; Priester & Petty, 1996; Thompson et al., 1995). This conceptual conflation risks overlooking the unique cognitive and behavioral consequences that arise from ambivalence, underscoring the need for alternative measurement approaches capable of capturing its complexity. Indeed, empirical research has shown that neutral classifications on bipolar scales may, in fact, obscure an underlying ambivalent evaluation of emotionally-charged pictures or towards robots (Anvari et al., 2023; Schneider et al., 2016; Stapels & Eyssel, 2021).

By proposing a more complex understanding of attitude structure, the Evaluative Space Model underscores the limitations of traditional bipolar scales in capturing the full range of attitudinal phenomena, especially ambivalence (Cacioppo & Berntson, 1994). This model conceptualizes positive and negative evaluations as separable dimensions rather than opposite ends of a single continuum. In this framework, attitudes are represented within a two-dimensional space where positivity and negativity can vary independently. This allows for a more nuanced representation of attitudes, including ambivalence. The model posits that positive and negative evaluative processes can be activated reciprocally (e.g., as in traditional bipolar models:

as positive evaluation increase, negatives evaluation decreases) but also uncoupled (where only positivity or negativity changes) or nonreciprocally (where both positivity and negativity increase or decrease simultaneously).

Building on this conceptual clarification, it is also important to differentiate ambivalence from other, often conflated constructs. One concept it is frequently confused with is ambiguity. Beyond scientific jargon, ambiguity and ambivalence are often used as synonyms. However, they do differ from one another as ambiguity is defined as "the property of a behavior, behavior pattern, or situation that might be interpreted in more than one way" (*APA Dictionary of Psychology*, n.d.). This means that ambiguity describes a state where information is insufficient and therefore no clear interpretation is possible (Frisch & Baron, 1988; Furnham & Ribchester, 1995). It is best illustrated with this sentence: "Amy saw a man with binoculars". Here it is not clear whether the man Amy saw had binoculars or whether she saw a man with help of binoculars. Therefore, this sentence is ambiguous but not ambivalent.

Ambivalence is also different from uncertainty. Uncertainty often arises when there is a lack of knowledge, and thus uncertainty is likely to decrease with increasing knowledge (Alvarez & Brehm, 1997). Ambivalence, on the other hand, is not necessarily resolved with more information. In fact, systematic information processing—engaging deeply with conflicting information—can heighten awareness of evaluative incongruence and generate ambivalence rather than resolving it (Rudolph & Popp, 2007). For example, individuals who systematically process arguments about complex issues, such as political debates or social policies, often develop contrasting, co-occurring evaluations that coexist with high levels of certainty about their mixed attitudes. Indeed, it is possible to hold an ambivalent attitude with great certainty (Luttrell et al., 2016). This highlights that ambivalence reflects cognitive complexity, not indecision or lack of clarity, distinguishing it sharply from uncertainty.

Another endeavor in ambivalence research has been to determine how ambivalence differs from (and is similar to) dissonance. Dissonance describes "the existence of non-fitting

relations among cognitions" (Festinger, 1957, p. 3)—that is, any two beliefs, opinions, or any other kind of knowledge of the world around us or about ourselves (all of which Festinger subsumes under the term "cognitions") that is not in accordance with one another can be the cause of dissonance, creating a state of psychological tension (Festinger, 1957). As such, both ambivalence and dissonance describe phenomena of psychological inconsistency, but aside from this striking parallel, differences have been worked out as well.

Newby-Clark and colleagues (2002) for example argued that one major difference is that ambivalence exists before making a decision (i.e., it emerges in a pre-decisional phase; Van Harreveld, Van der Pligt, et al., 2009) whereas dissonance emerges after a decision has been made (i.e., a post-decisional conflict), that is, after one has committed themselves to a choice. In line with this, van Harreveld and colleagues (2009) posit that one important difference is the level of commitment: While people who are ambivalent have low commitment to one evaluation over the other, with dissonance there is a commitment to the behavior (e.g., a choice made) that is conflicting with one's attitude. Going beyond commitment, they argue that with dissonance attitude and behavior are incongruent, with ambivalence however, there is an incongruence between evaluations of an attitude object. Moreover, van Harreveld and colleagues (2009) make the point that ambivalence and dissonance also differ in terms of their resolution: as people who experience dissonance have already committed to a behavior (i.e., a choice they made), they are motivated to defend the made behavior (for example through spreading the alternatives; Harmon-Jones & Harmon-Jones, 2008). However, ambivalent people have not yet committed to a choice and therefore they might try to resolve their ambivalence by way of more effortful information processing to make the best possible choice (Van Harreveld, Van der Pligt, et al., 2009).

1.2 Inter-, Intrapersonal, and Contextual Antecedents of Ambivalence

Having reviewed what ambivalence is and what it is not, we can turn to the question of the antecedents of ambivalence. Psychological research has pointed to several key factors that

contribute to the experience of co-occurring emotions or evaluations towards an object or situation. For example, personality factors could make it more or less likely that a person experiences ambivalence. Specifically, it seems that individuals with high *Need for Cognition* (people's tendency to engage in and enjoy effortful mental activities; Cacioppo et al., 1984) are on average less likely to experience ambivalence, as they tend to seek clarity and coherence in their evaluations whereas, those with high *Fear of Invalidity* (which means that even after careful consideration of all information one struggles to make a decision because of fearing to be wrong; Thompson et al., 2001) may feel greater ambivalence, driven by an aversion to making incorrect judgments or decisions (Thompson & Zanna, 1995). This tendency reflects a broader association between ambivalence and personality, where some individuals may have a chronic predisposition towards ambivalence across multiple attitude objects (Hui et al., 2009; Thompson & Zanna, 1995). Indeed, people systematically vary in their trait ambivalence (i.e., their general tendency to experience ambivalence; Schneider et al., 2022) which will be described in greater detail in Section 1.3.

Ambivalence can also be amplified by certain cognitive processes, particularly when individuals engage in systematic information processing. This form of deep cognitive engagement increases the likelihood of exposure to conflicting information, especially in complex domains such as politics (Rudolph & Popp, 2007). Contextual factors can also intensify ambivalence. For example, political campaign periods, where competing values and ideologies are at the forefront, can make conflicting beliefs and evaluations more salient (Keele & Wolak, 2008). In these situations, individuals may be forced to reconcile competing political messages, resulting in heightened ambivalence.

Not only the increased awareness of stances with opposed valence (i.e., evaluative incongruence) can give way to ambivalence but this can also be the case when individuals are confronted with semantic incongruencies—situations where two seemingly positive (i.e., having the same valence) traits or attributes appear contradictory or represent an unusual pairing

(Gebauer et al., 2013). For example, a person might display both communal (warm) and agentic (dominant) traits or a product as both inexpensive and high quality, leading to a sense of ambivalence even though both traits are individually positive.

Ambivalence can also arise from the persistence of previous attitudes that continue to exert influence, even as new attitudes are formed. This notion is captured by the "Past Attitudes are Still There" (PAST) model (Petty et al., 2006). According to this model, implicit ambivalence occurs when a newly adopted attitude exists alongside a previous, conflicting one stored in memory. This blend of past and present attitudes does not necessarily produce a conscious feeling of ambivalence but rather an implicit ambivalence. This implicit form of ambivalence encourages more thorough information processing and can lead to behavioral and cognitive consequences associated with ambivalent attitudes. Additionally, discrepancies between an individual's current attitude and the attitude they aspire to hold can create a subjective sense of ambivalence (DeMarree et al., 2014). This feeling of ambivalence emerges even in the absence of direct contradictions in the individual's beliefs and was consistent across topics ranging from personal relationships to public health issues. Together, the PAST model and the concept of idealized attitudes highlight that both the lingering influence of old beliefs and the tension between current and aspirational attitudes can serve as important contextual antecedents to ambivalence, prompting individuals to process information more deeply, for example as a way to resolve the internal conflict or better align their current views with their ideal ones.

Finally, interpersonal dynamics can also serve as a source of ambivalence. Priester and Petty (2001) argue that ambivalence may arise not only from the personal experience of co-occurring evaluations but also from discrepancies between one's own position and the views of close others. When people perceive a divergence between their opinions and those of valued social contacts, this can introduce tension and mixed feelings. In this way, ambivalence is shaped not only by personal evaluative conflict but also by the social contexts in which these evaluations are formed.

1.3 Different Types of Ambivalence and How They Can Be Measured

Because ambivalence consists of both positive and negative evaluations towards the same attitude object, it cannot be adequately captured using traditional (bipolar) scales that range from 'very positive' to 'very negative' because these scales assume attitudes fall along a single continuum (Gardner, 1987). This limitation reflects a broader issue in attitude research, where the assumption that positive and negative evaluations are always inversely related has long dominated measurement approaches. To address this limitation, researchers have developed methods that capture different types of ambivalence, aligning with the Evaluative Space Model which conceptualizes attitudes as existing in a two-dimensional space where positive and negative evaluations can vary independently, rather than as points on a single bipolar continuum (Cacioppo & Berntson, 1994).

Particularly in attitudinal ambivalence research, a distinction is often made between objective (also referred to as potential or structural) ambivalence and subjective (also referred to as felt) ambivalence. Objective ambivalence refers to the simultaneous existence of positive and negative evaluations towards a single attitude object (Kaplan, 1972), reflecting what Cacioppo and Berntson (1994) term 'nonreciprocal activation' of evaluative processes which describes that positive and negative evaluations can change independently or even in the same direction, rather than always being inversely related. For example, learning more about a complex issue might increase both positive and negative evaluations simultaneously, leading to increased ambivalence.

Objective ambivalence thus serves as an indicator of contrasting co-occurring evaluations and assesses the strength of opposing evaluations (Thompson et al., 1995). This approach acknowledges that positive and negative evaluative processes exist and may not always be reciprocally activated (i.e., inversely). In practice, positive and negative evaluations are measured on separate scales, typically by asking participants to indicate how positive (and separately, how negative) they feel towards an attitude object while being instructed to ignore the opposite valence (e.g., Newby-Clark et al., 2002). This measurement approach aligns with the bivariate

framework proposed by Cacioppo and Berntson (1994), allowing for a more comprehensive representation of attitudes that includes attitudinal ambivalence.

To measure objective ambivalence, people are usually asked to rate how positive and, respectively, how negative they feel towards an attitude object on separate scales ranging from "not at all positive (negative)" to "very positive (negative)." A score of objective ambivalence can then be calculated using the following formula: $((P + N)/2) - |P - N|$, where P refers to the positive evaluation score and N to the negative evaluation score (Thompson et al., 1995). This score captures both the strength of each evaluation (through the average of P and N) and the extent to which they are opposed (through the absolute difference between P and N). Higher scores reflect greater objective ambivalence, considering both the intensity and the balance of evaluations.

Beyond objective ambivalence, which reflects the structure of the attitude in terms of valence, researchers have also been interested in measuring subjective or "felt" ambivalence. This type of ambivalence taps into how structural ambivalence (i.e., objective ambivalence) is subjectively experienced (Priester & Petty, 1996, 2001). Subjective ambivalence is typically assessed with a self-report measure developed by Priester and Petty (1996), consisting of three items that ask individuals to report the extent to which they feel indecisiveness, conflicting thoughts, and mixed feelings towards the respective attitude object. Past research suggests that subjective (or felt) ambivalence is the main driver behind the consequences of ambivalence for cognitive processing and attitude-behavior consistency (DeMarree et al., 2014; van Harreveld et al., 2015).

The relationship between objective and subjective ambivalence has drawn considerable attention, as these forms of ambivalence are related yet distinct. Initially, a strong correlation between the two types of ambivalence was anticipated, based on the notion that the existence of co-occurring evaluations would naturally translate into felt ambivalence (Has et al., 1992; Maio et al., 1996). However, empirical findings have consistently shown only modest correlations

between objective and subjective ambivalence. For instance, Priester and Petty (1996) reported correlations ranging from .36 to .52, while more recent studies by Snyder and Tormala (2017) found even broader variability, with correlations spanning from .14 to .60. These findings suggest that the mere presence of opposing evaluations (i.e., objective ambivalence) does not automatically lead to a subjective experience of the same degree (i.e., subjective ambivalence).

Instead, research indicates that it is the awareness and cognitive processing of these co-occurring evaluations that amplify subjective ambivalence (van Harreveld et al., 2015). Studies have shown that factors heightening this awareness—such as focusing attention on inconsistencies within one's evaluations or reflecting on potential implications of holding opposing views—can moderate and intensify the relationship between objective and subjective ambivalence (Newby-Clark et al., 2002; Van Harreveld, Van der Pligt, et al., 2009). Expanding on this, Ng and colleagues (2022) found that when a message's affective or cognitive tone matches the orientation of the topic, the correspondence between objective and subjective ambivalence strengthens, as co-occurring evaluations become more accessible and cognitively salient. For example, if a topic like flu vaccinations is generally thought of in cognitive terms (such as health risks and benefits), a message that uses logical arguments (cognitive tone) about flu vaccinations will make it easier for people to access and consider any positive and negative evaluations they might hold, thereby increasing felt ambivalence. Furthermore, this alignment effect is particularly pronounced when messages counter one's established attitudes, as contrasting co-occurring reactions are more prominent. So, for example, if someone already has a negative stance on flu vaccinations but receives a pro-vaccination message with a cognitive tone, they are more likely to experience subjective ambivalence because the matching tone (cognitive) increases the accessibility of any positive evaluations they might also hold, even if they are minor. Together, these findings highlight how situational factors, such as message alignment, influence the extent to which contrasting co-occurring evaluations are translated into felt ambivalence. At the same

time, they point to the complexity of the interplay between evaluative structure and subjective experience, indicating that much remains to be understood in this regard.

Most of the ambivalence research discussed so far has focused on investigating it as a state—that is, examining how ambivalent people feel in the moment in response to a stimulus. However, as touched upon in the section on antecedents of ambivalence, some research has also explored the idea that there are individual differences in the experience of ambivalence; that is, the extent to which ambivalence is experienced may vary from person to person (Conner & Armitage, 2008; Hui et al., 2009; Sincoff, 1990; Thompson & Zanna, 1995). Research supporting the conceptualization of ambivalence as a personality trait has examined how other personality constructs relate to state ambivalence. For example, Thompson and Zanna (1995) found that Need for Cognition was negatively related to experienced ambivalence, whereas Personal Fear of Invalidity was positively related. Ambivalence is also linked to other personality constructs such as Preference for Consistency (Newby-Clark et al., 2002) and Dialectical Thinking (Hamamura et al., 2008; Hui et al., 2009), further bolstering the idea that stable individual differences in ambivalence exist.

Additional findings strengthening the conceptualization of ambivalence as a dispositional tendency come from studies investigating individual patterns of ambivalence reported across different stimuli. Specifically, Thompson and Zanna (1995) found that individuals' ambivalence ratings towards different attitude objects showed notable consistency, suggesting a stable tendency across contexts. This conclusion is further supported by work using multilevel modeling, which demonstrated that, alongside the characteristics of the stimuli themselves, individual differences accounted for a significant portion of the variance in ambivalence ratings (Simons et al., 2018).

Thus, it appears that not only the characteristics of the attitude object and the evaluative context determine how people experience ambivalence, but also stable factors within the individual. To capture this dispositional component, the Trait Ambivalence Scale (TAS) was

developed (Schneider et al., 2021, 2022). The TAS enables researchers to separate variance attributable to stable individual differences from situational influences and to address new research questions regarding generalized experiences of ambivalence. Its items are designed to reflect enduring objective and subjective experiences of ambivalence. The TAS consists of ten items and example items include: "My thoughts are often contradictory," "I often feel torn between two sides of an issue," and "My feelings are often simultaneously positive and negative," rated on a 7-point scale. The TAS demonstrates good internal consistency and temporal stability (Schneider et al., 2021). Moreover, it shows acceptable factor loadings, and higher TAS scores are associated with a greater number of topics evaluated as ambivalent. Finally, TAS scores correlate significantly with other psychological constructs, such as Dialectical Thinking, Need for Cognition, and Personal Fear of Invalidity (Schneider et al., 2022).

1.4 Consequences of Intrapersonal Ambivalence on Decision-Making and Information Processing

Having outlined how different forms of ambivalence can be conceptualized and measured, the question arises as to why these distinctions matter. Research on ambivalence has long examined its downstream consequences, particularly how it affects cognitive, emotional, and behavioral processes (e.g., van Harreveld et al., 2015). When focusing on cognitive processing, two broad streams of research can be distinguished that, at first glance, may appear distinct from one another. On the one hand, a substantial body of work has concentrated on the negative side of ambivalence—its association with discomfort, thoughts and feelings of conflict, and biased information processing (e.g., Nordgren et al., 2006; Van Harreveld, Van der Pligt, et al., 2009). On the other hand, more recent studies highlight its constructive potential, suggesting that ambivalence can foster associative breadth, increase receptivity to information, and improve judgment accuracy (Fong, 2006; Rees et al., 2013; Schneider et al., 2021).

Although these two streams differ in emphasis and in their underlying assumptions, they are not completely mutually exclusive. More traditional research generally frames systematic

information processing as a coping response to the discomfort of ambivalence, aimed at restoring evaluative consistency. Evidence in this line of work primarily operationalizes systematic processing through indicators such as longer reaction times or listing a greater number of attitude-related thoughts (K. Jonas et al., 1997; Maio et al., 1996; Van Harreveld et al., 2004). However, these measures do not necessarily speak to the quality of information processing or its effects on subsequent decision-making, as these aspects were rarely assessed. In contrast, the more recent line of research does not emphasize discomfort-reduction motives but instead arguably views systematic and broadened processing as an adaptive outcome in its own right. Taken together, these perspectives can be largely understood as complementary, reflecting different ways in which ambivalence can shape cognitive responses. The following two subsections review these perspectives in turn.

1.4.1 Negative Consequences: Conflict, Negative Affect, and Biased Information Processing

Traditionally, ambivalence has been construed as a consistency violation (Festinger, 1957), leading scholars to argue that ambivalence should generally constitute a negative psychological state. Reflecting this theoretical assumption, a large body of research has focused on the negative consequences of ambivalence. In particular, studies aimed to confirm that, in line with consistency motives, experiencing ambivalence induces conflict and negative affect (Cunningham et al., 2004; McGregor et al., 1999b; Newby-Clark et al., 2002; Nordgren et al., 2006). This appears to be especially the case when people have to make a decision about something that one feels ambivalent about (Nohlen et al., 2016; Van Harreveld, Van der Pligt, et al., 2009) because then both positive and negative evaluations become salient, and negative affect and feelings of discomfort can ensue (Nohlen et al., 2014; Nordgren et al., 2006; Van Harreveld, Rutjens, et al., 2009).

This negative affect can in turn have cognitive and behavioral consequences affecting subsequent decision-making processes (for a review see van Harreveld et al., 2015). For instance, negative affect may cause wanting to put the choice off, leading to choice delay (Nohlen, 2015).

A study on attitudinal ambivalence and conflict towards NATO military intervention in the Kosovo war, a very controversial issue in Germany back in 1999, showed that ambivalent attitudes reduced action readiness as was gauged by asking participants if they would sign a petition against NATO military air strikes (Hänze, 2001). Also, turning to potential cognitive consequences, ambivalent attitudes towards the military action led to more elaboration about the issue. This is in accord with other findings suggesting that ambivalence leads to increased systematic processing (K. Jonas et al., 1997).

To address the question of how ambivalence influences information processing, particularly in decision-making, van Harreveld and colleagues (2009) developed the Model of Ambivalence-Induced Discomfort (MAID). This model proposes that when individuals experience ambivalence, especially in the context of having to make a choice, the simultaneous activation of positive and negative evaluations creates discomfort. This discomfort motivates ambivalent individuals to engage in systematic information processing, often through what is referred to as problem-focused coping. Problem-focused coping involves gathering and evaluating information thoroughly to make a decision that minimizes anticipated regret (Van Harreveld, Van der Pligt, et al., 2009). The model thus theorizes that one way to reduce ambivalence-induced discomfort is for people to use more cognitive effort to process both sides of an issue, aligning with findings that ambivalence can increase sensitivity to relevant information (K. Jonas et al., 1997; Van Harreveld et al., 2004). However, the MAID Model also recognizes that cognitive resources and situational context impact the depth and direction of this processing. When cognitive resources are limited or ambivalent individuals see limited value in unbiased processing, they may engage in biased systematic processing by focusing on information aligned with their preexisting attitudes to ease discomfort with less effort. Selective attention to pro-attitudinal information (i.e., the side of the attitude that is more pronounced) can reduce subjective ambivalence by reinforcing a single evaluative direction, especially when perceived as adequate to resolve inner conflict (Lavine et al., 2000; Nordgren et al., 2006). This shows that

while ambivalence often promotes deeper information engagement, individuals may strategically shift to selective processing when seeking quicker resolution due to cognitive or contextual constraints.

For example, Nordgren and colleagues (2006) found that people were motivated to reduce the aversive state of felt (i.e., subjective) ambivalence by processing more information that was consistent with a prior attitude (i.e., motivated information processing). Indeed, people seem to predominantly use deep processing when it helps to reduce ambivalence (such as with pro-attitudinal information) and avoid counter-attitudinal messages which is supposedly driven by discomfort associated with subjective ambivalence (Clark et al., 2008). In line with this, Sawicki and colleagues (2013) found similar behaviors: ambivalent people sought out (unfamiliar) pro-attitudinal information in order to reduce their subjective ambivalence. Across several studies, they found that ambivalent attitudes led to a greater preference for pro-attitudinal information when people reported not to be very knowledgeable about the issue. In contrast, when participants reported high issue knowledge alongside ambivalence, the preference for pro-attitudinal information disappeared—presumably because they did not expect new information to effectively resolve their ambivalence.

Building on the Model of Ambivalence-Induced Discomfort (MAID), which focuses on choice as a catalyst of affective consequences, van Harreveld and colleagues (2015) proposed the ABC model of ambivalence, offering a more comprehensive account of the consequences of ambivalence. The ABC model integrates affective, behavioral, and cognitive responses to ambivalence, highlighting their dynamic interplay. The model posits that objective ambivalence typically elicits negative affect when conflicting evaluations become simultaneously accessible and conflict ensues. This affective discomfort subsequently drives cognitive and behavioral efforts aimed at reducing ambivalence or mitigating the unpleasant state. Cognitive responses may involve systematic information processing, which can be either unbiased or biased, and may reduce objective ambivalence (Maio et al., 1996; Monteith et al., 1993). Alternatively, individuals

may engage in compensatory cognitions, such as seeking perceptions of order (Van Harreveld et al., 2014), that primarily alleviate subjective discomfort without necessarily altering the underlying evaluative conflict. Together, these propositions portray ambivalence as a dynamic process, where cognition is closely intertwined with behavior and affect, producing a range of coping responses that often aim to restore evaluative congruence or at least make the inconsistency less unpleasant (van Harreveld, Van der Pligt, et al., 2009).

Another perspective on why ambivalence would lead to greater information processing is to help people boost their confidence in their attitudes. Jonas and colleagues (1997), for example, conducted experiments manipulating ambivalence towards a novel attitude object (i.e., presenting evaluative (in)consistent attributes of a shampoo) and found that these ambivalent attitudes were associated with a *stronger* attitude-intention link (i.e., likelihood of purchasing the shampoo). This was the case because people with ambivalent attitudes had a lower certainty towards their attitudes prompting a greater degree of cognitive elaboration (i.e., writing down a greater number of attitude-related thoughts) which ultimately strengthened the attitude-intention link. As an alternative to uncertainty being the driver of increased information processing, van Harreveld and colleagues (2004) looked at reaction times of people judging single attitude attributes versus an overall judgment of an evaluative congruent (i.e., univalent) or an evaluatively incongruent (ambivalent) attitude. They found that people had larger reaction times when they made an overall judgment about an ambivalent attitude versus a univalent attitude, which indicates greater processing. The authors proposed that ambivalence slows down evaluative judgment as individuals take more time to integrate inconsistent evaluations into their response. That these prolonged response times reflect a deep information integration process rather than stemming from weak accessibility or uncertainty, is strengthened by the fact that attitude certainty (included as a control variable) did not significantly predict the relation between response times and ambivalent attitudes in their studies.

Taken together, ambivalence has been associated with increased information processing, and there are several perspectives that aim at explaining why this is and how information processing is consequently affected. One prevailing perspective suggests that the discomfort caused by ambivalence motivates individuals to reduce this aversive state by processing information thoroughly to make a decision that minimizes anticipated regret (Van Harreveld, Van der Pligt, et al., 2009) or by focusing on pro-attitudinal information (e.g., Nordgren et al., 2006; Sawicki et al., 2013). Other interpretations attribute the increased information processing to a weak confidence people tend to feel towards ambivalent attitudes, prompting them to engage more systematically with relevant information to solidify their attitude-intention link (K. Jonas et al., 1997). Alternatively, it might not be attitude certainty driving increased information processing, but rather that with an ambivalent attitude people have to integrate inconsistent attitude attributes which requires more intense information processing (Van Harreveld et al., 2004). Crucially, more recent research suggests another, more positive, perspective: ambivalence may broaden information processing and in this way increase openness to alternatives, foster creativity, and enhance judgment accuracy (Fong, 2006; Rees et al., 2013)—an intriguing perspective, which I will explore in the following section.

1.4.2 Positive Consequences: Associative Breadth, Judgement Accuracy, and Cognitive Flexibility

While most existing research has focused on the role of ambivalence in increasing information processing as a way to reduce discomfort, it may also serve a more constructive function by broadening cognitive scope and reducing bias in judgment. Importantly, the cognitive and decisional benefits of ambivalence have been observed across a range of contexts—from basic judgment tasks in experimental psychology to decision-making in leadership and organizational settings—suggesting that these effects extend beyond the lab.

For instance, emotional ambivalence has been shown to lead to increased judgment accuracy (Rees et al., 2013). Emotional ambivalence describes the co-occurrence of both positive

and negative emotions (Larsen et al., 2001). Presumably, emotional ambivalence broadens the cognitive scope because it signals an unusualness in the environment, widening people's cognitive breadth of perception (Forgas, 2000; Schwarz, 2011; Schwarz & Clore, 1983). Indeed, compared to people who either felt happy or sad, people who felt both happy and sad (i.e. emotionally ambivalent), showed more associative breadth. That is, people who felt emotionally ambivalent found more unusual association across different sets of words thus demonstrating greater cognitive associative ability (Fong, 2006).

Based on the same idea that emotional ambivalence, it being a complex emotional state, broadens cognitive scope, it was proposed that this then leads to greater openness to other perspectives—thereby increasing judgment accuracy. Participants who simultaneously felt happy and sad (i.e., ambivalent) were more accurate in judgment tasks concerning weather forecasts as well as general knowledge tasks. Additionally, emotionally ambivalent participants were also more interested in and considerate of advice given by others (i.e., alternative perspectives) before making a judgment, compared to participants who were in a single-affect state (i.e., sad or happy; Rees et al., 2013) A positive effect of emotional ambivalence on judgment accuracy has also been demonstrated in a more naturalistic setting. During the 2018 FIFA World Cup, the emotions of 80 England supporters as well as their score predictions for England's matches were assessed (Hostler & Berrios, 2021). Higher levels of mixed emotions after a match were associated with more accurate predictions of the subsequent game, indicating that these emotions led to more balanced judgments.

Since ambivalence increases associative ability, receptivity to new information leading to greater judgment accuracy, it is unsurprising that ambivalence has also been observed to mitigate certain biases in (social) judgments. One study found that identified ambivalence, or the conscious recognition of ambivalent feelings and their source, enhances decision-making effectiveness by reducing cognitive biases. Particularly, it was proposed that when individuals accurately identify the cause of their ambivalence, they engage more with relevant situational

cues, which minimizes the influence of cognitive biases (Guarana & Hernandez, 2016). To assess correct versus incorrect identification, participants indicated whether their ambivalence was due to an initial writing task (i.e., indicating misattribution) where they had to write about a personal experience that was ambivalent (versus a positive, negative or no writing task) or the decision-making scenario (i.e., indicating correct attribution). Across four studies, it was found that identified ambivalence helped individuals have greater contextual awareness as evidenced by their ability to complete more decision-related words in a word-fragment completion task (e.g., solving "CU__E" which could be completed as "CUBE" or "CURE"). Supposedly, this higher contextual awareness indicated an expansion of accessible, relevant concepts in the participants' minds (i.e., implying an increase in associative breadth) which led to more balanced decisions. For example, participants had to choose between options presented as either a gain (lives saved) or a loss (lives lost) in a hypothetical scenario about treating a deadly disease. Such framing effects typically lead individuals to prefer risk-averse choices in the gain frame and risk-taking choices in the loss frame. However, participants who correctly identified the source of their ambivalence were more likely to show decision effectiveness by selecting the neutral option ("either program"; Guarana & Hernandez, 2016).

Connecting to this in a leadership context, Rothman and Melwani (2017) have proposed a model describing how emotional complexity (which includes ambivalence) increases cognitive flexibility in leaders, thereby enabling them to make better decisions. They suggest that emotional complexity, characterized by experiencing mixed emotions simultaneously or in sequence, enhances leaders' cognitive flexibility at the intrapersonal level. This emotional state broadens leaders' attentional scope, allowing them to perceive and consider diverse perspectives within a given situation. The inherent conflict in experiencing opposing emotions signals to leaders that their environment is complex and multifaceted, motivating a more balanced, nuanced processing of information. Cognitive flexibility, in this context, arises as leaders are prompted to integrate

conflicting appraisals associated with different emotions, which supports adaptive thinking and improves decision-making.

Not only ambivalence experienced in the moment can have beneficial effects, but also trait ambivalence, the dispositional tendency to experience ambivalence, has been associated with people showing weaker attribution biases in social judgments (Schneider et al., 2021). Specifically, the impact of ambivalence on correspondence bias (i.e., attributing others' actions to disposition rather than situational factors; Gilbert & Malone, 1995) and self-serving bias (i.e., crediting success to oneself and blaming failure on external factors; e.g., Miller & Ross, 1975) was examined. Across four studies, the authors found that individuals high in trait ambivalence exhibited lower levels of these biases, showing more balanced and nuanced social judgments. The results suggest that ambivalent individuals are better at considering situational factors and thus make less biased judgments, especially in evaluating others.

Together, these findings highlight the potential cognitive benefits of ambivalence, demonstrating its association with greater decision effectiveness in the form of increased judgment accuracy and reduced bias in (social) judgments. However, being ambivalent does not only seem to help counter certain biases; it also appears to assist individuals in dealing with their own preexisting biases. Rothman and colleagues (2022) examined whether experiencing emotional ambivalence—simultaneous positive and negative emotions—can reduce defensiveness to feedback about implicit racial bias. Across two studies, participants received either implicit bias feedback (indicating racial bias) or no feedback, with emotional ambivalence assessed independently. The findings reveal that emotional ambivalence decreased defensive responses (such as discounting feedback credibility) to bias feedback. Those high in ambivalence were less defensive, resulting in increased awareness of their own and others' biases. This research suggests that emotional ambivalence fosters cognitive flexibility, enabling individuals to consider self-relevant but potentially threatening information more openly. These results

highlight emotional ambivalence as a potential tool for reducing bias defensiveness, encouraging greater self-awareness in the context of prejudice regulation.

Importantly, the cognitive and decisional benefits of ambivalence have been observed across a range of contexts, from general cognitive tasks to leadership and organizational behavior, suggesting that these effects are not limited to lab-based phenomena but extend to applied, real-world settings. These benefits are particularly relevant in organizational contexts, where complex and often competing demands are commonplace, and leaders are regularly required to integrate conflicting perspectives in high-stakes decision-making. Scholars have therefore begun to explore whether intrapersonal advantages of ambivalence, such as greater cognitive flexibility and broader information processing, can enhance effectiveness in organizational and leadership roles.

To understand the role of ambivalence in organizational dynamics, Ashforth and colleagues (2014) developed a multilevel model describing how ambivalence arises from competing roles, conflicting goals, dualities (e.g., stability vs. change), and temporal factors. This ambivalence can diffuse across individuals and groups through social mechanisms, creating collective experiences that shape organizational decision-making and adaptation. They propose four primary responses to organizational ambivalence: avoidance (minimizing focus on either side), domination (emphasizing one side), compromise (balancing both sides), and holism (integrating both sides). While acknowledging that ambivalence can be uncomfortable, the authors emphasize its potential to foster growth in actors and promote highly adaptive and effective behavior. They particularly note the promise of holism, which involves simultaneously embracing opposing orientations, though they caution that each response can be functional or dysfunctional depending on the situation. Empirical research supports this theoretical framing. For instance, Plambeck and Weber (2009) found that German CEOs who were ambivalent towards the enlargement of the European Union in 2004 were more likely to take actions that were riskier, more comprehensive, and more novel, suggesting a search for actions outside of

routine terrains. These findings demonstrate that ambivalence can motivate more creative and flexible decision-making in high-level organizational contexts.

Taken together, this growing body of research demonstrates that ambivalence, whether momentary or dispositional, can serve as a powerful cognitive resource across domains, from personal judgments to executive leadership. It fosters more nuanced evaluations, broadens attentional scope, and enables individuals to process information more flexibly and less defensively, especially in complex decision environments.

While much of this research has focused on how ambivalence operates within the individual, a critical next step is to understand how ambivalence is perceived by others. After all, in social and organizational life, people rarely make decisions in isolation—they continuously interpret the attitudes and emotions of those around them, including signs of ambivalence. This raises important questions: When ambivalence is expressed outwardly, is it perceived as thoughtful and reflective—or indecisive and unstable? In the next section, I provide a comprehensive overview of research on the interpersonal consequences of perceiving ambivalence, across domains. Particular attention is paid to leadership and organizational contexts, as they form the basis for the empirical investigations presented in the second part of this dissertation.

1.5 Interpersonal Consequences of Perceiving Ambivalence: Ambivalence as a Social Signal

While ambivalence is typically studied as an internal experience that shapes individual judgment and behavior, it can also function as a social signal—something that others observe, interpret, and respond to. In many situations, people do not make decisions in isolation but rely on cues from others. For example, research suggests that social influence plays a crucial role in shaping individual choices and behaviors across multiple domains, such as voting or what to purchase online (R. Zheng et al., 2024). Given that ambivalence can give rise to negative as well as positive outcomes in individuals, this raises the question: what do observers infer when

someone expresses ambivalence? Do they perceive it as a marker of thoughtful deliberation and cognitive flexibility, or interpret it as uncertainty and indecision?

One of the first experimental studies to explicitly examine how ambivalence is perceived by others was conducted by Pillaud and colleagues (2018). Investigating social perceptions of attitudinal ambivalence, they found that ambivalence can be associated with competence-related impressions. Across four experiments involving controversial (e.g., immigration, the death penalty) and consensual topics (e.g., recycling, organic products), participants evaluated targets who expressed ambivalent attitudes. Ambivalence was judged as more socially useful, interpreted as a marker of thoughtfulness or competence, in the context of controversial topics, where evaluating multiple sides was seen as normatively appropriate. These findings suggest that perceiving ambivalence may lead observers to infer cognitive qualities, such as careful evaluation and perspective-taking, particularly in complex or divisive contexts. As such, ambivalence may positively influence impressions in domains where deliberation and balanced judgment are valued—underpinning its potential relevance in decision-making contexts.

Drawing on this work, Han and colleagues (2023) hypothesized that dispositional ambivalence may signal cognitive flexibility and social competence in certain contexts. Through a series of experiments, it was found that dispositional ambivalence affects perceptions of warmth and competence differently depending on the social context. For instance, in economic games, individuals perceived as ambivalent were expected to share resources more equitably than non-ambivalent counterparts, who were seen as less cooperative. Also, participants associated ambivalent faces with attributes like open-mindedness and warmth, while non-ambivalent faces were linked with decisiveness and competence.

These effects are particularly relevant in organizational and leadership contexts, where leaders are frequently observed and function as role models for followers (Bass, 1999; Rogers & Ashforth, 2017) and followers often try to interpret leader's behavior and action (Schilling et al., 2022). As with the intra-individual effects of ambivalence, findings on the interpersonal effects of

ambivalence in leadership are mixed: ambivalence can be perceived both positively and negatively. For example, ambivalent negotiators are perceived as more submissive (Rothman, 2011), and expert decision-makers expressing ambivalence are rated as less competent and less decisive than non-ambivalent counterparts (Marsh & Rothman, 2013). Moreover, when supervisors express emotional ambivalence, they may be seen as more unpredictable, resulting in lower task engagement among subordinates (Lim et al., 2021).

However, other research highlights potential positive interpersonal consequences of leader ambivalence. Rothman and Melwani (2017), in their functional theory of emotional complexity of leadership, propose that expressing multiple emotions simultaneously or in succession (i.e., emotional complexity) affects leaders' interpersonal dynamics and relationships with followers. They argue that leaders who express emotional complexity are perceived by followers as more cognitively flexible, open to diverse perspectives, and adaptable, which can foster a positive, empowering environment for followers. This perception enhances followers' proactive behaviors, such as voicing ideas or taking charge, which are critical in dynamic and uncertain organizational settings. The authors suggest that followers interpret leaders' emotional complexity as a sign of reflective and nuanced thinking, increasing trust and encouraging followers to engage actively with leaders' initiatives. Thus, Rothman and Melwani (2017) position emotional complexity as a potentially advantageous trait in leadership, depending on relational and situational factors that shape how followers interpret and respond to leaders' multifaceted emotional expressions.

Indeed, leaders' subjective ambivalence—feeling both positively and negatively about a work-related issue—can impact team performance through information-seeking behaviors (Guarana et al., 2023). Particularly, subjective ambivalence in leaders can be beneficial for team performance by motivating leaders to actively seek diverse information from their team members. This behavior signals to the team that their input is valued, fostering an environment of open communication and engagement. Team members, in turn, model this information-seeking

behavior, leading to enhanced team collaboration and ultimately better task performance. The study's findings emphasize the nuanced interpersonal effects of ambivalence, demonstrating that while traditionally viewed as a source of indecision or weakness, ambivalence can foster better team outcomes in contexts where openness to multiple viewpoints is essential.

1.6 Overview of the Dissertation

Despite the growing interest in the positive consequences of ambivalence, several gaps remain in the existing literature. Addressing these gaps, I aim to deepen the understanding of ambivalence and its potential benefits in intra- as well as interpersonal processes. Concretely, there are two overarching questions that guided the present dissertation research:

1. Following a growing line of research highlighting the benefits of ambivalence and challenging its predominantly negative conceptualization, what more can we learn about the functional role of ambivalence in both intra- and interpersonal decision-making processes?
2. Furthering past research that mostly investigated the effects of ambivalence experienced in the moment (i.e., state ambivalence), how are individual differences in ambivalence related to outcomes in intrapersonal as well as interpersonal processes?

Building on these foundational questions, this dissertation is made up of three empirical chapters that can be divided into two parts. In Part I of this dissertation, which includes Chapters 2 and 3, I investigate intra-individual ambivalence. Building on past research suggesting that ambivalence is connected to more diverse consideration of information (Rees et al., 2013; Rothman et al., 2017; Schneider et al., 2021), Chapter 2 focuses on how trait ambivalence is related to confirmation which describes the tendency to pay attention to, seek out, and interpret information to support one's already existing hypotheses (Butera et al., 2018; Klayman & Ha, 1987) which often culminates in what is known as confirmation bias (Nickerson, 1998). This work provides one of the first systematic investigations of the link between trait ambivalence and

confirmation. Using different decision-making paradigms across several studies to assess people's tendency for confirmation, my co-authors and I found a negative relationship between trait ambivalence and confirmation. As such, it contributes to both the ambivalence literature, by expanding the knowledge of the functional aspects of intrapersonal ambivalence, and to research on confirmation (bias), by identifying an individual difference associated with reduced confirmation tendencies- an area where research so far is limited (Rassin, 2008).

Expanding the results of the studies in Chapter 2, Chapter 3 examines how trait and state ambivalence towards a preliminary decision impacts the subsequent acquisition of decision information. Using a process-tracing method, my co-author and I were able to assess confirmation tendencies in a more implicit way and take a peek under the hood of information acquisition in a decision-making scenario. This enabled us to go beyond measures of intent and explicit evaluation of that. Additionally, we were able to explore how ambivalent attitudes (i.e., objective and subjective ambivalence) towards one's decision change through information acquisition. So, taken together, Chapter 2 and 3 expand the understanding of the benefits of ambivalence by looking at the role of trait and state ambivalence in both explicit (e.g., evaluation of decision information) and implicit (e.g., how much time people spend on acquiring certain kinds of information) processes in intrapersonal decision-making.

Thus far, this dissertation has focused on the benefits of ambivalence in intrapersonal processes, but ambivalence does not operate in isolation—it is also perceived and interpreted by others. However, research on how ambivalence in others is interpreted remains scarce. Organizational and leadership contexts provide an especially relevant setting for studying interpersonal perceptions of ambivalence, as they are domains where decision-making, communication, and impression formation are frequent and consequential. In these setting followers continuously evaluate their leaders' behavior (Bass, 1999; Rogers & Ashforth, 2017; Schilling et al., 2022), which is why it is crucial to understand how ambivalence is perceived in this context and what consequences these perceptions have. While Rothman and Melwani (2017)

theorized that leader ambivalence could signal cognitive flexibility, openness to diverse perspectives, and adaptability, this proposition has not been empirically tested. At the same time, existing empirical studies suggest that leader ambivalence may have both positive and negative consequences. For example, some research finds that perceiving ambivalent leaders may undermine follower task engagement (Lim et al., 2021), while other work suggests that leader ambivalence can foster information-seeking behaviors and improve team performance (Guarana et al., 2023). Given these mixed findings, in Chapter 4, my co-authors and I seek to clarify whether leaders high in trait ambivalence are perceived as more cognitively flexible as well as more responsive and, if so, whether this perception encourages followers to speak up about their ideas and concerns. By doing so, this dissertation elucidates perceptual processes that underlie leader-follower interactions.

Lastly, this dissertation closes with Chapter 5 that discusses the implications, both practical and theoretical, the limitations of the present research and delineates potential future research questions sparked by the present work. Also, the chapter also offers a summarizing conclusion that reflects on how integrating intrapersonal and interpersonal perspectives advances theoretical understanding of ambivalence and highlights its practical implications for improving decision-making and interpersonal effectiveness.

PART I

BEING AMBIVALENT:

TRAIT AND STATE AMBIVALENCE IN INTRAPERSONAL DECISION-MAKING CONTEXTS

CHAPTER 2

TORN BUT BALANCED: TRAIT AMBIVALENCE IS NEGATIVELY RELATED TO CONFIRMATION

This chapter is based on the following article:

Hohnsbehn, J.-M., Urschler, D. F., & Schneider, I. K. (2022). Torn but balanced: Trait ambivalence is negatively related to confirmation. *Personality and Individual Differences*, *196*, 111736. https://doi.org/10.1016/j.paid.2022.111736

Please be aware that certain formatting adjustments were made to align with the layout of this dissertation. However, the content of the article remains unchanged.

Supplementary Materials are available at:
https://osf.io/z3t65/ or directly here: https://ars.els-cdn.com/content/image/1-s2.0-S0191886922002410-mmc1.docx

Abstract

Traditionally, ambivalence has been conceptualized as a negative influence on decision-making (Van Harreveld, Van der Pligt, et al., 2009). Challenging this notion, recent work suggests that ambivalence can be beneficial because it promotes balance in the decision-making process (Rees et al., 2013; Schneider et al., 2021). Specifically, since ambivalence is a state where contrasting sides of an attitude object (i.e., both positive and negative evaluations) are salient, it likely leads to the consideration of more diverse information, thus reducing one-sided thought. However, this research has only focused on state ambivalence. We investigated whether trait ambivalence—the individual tendency to experience ambivalence—is also related to reduced bias in thought. We examined this idea in the domain of confirmation—the tendency to prefer information in accord with one's preexisting beliefs or hypotheses while neglecting information that is not (Klayman, 1995). Using different methods, we examined the relationship between trait ambivalence and confirmation. We present five online studies (total $N = 1306$) that showed that people with higher trait ambivalence showed less confirmation. This pattern was corroborated by meta-analytic evidence. Together, our work provides evidence that decision-making can benefit from trait ambivalence as it is connected to more disconfirmation.

Keywords: Trait ambivalence, Confirmation, Confirmatory hypothesis testing

2.1 Introduction

Modern life is complex, full of controversies and multifaceted issues, many of which do not allow for straightforward attitudes. For instance, the refugee crisis left many citizens in Germany feeling both positive *and* negative (nationwide survey; Zick & Preuß, 2016). Holding such positive and negative evaluations simultaneously towards one attitude object is referred to as ambivalence (Thompson et al., 1995). People are ambivalent about a vast array of attitude objects, including political figures (Basinger & Lavine, 2005), minority groups (Maio et al., 1996), tobacco products (Hohman et al., 2016), food (Gillebaart et al., 2016), and even oneself (DeMarree et al., 2011).

Research has so far cast a bright light on the negative consequences of ambivalence for judgment and decision-making, such as biased processing and decision-delay (Clark et al., 2008; Hänze, 2001; Van Harreveld, Rutjens, et al., 2009; Van Harreveld, Van der Pligt, et al., 2009). At the same time, there is evidence that ambivalence can have positive effects on the decision-making process. For instance, ambivalence leads to increased associative breadth (Fong, 2006), higher cognitive flexibility (Rothman et al., 2017), more accurate judgments (Hostler & Berrios, 2021; Rees et al., 2013), and more awareness and effectiveness in decision-making (Guarana & Hernandez, 2016). So far, research on such positive effects of ambivalence on decision-making has focused on state ambivalence—that is, ambivalence that is experienced in the moment. However, there are also stable individual differences in people's tendency to experience ambivalence (Schneider et al., 2021, 2022; Simons et al., 2018). Here, we examine whether such differences in trait ambivalence are related to decision-making. Specifically, we examine the relationship between trait ambivalence and confirmation.

2.1.1 Confirmation and Its Consequences

Confirmation describes people's tendency to pay attention to, seek out, and interpret information such that it supports their already existing hypotheses (Butera et al., 2018; Klayman & Ha, 1987). People often process new information in a way that confirms an existing idea,

belief, or hypothesis (Nickerson, 1998; Oswald & Grosjean, 2004). Because confirmation is a form of cognitive processing that often threatens high-quality decision-making, it is often referred to as confirmation *bias* (Nickerson, 1998). Indeed, confirmation leads to poor decision-making in various fields, such as finance (Christandl et al., 2011; Olsen, 2008; Perera et al., 2019), science (Kaptchuk, 2003; Paap, 2014), emergency medicine (Pines, 2006), forensics (Kassin et al., 2013; O'Brien, 2009) and in crisis management during the COVID-19 pandemic (Garcia-Alamino, 2020). Confirmation also plays a role in the partisan divide: both liberals and conservatives exhibit confirmation by avoiding exposure to each other's political opinions (Frimer et al., 2017). In line with this, confirmation facilitates the formation of homogenous groups on social media, potentially adding to the rise of "fake news" and misinformation (Del Vicario et al., 2016, 2019). For example, confirmation is a contributing mechanism explaining the maintenance of misinformation about climate change (Zhou & Shen, 2021). Given the negative impact and prevalence of confirmation, it is important to identify factors associated with reduced confirmation (Garcia-Alamino, 2020; Lilienfeld et al., 2009). Drawing on insights from ambivalence research, we believe that trait ambivalence is one such factor.

2.1.2 Benefits of (Trait) Ambivalence on Cognitive Processing

So far, research has focused on how state ambivalence—that is, ambivalence experienced in the moment—affects cognitive processing (Clark et al., 2008; Fong, 2006; Rees et al., 2013; Sawicki et al., 2013; Van Harreveld, Rutjens, et al., 2009). For example, research has shown that state ambivalence leads to positive consequences on decision-making, suggesting that it broadens cognitive processing. In a study on creativity, people who wrote about an ambivalent situation in their lives found more unusual connections across different word sets compared to people who wrote about a non-ambivalent life event (Fong, 2006). State ambivalence can also increase judgment accuracy. Particularly, state ambivalence leads to a greater openness to other perspectives before when making a judgment—thereby increasing judgment accuracy (Rees et al., 2013): People who felt ambivalent were more interested in and considerate of advice given by

others (i.e., alternative perspectives) compared to people who were in a non-ambivalent state leading to greater judgment accuracy concerning college tuition estimations (Rees et al., 2013).

Recent work suggests that people's trait ambivalence—that is, people's general tendency to experience ambivalence more often and about more things—is also connected to broader cognitive processing (Schneider et al., 2021). This research showed that people with a higher trait ambivalence show less cognitive bias in their judgments of others (Schneider et al., 2021). Specifically, this work looked at correspondence bias which describes the tendency to see others' behavior more as the result of dispositional factors rather than situational influences (Gilbert & Malone, 1995). So, when people observe someone's behavior, they tend to attribute that behavior (i.e., being late to a meeting) more strongly to dispositional factors (i.e., being a poor planner) than situational factors (i.e., traffic jams or family emergency). People with higher trait ambivalence tend to attribute a person's actions as strongly to dispositional factors (i.e., character traits) as those with low trait ambivalence, *but also* strongly to the environment's features (i.e., social norms), therefore considering both causes (Schneider et al., 2021).

Although the work by Schneider et al. (2021) did not look at decision-processes per se, their results showing that higher trait ambivalence is connected to considering distinctive kinds of information (i.e., external and internal causes of another's behavior) suggest that people with higher trait ambivalence process information more broadly. As such, people with higher trait ambivalence might also be more balanced when considering both confirmatory and disconfirmatory information—thus showing less confirmation.

2.1.3 Research Overview

We present five studies that systematically tested the hypothesis that trait ambivalence is negatively connected to confirmation. As a first step, we investigated whether trait ambivalence was related to the degree to which people use confirmatory strategies when testing assumptions. Thus, in Study 1A and 1B, we measured confirmation using several short decision tasks where participants read brief scenarios and could choose among confirmatory or disconfirmatory ways

to test assumptions made in the scenarios (Rassin, 2008). In Study 2A and 2B, we used the well-established Trait Hypothesis Testing Task (Snyder & Swann, 1978). With this paradigm, we examined how people would acquire information to test a hypothesis (Klayman & Ha, 1987) - and how this relates to trait ambivalence. We also added a state ambivalence manipulation to Study 2A to examine whether this affects confirmatory hypothesis testing as suggested by previous research (Rees et al., 2013). Study 2B offers a replication of Study 2A. Finally, in Study 3, we examined how people evaluated confirmatory and disconfirmatory information presented to them. In all studies, we measured trait ambivalence using the Trait Ambivalence Scale (Schneider et al., 2021). This scale has shown good internal and temporal consistency as well as acceptable factor loadings (Schneider et al., 2021, 2022). Additionally, higher scores on the Trait Ambivalence Scale were positively related to the degree of state ambivalence (objective and subjective) people experienced towards a variety of attitude objects (Schneider et al., 2022).

To estimate the robustness of our findings, we present a meta-analysis across all studies (including three additional studies in this project that are reported supplementary materials). For each *p*-value reported in this paper, we include whether the associated significance test was one-tailed or two-tailed. In case of a directional hypothesis, we report the one-tailed significance level whereas when there was no directional hypothesis, or the analysis was exploratory, we report the two-tailed significance level. Analyses scripts, data sets, and materials for all studies can be found here: https://osf.io/z3t65/. All data were analyzed using RStudio, version 1.4.1106 (RStudio Team, 2021).

2.3 Study 1A and 1B

Study 1A was a first test of the relationship between trait ambivalence and confirmation. Study 1B was a close replication of Study 1A with minor modifications for exploratory purposes. Study 1B received ethics approval granted by the faculty's ethics commission.

2.3.1. Method

Participants and design. One hundred and fifty participants participated in Study 1A. Participants were recruited via Amazon Mechanical Turk. Since it was essential for the validity of the results that participants understood the task's instructions, we excluded two non-native English speakers. We excluded five participants because they indicated that they were familiar with at least one of the decision tasks. The final dataset for study 1A consisted of 143 participants (M_{age} = 36.15, SD_{age} = 11.41, 70 male, 72 female, 1 other). For Study 1B, we recruited 264 participants via the recruiting platform Amazon Mechanical Turk. We excluded nine non-native English speakers. The final data set of Study 1B thus consisted of 255 participants (M_{age} = 34.92, SD_{age} = 10.93, 134 male, 118 female, three other). Study 1A and 1B followed the same main design. However, we made small modifications to Study 1B, described in detail below.

Study 1A was not preregistered. The preregistration for Study 1B can be found here: https://aspredicted.org/QZE_QFQ. The sample size for Study 1B was based on a conservative adjustment of the effect size found in Study 1A of r = 0.20. This effect size is comparable to the effects found for the relationship between trait ambivalence and bias in person perception (Schneider et al., 2021). A power analysis using g*power (Faul et al., 2009) with the respective effect size parameters: r = 0.2, α level = 0.05, and power = 0.95 produced a required sample size of 262. Also, a sample size in this range (about 250 participants) would be needed to obtain stable correlation estimates (Schönbrodt & Perugini, 2013).

Procedure and materials. Participants provided informed consent and then read a short study introduction saying that the study dealt with decision-making behavior. After this, participants were sequentially presented with five short decision tasks to measure confirmation (Rassin, 2008). In each task, a decision scenario was described where participants were asked to test an initial hypothesis (e.g., that a number sequence follows a certain rule). For each task, there were several answer options. The answer options were either biased towards confirming the initial hypothesis or not. All decision tasks and respective answer options, as well as their scoring,

can be found in the supplemental materials. To create an overall confirmation score, we coded each case where a participant chose a confirmatory answer as "1" and each instance where a disconfirming answer was selected as "0". Our main dependent variable in both Study 1A and 1B was the sum of these codings and could range from zero to five, where higher scores indicated more confirmation. Study 1B also included a sixth decision task for exploratory purposes. This was a modified Wason's Card Selection Task, where the scenario was embedded in a social context, which is easier to solve for participants (Griggs & Cox, 1982). As this item is not directly relevant to our focal research question, we report the analyses that include this exploratory item in the supplemental materials.

Next, we measured trait ambivalence. For this, participants filled out the Trait Ambivalence Scale (Schneider et al., 2021; Cronbach's α Study 1A = 0.94; Cronbach's α Study 1B = 0.91) that consists of 10 items (e.g., "I often feel torn between two sides of an issue", all items can be found in the supplemental materials). Participants stated their agreement on a 7-point Likert scale, ranging from 1 (does not apply to me at all) to 7 (strongly applies to me), with higher scores indicating higher trait ambivalence. Trait ambivalence was computed as the average of all items, with higher scores indicating higher trait ambivalence.

Additionally, we assessed individual differences in confirmation in Study 1A with the Confirmation Inventory (Rassin, 2008). The order of this scale and the Trait Ambivalence Scale was counterbalanced in Study 1A. As this scale was not relevant for the focal research question, the analysis concerning this scale can be found in the supplemental materials, and it was not included in Study 1B. Lastly, participants indicated gender, age, native language, and comments. After completion, participants were thanked and debriefed.

2.3.2 Results

Results and discussion Study 1A (exploratory). On average, participants had a confirmation score of 3.83 (*SD* = 1.01). The average trait ambivalence was 3.91 (*SD* = 1.38). We conducted a Spearman rank correlation to test our hypothesis because the confirmation score

was not normally distributed, $W = 8.52$, $p < .0001$ (one-tailed). In line with our expectation, trait ambivalence was significantly negatively associated with confirmation, $r_s = -0.34$, $p < .001$ (two-tailed), 95% CI [−0.48, −0.18]). Thus, the higher individuals' trait ambivalence, the less confirmation they showed in the decision tasks.

Results and discussion Study 1B (confirmatory). On average, participants had a confirmation score of 3.81 ($SD = 0.96$). The average trait ambivalence was 4.2 ($SD = 1.22$). Since the confirmation score was not normally distributed, $W = 8.68$, $p < .0001$ (one-tailed), we conducted the correlational analysis with Spearman rank correlations. Trait ambivalence was significantly negatively associated with the confirmation score, $r_s = -0.11$, $p = .048$ (one-tailed), 95% CI [−0.23, 0.02].

In both Study 1A and 1 B, we found a negative relationship between trait ambivalence and confirmation: the higher people were in trait ambivalence, the less confirmation they showed across decision tasks.

2.4 Study 2A and 2B

In Study 2A and 2B, we investigated the relationship between trait (and state) ambivalence and confirmatory hypothesis testing (Klayman, 1995). People often tend to test whether an idea or a hypothesis is true by generating confirming information rather than looking for information that would falsify it (Klayman & Ha, 1987; M. Snyder & White, 1981). For example, if people met someone new at work and they were trying to determine whether this person is extroverted or not, they would be more likely to look for traits that confirm this extroversion hypothesis (e.g., it is easy for the person to strike up conversations with basically anybody in the office) instead of testing its truth value by looking for falsifying information (e.g., this person often spends their lunch break reading).

To examine confirmatory hypothesis testing in Study 2A and 2B, we used the Trait Hypothesis Testing Task (M. Snyder & Swann, 1978). The Trait Hypothesis Testing Task captures people's tendency to test a focal hypothesis that a person is extraverted in a

confirmatory way (i.e., select more confirmatory vs. disconfirmatory questions). This paradigm focuses on information gathering strategies as a component of confirmatory hypothesis testing (Klayman, 1995) and recently showed good reliability (Berthet, 2021). In this task, people are asked to imagine themselves in an interview situation where their goal is to test the assumption of whether another person is extroverted (i.e., their initial hypothesis). To do this, people can choose questions they would want to ask this person. People can choose from a list with confirmatory questions—these questions could confirm that the person is indeed extraverted (e.g., "What would you do if you wanted to liven things up at a party? "), disconfirmatory—these questions could disconfirm that the person is extraverted (e.g. "In what situations do you wish you could be more outgoing? "), or neutral (e.g., "What activities do you really excel in?") questions.

Following an approach similar to Study 1A and 1B, we examined in Study 2A whether trait ambivalence was related to confirmatory hypothesis testing, and in Study 2B, we then confirmed the correlational findings through a replication. Finally, we also examined the effect of state ambivalence on these processes by including a manipulation of state ambivalence in Study 2A. Studies 2A and 2B received ethics approval granted by the faculty's ethics commission.

2.4.1 Method

Participants and design. In Study 2A, four hundred and twenty participants participated. Participants were recruited via Amazon Mechanical Turk. In line with our exclusion criteria in the preregistration, we excluded nine non-native English speakers. To ensure that participants understood the instructions for our ambivalence manipulation, we checked their understanding of what ambivalence was. Fourteen participants in the ambivalence condition thought ambivalence meant not knowing much about a topic, and 18 participants thought it meant not caring about a topic. These participants were excluded. These exclusions resulted in an N of 379 (M_{age} = 37.09, SD_{age} = 10.95, 209 male, 168 female, 2 other) for final data analysis.

In Study 2B, two hundred and sixty-one participants participated. Participants were recruited via Prolific. As we used an active pre-screening filter for native language "English" on Prolific, we did not need to exclude anyone based on this criterion. Therefore, we had a final N of 261 (M_{age} = 32.48, SD_{age} = 10.98, 101 male, 158 female, 2 other).

The preregistrations for Studies 2A and 2B can be found here https://aspredicted.org/blind.php?x=9fz9re and here https://aspredicted.org/blind.php?x=sh4cf7, respectively. Please note that the relationship between trait ambivalence and confirmatory hypothesis testing was preregistered in Study 2B but not in Study 2A. The sample size of Study 2A was determined based on the effect sizes for the relationship between trait ambivalence and confirmation found in Study 1A (r_s = −0.3; Cohen's d = 0.63) and 1B (r_s = −0.11; Cohen's d = 0.2). The computed average Cohen's d was 0.42. Because the effect of this relationship might have been inflated - in Study 1B, we found a spearman's rho of −0.11 - we, therefore, assumed a smaller effect size of Cohen's d = 0.25. A power analysis (Faul et al., 2009) with this effect size, an α level of 0.05, and a power of 0.80 yielded a sample size of 398. Additionally, to ensure that we would have enough usable data points, we included a data discard rate of 0.05 in our sample size calculation. Therefore, the total sample to collect amounted to 419 participants in Study 2A. To calculate the needed sample for Study 2B, we assumed a small effect size (Cohen's d = 0.4). Power analysis with this effect size as well as an α level of 0.05 and a power of 0.95 resulted in a sample size of 262.

Procedure and materials. First, participants provided informed consent and read a short study introduction telling participants that the study was about how people find out information about others. After this, in Study 2A, they were randomly assigned to one of two conditions of the state ambivalence manipulation where we asked half of the participants to write about an ambivalent topic and the other half to write about a non-ambivalent topic (cf. van Harreveld et al., 2014; see supplemental materials for full task description).

Participants in Study 2A then went on directly to complete the paradigm to capture confirmatory hypothesis testing—namely, the Trait Hypothesis Testing Task (Snyder & Swann, 1978; see supplemental materials for the complete task). In this paradigm, participants are told that their task is to find out whether a person they just met is extroverted or not and read the following instructions: "*On the next page you will read a general personality profile. Imagine that you are about to interview a person you don't know, and you want to find out if this person matches the personality profile. Which questions would you ask?* Participants then read a short description describing a typical extroverted person. After this, participants were provided with a list of 26 (25 in Study 2B) questions to find out whether the person is extroverted or not (11[1] hypothesis-confirming questions, e.g., "*What do you like about parties?*", 10 hypothesis-disconfirming questions, e.g., "*What factors make it hard for you to open up to people?*"; 5 neutral questions, e.g., "*What are your career goals?*"). Participants were asked to select 12 questions on this list that they would ask the other person to find out if the person is an extrovert. As a proxy of our dependent variable confirmatory hypothesis testing, we calculated a difference score where we subtracted the number of selected hypothesis-disconfirming questions from the number of selected hypothesis-confirming questions. Therefore, higher scores indicated a greater tendency towards confirmation in hypothesis testing. After completing the Trait Hypothesis Testing Task, participants in Study 2A filled out the Trait Ambivalence Scale to measure trait ambivalence levels (Schneider et al., 2021; Study 2A: Cronbach's $\alpha = 0.92$).

Next, participants in Study 2A completed the manipulation check for which we measured subjective ambivalence (Priester & Petty, 1996) and objective ambivalence (Thompson et al., 1995) that people experienced towards the topic they wrote about in the manipulation procedure (see the supplemental materials for a more detailed description of the manipulation check). As half of the participants in Study 2A were asked to write about a topic they felt ambivalent about,

[1] For Study 2B, we removed one confirmatory question to have an equal number of confirmatory and dis-confirmatory questions to select from (see Appendix E for a full list of the questions).

we included a control question of whether participants in this condition knew what "ambivalence" meant. The item read "*What, in your mind, does it mean to be ambivalent?*". Participants could select one of three answers: "*That you don't really know much about a topic.*", "*That you have strong feelings, both negative and positive, and that you feel conflicted about the topic.*" or "*That you don't care about the topic.*". Participants in the ambivalence condition (i.e., who were asked to write about an ambivalent topic) who did not select the second (i.e., the correct) answer were excluded.

In Study 2B, where there was no manipulation procedure, the order of the Trait Ambivalence Scale (Schneider et al., 2021; Study 2B: Cronbach's $\alpha = 0.91$) and the Trait Hypothesis Testing task was counterbalanced. Participants in both Study 2A and 2B concluded the studies by answering demographic questions (e.g., gender, age, native language). On the last page before completion, participants received a full debrief.

2.4.2 Results: State Ambivalence (Study 2A only)

Manipulation check. Participants in the ambivalence condition had significantly higher scores of objective ambivalence ($M = 8.36$, $SD = 2.69$) than participants in the non-ambivalence condition ($M = 4.11$, $SD = 3.91$), $t(372.64) = 12.51$, $p < .0001$ (one-tailed), Cohen's $d = 1.24$, 95% CI [3.58, 4.91]. This was also the case for subjective ambivalence ($M = 7.56$, $SD = 2.22$ vs. $M = 3.65$, $SD = 3.13$), $t(374.46) = 14.25$, $p < .0001$ (one-tailed), Cohen's $d = 1.41$, 95% CI [3.37, 4.45]. This suggests that the manipulation of state ambivalence was successful.

Main analysis. The difference score (i.e., number of selected confirmatory questions – number of selected disconfirmatory questions) was not normally distributed ($W = 0.97$, $p < .0001$). Therefore, we ran a Wilcoxon rank-sum test with continuity correction to test our preregistered hypothesis: the difference score in the ambivalence condition ($Mdn = 4.00$) did not differ significantly from the non-ambivalence condition ($Md = 3.00$), $W = 18{,}874$, $p = .438$ (one-tailed), $r = -0.008$. This means that the manipulation did not significantly affect how much confirmation people showed in their hypothesis testing.

2.4.3 Results: Trait Ambivalence (Study 2A and 2B)

Study 2A (exploratory). Mean trait ambivalence was 4.09 (*SD* = 1.27). Trait ambivalence was negatively associated with the number of selected confirmatory questions ($r_s = -0.33$, $p < .0001$(two-tailed), 95% CI [−0.41, −0.23]), indicating that with higher trait ambivalence, participants tended to select fewer confirmatory questions. Moreover, trait ambivalence levels were also negative correlated with the difference score, $r_s = -0.28$, $p < .0001$ (two-tailed), 95% CI [−0.38, −0.19]). These results, therefore, conceptually replicate the findings of Study 1A and 1B, where we also found a negative relationship between trait ambivalence and confirmation bias.

Study 2B (confirmatory and exploratory). Mean trait ambivalence was 4.18 (*SD* = 1.17). For Study 2B, based on literature using the Trait Hypothesis Testing Task (Berthet, 2021; Kleiman & Hassin, 2013), we preregistered the number of selected confirmatory questions as the dependent variable. The number of selected confirmatory questions was not normally distributed ($W = 0.94$, $p < .0001$). For this reason, we used Spearman correlations for our confirmatory analysis. It revealed that trait ambivalence was significantly negatively associated with the number of selected confirmatory questions ($r_s = -0.19$, $p < .01$ (one-tailed), 95% CI [−0.31, −0.07]), meaning that the higher trait ambivalence participants had, the fewer confirmatory question they selected. Concerning the exploratory analysis, the same pattern was observed when looking at the correlation between trait ambivalence and difference score (the preregistered dependent variable in Study2A): $r_s = -0.15$, $p = .015$ (two-tailed), 95% CI [−0.27, −0.03]. The results are consistent with what we found in Study 2A and conceptually consistent with the results of Studies 1A and 1B.

2.4.3 Confirmatory Hypothesis Testing and Trait Ambivalence: Combined Results Over Study 2A and 2B

To better assess the consistency of all our findings concerning confirmatory hypothesis testing and trait ambivalence, we created a comprehensive overview of the results (see Table 2.1).

For this overview, we present the correlational result in two categories: (1) per single number of selected confirmatory and disconfirmatory questions and (2) in difference scores. In the second category, we put the selection of confirmatory versus disconfirmatory questions in direct contrast by calculating a difference score where we subtracted the number of selected disconfirmatory questions from the number of selected confirmatory questions. Further, we also calculated the absolute difference score: perfect balance would then be a score of 0, and higher scores would indicate higher imbalance. Using this score with the absolute difference, we cannot tell whether the deviation—or imbalance—is because more confirmatory than disconfirmatory questions were selected or vice versa. Finally, we present the weighted score and its correlations with trait ambivalence, where we divided the difference score by the sum of selected confirmatory and disconfirmatory questions.

Table 2.1

Correlations Between Trait Ambivalence and Confirmatory Hypothesis Testing Variables of Studies 2A and 2B

	Correlations per question type		**Correlation with difference scores (confirmatory – disconfirmatory)**		
Study	*r*(TA, CQ)	*r*(TA, DQ)	*r*(TA, raw difference score)	*r*(TA, absolute difference score)	*r*(TA, weighted difference score)
Study 2A (*N*=379)	- .33*** [-.41; .24]	.22*** [.13;.30]	-.28*** [-.37;-.20]	-.26*** [-.34;-.17]	-.27*** [-.35;-.18]
Study 2B (*N*=266)	-.19** [.31;-.06]	.10 [-.02;.22]	-.15* [-.27;-.03]	-.15* [-.27;-.03]	-.14* [-.25;-.02]

Note. TA = Trait Ambivalence, CQ = Number of Confirmatory Questions, DQ = Number of Disconfirmatory Questions. All correlations are Spearman correlations because the confirmatory hypothesis testing scores were not normally distributed. Numbers in square brackets represent the 95% confidence interval [Lower limit; Upper limit].

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

The correlations between trait ambivalence and the number of selected confirmatory questions across all three studies reveal a consistent pattern of negative association. Combined,

the results of the two studies show that the higher the trait ambivalence levels, the fewer confirmatory questions participants selected. The correlational results concerning trait ambivalence and the selection of disconfirmatory questions showed positive relationships. Hence, participants with higher trait ambivalence selected not only fewer confirmatory questions but also more disconfirmatory ones. Although the pattern for the selection of disconfirmatory questions is not quite as consistent as we did not find a significant correlation in Study 2B, the direction of the correlations is the same. Moreover, there were consistent negative correlations concerning all difference scores in both studies. This indicates that while participants with higher ambivalence selected more disconfirmatory than confirmatory questions, the difference between the number of selected confirmatory and disconfirmatory questions tended to be smaller at higher trait ambivalence levels. Also, the correlation with the weighted difference score showed that participants higher in trait ambivalence selected more disconfirmatory than confirmatory questions.

The results presented in Table 2.1 show that how people go about gathering information differs as a function of trait ambivalence: people with higher trait ambivalence set out to acquire information using fewer confirmatory questions. However, it remains unclear how people would respond to actual information based on their trait ambivalence levels. In other words, how would people with different trait ambivalence levels evaluate confirmatory and disconfirmatory information? In Study 3, we aimed to shed light on this question by exploring how trait ambivalence relates to how confirmatory versus disconfirmatory information is evaluated.

2.5 Study 3

As the decision-making process requires not only the acquiring of information but also the handling and evaluation of actual information, we set out to examine how people evaluate information in the decision-making process as a function of their trait ambivalence levels. To do this, we drew upon a well-established paradigm used in confirmation research (Frey & Rosch, 1984; E. Jonas et al., 2003). In this paradigm, participants read a decision scenario about whether

or not to extend a store manages contract. After making a preliminary decision about the contract extension, participants are presented with information pieces that are either in line with (i.e., confirmatory) or speaking against (i.e., disconfirmatory) contract extension. Typically, three confirmation variables are of interest in this paradigm: how credible and important do people find each piece of information and whether people would like to learn more about the different pieces of information.

Based on our results so far that show higher trait ambivalence is related to less confirmation, we predicted that with higher trait ambivalence, people would show less interest in learning more about confirmatory information in contrast to disconfirmatory information. Likewise, we examined the relationship between state ambivalence and interest. We also looked at the evaluation of confirmatory and disconfirmatory information and how the evaluation bias score was related to trait ambivalence levels and state ambivalence.

2.5.1 Method

Participants and design. Three hundred and twenty-four participants were recruited from an online participant pool at the Social Cognition Center of the University of Cologne. We only included participants whose preliminary and final decisions were identical in order to clearly identify pro and con decision-makers to validly distinguish between confirmatory and disconfirmatory information (see Frey & Rosch, 1984). Accordingly, fifty-six participants were excluded. As we ran this exact study as a pilot, we excluded any participants who participated in this pilot based on a self-generated anonymous participant code. This led us to exclude three participants. Additionally, we excluded all participant code duplicates in the current sample (N = 12). The final dataset for Study 3 consisted of 268 participants (M_{age} = 26.13, SD_{age} = 9.35, 59 male, 203 female, four other, and two rather did not say). The preregistration for Study 3 can be found here: https://aspredicted.org/blind.php?x=5xt69s. The sample size of Study 3 was determined based on a small to medium effect (Cohen's d = 0.415). A power analysis using

g*power (Faul et al., 2009) with this effect size and an α level of 0.05 and a power of 0.80 yielded a required sample size of 262.

Procedure and materials. First, participants provided informed consent and then read a short study description telling participants that the study dealt with decision-making tasks. The order of the selective exposure task and Trait Ambivalence Scale was counterbalanced, so half of the participants continued by filling out the Trait Ambivalence Scale (Schneider et al., 2021; Cronbach's $\alpha = 0.91$) and the other half with the selective exposure task.

In the selective exposure task (Frey & Rosch, 1984; Jonas et al., 2003), participants read a scenario about the decision of whether Mr. Müller's employment contract should be extended or not. Participants were presented with a text describing Mr. Müller, a department store manager at a fictional department store. This description included information about Mr. Müller's general tasks and performance and concluded with the summary that under his management, there have been neither significant gains nor significant losses (see supplemental materials for an English translation of the entire introductory text). After this, participants were asked to make a preliminary decision: "*Please imagine you have to make a preliminary decision now: Should Mr. Müller's employment contract be extended?*" Participants could answer either "*Yes*" or "*No*".

Participants then responded to several more items concerning their preliminary decision. Two of these were used to calculate state ambivalence "*How much would you like Mr. Miller's contract to be extended?*" and "*How much would you not like Mr. Miller's contract to be extended?*", for both there was a 10-point scale, ranging from "*not at all*" to "*very much*". For the final state ambivalence score, both ratings were submitted to the following formula: $((P + N)/2) - |P - N|$; with P referring to the score on the "*How much would you like Mr. Miller's contract to be extended?*"- item and N referring to the score on the *How much would you not like Mr. Miller's contract to be extended?*"- item (Thompson et al., 1995). Additionally, as part of the standard selective exposure paradigm, we assessed decision certainty with eight items (Fischer et al., 2010; E. Jonas et al., 2003). As they are not relevant to the current research question, we are not reporting any analyses with these items.

After this, participants were told that they would be presented with additional information concerning the decision in the form of short statements by industry experts. Participants sequentially read the 12 experts' statements (see all statements in the supplemental materials) in randomized order and for each were asked to answer the following three questions: "*How credible do you consider this argument?*" (10-point scale, from "not at all credible" to "very credible"), "*How important do you consider this argument?*" (10-point scale, from "*not at all important*" to "*very important*"), and "Would you read the associated article?" (" *Yes*" or "*No*"). Participants were asked to make a final decision: "*Please imagine you have to make a final decision now: Should Mr. Müller's employment contract be extended?*" Participants could answer either "*Yes*" or "*No*".

To create our main dependent variable—the confirmatory interest score, we subtracted the number of saying "*Yes*" to read more of the disconfirmatory statements from the number of saying "*Yes*" to read more of the confirmatory statements. As such, the higher this score, the greater the interest in learning more about confirmatory information in contrast to disconfirmatory information. For the evaluation bias score, we first created difference scores: we subtracted the mean importance rating of disconfirmatory statements from the mean importance ratings of the confirmatory statements and did the same with the credibility statements. Given that both difference scores were highly correlated, we collapsed both scores into one, creating the evaluation bias score. This way, the higher the evaluation bias score, the more favorable (i.e., important and credible) confirmatory information was evaluated as compared to disconfirmatory information.

Lastly, some demographic questions (e.g., gender, age, native language, comments) followed, and upon completion, participants were thanked and debriefed on the last page of the survey.

2.5.2 Results

Confirmatory analysis. To test our main hypotheses that there is a negative association between the confirmatory interest score and trait as well as state ambivalence, we conducted

multiple linear regression analyses that included the confirmatory interest score as the dependent variable and trait ambivalence as well as state ambivalence as predictors (see Table 2.2). For the analysis, both predictors were centered on their respective mean. The results of the multiple regression analyses show that neither trait ambivalence ($b = -0.13$, $t(265) = -1.51$, $p = .065$ (one-tailed)) nor state ambivalence ($b = -0.05$, $t(265) = -1.30$, $p = .098$ (one-tailed)) was significant predictors of the confirmatory interest score. This suggests no meaningful relationship between trait ambivalence and how much interest people showed in wanting to learn about confirmatory versus disconfirmatory information. The same was true for state ambivalence.

Table 2.2

Regression Results Using the Confirmatory Interest Score as the Criterion

Predictor	*b*	*b* 95% CI	*beta*	*beta* 95% CI		Fit
(Intercept)	0.58**	[0.39, 0.77]				
Trait ambivalence	0.13	[-0.29, 0.04]	-0.09	[-0.17, 0.07]	-.10	
State ambivalence	0.05	[-0.12, 0.03]	-0.08	[-0.22, 0.01]	-.09	
						R^2 = 0.016; 95% CI[0.00,0.05]

Note. Square brackets indicate the 95% confidence interval [LL**,** UL]. * $p < .05$. **, $p < .01$.

Exploratory analysis. We conducted multiple regression analyses to investigate whether trait ambivalence and state ambivalence predict the evaluation bias score between ratings of confirmatory and disconfirmatory statements as the dependent variable. The raw difference was calculated by subtracting the average importance ratings of the disconfirmatory information from the average importance ratings of the confirmatory information. We did the same for the credibility ratings. Due to their high correlation ($r = 0.84$, $p < .0001$) and same scaling properties, we collapsed the raw difference scores for importance and credibility ratings into one evaluation bias score. The multiple regression analysis revealed that both trait ambivalence, $b = -0.21$, $t(265) = -2.60$, $p < .01$ (two-tailed), and state ambivalence, $b = -0.22$, $t(265) = -6.09$, $p < .0001$ (two-

tailed), were significant predictors of the evaluation bias score (see Table 2.3). Therefore, both higher trait and state ambivalence were related to a smaller evaluation bias. In other words, the higher participants were in both trait and state ambivalence, the more relative importance and credibility they assigned to disconfirmatory information over confirmatory information

Table 2.3

Regression Results Using the Collapsed Raw Difference Scores of Importance and Credibility as the Criterion

Predictor	*b*	*b* 95% CI	*beta*	*beta* 95% CI	*r*	Fit
(Intercept)	1.02**	[0.84,1.21]				
Trait ambivalence	-0.21**	[-0.37,0.05]	-0.15	[-0.26, 0.04]	-.18**	
State ambivalence	-0.22**	[-0.29, 0.15]	-0.35	[-0.46, 0.23]	-.36**	
						R^2 = 0.15**; 95%CI[.08,.23]

Note. Square brackets indicate the 95% confidence interval [LL**,** UL]. * $p < .05$. **, $p < .01$.

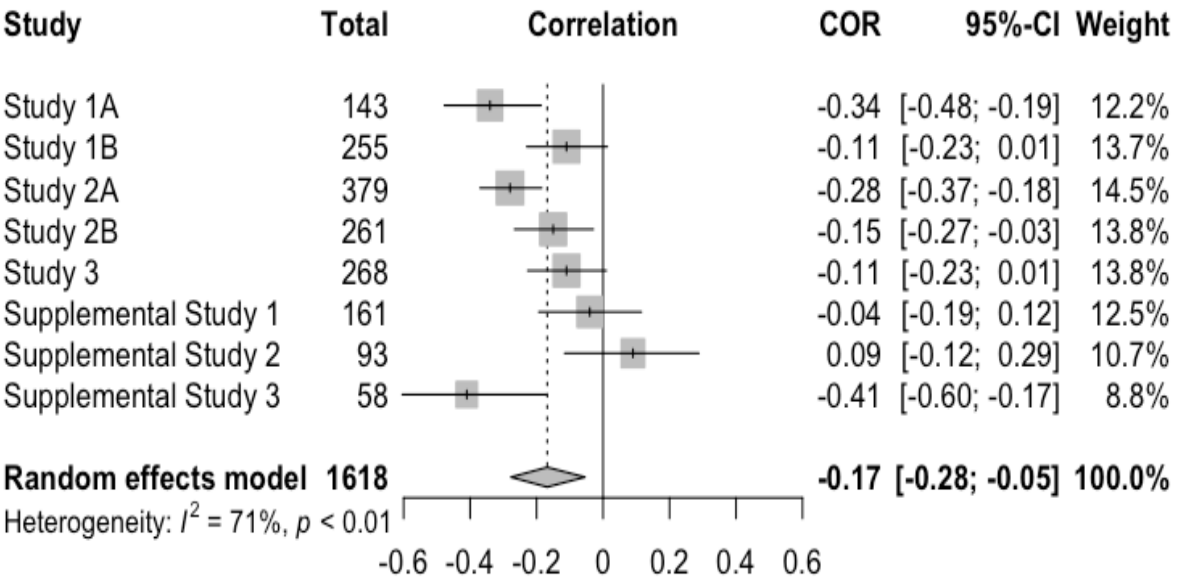
Discussion. Neither trait ambivalence nor state ambivalence was connected to people's interest in confirmatory versus disconfirmatory information. However, in our exploratory analysis, we found that higher trait ambivalence was negatively related to the evaluation bias score. This means that the higher the trait ambivalence levels, the smaller the bias to evaluate confirmatory information more favorably than disconfirmatory information, suggesting that people with higher trait ambivalence showed less confirmation in how they valued different types of information. In addition, we found the same pattern of results for state ambivalence: The higher state ambivalence, the less confirmation people showed in terms of information evaluation (i.e., less evaluation bias).

2.6. Meta-Analysis Across All Studies

To determine the overall effect size of the relationship between trait ambivalence and confirmation, we performed a meta-analysis across all studies done in this project. This analysis

Figure 2.1

Forest Plot of Meta-Analytic Results of the Relationship Between Trait Ambivalence and Confirmation Bias



*Note***.** Forest plot of meta-analytic results of the relationship between trait ambivalence and confirmation bias. The squares represent the individual effect sizes, and its size indicates the weight with which it enters the overall effect size, under "Weight" this is indicated as percentage per study. The diamond represents the overall effect size across all studies. The width of the diamond represents the 95% confidence interval.

allows us to draw a more comprehensive and precise conclusion concerning the overall effect and increases transparency because null findings can be included as well (Goh et al., 2016). In our meta-analysis, we included all studies that are presented in the paper (Studies 1A, 1B, 2A, 2B, and 3) as well as three studies reported in the supplemental materials where we either did not find a significant relationship and/or had only small sample sizes (Supplemental Studies 1, 2, and 3), resulting in 8 studies.

In all three supplemental studies, we included the Trait Ambivalence Scale (Schneider et al., 2021). In Supplemental Study 1 and 2, we used the same decision tasks as in Study 1A and 1B to capture confirmation, while in Supplemental Study 3, we used the Trait Hypothesis Testing Task (Snyder & Swann, 1978) to assess confirmatory hypothesis testing. In contrast to the studies presented in the main text, the Supplemental Studies 1, 2, and 3 are not fully powered studies (for

a more detailed description of the methods and results of these studies, see the supplemental materials). By including all studies of the project line, instead of selectively presenting studies, we increase the validity of our meta-analysis to closer represent the "true" size of the relationship between trait ambivalence and confirmation (Vosgerau et al., 2019).

For Study 1A, 1B as well as Supplemental Studies 1 and 2, we used the correlation between trait ambivalence and the overall confirmation score as input for the meta-analysis. For Studies 2A, 2B, and Supplemental Study 3, we used the correlation coefficients between trait ambivalence and the raw difference scores (i.e., subtracting the number of selected disconfirmatory questions from the number of selected confirmatory questions). This approach made the correlation coefficients of Studies 2A, 2B, and Supplemental Study 3 more comparable with those of Study 3. For Study 3, we took the average of the two correlations: first, the correlation between trait ambivalence and the collapsed importance and credibility difference score and second, the correlation between trait ambivalence and the interest difference score ($r_s = -0.11$). As we used different measurements of confirmation across studies, we used a random-effects model with restricted maximum likelihood estimation. We also specified that for the analysis, all correlations were Fisher-z-transformed. In line with our overall hypothesis, the meta-analysis revealed an overall estimated negative correlation between trait ambivalence and confirmation, $r = -0.17$, $z = -2.88$, $p < .01$, 95%CI [−0.28; −0.05] (see Fig. 1). Thus, the combined results of all eight studies show that people with higher trait ambivalence levels show less confirmation.

2.7 General Discussion

A growing body of work suggests that state ambivalence can have positive consequences (Cavazza & Butera, 2008; Fong, 2006; Guarana & Hernandez, 2016; Hostler & Berrios, 2021; Pillaud et al., 2018; Rees et al., 2013; Schneider et al., 2021). We extend these findings to trait ambivalence into the domain of confirmation. Confirmation describes people's tendency to pay attention to and interpret information in a way that corroborates an already existing hypothesis or

belief, rather than trying to falsify it by considering alternative hypotheses (Butera et al., 2018; Klayman & Ha, 1987; Oswald & Grosjean, 2004). We hypothesized that trait ambivalence is negatively related to confirmation. The results of five studies, focusing on different aspects of confirmation, supported our hypothesis.

First, higher trait ambivalence was related to selecting fewer confirmatory answers (Study 1A and 1B). This same tendency emerged when we asked people how they would acquire information to test a hypothesis (Study 2A and 2B): people higher in trait ambivalence consistently chose fewer hypothesis-confirming questions. Moreover, trait ambivalence was also related to how people evaluated information. Specifically, the higher their trait ambivalence, the smaller people's evaluative bias towards confirmatory information. Instead, people with higher trait ambivalence tended to evaluate disconfirmatory information as more important and credible than confirmatory information (Study 3). The replicability of our findings is corroborated by a meta-analysis that included all studies presented in the main text and three additional studies reported in the supplemental materials. This meta-analysis showed an overall negative relationship between trait ambivalence and confirmation across studies and offers a more precise estimate of the effect size. Our results are further strengthened by using different decision tasks, thereby covering different facets of confirmation (e.g., Brunswik, 1947, 1955; for similar reasoning see Urschler et al., 2019).

While the relationship between trait ambivalence and confirmation was consistent across studies, our findings related to state ambivalence were more difficult to interpret. Previous research has found positive effects of unrelated state ambivalence (Rees et al., 2013), that is, an effect of experiencing ambivalence in the moment that is unrelated to the decision at hand. We included a similar manipulation in Study 2A, but the results did not reveal any effects on confirmation. This may be due to methodological differences and constraints in the present work. When testing for an effect of unrelated state ambivalence, we used a different ambivalence manipulation that focused on thinking about a topic one is ambivalent about and then listing the

reasons why this is (van Harreveld et al., 2014) rather than using the experimental manipulation of emotional ambivalence and single-affect states as was done in past work (Rees et al., 2013). Therefore, it is possible that the manipulation we used did not work because it did not focus on affect, and affect might be a stronger cue that people also unwittingly carry over to consequent unrelated tasks (Schwarz, 2011; Schwarz & Clore, 1983).

However, we did find that greater *related* state ambivalence—ambivalence directly related to the decision—*was* associated with less confirmation. Earlier research indicated that related state ambivalence under some circumstances worsens bias (Sawicki et al., 2013). However, in research by Sawicki et al. (2013), related state ambivalence was operationalized as the subjective experience of ambivalence (Priester & Petty, 1996). Subjective ambivalence was measured with items asking about the degree of mixed feelings, indecision, and conflict people felt (Sawicki et al., 2013). In our work, we only looked at the "raw" attitude people reported towards their preliminary decision and did not assess how people experienced their ambivalent or non-ambivalent attitudes. Possibly ambivalence leads to more biased information processing when the ambivalent attitude towards the issue at hand translates into the metacognitive awareness of feeling conflicted (i.e., subjective ambivalence; van Harreveld et al., 2015). When this subjective experience of the ambivalent attitude is accompanied by negative affect, people become motivated to quickly resolve their ambivalent attitude (Van Harreveld, Rutjens, et al., 2009) – likely by engaging in biased information processing (Clark et al., 2008).

2.7.1 Open Questions and Future Work

The present work can serve as a jumping-off point for future research looking to directly explore *why* ambivalence has positive effects. As mentioned above, people with higher trait ambivalence showed both *less* confirmation and *more* disconfirmation (Studies 2A, 2B, and 3). Using disconfirmation entails not just focusing on the hypothesis at hand but also holding an alternative hypothesis simultaneously, which is why it may be more difficult for people to use disconfirmation (Legrenzi et al., 1993). Therefore, disconfirmation requires the capacity for

cognitive and motivational complexity as well as divergent thinking (Butera et al., 2018). Possibly, highly ambivalent people have a greater capacity for divergent and de-focused thinking, allowing them to engage less in selective hypothesis testing (i.e., only focusing on the hypothesis at hand and not considering alternative ones). Therefore, a direct test of divergent thinking and selective hypothesis testing as the underlying process of the relationship between trait ambivalence and confirmation is a fruitful avenue for future work.

Although we used samples from different populations (US, UK, and Germany), there is reason to assume that cultural differences might play a role in the relationship between trait ambivalence and confirmation. Research investigating the relationship between positive framing of contradictions and creativity found that especially people from Western cultures profited from adopting such paradoxical frames, which describes a positive framing of contradictions (Leung et al., 2018). In contrast, positive effects of paradoxical frames on creativity were not found in East Asian samples. Presumably, East Asian participants do not experience conflict when confronted with paradoxical frames. Given that paradoxical frames and ambivalence share the element of contradiction, the relationship between trait ambivalence and confirmation may be more pronounced in Western than in East Asian samples.

By consistently demonstrating that trait ambivalence is negatively connected to confirmation in decision-making, the present research helps to elucidate the relationship between personality factors and confirmation—an area where, to date, research seems to be scant (Rassin, 2008). However, there is recent work suggesting that confirmation is negatively related to the Openness domain and positively related to the Neuroticism domain of the Big Five personality traits (Melinder et al., 2020). Future research could investigate whether trait ambivalence is accordingly related to greater Openness and less Neuroticism and whether this could be an underlying mechanism of the negative relationship we found. Research examining dispositional mixed emotions found that people who often experience mixed emotions also scored higher on

Openness (Barford & Smillie, 2016), suggesting that trait ambivalence, as a conceptually similar construct to dispositional mixed emotions, might also be positively related to Openness.

2.7.2 Conclusions

In this work, we set out to examine the relationship between trait ambivalence and confirmation—a ubiquitous form of reasoning that can have negative consequences on decision-making. In line with our hypothesis, we found that overall, higher trait ambivalence is related to less confirmation. We found this negative relationship using different paradigms and examining different aspects of confirmation. A meta-analysis over all studies further supports the robustness of our findings. Our work extends research showing that state ambivalence can have benefits for decision-making (Fong, 2006; Rees et al., 2013) by showing that trait ambivalence is related to less bias in decision-making and bolsters previous work showing that trait ambivalence is negatively related to bias in social judgment (Schneider et al., 2021). Taken together, our findings show that ambivalent people show less confirmation and instead also consider information that does not fit a currently held hypothesis. As such, this work shows that while ambivalent people might be torn, they are also balanced.

Supplemental Materials for Chapter 2

Appendix A

Decision Tasks (Rassin, 2008)

1) You engage in a game in which your opponent has written down a rule with regard to three numbers. He tells you that the number sequence 2-4-6 complies with the rule. It is your goal to find out what the rule is. You must achieve this by naming one number sequence, after which your co-player will inform you whether or not your sequence complies with the rule. Then, you must guess what the rule is. You think that the rule is 'add two to the previous number'. Which of the following three sequences would you put forward?

○ 8-10-12 (CB)

○ 3-6-9

○ 1-2-3

2) You meet a person, and you would like to find out whether he/she is an introvert or extravert. You guess that the person is an extravert. Which of the following two questions would you ask?

○ "Do you like spending time home alone?"

○ "Do you like going to parties?" (CB)

3) You are baking a cake, but you have run out of several ingredients. Hence, you use margarine instead of butter, honey instead of sugar, and brown wheat instead of white

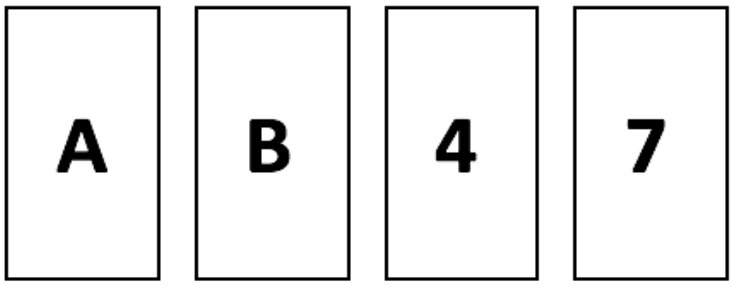
flour. The cake turns out great. You think that the reason for this is that you used the honey. Which of the following strategies would be best to test your idea?

- ○ Bake another cake with margarine, sugar, and wheat
- ○ Bake another cake with butter, honey, and flour (CB)
- ○ Bake another cake with butter, sugar, and flour

4) Six-year-old Karin is ill. She has lots of red spots and pimples on her body and she suffers from mild hyperthermia. You think that Karin might be overheated. Which of the following questions would you like to have answered?

- ○ Was Karin in contact with children who suffer from measles?
- ○ Is Karin allergic to mosquito bites?
- ○ Did Karin spend a long time in the sun? (CB)

5) Below, there are four cards. Every card has a letter on one side, and a number on the other.
Which cards (as few as possible) have to be turned in order to test the following rule: 'If there is a vowel on one side of the card, then there is an even number on the other'?



Which cards should be turned over? (multiple selection is possible)

- ☐ A
- ☐ B
- ☐ 4
- ☐ 7

(selecting "A" and "7" would be considered the non-confirmatory answer)

Exploratory decision task (additionally presented in Study 1B; cf. Griggs & Cox, 1982)

On this task imagine that you are a police officer on duty. It is your job to ensure that people conform to certain rules. The cards in front of you have information about four people sitting at a table. On one side of a card is a person's age and on the other side of the card is what the person is drinking. Here is a rule: IF A PERSON IS DRINKING BEER, THEN THE PERSON MUST BE OVER 19 YEARS OF AGE. Select the card or cards you definitely need to turn over to determine whether or not they are violating the rule.

Which card(s) should be definitely turned over? (multiple selection is possible)

- ☐ Drinking a beer
- ☐ 16 years of age
- ☐ drinking a coke
- ☐ 22 years of age

(selecting "Drinking a beer" and "16 years of age" would be considered the non-confirmatory answer)

Appendix B

Exploratory Analyses of Study 1A and Study 1B

Study 1A

Proneness to confirmation bias. The Confirmation Inventory is a self-reported scale that measures proneness to confirmation bias, and, according to previous work , this scale should be positively related to confirmatory decision-making (Rassin, 2008). However, in our data, this relationship was not there; in fact, it was the reverse, with proneness to confirmation being negatively correlated to confirmation, suggesting possible problems with construct validity of this scale in our data.

Additionally, proneness to confirmation bias was positively related to trait ambivalence, r = .26, p = .002 (two-tailed), indicating that the higher participants' trait ambivalence, the higher their self-reported individual proneness confirmation bias. Thus, in our data, people who indicate they are prone to confirmation bias also report being more ambivalent and show less confirmation. While the relation between the latter two is in line with our predictions and replicated across our studies, the negative relationship between proneness and confirmation is puzzling. Possibly in our dataset, participants did not have very accurate insight into their proneness to bias.

Study 1B

Exploratory decision task. For exploratory purposes, we also created a confirmation score that included a less abstract version of the Wason Card Selection Task. This score did not correlate with trait ambivalence, r_s = -.05, p =.440 (two-tailed). Moreover, there was no significant correlation between trait ambivalence and a confirmation score where we substituted the abstract task version with the more applied one, r_s = -.05, p =.479 (two-tailed).

Appendix C

Supplemental Study 1: Assessing Both the Effect of State Ambivalence on Confirmation Bias as Well as Its Relationship With Trait Ambivalence

Method

Participants. Two hundred fifteen participants started the study in our laboratory at the University of Cologne. Participants who completed the study were compensated with 1€. Since it is essential for the validity of the results that participants understand the instructions of the task as well as the list of questions, we excluded non-native German speakers (N = 17). Moreover, we excluded a total of thirty-three participants because they said to be familiar with at least one of the decision tasks. Four Participants did not finish the study and were excluded. These exclusions yielded an N of 161 participants of which 44 were male, 114 female, and three persons indicated "other" as gender. Participants were ranging in age for from 18 to 43 (M_{age} = 23.23, SD_{age} = 3.76). We preregistered a required sample size of 321 (f = .2, alpha level = .05, power = .9). However, to maximize efficiency this study incorporated sequential hypothesis testing using a spending function with one interim analysis and one final analysis (Lakens, 2014). The interim analysis was preregistered at an N of 161 with a nominal alpha of 0.025. After this analysis, we opted not to continue data collection. The full pre-registration can be found here: https://aspredicted.org/blind.php?x=33j2xf.

Essay task. There were three conditions where participants completed an autobiographical memory task to induce participants to feel both happy and sad (i.e., ambivalent), only sad or only happy (Rees et al., 2013). For example, in the only happy condition, participants were instructed to „*Please think of an event in your life that made you feel very happy. Please describe this event as vividly as possible.*" Whereas in the only sad condition, they were asked to „*Please think of an event in your life that made you feel very sad. Please describe this event as vividly as possible.*" and in both happy and

sad condition to „*Please think of an event in your life that made you feel happy and sad simultaneously. Please describe this event as vividly as possible.*"

Manipulation Check. We asked for the participants' current emotional state to see whether the manipulation in the essay task worked. Participants rated separately how happy, sad as well as how strong of a mixture of happy and sad feelings they currently felt on a 7-point Likert scale, ranging from 1 ("not at all") to 7 (very much).

Decision tasks. To capture confirmation bias, we used the same decision tasks as well as the same scoring procedure as in Study 1B (Rassin, 2008).

Trait Ambivalence. Trait ambivalence was measured with the Trait Ambivalence Scale (Schneider et al., 2021; Cronbach's $\alpha = .86$)

Procedure. First, participants provided informed consent and then read a short study introduction. After this, participants completed the essay task which was followed by the manipulation check. Then, participants were sequentially presented with the five decision tasks to capture confirmation bias in decision-making. Next, they filled out the Trait Ambivalence Scale. Participants then answered demographic questions about their gender, age, whether their native language was German, if they were psychology students, whether they were familiar with any of decision tasks as well as if they had any comments about the survey. Upon completion participants were thanked debriefed on the last page of the survey.

Results

Manipulation check. To check whether happiness ratings differed according to conditions, we conducted one-way ANOVAs with the respective happiness, sadness, and mixed feelings ratings as the dependent variable and the conditions as the independent variable. For the happiness rating, the model revealed that participants differed significantly concerning their reported happiness, $F(2,158) = 4.62$, $p = 0.01$, $\eta_p^2 = 0.06$. Tukey post-hoc tests showed that the

happiness scores were significantly higher for participants in the happy condition (*M*= 4.86, *SD*= 1.25) than for participants in the sad condition (*M*= 4.15, *SD*= 1.49; p = .019). Participants in the sad condition (*M*= 4.15, *SD*= 1.49) were significantly happier than participants in the ambivalent condition (*M*=4.83, *SD*=1.31; p = .032). However, participants in the happy condition (*M* = 4.86, *SD*= 1.25) did not differ significantly from participants in the ambivalent condition (*M* =4.83, *SD*=1.31; p = .99). In terms of sadness ratings, the one-way ANOVA revealed that participants differed significantly concerning their reported sadness, $F(2,158)= 7.04$, $p<0.01$, $\eta_p^2 = 0.08$. Tukey post-hoc tests showed that the sadness scores were significantly higher for participants in the sad condition *(M*=3.17, *SD*= 1.71) than for participants in the happy condition (*M*=2.12, *SD*= 1.24; $p <.001$) and participants in the ambivalent condition (*M*=2.50, *SD*= 1.45; $p = .055$). However, participants in the happy condition (*M*=2.12, *SD*= 1.24) did not differ significantly from the participants in the ambivalent condition (*M*=2.50, *SD*= 1.45; $p = .378$). Lastly, a one-way ANOVA revealed that participants did not differ significantly concerning their reported mixed feelings, $F(2,158)= 0.13$, $p =0.88$, $\eta_p^2 < 0.01$. As they were no significant differences between reported mixed feelings ratings, we must conclude that the manipulation did not produce the intended effects.

Main analysis. On average, participants had a confirmation score of 3.99 (*SD* = 0.84). Since the confirmation score was not normally distributed ($W = 8.41$, $p <.0001$; *Mdn* = 4.00), we conducted a Kruskal-Wallis test as a non-parametric alternative to a one-way ANOVA. The results of this test showed that they were no significant differences in the confirmation score between conditions, $H(2) = 1.05$, $p = .59$ (one-tailed).

Exploratory analysis. The average trait ambivalence was 3.81 (*SD* = 1.06). There was no significant correlation between trait ambivalence and confirmation score, $r_s = -0.04$, $p= 0.58$ (two-tailed).

Appendix D

Supplemental Study 2: Assessing the Effect of State Ambivalence on Confirmation Bias With a Different Manipulation Procedure

Method

Participants. One hundred and twenty-one participants started the study in our laboratory at the University of Cologne. Participants who completed the study were compensated with 1€. Since it is essential for the validity of the results that participants understand the instructions of the task as well as the list of questions, we excluded non-native German speakers (N = 8). Moreover, we excluded a total of nineteen participants because they said to be familiar with at least one of the decision tasks. One person did not finish the study and was excluded. These exclusions yielded an N of 93 participants of which 29 were male, 61 female, and one person indicated "other" as gender and one did not want to give any information regarding their gender. Participants were ranging in age for from 18 to 43 (M_{age} = 23.42, SD_{age} = 3.96). We preregistered a required sample size of 272 (Cohen's d = .4, alpha level = .05, power = .95). However, to maximize efficiency this study incorporated sequential hypothesis testing using a spending function with one interim analysis and one final analysis (Lakens, 2014). The interim analysis was preregistered at an N of 136 with a nominal alpha of 0.025. Unfortunately, we were only able to approximate 136 responses because data collection on campus went into the summer break and had to be ultimately stopped because there were no more students on campus. After the present analysis, we opted not to continue data collection. The full pre-registration can be found here: https://aspredicted.org/GMO_ZQT.

Topic Task. To manipulate ambivalence, participants completed a topic task (Van Harreveld et al., 2014). In the non-ambivalence condition, participants had to think of a topic they either felt very positive or very negative about and were asked to write down accordingly either eight positive or negative aspects about their self-chosen topic. Participants assigned to the

ambivalence conditions were asked to first think of a topic they felt both strongly positive and negative about (i.e., ambivalence) and then to write down four positives and four negative aspects about their self-chosen topic.

Manipulation Check. As a manipulation check, we used the subjective ambivalence scale (Priester & Petty, 1996) assessing the extent to which participants experience mixed thoughts or feelings, indecisiveness, and conflict on a 10-point scale ranging from 1 ("not at all") to 10 ("very strongly"). Also, participants rated their positivity (10-point scale ranging from 1 ("not at all positive") to 10 ("extremely positive")) as well as the negativity (10-point scale ranging from 1 ("not at all negative") to 10 ("extremely negative")) towards their self-chosen topic on two respective scales. Using these two scales, we calculated the objective ambivalence for each participant (Thompson et al., 1995).

Decision tasks. To capture confirmation bias, we used the same decision tasks as well as the same scoring procedure as in Studies 1A, 1B, and 2A.

Trait Ambivalence. Trait ambivalence was measured with the Trait Ambivalence Scale (Schneider et al., 2021; Cronbach's $\alpha = .81$).

Procedure. First, participants provided informed consent and then read a short study introduction. Participants then worked on the topic task. After this, participants completed the decision tasks which were followed by the manipulation checks. Next, they filled out the Trait Ambivalence Scale. Lastly, some demographic questions (e.g., gender, age, native language, comments) followed and upon completion, participants were thanked debriefed on the last page of the survey.

Results

There was a significant difference between the ambivalent condition ($M = 6.32$, $SD = 2.17$) and the univalent condition ($M = 2.80$, $SD = 2.24$) regarding the objective ambivalence,

$t(90.95) = 7.70$, $p < 0.0001$ (one-tailed). Moreover, there was a significant difference between the ambivalent condition ($M = 8.49$, $SD = 2.15$) and the univalent condition ($M = 2.32$, $SD = 1.90$) regarding the subjective ambivalence, $t(89.17) = 9.90$, $p < 0.0001$ (one-tailed).However, there was no significant difference between the ambivalent condition ($M = 3.89$, $SD = 0.88$) and the univalent condition ($M = 3.89$, $SD = 1.01$) regarding the decision task answers, $t(89.79) = -0.01$, $p = 0.99$ (one-tailed). Lasty, there was no significant correlation between trait ambivalence and the decision task answers, $r_s = 0.09$, $p = 0.38$ (two-tailed).

Appendix E

The Trait Hypothesis Testing Task (Snyder & Swann, 1978)

Interview Task: Finding Out About Others

One way to learn about others is to ask them questions about their likes and dislikes, their favorite activities, their life experiences and their feeling about themselves. On the next page you will read a general personality profile. Imagine that you are about to interview a person you don't know and you want to find out if this person matches the personality profile. Which questions would you ask?

We are interested in which questions people would want to ask, so we can use these and similar questions in a later study.

Please click on "next" to see the personality profile and further instructions.

Your task is to assess the extent to which the person's behaviors and experiences match those of a prototypical **extrovert**:

***"Extroverts** are typically outgoing, sociable, energetic, confident, talkative, and enthusiastic. Generally confident and relaxed in social situations, this type of person rarely has trouble making conversation with others. This type of person makes friends quickly and easily and is usually able to make a favorable impression on others. This type of person is usually seen by others as characteristically warm and friendly."*

This personality profile is a description of a type of person familiar to us all – the extrovert. You are to find out how well this profile describes a person you are about to interview. You will receive a list of questions that you may use in the interview. **You can choose 12 questions that would help you find out whether this person's beliefs, attitudes, and actions in life situations match the general characteristics described in the profile.**

Please click on "next" to see the list of questions.

From the list below, **please select 12 questions** you would want to ask during the interview to find out whether the person is an extrovert.

1. Think about times when you felt lonely. What events brought on these feelings?
2. What events make you feel popular with people?
3. What activities do you really excel in?
4. In what situations do you wish you could be more outgoing?
5. What do you do to keep yourself in good spirits?
6. Tell me about sometime when you felt left out from some social group. How did you handle these feelings?
7. What kinds of events make you feel like being alone?
8. What factors make it hard for you to really open up to people?
9. What social activities (e.g., clubs or groups) have you been active in over the years?
10. What do you like about living situations in which there are always lots of people around?
11. What do you usually think about when you're in a serious mood?
12. What kind of situations do you seek out if you want to meet new people?
13. What kind of charities do you like to contribute to?
14. Describe to me a type of social situation that invariably makes you feel ill at ease and awkward. What is it about such situations that makes you uncomfortable?
15. In what social situations are you most likely to be outgoing and friendly?
16. Think about times when your shyness in social situations has made you come across as being aloof. Can you give me an example?
17. What things do you dislike about loud parties?
18. What do you think the good and bad points of acting friendly and open are?
19. In what social situations are you most likely to feel self-assured and confident in yourself?
20. What are some of your favorite books? Can you recall a time that you got into a book so much that you could hardly put it down?
21. What are your career goals?
22. Think about times you have engaged in a lively and spirited debate with someone. What are some typical things you like to debate?[2]
23. In what situations are you most talkative? What is it about these situations that makes you like to talk?
24. Think about a time when you really wanted to talk to someone, but just couldn't bring yourself to initiate conversation. What types of situations are most likely to make you feel this way?
25. What do you like to do when you are feeling really energetic?
26. What would you do if you wanted to liven things up at a party?

Scoring of the questions
Extrovert: 2,3,9,10,12,15,19,22,23,25,26
Introvert: 1,4,6,7,8,11,14,16,17,24
Neutral: 5,13,18,20,21

[2] This question was only used in Study 2A where we used the original paradigm of Snyder and Swann (1978) with all 26 questions. For Study 2B, we removed question 22 to have an equal number of confirmatory and dis-confirmatory questions to select from.

Appendix F

State Ambivalence Manipulation and Manipulation Check in Study 2A

To manipulate state ambivalence in Study 2A, we used a topic task adapted from van Harreveld et al. (2014). Participants who were randomly assigned to the ambivalence condition were asked to think of a topic they "*are ambivalent (i.e., have both negative AND positive thoughts and feelings about) and write down your thoughts and/or feelings regarding this topic. Please write down below 2 negative thoughts/feelings as well as 2 positive thoughts/feelings you have about this topic.*". Participants randomly assigned to the non-ambivalence condition read the following instruction: "*Please think of a topic about which you have a set opinion (i.e., only positive thoughts and feelings OR only negative thoughts and feelings) and write down your thoughts and/or feelings regarding this topic. Please write down four thoughts/feelings for why you have a set opinion on this topic.*".

As a manipulation check, we used the subjective ambivalence scale (Priester & Petty, 1996) assessing the extent to which participants experience mixed thoughts or feelings on a 10-point scale ranging from 1 ("*not at all*") to 10 ("*very strongly*"). Also, we had participants rate their positivity on a 10-point scale ranging from 1 ("*not at all positive*") to 10 ("*extremely positive*") as well as the negativity on a 10-point scale ranging from 1 ("*not at all negative*") to 10 ("*extremely negative*") towards the topics. A score of objective ambivalence was calculated from the two separate ratings, using the following formula: $((P+N)/2) - |P - N|$; with P referring to the score on the positive evaluation item and N referring to the score on the negative evaluation item (Thompson et al., 1995). As such, this score represents the level of objective ambivalence, considering both the strength of each evaluation $(P+N/2)$ and the extent to which they are opposed $|P - N|$.

Study 2A: In-paper validation of the Trait Ambivalence Scale

In line with previous work on the validation of the Trait Ambivalence Scale (Schneider et al., 2022), we find in Study 2A that trait ambivalence was significantly related to both state objective ($r = .40$, $p < .0001$) and state subjective ambivalence ($r = .46$, $p < .0001$) experienced towards self-selected topics.

Appendix G

Supplemental Study 3

Method

Participants. One hundred ninety-eight participants started the study on Prolific. Participants who completed the study were compensated with £1.50. Since it is essential for the validity of the results that participants understand the instructions of the task as well as the list of questions, we excluded non-native English speakers (N = 140). These exclusions resulted in a total N of 58 participants of which 22 were male, 34 female and two persons indicated "other" as gender. Participants were ranging in age for from 19 to 63 (M_{age} = 34.21, SD_{age} = 12.21 and 37,93% reported to be students. The full pre-registration can be found here: https://aspredicted.org/blind.php?x=bq5vs8.

Essay task. There are 3 conditions in total where we have participants complete an autobiographical memory task to induce participants to feel both happy and sad, only sad or only happy (Rees et al., 2013):

1) Only happy (non-ambivalent): „Please think of an event in your life that made you feel very happy. Please describe this event as vividly as possible."

2) Only sad (non-ambivalent): „Please think of an event in your life that made you feel very sad. Please describe this event as vividly as possible."

3) Both happy and sad (ambivalent): „Please think of an event in your life that made you feel happy and sad simultaneously. Please describe this event as vividly as possible."

Manipulation Check. We asked for the participants' current emotional state to see whether the manipulation in the essay task worked. Participants rated the degree to which they felt the following eight emotions when engaging the writing task on a 10-point Likert scale, ranging from 1 (not at all) to 7 (Extremely): "Pleased", "Happy", "Torn", "No emotion/ neutral", "Mixed feelings- both sad and happy", "Conflicted", "Sad", and "Depressed".

Trait hypothesis testing task. To assess confirmatory hypothesis testing, we used the trait hypothesis testing task (Snyder & Swann, 1978). In this paradigm, participants are told that their task is to find out whether a person they just met is extroverted or not and read the following instructions: "*One way to learn about others is to ask them questions about their likes and dislikes, their favorite activities, their life experiences and their feeling about themselves. On the next page you will read a general personality profile. Imagine that you are about to interview a person you don't know, and you want to find out if this person matches the personality profile. Which questions would you ask? We are interested in which questions people would want to ask, so we can use these and similar questions in a later study.*"

Participants then read a short description describing a typical extroverted person: "*Extroverts are typically outgoing, sociable, energetic, confident, talkative, and enthusiastic. Generally confident and relaxed in social situations, this type of person rarely has trouble making conversation with others. This type of person makes friends quickly and easily and is usually able to make a favorable impression on others. This type of person is usually seen by others as characteristically warm and friendly.*" After this, participants were provided with a list of 26 questions to find out whether the person is extroverted or not (11 hypothesis-confirming questions, e.g. "*What do you like about parties?*"; 10 hypothesis-disconfirming questions, e.g. "*What factors make it hard for you to open up to people?*"; 5 neutral questions, e.g. "*What are your career goals?*"). Participants were asked to select 12 questions on this list that they would ask the other person to find out if the person is an extrovert.

As a proxy of our dependent variable confirmatory hypothesis testing, we used the number of selected hypothesis-confirming questions. Therefore, the higher number indicate greater the confirmatory hypothesis testing.

Trait Ambivalence. Trait ambivalence was measured with the Trait Ambivalence Scale (Schneider et al., 2021; Cronbach's $\alpha = .85$).

Procedure. First, participants provided informed consent and then read a short study introduction. After this, participants completed the essay task. The essay task was followed by the

decision task. Next, they filled out the Trait Ambivalence Scale (Schneider, et al., 2021), which was followed by the manipulation check. Lastly, some demographic questions (e.g., gender, age, native language, comments) followed and upon completion participants were thanked debriefed on the last page of the survey.

Results

The model revealed that participants differed significantly concerning their reported happiness, $F(2,55) = 35.22$, $p = < .001$, $\eta 2p = 0.56$. Tukey post-hoc tests showed that the happiness scores were significantly higher for participants in the happy condition ($M = 7.77$, $SD = 2.09$) than for participants in the sad condition ($M = 4.15$, $SD = 1.49$). Participants in the ambivalent condition ($M=5.70$, $SD=2.14$) were significantly happier than participants in the sad condition ($M = 4.15$, $SD = 1.49$). However, participants in the happy condition ($M = 7.77$, $SD = 2.09$) did not differ significantly from participants in the ambivalent condition ($M = 5.70$, $SD = 2.14$). The model revealed that participants differed significantly concerning their reported sadness, $F(2,55) = 22.34$, $p < .001$, $\eta 2p = 0.448$. Tukey post-hoc tests showed that the sadness scores were significantly higher for participants in the sad condition ($M = 7.13$, $SD = 2.48$) than for participants in the happy condition ($M = 2.38$, $SD = 2.09$) and participants in the ambivalent condition ($M = 3.86$, $SD = 1.98$). However, participants in the happy condition ($M = 2.38$, $SD = 2.09$) did not differ significantly from the participants in the ambivalent condition ($M = 3.86$, $SD = 1.98$). The model revealed that participants differed significantly concerning their reported ambivalence, $F(2,55) = 5.9$, $p<0.005$, $\eta 2p = 0.18$. Tukey post-hoc tests showed that the ambivalence scores were significantly higher for the ambivalent condition ($M = 5.18$, $SD = 2.30$) than for the sad condition ($M = 3.36$, $SD = 1.73$) and the happy condition ($M = 3.07$, $SD = 2.27$). However, participants in the happy condition ($M = 3.07$, $SD = 2.27$) did not differ significantly from the participants in the sad condition ($M = 3.36$, $SD = 1.73$).

We ran a model with number of selected confirmatory questions as the dependent variable and condition as a between factor. The model revealed that participants did not differ

significantly concerning the number of selected confirmatory questions, $F(2,55) = 0.38$, $p = .69$. Furthermore, trait ambivalence was negative related to the number of selected confirmatory questions, $r_s = -0.35$, $p < 0.01$ (one-tailed). Trait ambivalence was also negatively related to the difference score (number of selected confirmatory questions – number of selected disconfirmatory questions), $r_s = -0.41$, $p < 0.01$ (two-tailed).

Appendix H

English Translation of the Introductory Description of Mr. Müller

Decision-making Scenario: Extension of Mr. Müller's Contract

Imagine you are the owner of a company and have to make a business decision. It is about Mr. Müller: Mr. Müller has been hired by you as manager of the department store "Röhring GmbH", Kaiserslautern. You have inherited the company and would like to have the company managed by a competent business professional. You and Mr. Müller have initially agreed on a contract for one year. After this year, negotiations are to take place to extend the contract. The department store with 38 employees was running relatively satisfactorily before Mr. Müller was hired; i.e. "Röhring GmbH" did not make any loss-making business, but neither did it make any particularly high profits. The task of the newly appointed manager was to buy men's and women's clothing at reasonable prices and to make the department store more attractive to customers. In this respect, there has recently been a greater need to catch up, as both the product range and the premises have changed little in recent years. In the first year of his employment at "Röhring GmbH", Mr. Müller succeeded in gaining some new customers through unconventional advertising campaigns. Whether the expansion of the product range to include "young fashion" will be successful remains to be seen in view of the strong competition. In any case, the range of men's and women's clothing put together by Mr. Müller has not been accepted by large sections of the regular clientele. The large stocks still available at the end of the season could therefore only be reduced by granting substantial price reductions. The remodeling of the department store carried out by Mr. Müller has met with a divided response from customers. Some praise the more contemporary design of the floor space, while others criticize the more cluttered nature of the store. Overall, Mr. Müller's decisions have not significantly changed the business situation, i.e. there have been no major gains, but no losses either. However, his management style was perceived by many longstanding employees as too brash and disrespectful. In some cases, this led to considerable conflicts. As a result, very costly termination agreements had to be concluded with some department heads. If you feel you have a good idea of the situation, please click "continue".

English Translation of the Expert Statements Used in Study 3

1. "Mr. Miller was able to compete with the very strong local competition. Even price discounts and temporarily high inventories did not have any serious consequences. Anyone who can master such situations will be able to defend the department store's market share against the competition."
2. "Due to Mr. Miller's decisions the company lost many long-term customers. It can be expected that even more customers will start buying at different stores. Since long-term customers are very important in terms of sales numbers, this is a very bad development."
3. "Mr. Miller has a good understanding of the industry and knows trends (like "young fashion") and Mr. Miller's creative innovations will lead to a new branch of customers."
4. "In view of the unchanged business situation, Mr. Miller was unable to live up to the initially high expectations. In a dynamic economy, maintaining the status quo actually means stagnation and regression. This will have an increasingly negative impact on business."
5. "By ensuring a continuous course of business, Mr. Miller has fully lived up to the expectations. Continuity is becoming more and more important in the face of increasing market turbulence and will pay off in the future."
6. "The changes in young people's fashion are nothing new on the market. This sales strategy already exists in similar department stores. Mr. Miller only copies business ideas of his competitors, so the success of this strategy is more than questionable."
7. "Due to Mr. Miller's modernization of the department store's interior, more young people started buying at the store. These newly acquired customers will be very important for the company's future."
8. "Balancing out different employees' interests is an important factor for the continuous safeguarding of the business. If you get into conflict with experienced, long-standing employees as quickly as Mr. Miller has, you will fail to manage a department store in the long run."
9. "New customers could be won through creative advertising campaigns. Mr. Miller's can obviously address and attract new customer groups and this will pay off in the future."
10. "Mr. Miller's purchasing policy led to temporarily high inventories, which could only be reduced by giving large price discounts to customers. This also damaged the reputation of the department store which will have a long-term negative effect on business results."
11. "Mr. Miller's personnel decisions to increasingly focus on younger employees and to inspire them with enthusiasm for the company are very future-oriented. 'Fresh blood' will ensure new ideas and creativity in the business processes."
12. "Due to the restructuring measures and modernizations initiated by Mr. Miller, the department store has become more confusing. These measures will increasingly lead to a reduction in the number of customers."

CHAPTER 3

AMBIVALENCE AND INFORMATION ACQUISITION: A PROCESS-TRACING EXPERIMENT

This chapter is based on the following manuscript:

Hohnsbehn, J.-M., & Schneider, I.K. (2025). *Ambivalence and information acquisition: A process-tracing experiment*. Manuscript in Preparation.

Please be aware that certain formatting adjustments were made to align with the layout of this dissertation. However, the content of the article remains unchanged.

Supplementary materials are available at:
https://osf.io/ke7wv/?view_only=06781feaaec64d51a2007c0e59bdf345

Abstract

Confirmation bias, the tendency to seek information that confirms existing beliefs while neglecting disconfirmatory information, is a common pitfall in decision-making. A crucial part of this bias is how people acquire information: rather than seeking a balanced set of information, individuals often focus on confirmatory evidence, overlooking information that challenges their views. State ambivalence (experiencing mixed thoughts and feelings about a specific decision) and trait ambivalence (a general tendency to experience mixed thoughts and feelings) have been linked to less confirmation in decision-making. However, this research has primarily focused on the intended acquisition as well as the explicit evaluation of confirmatory versus disconfirmatory information, leaving the actual process of information acquisition less understood. This study used MouselabWEB, a process-tracing tool, to measure participants' (N = 256) viewing times for confirmatory versus disconfirmatory information in a decision-making task. In our preregistered analysis, we hypothesized that higher levels of ambivalence would be associated with reduced confirmation bias, indicated by less time spent viewing confirmatory information compared to disconfirmatory information. Contrary to predictions, neither trait nor state ambivalence significantly predicted viewing times. In exploratory analyses, we categorized participants based on their overall information preference—whether they spent more time on confirmatory or disconfirmatory information. Results revealed that objective ambivalence was linked to a preference for disconfirmatory information, while subjective ambivalence was associated with a preference for confirmatory information. These exploratory findings offer new insights into the role of ambivalence in shaping information acquisition and point to future research avenues needed for a deeper understanding of how ambivalence influences cognitive processing during decision-making.

Keywords: ambivalence, confirmation bias, information acquisition, decision-making, Process tracing

3.1 Introduction

People make numerous daily decisions (Sahakian & LaBuzetta, 2013; Wansink & Sobal, 2007). While some are quick choices made almost every day (such as deciding what to order at the coffee shop or which train to take to work), others require more dedicated thought, especially when the goal is to make the best decision possible (e.g., which place to choose for the next vacation or which political candidate to vote for). Arguably, one prerequisite for making good decisions is to acquire as much relevant information as possible to then carefully review and integrate each piece of information into an overall decision. However, all too often, this does not happen when people collect and process information. Rather, certain information is favored, whereas other information is neglected. In other words, people often fall prey to what is referred to as confirmation bias, a decision-making bias that describes people's tendency to seek information that is in line with their existing views, hypotheses, or ideas, leading people to pay more attention to information that confirms their view while simultaneously neglecting information that does not (Nickerson, 1998; Oswald & Grosjean, 2004).

Confirmation bias is a ubiquitous pitfall in good decision making that has led to suboptimal outcomes in various fields, including investment (Cheng, 2018; Cipriano & Gruca, 2014), child welfare and social work (Spratt et al., 2015), as well as healthcare (Gopal et al., 2021). In its ubiquity, confirmation bias often manifests itself in information acquisition, meaning that people often gather information in such a way as to confirm an existing belief (Jones & Sugden, 2001). This has been shown in simple perceptual choice tasks where people were asked to determine which of two circles contained more dots. After their initial choice, participants had to the chance to sample more information about how many dots are presented in a certain circle and they tended to do so in way that confirmed their original decision. Moreover, this tendency was exacerbated when participants had higher confidence in their initial decision and it disappeared when information sampling was outside of their control (i.e., controlled by the experimenter; Kaanders et al., 2022). Going from a fundamental to a more applied context,

confirmation bias tendencies have also been found in the context of using web searches where people tended to select and view more results in line with their negative prior belief about the safety of GMO foods—especially when their health literacy was low (e.g., their ability to identify high-quality health information on the internet; Suzuki & Yamamoto, 2021).

This raises the question of what can be done to mitigate confirmatory information acquisition in decision-making. As it has been connected to a more balanced consideration of information (Schneider et al., 2021) and greater openness to alternative perspectives (Rees et al., 2013), being more ambivalent has been shown to correlate with less confirmatory processing across decision-making tasks: For example, when people were put in a hypothetical scenario where they were asked to find out whether someone they had just met was extroverted, people who were more ambivalent chose to ask a more balanced set of questions that aimed to find out about *both* extroverted and introverted traits. In contrast, people with lower levels of ambivalence chose more questions targeting the extroverted traits of the person, thereby adopting a more confirmatory strategy to collect information. Moreover, when confronted with actual pieces of information in a decision-making task, people with lower ambivalence are more likely to rate confirmatory information as more important and credible than disconfirmatory information, whereas more ambivalent people are more likely to rate them equally in terms of importance and credibility (Hohnsbehn et al., 2022).

As such, this past work offers insights into how people *intend* to acquire information as well as how they explicitly evaluate confirmatory versus disconfirmatory decision information as a function of their ambivalence. Considering that decision-making processes are intricate and cannot solely be understood in terms of the explicit evaluations people make, (Evans, 2008; Strack & Deutsch, 2004) the question remains whether the negative relationship between ambivalence and confirmatory processing strategies is mirrored in more implicit decision-making processes as well. In particular, can the tendency to show less confirmation with higher

ambivalence also be observed in actual versus intended information acquisition of confirmatory versus disconfirmatory information?

Specifically, we tested how people's general experience of ambivalence (Schneider et al., 2021) relates to confirmation bias in information acquisition. Past research found that higher trait ambivalence was related to less correspondence bias (Schneider et al., 2021), which describes the tendency to interpret people's actions as consequences of their personality rather than being influenced by situational factors (Gilbert & Malone, 1995). In other words, people with higher trait ambivalence showed greater consideration of diverse information (i.e., both dispositional and situational factors) to explain other people's behavior. People with higher trait ambivalence also showed fewer confirmatory strategies to test the hypotheses posed in decision-making tasks and rated confirmatory and disconfirmatory more equally in terms of credibility and importance, whereas people with lower trait ambivalence tended to rate confirmatory information more favorably (Hohnsbehn et al., 2022). Based on these findings, which concentrated on more explicit judgments of decision information, we propose the hypothesis that higher trait ambivalence levels are associated with less confirmation bias in information acquisition, as evidenced by spending more time looking at disconfirmatory versus confirmatory information, representing a more implicit measure.

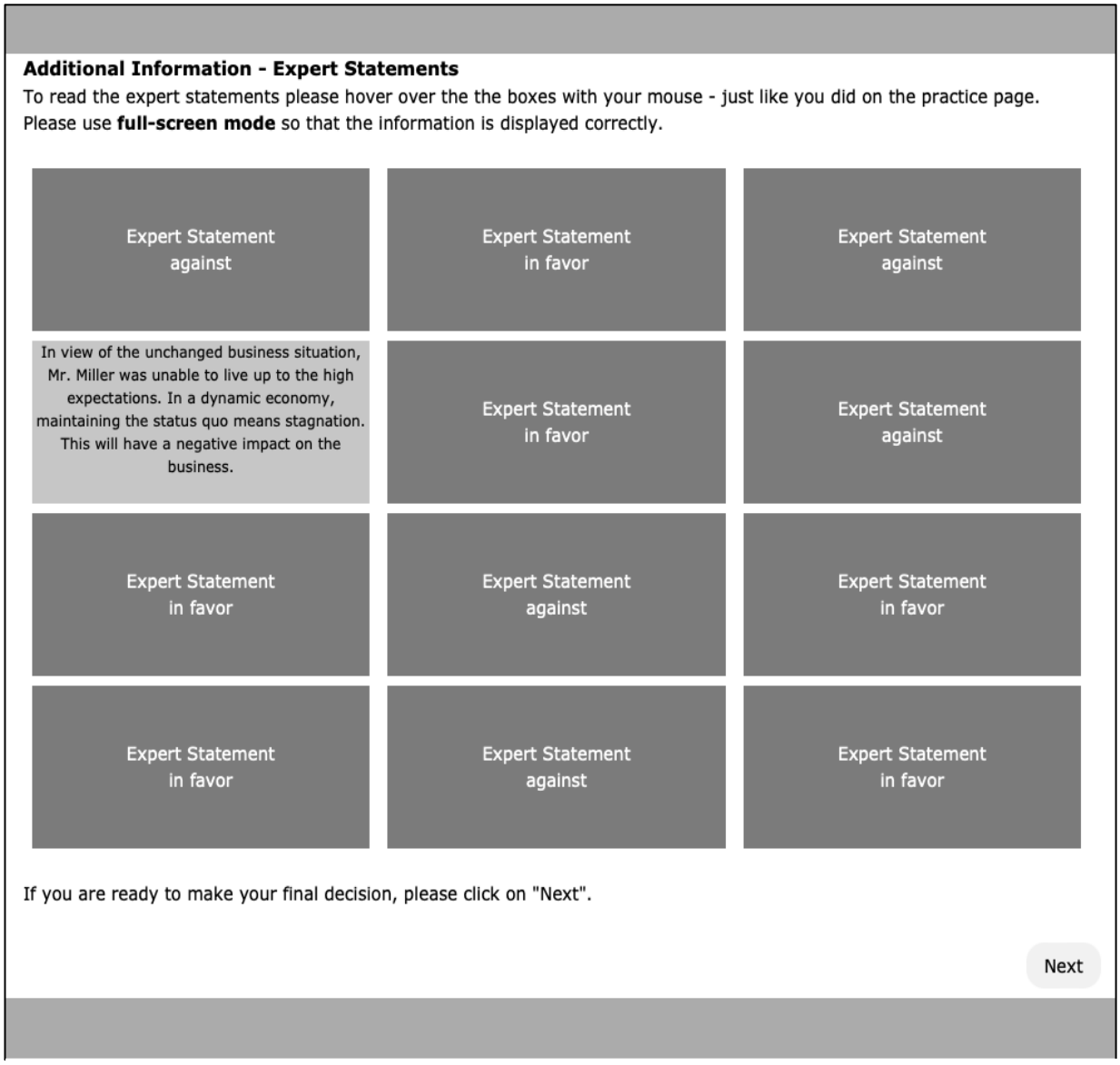
Next to work showing that trait ambivalence is connected to less bias (Hohnsbehn et al., 2022; Schneider et al., 2021), there is also evidence suggesting that the ambivalence one experiences directly in response to the issue at hand (i.e., related state ambivalence) is associated with less biased decision-making on that same issue. For example, during the FIFA 2018 Soccer World Cup, people were asked how they felt before and after watching each of their team's matches and the gave predictions about the outcome of their team's next match. Those who reported experiencing greater mixed emotions (i.e., co-occurring positive and negative emotions) provided more likely score predictions (Hostler & Berrios, 2021). Moreover, higher objective ambivalence (i.e., the degree to which simultaneous positive and negative evaluations exist

towards the same attitude object; Kaplan, 1972; Thompson et al., 1995) toward an initial decision was associated with rating disconfirmatory decision information as more important and credible than confirmatory decision information (Hohnsbehn et al., 2022). Based on this, we set out to test whether higher objective ambivalence towards a preliminary decision in a decision-making scenario is associated with less confirmation bias in subsequent information acquisition, as demonstrated by spending more time looking at disconfirmatory than confirmatory information.

In summary, the present work investigates the assumption that both higher trait and objective state ambivalence are associated with a smaller tendency to acquire confirmatory rather than disconfirmatory information before making a decision. To measure information acquisition, we used a process tracing tool called MouselabWEB, which is a movement-based measure to capture the processes of attention and information search strategies (Schulte-Mecklenbeck et al., 2017; Willemsen & Johnson, 2019). Specifically, it measures the time people spend looking at certain information, in milliseconds. It has been used to investigate how people acquire and process information in the context of tax decisions (Kogler et al., 2022), social decision making (Bieleke et al., 2020), and food choices (Schulte-Mecklenbeck et al., 2013). Investigating information acquisition in such an unobtrusive manner enables us to gain insight into decision-making processes with higher fidelity. Thus, we can go beyond explicit information evaluations and information acquisition strategies, ultimately contributing to a better understanding of how ambivalence shapes information processing in decision-making.

3.2 Research Overview: Investigating the Role of Trait and State Ambivalence in the Acquisition of Confirmatory Versus Disconfirmatory Information.

To take a closer look at how people acquire confirmatory versus disconfirmatory information as a function of their trait and state ambivalence, we created a selective exposure paradigm in a process tracing tool called MouselabWEB (Willemsen & Johnson, 2019). With this, we were able to display decision information in the form of short statements on a single page that was either confirmatory or disconfirmatory to a previously made decision and that participants were then able to peruse in a self-paced manner. Crucially, all statements were hidden in boxes



Note. Statements were only revealed when participants hovered with their mouse over the respective box.

and were only opened when participants hovered with their mouse over the respective box (see Figure 3.1 for an example display of the expert statements). Thus, MouselabWEB can record how long (in milliseconds) each statement has been displayed to the participants, and we could therefore calculate how much time participants spent looking at confirmatory versus disconfirmatory statements. Based on past results showing that people with higher trait as well as state ambivalence tended to evaluate disconfirmatory statements in more favorable terms than confirmatory statements (Hohnsbehn et al., 2022), we expected the same pattern in time spent viewing these two kinds of statements. That is, we predicted that the higher people are in trait ambivalence, the more time they spend looking at disconfirmatory versus confirmatory information; analogously, the higher the objective ambivalence, the more time will be spent looking at disconfirmatory versus confirmatory information. In other words, we predicted that people with higher ambivalence would show no confirmation tendencies in information acquisition and instead spend more time acquiring disconfirmatory information.

3.2.1 Method

Participants and Design. Two hundred ninety-one participants started the study. Participants were recruited via Amazon MechanicalTurk and 259 participants completed the study. To ensure that we had responses only for participants who understood the instructions and the scenario for our data analysis, we preregistered that we would exclude all nonnative English speakers (the study was conducted in English). No exclusions were made based on this criterion. Furthermore, we also included a control question to check whether participants were able to read all text hidden behind the boxes (i.e., that the text was fully visible, and it was not cut-off). We excluded data of one participant who indicated that the text was not displayed accurately. Due to technical errors, information acquisition data were not recorded for two participants; therefore, data of these participants were excluded as well. Thus, the final dataset for this study consisted of 256 participants (M_{age} = 40.50, SD_{age} = 11.59, 156 male, 98 female, two participants chose not to disclose any information on their gender).

This study was preregistered (find the preregistration here https://aspredicted.org/C8V_J2D). Based on previous meta-analytic results that estimated the strength of the relationship between trait ambivalence and confirmation (Hohnsbehn et al., 2022), we assumed a mean effect size of *rho*/*r* =. 20 (Cohen's *d* = .415) for the sample size calculations in the present study. Using G*Power (version 3.1.9.4; Faul et al., 2009), a power analysis for a "Linear multiple regression: Fixed model, single regression coefficient" with a partial r^2 of .02 (= f^2 of .04), one-tailed, alpha level = .05, power = .95, number of predictors = 2, yielded a sample size of 262. To maximize efficiency, this study incorporated sequential hypothesis testing using a spending function with one interim analysis (where we collected half of the participants, i.e., *N* = 131) and one final analysis (i.e., full sample of *N* = 262; Lakens, 2014). We collected the full sample and therefore, had a nominal alpha level of .035 instead of the conventional level of .05 for the final data analysis.

Procedure and Materials. After a short study introduction, participants provided consent before they received more detailed information about the decision scenario. After the consent page, the counterbalanced design began, where half of the participants completed the Trait Ambivalence Scale (Schneider et al., 2021) before the decision scenario and the other half of participants after the decision scenario.

In the decision scenario, participants read a text about the employment of a person named Mr. Miller's. Mr. Miller, a department store manager, is described in more detail in terms of his work performance (e.g., how long he has worked there, how well his initiatives for the business have fared, and some employees' impressions of him). After reading this scenario, participants were asked to make a preliminary decision: "Please imagine you have to make a preliminary decision now: Should Mr. Miller's employment contract be extended?" Participants answered either "Yes" or "No".

Regarding their preliminary decision, participants responded to three items that we used to calculate participants' state ambivalence towards their preliminary decision. On 10-point scales,

ranging from “not at all” to “very much”, we asked participants "How strongly are you in favor of Mr. Miller's continued employment?" and "How strongly are you against Mr. Miller's continued employment?". From these two separate ratings, we calculated a score of objective ambivalence using the following formula: (P+N)/2) - |P - N|, where P refers to the score on the positive evaluation item and N refers to the score on the negative evaluation item (Thompson et al., 1995). As such, the objective ambivalence score considers both the strength of each evaluation (P+N/2) and the extent to which they are opposed |P - N|. Using this formula on the present scale format, the scores can range from -3.5 to 10. A score of 10 (i.e., P = 10 and N = 10) would indicate maximal ambivalence, whereas a score of -3.5 (i.e., P = 10 and N = 1 or N = 10 and P = 1) would indicate maximal univalence, and a score of 1 would indicate maximal indifference (i.e., P = 1 and N = 1).

For exploratory purposes, we also assessed another form of state ambivalence, namely, participants’ subjective experience of ambivalence. Subjective ambivalence was measured using three items (Priester & Petty, 1996; Cronbach’s alpha of .96): On 10-point scales, we asked participants to indicate how much conflict (from “no conflict at all” to “maximum conflict”), indecision (from “no indecision at all” to “maximum indecision”), and mixed reactions (from “completely one-sided reactions” to “completely mixed reactions”) they experienced in terms of their preliminary decision.

After this preliminary decision, participants read the following instruction:

"*Before you make a final decision, you have the chance to read additional information about the decision. These are statements of experts towards a possible contract extension of Mr. Miller. The experts were asked to make predictions about the company's future in case Mr. Miller's stays the store's manager. There are a total of 12 expert statements, each summarized in one to three sentences. The expert statements will be hidden behind boxes. You can look at the statements by moving the mouse pointer into the box. The box will open and you can see the information, until you move the mouse out of the box again."*

After a practice round to become familiar with the boxes, participants went to the page with all 12 statements hidden behind the boxes (50% of statements in favor of contract extension, 50% of statements against). All the boxes were either clearly labeled as "Expert Statement in favor" or "Expert Statement against" to minimize noise and random exploratory search (see the Appendix B in the supplemental materials for an overview of all expert statements as well as their character and word count).

To create this information acquisition measure, we used the MouselabWEB tool (Willemsen & Johnson, 2019). The key variable of information acquisition recorded on this site was how long each of the boxes was open (i.e., time measured in milliseconds that a statement was revealed so that it could be read). We calculated the average time (in ms) spent exploring confirmatory and disconfirmatory information. For our main analysis, we created a difference score by subtracting the average viewing time of confirmatory information from the average viewing time of disconfirmatory information. Studies on information acquisition have demonstrated the significant influence of reading order, with Western participants typically beginning at the top-left box. As a result, information is more likely to be acquired in reading order (Willemsen & Johnson, 2019). To separate the effects of information type from position and reading order effects, we counterbalanced the position of the boxes between participants (i.e., the positions of all 12 boxes were randomized for each participant).

We extracted two important process tracing variables: the depth of information search as well as the latency of information search. Depth of search is the amount of total information that is searched, i.e., how many times the participant opened a box (Schrah et al., 2006; Willemsen & Johnson, 2019). To quantify this, the MouselabWEB program generates a variable called "Maxcount" that counts the overall times boxes were opened. This variable's lowest possible value therefore is 0— indicating no search because no boxes were opened. Theoretically, there is no upper limit because the participant can open boxes as often as they want. This variable can also be explored for confirmatory and for disconfirmatory information separately, that is how

many times were boxes opened that contained confirmatory versus disconfirmatory information. As for the second variable, latency of search, this is the time spent viewing the information behind the boxes (i.e., average time spent per information acquisition; Schrah et al., 2006; Willemsen & Johnson, 2019).

Next, participants could make a final decision and were asked "Imagine you had to make a final decision: Would you decide for or against Mr. Miller's continued employment?". participants answered either "Yes" or "No". In the same way as with the preliminary decision, we then assessed objective and subjective ambivalence about the final decision. After the final decision, the other half of participants filled in the Trait Ambivalence Scale (Schneider et al., 2021, *Cronbach's alpha* = .94; see Appendix A for all items) to measure individual tendency of feeling ambivalent. The scale consisted of 10 items (e.g., "I often feel torn between two sides of an issue"). Participants stated their agreement on a 7-point Likert scale, ranging from 1 (does not apply to me at all) to 7 (strongly applies to me). Participants' trait ambivalence was computed as the average of all items, with higher scores indicating higher trait ambivalence.

For exploratory purposes, we included the Intolerance of Uncertainty Scale (short version; Carleton et al., 2007; *Cronbach's alpha* = .94) at the end of the study, right before the demographics page where participants were asked for their age, gender, the control questions about native language as well as proper legibility and finally whether they had any comments. Upon completion, participants received a debrief of the study (see Appendix C in the supplemental materials for a documentation of the study procedure).

3.2.2 Results and Discussion

In the final dataset, instances when a box was open for less than 200ms were deleted because such instances represent spurious rather than consciously processed acquisitions (i.e., accidental mouse hover over a box; Willemsen & Johnson, 2019). Excluding those spurious mouse hover events, the average overall latency of search (i.e., viewing times) of the statements were 4170.53 ms (*SD* = 2866.93 ms; see Table 3.1 for a more detailed overview of average latency as well as depth of search). Out of the 256 participants, 239 (93.36%) had identical preliminary and final decisions, whereas 17 (6.64%) made a final decision that was different from their preliminary decision. In accordance with that, the preliminary decision significantly predicted the final decision, $X^2(1, 256) = 162.86$, $p < .001$. The results of paired samples t-tests revealed that there was neither a significant difference in terms of search latency between confirmatory (M = 4258.60, SD = 3313.92) and disconfirmatory information (M = 4082.46, SD = 2867.99), $t(255) = 1.20$, $p = .232$, nor in terms of depth of search between confirmatory (M = 8.45, SD = 3.82) and disconfirmatory information (M = 8.14, SD = 3.82), $t(255) = 1.73$, $p = .084$.

Table 3.1

Average Latency of search (in ms) and depth of search (times boxes were opened) overall as well as by confirmatory and disconfirmatory information.

	Overall information	Confirmatory information	Disconfirmatory information
Latency of search	*M* = 4170.53 *SD* = 2866.61	*M* = 4258.60, *SD* = 3313.92	*M* = 4082.46, *SD* = 2867.99
Depth of search	*M* = 16.42 *SD* =6.83	*M* = 8.45 *SD* = 3.82	*M* = 8.14 *SD* = 3.82

Note. Latency of search describes the time spent on information acquisition (i.e., time viewing the information). Depth of search is operationalized as number of times boxes were opened to reveal the information (e.g., Schrah et al., 2006; Willemsen & Johnson, 2019).

Mean trait ambivalence was 3.71 (*SD* = 1.31) and mean objective ambivalence towards the preliminary decision (i.e., the state ambivalence measure for the preregistered analysis) was 0.29 (*SD* = 2.81). See Table 3.2 for mean, standard deviation as well as correlations between trait

ambivalence, objective ambivalence (both towards preliminary and final decision), subjective ambivalence (both towards preliminary and final decision) and intolerance of uncertainty.

Table 3.2

Means, Standard Deviations, and Correlations With Confidence Intervals

Variable	*M*	*SD*	1	2	3	4
1. Trait Ambivalence	3.71	1.31				
2. Objective Ambivalence (preliminary decision)	0.29	2.81	.25** [.13, .36]			
3. Subjective Ambivalence (preliminary decision)	3.71	2.19	.43** [.32, .52]	.74** [.67, .79]		
4. Objective Ambivalence (final decision)	0.45	2.91	.43** [.32, .52]	.71** [.64, .76]	.62** [.54, .69]	
5. Subjectives Ambivalence (final decision)	3.84	2.36	.53** [.43, .61]	.53** [.44, .62]	.67** [.60, .73]	.79** [.74, .83]

Note. *M* and *SD* are used to represent mean and standard deviation, respectively. Values in square brackets indicate the 95% confidence interval for each correlation. * indicates $p < .05$. ** indicates $p < .01$.

Preregistered Analysis. To test our main hypotheses, we conducted simple multiple regression analysis to investigate whether trait ambivalence and state ambivalence predicted the ratio of time spent viewing confirmatory versus disconfirmatory information. Namely, we predicted that the higher the trait ambivalence, the more time participants will spend looking at disconfirmatory versus confirmatory information. We expected the same for state ambivalence: the higher the objective ambivalence, the more time participants will spend looking at disconfirmatory versus confirmatory information. Therefore, the dependent variable was the difference score where we subtracted the average time (in ms) looked at confirmatory information from the average time looked at disconfirmatory information. The multiple regression analysis revealed that both trait ambivalence, $b = 1014.2$, $t\,(254) = 1.46$, $p = .146$, and

state ambivalence, b = -296.9, t (254) = -.92, p = .361, did not significantly predict the difference score.

Exploratory Analysis.

Logistic Regression. To test our hypotheses that the higher the trait ambivalence (H1) and the higher objective ambivalence (H2), the more time will be spent looking at disconfirmatory vs. confirmatory information, we also created a binary variable to indicate whether more time was spent looking at confirmatory versus disconfirmatory information. This approach can increase both simplicity of the analysis and interpretation as well as increase specificity by directly addressing whether confirmatory received more attention than disconfirmatory information. However, dichotomizing continuous variables can lead to loss of information and reduced statistical power. Using such a binary dependent variable where a value of 1 indicated more time spent on confirmatory information and 0 indicated more time spent on disconfirmatory information, a logistic regression analysis was conducted to investigate the influence of trait ambivalence, preliminary objective ambivalence, and preliminary subjective ambivalence on information type dominance (i.e., the likelihood of spending more time looking at confirmatory versus disconfirmatory information; the results are shown in Table 3.3). Trait ambivalence was not a significant predictor of information type dominance (b = 0.01, t(255) = 0.08, p = .935, thereby lending no support for our original hypothesis about trait ambivalence and information acquisition (H1). However, objective ambivalence had a significant negative association with information type dominance (b = - 0.24, t(255) = -2.21, p < .05), indicating that higher levels of objective ambivalence decreased the likelihood of spending more time on confirmatory information (i.e. decreased the likelihood that the dominant information type confirmatory information) —which would be in line with our original hypothesis (H2). Preliminary subjective ambivalence showed a significant positive association (b = 0.28, t(255) = 2.83, p < .01) with information type dominance suggesting an increase in the likelihood of spending more time on confirmatory information with higher subjective ambivalence (i.e.

increased the likelihood that the dominant information type confirmatory information). The interaction term between objective ambivalence and subjective ambivalence was not significant (b = 0.025, $t(255) = 1.26$, $p = .208$). Together, these findings suggest that objective and subjective ambivalence have distinct and opposing relationships with subsequent information processing tendencies in terms of dominant information type. While higher objective ambivalence leads to increased dominance of disconfirmatory information, higher subjective ambivalence is associated with a dominance of confirmatory information in information acquisition.

Table 3.3

Logistic Regression Predicting Likelihood of Spending More Time on Confirmatory Versus Disconfirmatory Information

	Estimate (b)	Std. Error (SE)	z-value	p-value
(Intercept)	-1.02	0.45	-2.27	.023*
Trait Ambivalence	0.01	0.11	0.08	.935
Objective Ambivalence (OA)	-0.24	0.11	-2.21	.027*
Subjective Ambivalence (SA)	0.28	0.10	2.83	.005**
OA × SA Interaction	0.03	0.02	1.26	.208

Note. Objective and subjective ambivalence refer to the objective and subjective ambivalence reported towards the preliminary decision. **p < .05, **p < .01, ***p < .001

Depth of search. Multiple regression analysis showed that neither trait ambivalence (b = .16, $t(251) = 1.08$, $p = .283$), objective ambivalence (b = .05, $t(251) = .34$, $p = .736$) nor subjective ambivalence (b = -.003, $t(251) = -.03$ $p = .979$) were significant predictors of ratio of depth of search in regard to confirmatory versus disconfirmatory information (i.e., how many boxes with confirmatory versus disconfirmatory information were opened). Also, there was no significant interaction between objective and subjective ambivalence (b = .01, $t(251) = .19$, $p = .850$).

Concerning overall depth of search, multiple regression analysis showed that neither trait ambivalence (b = .39, $t(251) = 1.05$ $p = .293$), objective ambivalence (b = .28, $t(251) = .79$ p = .432) nor subjective ambivalence (b = -.07, $t(251) = -.21$ $p = .833$) were significant predictors.

Also, there was no significant interaction between objective and subjective ambivalence (b = -.08, $t(251)$ = -1.27, p = .206; see the full regression model in the supplemental materials). We also conducted the same analysis separately for search depth of confirmatory and disconfirmatory information as criterion. Both multiple regression models showed the same pattern as the one reported above with overall information as the criterion (see the full models for search depth for confirmatory, disconfirmatory, and overall information in Appendix D in the supplemental materials).

Multilevel analysis: Latency of search. Having collected multiple viewing measurements per participant (i.e., viewing time per information box), this creates a special structure in our data. Specifically, having multiple observations (i.e., repeated measurements) nested within each participants introduces a hierarchical structure that should be accounted for in the analysis. To address this, we applied multilevel modeling which enabled us to account for individual differences by modeling heterogeneity by means of the random coefficients in the model. For the multilevel regression analysis, we included search latency (i.e., time in seconds a box was opened and thus information was revealed) in milliseconds as the outcome (see Table 3.4 for the step-by-step multilevel regression models).

Looking at the random effects, our analysis revealed significant variability in search latency intercepts across participants. Specifically, the standard deviation of the random intercepts was SD = 1427.00 milliseconds (95% CI: 1024.56, 1841.87), indicating that some participants, on average, viewed information for much longer periods than others. This variance was highly significant, $\chi^2(1) = 350.09$, $p < .001$, meaning that participants displayed differences in their average search latency. These results suggest that search latency is not uniform across individuals—some people tend to consistently take more time than others to process information, likely reflecting individual differences in reading speed, motivation, or decision-making strategies. Given the significant variability in intercepts, using multilevel analysis helps to take those individual differences into account. The intraclass correlation (ICC) was 0.16,

indicating that 16.00% of the variance in the model could be attributed to individuals or in other words was explained by people being different from one another (i.e., explained the variability between people).

Furthermore, we found significant variability in the slopes for the relationship between trait ambivalence and overall search latency across participants, SD = 1456.00 ms (95% CI: 871.87, 1955.36), $\chi^2(1) = 14.69$, $p < .001$. This suggests that the effect of trait ambivalence on how long participants spent viewing information varied significantly between individuals. This means that for some participants, trait ambivalence had a much stronger influence on overall search latency, while for others, the effect was weaker. This individual-level variation highlights that trait ambivalence may interact with personal factors (such as possibly decision-making style) to influence how much time one spends gathering information before making a decision. Therefore, allowing the relationship between trait ambivalence and search latency to vary across participants significantly improved the model's fit and provided a more accurate representation of the data.

Interestingly, the slopes of the relationship between objective ambivalence and overall search latency did not vary significantly across participants, $\chi^2(1) = .01$, $p = .916$. This suggests that the effect of objective ambivalence on overall search latency was consistent across individuals, meaning that participants with higher levels of objective ambivalence tended to exhibit similar patterns of search latency regardless of other individual differences. In practical terms, this indicates that while trait ambivalence may affect people differently, objective ambivalence appears to have a more uniform effect on how long participants take to view information. This finding suggests that objective ambivalence might act as a situational factor influencing information acquisition behavior in a consistent manner across individuals, potentially driven by the decision itself rather than individual differences in cognitive or emotional responses.

As for the fixed effects, information type (confirmatory versus disconfirmatory) had no significant effect on search latency, b = -18.63, $t(3987)$ = -.12, p = .901. In line with this, including information type as a fixed effect did not significantly improve the model fit in comparison to having a model with only varying intercepts (p >.05). However, adding trait ambivalence and objective ambivalence as fixed effects did significantly improve the model fit, $\chi 2(1)$ = 10.44, p < .01. Trait ambivalence was not a significant predictor of search latency, b = 324.66, $t(3987)$ =1.72, p =.088. Neither objective ambivalence, b = -293.52, $t(3987)$ = -1.39, p = .166, nor subjective ambivalence, b = 181.79, $t(3987)$ = .82, p = .411, were significant predictors of search latency. However, the interaction of subjective and objective ambivalence significantly predicted search latency, b = -305.56, $t(3987)$ = -2.44, p < .05. To further examine this significant interaction, we conducted simple slope analysis (see Figure 3.1).

Table 3.4

Multilevel Regression Model Results for Overall Latency of Search

	Null Model	Information Type (Level 1 Predictor)	Trait and Objective Ambivalence (Level 2 Predictors)	Final Model with Subjective Ambivalence and Interaction
(Intercept)	4389.59***	4418.89***	4427.83***	4649.02***
	(154.07)	(271.79)	(269.91)	(277.88)
Information Type		-19.67	-17.88	-18.63
		(150.37)	(150.37)	(150.30)
Trait Ambivalence			359.31*	324.66+
			(153.87)	(188.91)
Objective Ambivalence			- 424.26**	-293.52
			(152.37)	(210.99)
Subjective Ambivalence				181.79
				(220.78)
Objective Ambivalence × Subjective Ambivalence				-305.56*
				(125.47)
Num.Obs.	4248	4248	4248	4248
R2 Marg.	0.000	0.000	0.008	0.011
R2 Cond.	0.159	0.159	0.158	0.090
AIC	84501.2	84491.3	84450.3	84423.9
BIC	84520.3	84516.7	84494.8	84481.1
ICC	0.16	0.16	0.15	0.08
RMSE	4741.83	4741.81	4743.86	4748.20

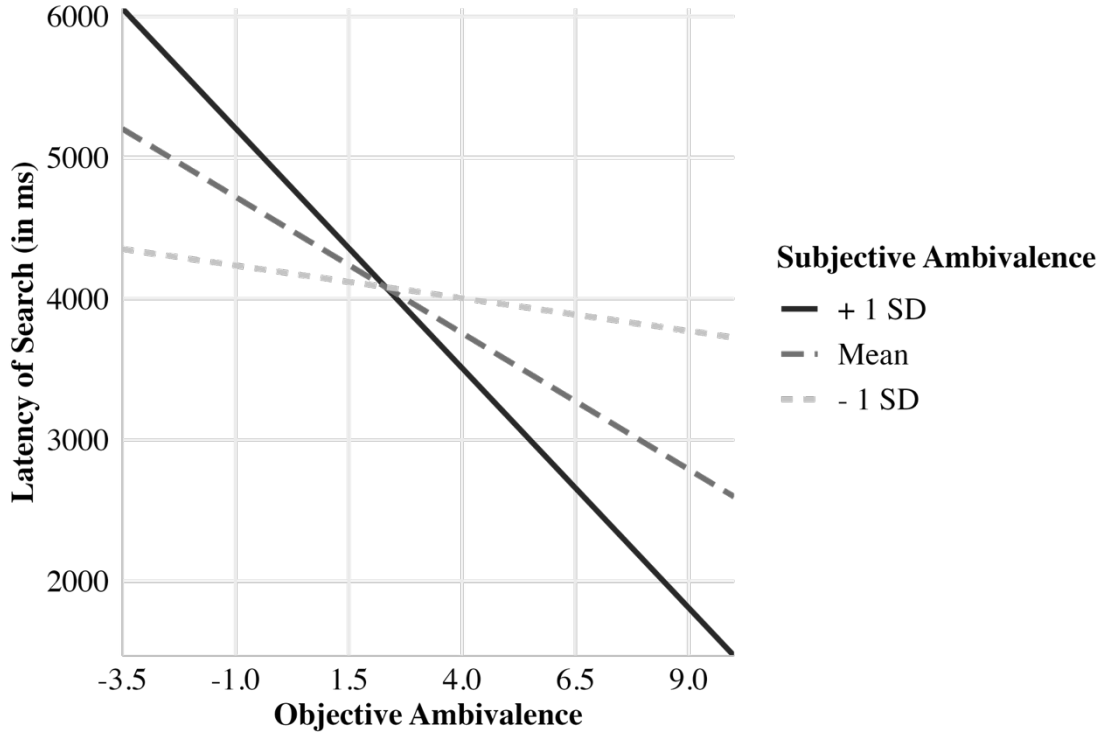
Note. Standard errors within parentheses. Objective and subjective ambivalence refer to the objective and subjective ambivalence reported towards the preliminary decision. Trait, objective and subjective ambivalence were centered around the grand mean for the multilevel analysis. $+ p < 0.1$, $* p < 0.05$, $** p < 0.01$, $*** p < 0.001$

The simple slope analysis showed that objective ambivalence towards the preliminary decision did not significantly correlate with search latency when subjective ambivalence was low (one standard deviation below the mean = 1.51), b = -46.36, $t(251)$ = -.40, p =.69. However, the relationship between search latency and objective ambivalence was significant under conditions of average (mean of subjective ambivalence = 3.70; b = -192.95, $t(251)$ = -2.07, p <. 05) and high subjective ambivalence (one standard deviation above the mean = 5.90), b = -339.54, $t(251)$ = -3.48, p <. 001. In summary, there was a negative relationship between objective ambivalence and search latency (i.e., the higher the objective ambivalence towards the preliminary decision, the smaller the reading time) under all conditions of subjective ambivalence. However, this negative

Figure 3.1

Interaction Plot of Objective Ambivalence (Toward the Preliminary Decision) and Subjective Ambivalence (Toward the Preliminary Decision)

relationship between objective ambivalence and search latency became strongest and highly



Note. * p < 0.05, *** p < 0.001, n.s. not significant.

significant when subjective ambivalence was high. As such, these results align (at least partly) with some theoretical assumptions as well as empirical result produced by past work on ambivalence. Namely, that subjective ambivalence is the driver of the effects of ambivalence (e.g., van Harreveld et al., 2015). Additionally, considering that the negative relationship between objective ambivalence and search latency became stronger with increasing subjective ambivalence, the results support the idea that subjective ambivalence, as it can be seen as a proxy for negative affect, is the driver of the negative effects that ambivalence can have (i.e., in this case it was decreased reading times). We looked more into these assumptions about the interplay of objective and subjective ambivalence in the section below where we performed a test of the ABC Model of Ambivalence (van Harreveld et al., 2015).

Testing the ABC Model of Ambivalence. To explore the interplay of objective and subjective ambivalence with information processing, we tested the predictions of the ABC (Affect, Behavior, Cognition) model of ambivalence (van Harreveld et al., 2015). The ABC model of ambivalence posits that objective ambivalence leads to experienced evaluative conflict (i.e., subjective ambivalence) when the conflicting evaluative components of the attitude become accessible at the same time. In our study design, simultaneous accessibility is given because people are asked to make a choice which has been argued to cause the (conflicting) evaluative components of the respective attitude to become salient (Van Harreveld, Van der Pligt, et al., 2009). Crucially, the ABC model assumes that individual differences moderate the relationship between objective and subjective ambivalence. Thus, we can empirically explore how trait ambivalence levels moderate the relationship between objective and subjective ambivalence. It may be that with higher trait ambivalence, people do not have a substantial (and potential negative) subjective experience of ambivalence because they are used to experiencing ambivalence. In other words, high trait ambivalence would have an attenuating effect on the relationship between objective and subjective ambivalence. However, the opposite could also be true: people who generally experience more ambivalence are more sensitized to their ambivalence

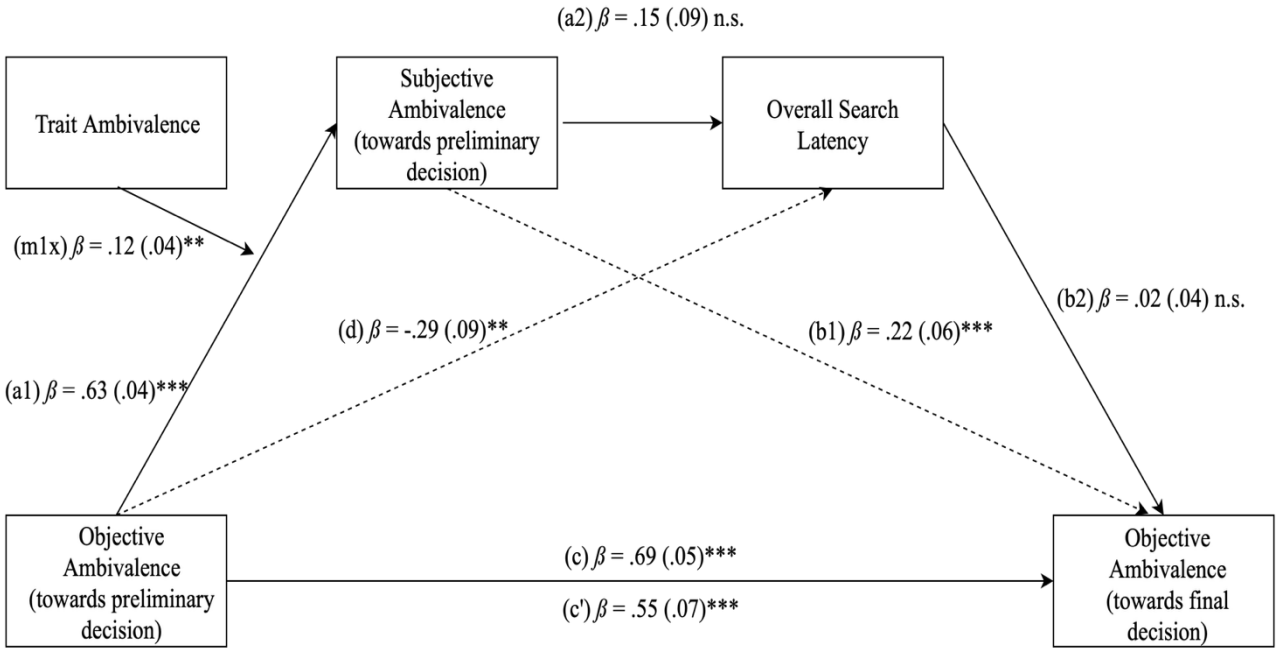
and experience it more strongly. If that were the case, then higher trait ambivalence may amplify the relationship between objective and subjective ambivalence.

The ABC model of ambivalence posits that subjective ambivalence, rather than objective ambivalence, is the primary factor influencing the consequences of ambivalence. Thus, for objective ambivalence to impact behavior, affect, or cognition, it must generate sufficient subjective ambivalence. The ABC model also proposes that this relationship between objective and subjective ambivalence is part of a feedback loop: First, objective ambivalence will lead to subjective ambivalence when the evaluative components of the attitude become accessible at the same time and (evaluative) conflict can ensue which is then ultimately experienced as subjective ambivalence. Second, this subjective ambivalence influences subsequent information processing. Finally, the outcome of the information processing can then, in turn, change the underlying attitude (i.e., objective ambivalence). Our study design allows us to examine this process by measuring objective and subjective ambivalence at two time points—first regarding the preliminary choice and then concerning the final decision made by participants, with information processing occurring between these measurements. This enables us to investigate how participants' objective and subjective ambivalence towards their preliminary decision affects their subsequent information acquisition and how this, in turn, impacts their objective ambivalence towards the final decision.

To test how objective and subjective ambivalence influences subsequent information acquisition and how this in turn affects objective ambivalence, we conducted a path analysis. The path model also included trait ambivalence as a moderator of the relationship between preliminary objective and preliminary subjective ambivalence. The path model showed a significant chi-square statistic, however indicating a rather poor fit to the data, $\chi^2(4) = 40.779$, $p <$

Figure 3.2

Structural Equation Model Depicting the Direct and Indirect Effects Between Objective Ambivalence (Toward Preliminary Decision), Subjective Ambivalence (Toward Preliminary Decision), Trait Ambivalence, Overall Search Latency, and Objective Ambivalence (Toward Final Decision)



Note. Path coefficients are presented as standardized estimates with their respective standard errors in parentheses. (m1x) represents the interaction effect of Objective Ambivalence and Trait Ambivalence on Subjective Ambivalence (towards preliminary decision); (c') represents the direct effect of Objective Ambivalence (towards preliminary decision) on Objective Ambivalence (towards final decision); and (c) represents the total effect of Objective Ambivalence (towards preliminary decision) on Objective Ambivalence (towards final decision). * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, *n.s.* = non-significant.

.001. Other fit indices suggested moderate fit (CFI = 0.923, TLI = 0.768, RMSEA = 0.190, 90% CI [0.139, 0.244], p < .001; SRMR = 0.063; see Figure 3.3 for the full path model).

The direct effect of preliminary objective ambivalence on final objective ambivalence was significant, $\beta = 0.549$, SE = 0.065, $z = 8.495$, $p < .001$, suggesting on the one hand that more preliminary objective ambivalence is related to more final objective ambivalence and on the other hand, that preliminary objective ambivalence has a direct and unmediated effect on final objective ambivalence. Preliminary objective ambivalence also significantly and positively predicted

preliminary subjective ambivalence, $\beta = 0.630$, $SE = 0.041$, $z = 15.180$, $p < .001$, and trait ambivalence, $\beta = 0.275$, $SE = 0.040$, $z = 6.891$, $p < .001$. Additionally, the interaction between preliminary objective ambivalence and trait ambivalence was positive and significant, $\beta = 0.117$, $SE = 0.035$, $z = 3.336$, $p < .01$, which suggests that trait ambivalence has an amplifying rather than an attenuating effect on the relationship between objective and subjective ambivalence.

Final objective ambivalence was also significantly predicted by preliminary subjective ambivalence, $\beta = 0.220$, $SE = 0.064$, $z = 3.442$, $p < .01$, meaning that the higher the subjective towards the preliminary decision, the higher the objective ambivalence towards the final decision. Preliminary subjective ambivalence was not a significant predictor of information acquisition time, $\beta = 0.150$, $SE = 0.091$, $z = 1.656$, $p = .098$. However, information acquisition time was significantly predicted by preliminary objective ambivalence, $\beta = -0.263$, $SE = 0.091$, $z = -2.898$, $p < .01$, in that the lower the objective ambivalence towards the preliminary decision, the smaller the subsequent time spent on information acquisition. The effect of information acquisition time on final preliminary objective ambivalence was not significant, $\beta = 0.027$, $SE = 0.044$, $z = 0.614$, $p = .539$.

The indirect effect of preliminary objective ambivalence on final objective ambivalence through preliminary subjective ambivalence was significant, $ab1 = 0.139$, $SE = 0.041$, $z = 3.357$, $p = .001$. The indirect effect through both preliminary subjective ambivalence and information acquisition time was not significant, $ab2 = 0.003$, $SE = 0.004$, $z = 0.576$, $p = .565$. The total effect of preliminary objective ambivalence on final objective ambivalence was significant, $total = 0.691$, $SE = 0.046$, $z = 14.978$, $p < .001$. The model explained 52.4% of the variance in the final objective ambivalence ($R^2 = 0.524$). It explained 62.1% of the variance in preliminary subjective ambivalence ($R^2 = 0.621$) and 3.4% of the variance in information acquisition time ($R^2 = 0.034$).

Rounding off the insights into preliminary versus final objective and subjective ambivalence, we conducted paired t-test which showed neither significant difference between preliminary and final objective ambivalence, $t = -1.211$, $df = 255$, $p = .23$ (CI 95% -0.44; 0.109

nor between preliminary and final subjective ambivalence t = -1.148, df = 255, p = .252 (CI 95% -0.36; 0.10). Indicating that overall, there was neither a change in the structural attitudinal ambivalence nor in the subjective experience of that ambivalence between preliminary and final decision suggesting that information processing did not affect the final objective and subjective ambivalence.

3.3 General Discussion

The present study investigated the role of both trait (i.e., reflecting how often people experience ambivalence in their lives) and state ambivalence (i.e., temporary ambivalence that is situation- or object-specific) in how people acquire disconfirmatory versus confirmatory information in a decision-making scenario. Since there is evidence that higher trait ambivalence levels are related to less confirmation (Hohnsbehn et al., 2022), we expected higher trait ambivalence to be related to less confirmation when acquiring disconfirmatory versus confirmatory information. Likewise, we predicted that the more ambivalent people were towards their preliminary decision (i.e., when they had higher state objective ambivalence), the more time they would spend viewing disconfirmatory versus confirmatory information. In other words, we hypothesized that the more ambivalent people are, the less confirmation they would show in favor of their preliminary decision in the acquisition of relevant decision information.

3.3.1 Preregistered Results

All in all, the present data did not offer strong support for these hypotheses: Our preregistered analysis showed that there was no significant relationship between either state or trait ambivalence and the ratio of acquired (i.e., viewed) disconfirmatory versus confirmatory information. That is, how ambivalent people were towards their preliminary decision was not related to the difference between their viewing times of confirmatory versus disconfirmatory information before making their final decision. Therefore, the results of the preregistered analysis are not in line with previous research that showed that both trait and state ambivalence are related to less confirmation (Hohnsbehn et al., 2022; Schneider et al., 2021). Although the data

did not support our hypotheses, it is conceivable that more subtle effects of ambivalence were present but went undetected.

A possible explanation for the non-significant findings in the preregistered multiple regression analysis is that the effect size of ambivalence on the continuous difference measure may have been smaller than initially anticipated, suggesting that our study may have been underpowered to detect such subtle effects. Since there is a limited amount of research on the true effect size of the relationship between (trait) ambivalence and confirmation bias and given the fact that we used a more implicit measurement of confirmation bias (i.e., viewing times in ms), we possibly overestimated the effect size and therefore have an underpowered study design. Instead of assuming a small-to-medium effect of (i.e., f^2 of .04), it could have been more appropriate to base the sample size calculation on a small effect (f^2 of .02 according to G*Power). In this study, the observed effect size was $f^2 = 0.01$, indicating that trait ambivalence and objective ambivalence explained only 1% of the variance in the difference score (viewing times confirmatory minus viewing times for disconfirmatory). However, it is important to acknowledge that the study was not powered to detect such small effects, as the sensitivity analysis indicated that the minimum detectable effect size for this study was $f^2 = 0.04$. Consequently, the null result observed in the main analysis may be due to the study's limited power to detect smaller effects. Power simulations revealed that the sample size would need to be increased to 1000 participants to achieve a power of 83.70%, ensuring a higher likelihood of detecting the effect.

In addition to potential issues related to sample size and statistical power, the study design and materials may have also contributed to the non-significant findings by suppressing the detection of a larger, more meaningful effect. Specifically, since the expert statements were rather short, it could be that this constituted a low barrier for participants to review all boxes—regardless of kind of information they contained. That is, the time necessary to properly acquire the information was short to begin with. This then resulted in similar viewing times between confirmatory and disconfirmatory information, suggesting a similar level of information uptake

and processing. In order to test whether the distribution of viewing times followed a uniform distribution (i.e., indicating that generally viewing times varied across statements), we conducted a one-sample Kolmogorov-Smirnov which showed that distribution of the viewing times deviated significantly from a uniform distribution, $D = 0.889$, $p < .001$. This indicates that the viewing times per statement were not uniformly distributed, suggesting a clustering of similar viewing times for all statements.

Possibly, with longer and more complex decision information (e.g., reading a full expert interview instead of a short summarizing expert statement), one would be better able to differentiate between in-depth (i.e., carefully reading and processing the information) and shallow information acquisition and consequently, an effect would be more detectable. Considering that the statements were quite short and the viewing times quite similar, it could have been helpful to have participants explicitly rate the statements on dimensions such as importance, relevance or compellingness (similar to what was done in Study 3 in Hohnsbehn et al., 2022) to get a fuller picture of the decision process, thus being able to put the implicit measurements of viewing times into perspective.

Since it was relatively cost free to look at all pieces of information and participants were self-paced in their reading, it would be interesting to see whether people would show a different behavior when they are put under time pressure (versus accuracy pressure). For example, the acquisition of information could be made "pricier" by giving people not only the information that a statement is disconfirmatory or confirmatory but also give people an estimated reading time of a statement (e.g., half a minute, 1 minute, 2 minutes). Possibly, people would read all half a minute information pieces but presumably show more confirmation when it comes to more comprehensive information that entails longer reading times. In similar vein, the number of statements that can be read could be constrained in order to make confirmatory processes—and how they are affected by trait and state ambivalence—more salient. This would then force participants to make trade-offs because they must choose between boxes hiding confirmatory

versus disconfirmatory information. Indeed, research shows that when information search is constricted, creating a sense of information scarcity, people are more inclined to expose themselves to information that is supporting their initial stance (i.e., they show more confirmation in information search; Fischer et al., 2005).

Moreover, one limiting factor of this study arguably lies in the nature of the decision scenario itself. Namely, we did find little variation in the way people made their final decision: 93.36% of participants made the same preliminary and final decision, whereas 6.64% made different preliminary and final decisions. Therefore, it would be interesting to see what people's information acquisition behavior would look in a decision scenario that deals with a different topic and that might not induce such a clear prior stance as did the scenario we used. In a similar vein, it would be interesting to look at confirmation processes and the role how state and trait ambivalence play in that in more naturalistic context, for example in web search behavior. Given that using search engines online is a ubiquitous behavior for people, using a search engine mock-up where one could experimentally manipulate search results and track which ones are being visited and for how long. In such an experimental context, confirmation bias in web search tasks has been demonstrated for people with negative prior beliefs while this was not found for people with neutral or positive prior beliefs (Suzuki & Yamamoto, 2021), but this has not yet been examined for people with ambivalent prior attitudes.

3.3.2 Exploratory Results

However, in our exploratory analyses we performed a logistic regression where we assigned participants into one of two categories as the outcome variable: Participants who spent overall more time acquiring confirmatory versus disconfirmatory information and vice versa. This analysis was in line with the results of our preregistered analysis in that trait ambivalence was not a significant predictor of whether people spent more time viewing confirmatory versus disconfirmatory information. However, both objective and subjective ambivalence towards the preliminary decision significantly predicted what type of information people predominantly

acquired. Specifically, objective ambivalence towards the preliminary decision was associated with dominant acquisition of disconfirmatory information whereas subjective ambivalence showed the opposite pattern; more subjective ambivalence was associated with more acquisition of confirmatory versus disconfirmatory information. These results are in line with previous research showing that subjective ambivalence is connected to more biased information processing (Sawicki et al., 2011, 2013) whereas objective ambivalence has been connected to less confirmation (Hohnsbehn et al., 2022).

While the preregistered multiple regression analysis did not reveal a significant relationship between ambivalence (both objective and trait) and the continuous difference in time spent viewing each type of information, the logistic regression analysis highlighted a significant effect of objective (as well as subjective) ambivalence on the likelihood of favoring one type of information over the other during information acquisition. This discrepancy suggests that the continuous measure of time difference could be too variable and influenced by a range of factors, diluting the potential impact of ambivalence. In contrast, the binary classification of information preference in the logistic regression might better capture the influence of ambivalence by focusing on the direction of preference rather than the magnitude. While these findings underscore the importance of considering how the nature of the dependent variable and the analytical approach can influence the detection of psychological effects, it is important to note that the logistic regression was not part of the preregistered analysis plan. This exploratory analysis highlights the need for future research to carefully consider and preregister their analytical strategies, particularly when investigating constructs like ambivalence that may subtly influence decision-making.

While there was no straightforward evidence in terms of how trait and state ambivalence relate to (dis)confirmatory information acquisition, we also looked at overall search latency to gain insight into the general tendency of information acquisition as a function of trait and state ambivalence. Exploratory multilevel analyses showed that while trait ambivalence had no

significant relationship with overall search latency (i.e., overall viewing times) the interaction of objective and subjective ambivalence towards the preliminary decision had a significant effect on overall search latency, that is, overall information acquisition time. Follow-up analyses showed that it was only under conditions of average and high subjective ambivalence that objective ambivalence was significantly associated with overall search latency. Specifically, the negative relationship between objective ambivalence and search latency became greatest when subjective ambivalence was high. As such, this finding is in line with the assumption that subjective ambivalence is the driver of the effects that objective ambivalence can have (e.g., van Harreveld et al., 2015).

The notion that subjective ambivalence is the driver of the effects of ambivalence was also partly supported in our test of the ABC model's (van Harreveld et al., 2015) claims concerning the influence of objective and subjective ambivalence on subsequent information processing. Specifically, subjective ambivalence partly mediated the relationship between objective ambivalence and information acquisition. This means that objective ambivalence affects information acquisition both directly and indirectly through subjective ambivalence. The significant indirect effect indicates that when objective ambivalence leads to subjective ambivalence, it has downstream consequences on cognitive processing (e.g., information acquisition time). However, the significant direct effect of objective ambivalence on information acquisition time suggests that objective ambivalence also exerts influence independently of subjective ambivalence. This partial mediation implies that while subjective ambivalence is a crucial pathway, objective ambivalence can also directly impact cognitive processes.

Additionally, we tested the ABC model's proposition that individual differences (i.e., trait ambivalence) moderate the relationship between objective and subjective ambivalence. Specifically, we found that trait ambivalence amplifies the effect of preliminary objective ambivalence on preliminary subjective ambivalence. Meaning that the positive relationship between preliminary objective ambivalence and preliminary subjective ambivalence was stronger

at higher levels of trait ambivalence. Interestingly, while preliminary subjective ambivalence significantly predicted information acquisition time, information acquisition time did not significantly predict final objective ambivalence. This suggests that while subjective ambivalence may influence processing of relevant information, the amount of time spent on information acquisition may not directly influence the final ambivalence towards the attitude object. Therefore, it does not seem to be the case that subsequent information processing leads to a mitigation of the ambivalence associated with the decision. In fact, in the present experiment we did not find a significant difference between the objective ambivalence people reported towards their preliminary versus final decision. As such, this exploratory test offered only partial support for the ABC model's assumptions in regard to how ambivalence affects cognitive processes.

3.3.3 Strengths, Limitations, and Implications

This study presents a number of methodological and theoretical advancements that provide new insights into how ambivalence affects information acquisition during decision-making. By using MouselabWEB, a cognitive process-tracing tool, we were able to directly and unobtrusively measure participants' information acquisition behaviors. This methodology allowed for the capture of precise viewing times for confirmatory versus disconfirmatory information, offering an objective window into cognitive processes that are often difficult to assess through self-report measures alone (Schulte-Mecklenbeck et al., 2019). Unlike traditional measures of decision-making that focus on participants' stated intentions or evaluations, process tracing enables the examination of how decisions unfold in real-time, revealing subtle dynamics that contribute to confirmation bias.

Another strength of this study lies in its comprehensive decision-making scenario, which enabled an examination of ambivalence across multiple stages of decision-making—from a preliminary decision to a final choice—rather than in isolated tasks. This design mirrors real-world decision processes more closely and adds richness to our understanding of how ambivalence influences behavior over time. It also allowed to do a full (exploratory) test of the

ABC model's theoretical assumption about the consequences of ambivalence on cognition (van Harreveld et al., 2015). To our knowledge, this is the first empirical test that considered how objective ambivalence changes over the course of decision-making. Furthermore, by adopting a counterbalanced design and randomizing the position of decision information, we controlled for confounding factors such as reading order effects. This strengthened the internal validity of our findings, ensuring that observed differences in information acquisition were attributable to ambivalence rather than procedural artifacts.

Despite these strengths, the study is not without limitations, many of which point to directions for future research. One key limitation is that while we measured the amount of time participants spent viewing information, we did not capture the depth of cognitive processing or the extent to which participants truly engaged with the content. Time spent viewing information does not always correlate with depth of understanding or the degree of reflection (Morrow et al., 2012) and it remains unclear how ambivalence may influence deeper cognitive strategies such as critical thinking or elaboration. Future studies could address this by incorporating eye-tracking methods or asking participants to rate the perceived importance and relevance of the information they acquired, which would offer a fuller picture of their decision-making processes.

Another potential limitation is the hypothetical nature of the decision-making task. While the scenario was designed to mimic a realistic decision, it may not fully capture the emotional stakes and complexities of actual real-world decisions. This constrains the generalizability of the findings to other decision contexts, especially those with higher personal or emotional investment, such as for example political voting or health-related decisions. Future research should therefore use decision scenarios that are more personally relevant instead of further removed hypothetical situation. Specifically, self-relevant scenarios reduce hypothetical thinking and help participants engage more deeply with the task, leading to more accurate and meaningful decisions. This notion aligns with ecological rationality, which suggests that decision-making is optimized when individuals operate in environments or tasks familiar and relevant to their

personal experiences (Gonzalez, 2014; Zeelenberg et al., 2008). Ideally, those decision scenarios could then be embedded in more naturalistic settings, such as participants' web search behavior, which would better simulate the environments in which ambivalence and confirmation bias commonly occur (Suzuki & Yamamoto, 2021).

The implications of this research are multifaceted, particularly regarding the distinction between trait and state ambivalence in decision-making processes. Although our primary hypotheses were not supported—that is, showing no significant relationship between trait ambivalence and reduced confirmation bias, our exploratory findings revealed important nuances. Specifically, objective state ambivalence was associated with more disconfirmatory information acquisition, while subjective ambivalence was linked to greater confirmatory information acquisition. This finding challenges a common assumption in ambivalence research: that subjective and objective ambivalence typically work in unison towards the same outcome. While past research has frequently measured both forms, the assumption has often been that they would contribute similarly to more information processing. However, our results reveal a more complex picture, where subjective and objective ambivalence can lead to opposing effects on information acquisition.

This highlights the need for future models of decision-making to differentiate between these two dimensions of ambivalence and recognize that cognitive conflict (objective ambivalence) and the internal experience of that conflict (subjective ambivalence) may push individuals in different directions. Our findings suggest that subjective ambivalence, reflecting the personal discomfort of conflicting evaluations, can actually drive confirmation-seeking as individuals may attempt to alleviate that discomfort. Conversely, objective ambivalence, which reflects conflicting evaluations in a more neutral or purely structural sense, may encourage more balanced and open information processing. These oppositional effects call for more refined theoretical models that address how the evaluative conflict and the experience of that conflict can independently shape decision-making behavior.

Our study also offers refined insights into the broader claim that subjective ambivalence is the primary driver of ambivalence's consequences (van Harreveld et al., 2015). While our results do show that subjective ambivalence significantly mediates the effects of ambivalence on information acquisition, such as search latency, it is not a complete mediation. This partial mediation indicates that objective ambivalence also exerts its own influence on information processing, independent of subjective ambivalence. Together, these findings underscore the need to view ambivalence as a multifaceted construct, with both subjective and objective components playing distinct roles in decision-making processes. Future research should continue to investigate how these dimensions work both independently and interactively to shape cognitive and behavioral outcomes.

3.3.4 Conclusion

In conclusion, this study provides nuanced insights into the role of ambivalence in decision-making, highlighting the differential impacts of trait and state ambivalence on information acquisition. While the initial hypotheses regarding trait ambivalence and confirmation bias were not supported, the exploratory findings suggest that state ambivalence, both objective and subjective, plays a more prominent role in shaping decision processes. The opposite patterns observed, where objective ambivalence reduced acquisition of confirmatory information while subjective ambivalence increased it, emphasize the complexity of ambivalence's influence on decision-making. These results open the door for refining theoretical models to better capture the nuanced interplay between different forms of ambivalence. Future research, building on these methodological innovations, can deepen our understanding of how people manage ambivalence in real-world decision contexts, such as web search behavior, and help design interventions to promote more balanced and open-minded information processing.

Supplemental Materials for Chapter 3

Appendix A

Trait Ambivalence Scale (Schneider et al., 2021)

Now, we would like you to indicate for each statement, how much it applies to you. There are no right or wrong answers, we are interested in your personality.
(1 = „Does not apply to me at all" to 7 = „Strongly applies to me")

1. My thoughts are often contradictory
2. Many topics make me feel conflicted
3. I usually see both the positive as well as the negative side of things
4. I often experience both sides of an issue pulling on me
5. I often find that there are pros and cons to everything
6. I often feel torn between two sides of an issue
7. Most of the time, my thoughts and feelings are not necessary in accordance with each other
8. Sometimes when I think about a topic, it almost feels like I am physically switching from side to side
9. My feelings are often simultaneously positive and negative
10. I often experience that my thoughts and feelings are in conflict when I'm thinking about a topic

Reference

Schneider, I. K., Novin, S., van Harreveld, F., & Genschow, O. (2021). Benefits of being ambivalent: The relationship between trait ambivalence and attribution biases. *British Journal of Social Psychology, 60*(2), 570–586.

Appendix B

The 12 Expert Statements (character count/word count)

13. PRO "Mr. Miller could compete with the strong local competition. Even price discounts and temporarily high inventories did not have any serious consequences. Mr. Miller seems to be able to defend the department store's market share." (227/35)
14. CON "Due to Mr. Miller's decisions the department store lost many long-term customers. It is likely that even more customers will start buying elsewhere. Since long-term customers are important for sales numbers, this is a bad development." (234/36)
15. PRO "Mr. Miller has a good understanding of the industry and keeps up to date with the latest trends (like "young fashion"). With his new ideas and creative innovations, Mr. Miller's changes of the department store will lead to a new branch of customers." (249/43)
16. CON "In view of the unchanged business situation, Mr. Miller was unable to live up to the high expectations. In a dynamic economy, maintaining the status quo means stagnation. This will have a negative impact on the business." (220/37)
17. PRO By ensuring a continuous course of business, Mr. Miller has fully lived up to the expectations. Continuity is becoming more and more important in the face of increasing market turbulence and will pay off in the future." (218/37)
18. CON "Changes in young people's fashion are nothing new on the market. This sales strategy already exists in similar department stores. Mr. Miller only copies business ideas of his competitors, so the success of this strategy is questionable." (236/37)
19. PRO "Due to Mr. Miller's modernization of the department store's interior, more young people started buying at the store. These newly acquired customers will be very important for the company's future." (196/30)
20. CON "Balancing out employees' interests is important for the continuous safeguarding of the business. If you come into conflict with long-standing employees as quickly as Mr. Miller has, you will fail to manage a department store in the long run." (242/40)
21. PRO"New customers were won through creative advertising campaigns. Mr. Miller can obviously attract new customer groups. Fostering engagement and loyalty of new customer groups will pay off in the future and is an important development." (232/35)
22. CON "Mr. Miller's purchasing policy led to high inventories, which could only be reduced by giving large price discounts to customers. This damaged the store's reputation and will have long-term negative effects on the business." (224/35)
23. PRO "Mr. Miller's personnel decisions to increasingly focus on younger employees and to inspire them with enthusiasm for the company are very future-oriented. "New blood" will ensure new ideas and creativity in the business process." (227/34)
24. CON "Due to the restructuring measures and modernizations initiated by Mr. Miller, the department store has become more confusing. These measures will lead to a reduction in the number of customers." (193/30)

Total characters PRO: 1349
Total characters CON: 1349
Total words PRO: 214
Total words CON: 215

Appendix C

Study procedure & Materials

Page 1

Dear participant,

Thank you for your interest in our study. It takes **approximately 10 minutes** and you will be paid **$2.00 on MTurk** for completing it. At the end of the study, you will be given a unique completion code. Please enter your unique completion code in the form on MTurk and submit it.

In this study, we would like you to work on a decision scenario as well as to answer some questions about yourself. Your data will be anonymously evaluated and are only used for scientific purposes. If you have any questions or suggestions, feel free to contact us via j.hohnsbehn@uni-koeln.de.

To make sure that the website is correctly displayed, **please put your browser window in full-screen mode!**

Please only participate if **English is your native language** (i.e., the first language you learned as a child)

Please click "Next" to start the study.

Social and Economic Cognition III Team
University of Cologne

Next

Page 2

Basic information on data protection

Generally, we assess and process participants' personal data only after your consent. The aim of the assessment and processing of these data is the conduction of this research project. Anonymity and confidentiality of your data is ensured at all times in accordance with current data protection laws as well as psychological research ethics. We will not collect your IP-address. All data will be saved password-protected, will be protected against unauthorized access and shall not be kept longer than is necessary for that purpose. We will store your data at least ten years. Moreover, we will publish an anonymized data set on an online repository in order to ensure transparency in science. To participate in this study, you have to agree to the consent form provided at the end.

In case you have questions on this declaration of data protection, please contact the project managers or the data protection officer. According to the EU General Data Protection Regulation (GDPR) and the respective national data protection laws and other regulations, responsible is the University of Cologne or the leading researcher: Jana Hohnsbehn, Tel.: +49 -221-470-6511, E-Mail: j.hohnsbehn@uni-koeln.de Contact of the data protection officer of the University of Cologne: phone: 0221 / 470-3872; email: dsb@verw.uni-koeln.de
Further information on data protection: https://portal.uni-koeln.de/en/privacy-protection-statement

Your participation in this study is completely voluntary, and you may refuse to participate or withdraw from the study at any time. If you stop working on the study before the study is completed, please contact me via email (j.hohnsbehn@uni-koeln.de) and let me know when you stopped working on the study (e.g. via a screenshot or an estimate of the time you spent on the study). You will receive partial compensation via an individual bonus payment.

Declaration of consent

I hereby confirm that I am participating in this study on a voluntary basis. I am aware that I can quit the study at any time without indicating any reasons [by closing my browser window]. I will thus lose any claims for the receipt of payment. After completion of the study, I have the right to be informed about the background, aims and results of the study. I am aware that I can assert this right by asking for the relevant information. The corresponding contact address will be indicated at the end of the study.

My anonymity will remain assured at all times. Data will be used for scientific purposes only and will be saved only for data analysis. Conclusions regarding individual participants are not possible. My anonymized data will be made available for secondary use by third parties in order to ensure transparency in science. The aim, purpose and extent of this secondary use are not yet foreseeable.

I have read and understood the above-mentioned points and consent to the terms of participation.

Yes, I consent

Page 3

Dear participant,

In the following, you will be asked to imagine yourself in a decision-making situation and to make a decision. You will be presented with various pieces of information which you can use to make your decision.

Following your decision, you will be provided with additional information regarding the situation presented and you will again be asked to make a final decision.

Of course, you cannot make an expert judgment. The decision is more a matter of your subjective feeling as to which option seems better to you.

Please click on "Next" to read about the decision situation.

Next

Page 4

Decision-making scenario

Mr. Miller's contract extension - Part 1

Imagine you are the owner of a department store and you have to make a business decision. It is about Mr. Miller: Mr. Miller has been hired by you as managing director of the department store. You have inherited the department store and would like to have it managed by a competent business professional.

You and Mr. Miller have initially agreed on a contract for one year. After this year, negotiations on extending the contract are to take place. The department store with 38 employees was running relatively satisfactorily before Mr. Miller was hired; i.e. the department store did not make any loss-making business, but neither did it generate any particularly high profits.

The task of the newly appointed manager was to buy men's and women's clothing at reasonable prices and to make the department store more attractive to customers. In this respect, there has been a greater need to improve of late, as both the product range and the premises have changed little in recent years

Please click on "Next" to read the second part of the scenario.

Next

Page 5

Decision-making scenario

Mr. Miller's contract extension - Part 2

In his first year of employment at the department store, Mr. Miller has succeeded in attracting a number of new customers through unconventional advertising campaigns. Whether the expansion of the product range to include "young fashion" will be successful remains to be seen in view of the strong competition. In any case, the range of men's and women's clothing put together by Mr. Miller has not been accepted by large parts of the regular clientele. The large stocks still available at the end of the season could therefore only be sold off by granting substantial price reductions.

The remodeling of the department store carried out by Mr. Miller has met with a divided response from customers. Some praise the more contemporary design of the floor space, while others criticize the greater clutter. Overall, Mr. Miller's decisions have not significantly changed the business situation, i.e., there have been no major gains, but no losses either.

However, his management style was perceived by many longstanding employees as too brash and disrespectful. In some cases, this led to considerable conflicts. As a result, very costly termination agreements had to be concluded with some department heads.

If you feel you have a good idea of the situation, please click "Next".

Next

Page 6

Before continuing to the next page, please answer the following questions about the text you just read:

How long has Mr. Miller been working as department store manager?

- 6 months
- 1 year
- 3 years

How many employees does the department store have?

- 38
- 72

Next

Page 7

Preliminary decision

Please imagine you have to make a preliminary decision now: Should Mr. Miller's employment contract be extended?

- Yes, I am in favor of the extension of Mr. Miller's contract.
- No, I am against the the extension of Mr. Miller's contract.

In addition, please mark your decision on the following two scales:

How strongly are you in favor of Mr. Miller's continued employment?

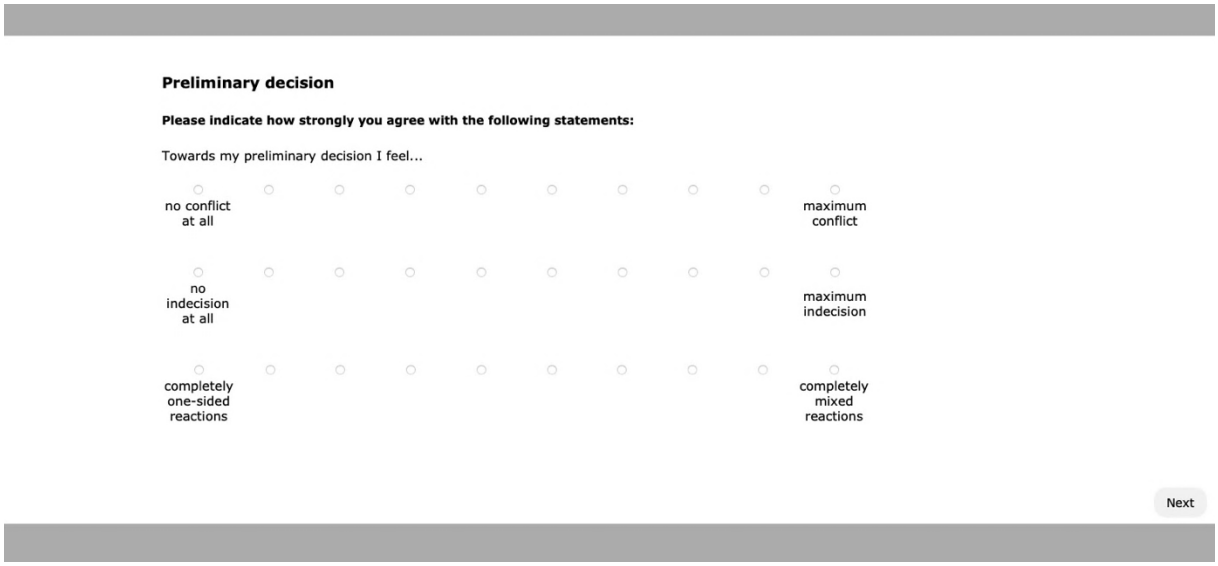
not at all ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ very much

How strongly are you against Mr. Miller's continued employment?

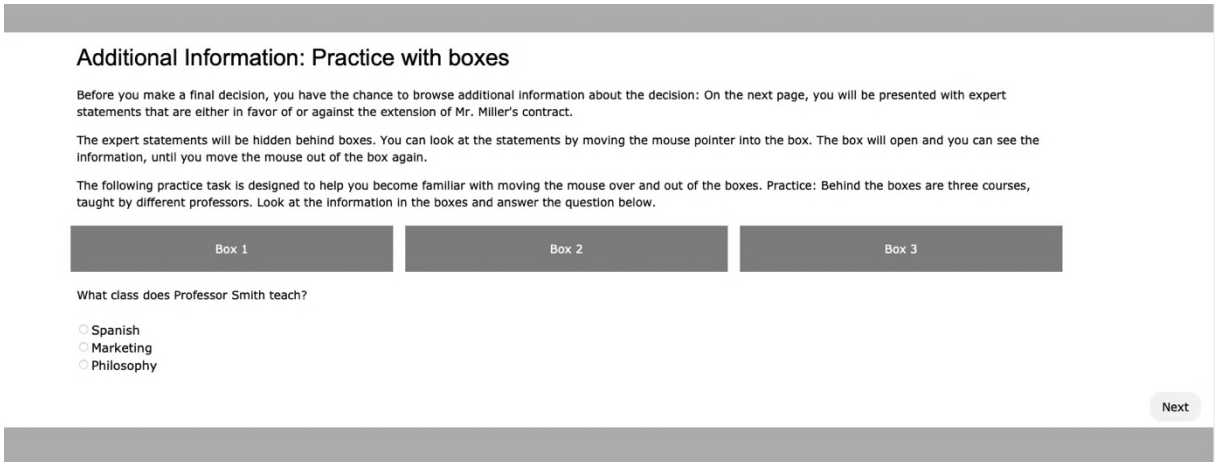
not at all ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ very much

Next

Page 8


Preliminary decision
Please indicate how strongly you agree with the following statements:
Towards my preliminary decision I feel...
no conflict at all
maximum conflict
no indecision at all
maximum indecision
completely one-sided reactions
completely mixed reactions
Next

Page 9


Additional Information: Practice with boxes
Before you make a final decision, you have the chance to browse additional information about the decision: On the next page, you will be presented with expert statements that are either in favor of or against the extension of Mr. Miller's contract.
The expert statements will be hidden behind boxes. You can look at the statements by moving the mouse pointer into the box. The box will open and you can see the information, until you move the mouse out of the box again.
The following practice task is designed to help you become familiar with moving the mouse over and out of the boxes. Practice: Behind the boxes are three courses, taught by different professors. Look at the information in the boxes and answer the question below.
Box 1
Box 2
Box 3
What class does Professor Smith teach?
Spanish
Marketing
Philosophy
Next

Page 10 (order of the statements was randomized across participants)

Additional Information - Expert Statements

To read the expert statements please hover over the the boxes with your mouse - just like you did on the practice page. Please use **full-screen mode** so that the information is displayed correctly.

Expert Statement against	Expert Statement in favor	Expert Statement against
In view of the unchanged business situation, Mr. Miller was unable to live up to the high expectations. In a dynamic economy, maintaining the status quo means stagnation. This will have a negative impact on the business.	Expert Statement in favor	Expert Statement against
Expert Statement in favor	Expert Statement against	Expert Statement in favor
Expert Statement in favor	Expert Statement against	Expert Statement in favor

If you are ready to make your final decision, please click on "Next".

Next

Page 11

Final decision

Imagine you had to make a final decision: Would you decide for or against Mr. Miller's continued employment?

- Yes, I am in favor of the extension of Mr. Miller's contract.
- No, I am against the the extension of Mr. Miller's contract.

In addition, please mark your decision on the following two scales:

How strongly are you in favor of Mr. Miller's continued employment?

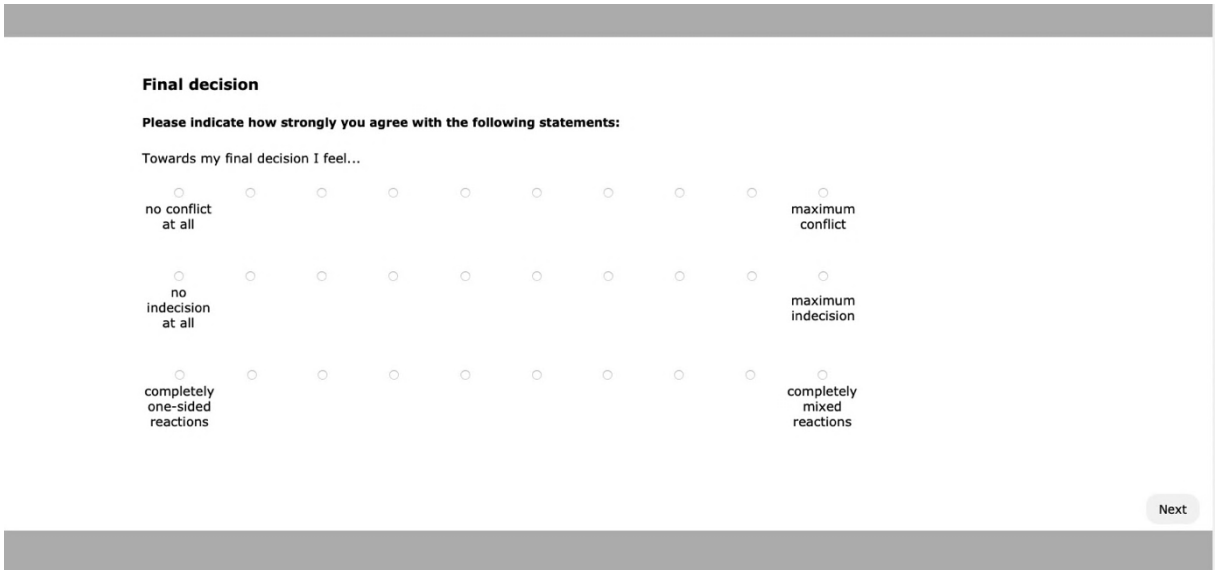
not at all very much

How strongly are you against Mr. Miller's continued employment?

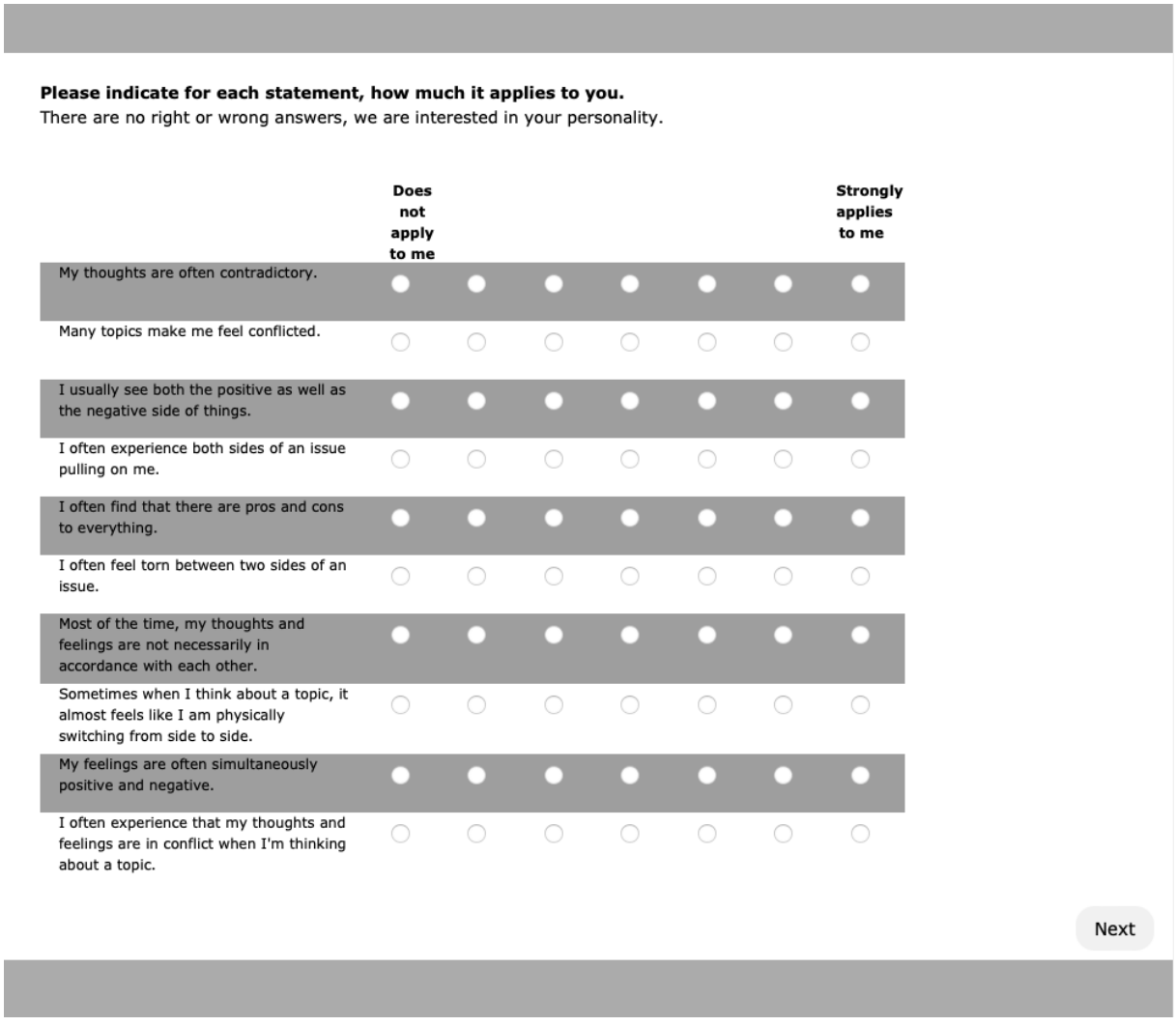
not at all very much

Next

Page 12



Page 13



Page 14

Below, you will find a series of statements which describe how people may react to the uncertainties of life.
Please use the scale below to describe to what extent each item is characteristic of you.

	(1) Not at all characteristic of me				(5) Entirely character-istic of me
Unforeseen events upset me greatly.	○	○	○	○	○
It frustrates me not having all the information I need.	○	○	○	○	○
Uncertainty keeps me from living a full life.	○	○	○	○	○
One should always look ahead so as to avoid surprises.	○	○	○	○	○
A small unforeseen event can spoil everything, even with the best planning.	○	○	○	○	○
When it's time to act, uncertainty paralyses me.	○	○	○	○	○
When I am uncertain, I can't function very well.	○	○	○	○	○
I always want to know what the future has in store for me.	○	○	○	○	○
I can't stand being taken by surprise.	○	○	○	○	○
The smallest doubt can stop me from acting.	○	○	○	○	○
I should be able to organize everything in advance.	○	○	○	○	○
I must get away from all uncertain situations.	○	○	○	○	○

Next

Page 15

This concluded the main part of the study. Now, we would like you to answer some final questions.

I am ...
- male
- female
- other
- rather not say

Age (please use whole numbers):

Is English your native language (i.e. the first language you learned as a child)?
- Yes
- No

Were you able to read the whole text hidden behind each box (i.e. the text was not cut-off or extended beyond the borders of the box)?
(Your answer will not affect your HIT acceptance.)

- Yes, I was able to read the text hidden behind each box.
- No, some text was cut-off and/or extendend beyond the border of the box.

What do you think this study was about?

Do you have any comments on this study?

Next

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Thank you for taking the time to complete this survey!

Your completion code is: ML319I

To receive payment, you must return to the MTurk HIT listing and enter your unique completion code from above. In order to do this, **please make a note of your unique completion code.To then end the study, please close the browser window/tab.**

After this, you may navigate to MTurk.com. When the HIT comes up, click 'continue work on this HIT'. This will bring up the first page of the HIT, where you will see a place to enter the unique identification code and a 'submit' button which will allow you to complete the HIT. If you have any trouble receiving payment or have any other questions, concerns, or comments about the survey, please email the researchers at j.hohnsbehn@uni-koeln.de

Debriefing:
When people make decisions, they often tend to do this in a confirmatory way. In this particular study that means that people tend to use or rely more information that confirms an already made decision rather than information that is not in line with a preliminary decision. Research in our lab has shown that people who report being generally more ambivalent show less confirmatory information search - i.e. a smaller preference for information that confirms a preliminary decision. In this study, we test if this relationship still holds true when people acquire information for decision. That is, we measure in this study how long people look at the different information (PRO or CON) hidden in the boxes and test the idea that more ambivalent people spend roughly the same amount of time to look at both kinds information (in favor of and against). The decision scenarios were all hypothetical. This enabled us to standardize the materials across conditions and allows us to draw causal conclusions about the results. Thank you for helping with this experiment. Your participation is greatly appreciated. Please do not tell anyone about this experiment for the next six months, since knowing about a study ahead of time can actually change the way people respond. If you have any further questions about this study, please feel free to contact the investigator, Jana Hohnsbehn, at j.hohnsbehn@uni-koeln.de

Appendix D

Additional exploratory analyses (full regression models): Latency of search

	Model 1 Latency of Search (Overall)					Model 2 Latency of Search (Overall)					Model 3 Latency of Search (Overall)					
Predictors	*Estimates*	*std. Beta*	*CI*	*standardized CI*	*p*	*Estimates*	*std. Beta*	*CI*	*standardized CI*	*p*	*Estimates*	*std. Beta*	*CI*	*standardized CI*	*p*	*std. p*
Intercept	2931.95	0.00	1879.47 – 3984.43	-0.12 – 0.12	**<0.001**	2576.91	-0.00	1520.71 – 3633.11	-0.12 – 0.12	**<0.001**	2226.75	0.11	1077.42 – 3376.09	-0.03 – 0.25	**<0.001**	0.130
Trait Ambivalence	313.89	0.14	46.57 – 581.20	0.02 – 0.27	**0.022**	425.47	0.19	154.21 – 696.73	0.07 – 0.32	**0.002**	419.87	0.19	129.77 – 709.96	0.06 – 0.32	**0.005**	**0.005**
Objective Ambivalence						-206.57	-0.20	-332.96 – -80.19	-0.33 – -0.08	**0.001**	41.03	-0.21	-236.88 – 318.95	-0.39 – -0.03	0.771	**0.023**
Subjective Ambivalence											184.04	0.13	-67.05 – 435.12	-0.06 – 0.32	0.150	0.194
Objective Ambivalence x Subjective Ambivalence											-68.43	-0.15	-115.81 – -21.06	-0.25 – -0.05	**0.005**	**0.005**
Observations	256					256					256					
R^2 / R^2 adjusted	0.021 / 0.017					0.059 / 0.052					0.091 / 0.077					

Confirmatory Information

	Model 1 Latency of Search (Confirmatory Information)					Model 2 Latency of Search (Confirmatory Information)					Model 3 Latency of Search (Confirmatory Information)					
Predictors	*Estimates*	*std. Beta*	*CI*	*standardized CI*	*p*	*Estimates*	*std. Beta*	*CI*	*standardized CI*	*p*	*Estimates*	*std. Beta*	*CI*	*standardized CI*	*p*	*std. p*
Intercept	2745.48	-0.00	1529.66 – 3961.31	-0.12 – 0.12	**<0.001**	2357.71	-0.00	1134.94 – 3580.49	-0.12 – 0.12	**<0.001**	1946.13	0.09	609.28 – 3282.98	-0.05 – 0.23	**0.004**	0.213
Trait Ambivalence	379.82	0.15	71.01 – 688.62	0.03 – 0.27	**0.016**	501.69	0.20	187.65 – 815.73	0.07 – 0.32	**0.002**	478.86	0.19	141.43 – 816.29	0.06 – 0.32	**0.006**	**0.006**
Objective Ambivalence						-225.62	-0.19	-371.93 – -79.31	-0.32 – -0.07	**0.003**	-10.12	-0.21	-333.38 – 313.14	-0.39 – -0.03	0.951	**0.020**
Subjective Ambivalence											215.66	0.13	-76.38 – 507.71	-0.06 – 0.32	0.147	0.181
Objective Ambivalence x Subjective Ambivalence											-65.32	-0.12	-120.43 – -10.22	-0.22 – -0.02	**0.020**	**0.020**
Observations	256					256					256					
R^2 / R^2 adjusted	0.023 / 0.019					0.057 / 0.049					0.081 / 0.066					

Disconfirmatory Information

	Model 1 Latency of Search (Disconfirmatory Information)					Model 2 Latency of Search (Disconfirmatory Information)					Model 3 Latency of Search (Disconfirmatory Information)					
Predictors	*Estimates*	*std. Beta*	*CI*	*standardized CI*	*p*	*Estimates*	*std. Beta*	*CI*	*standardized CI*	*p*	*Estimates*	*std. Beta*	*CI*	*standardized CI*	*p*	
Intercept	3118.42	-0.00	2072.22 – 4164.61	-0.12 – 0.12	**<0.001**	2796.11	-0.00	1742.65 – 3849.57	-0.12 – 0.12	**<0.001**	2507.38	0.11	1361.87 – 3652.88	-0.03 – 0.25	**<0.001**	
Trait Ambivalence	247.95	0.11	-17.77 – 513.68	-0.01 – 0.24	0.067	349.25	0.16	78.70 – 619.81	0.04 – 0.29	**0.012**	360.87	0.17	71.74 – 650.00	0.03 – 0.30	**0.015**	
Objective Ambivalence						-187.53	-0.19	-313.58 – -61.47	-0.31 – -0.06	**0.004**	92.19	-0.17	-184.80 – 369.18	-0.35 – 0.01	0.513	
Subjective Ambivalence											152.41	0.10	-97.84 – 402.65	-0.09 – 0.29	0.231	
Objective Ambivalence x Subjective Ambivalence											-71.54	-0.16	-118.75 – -24.32	-0.26 – -0.05	**0.003**	
Observations	256					256					256					
R^2 / R^2 adjusted	0.013 / 0.009					0.046 / 0.038					0.080 / 0.065					

Additional exploratory analyses: Depth of search

	Model 1 Depth of Search (Overall)					Model 2 Depth of Search (Overall)					Model 3 Depth of Search (Overall)					
Predictors	*Estimates*	*std. Beta*	*CI*	*standardized CI*	*p*	*Estimates*	*std. Beta*	*CI*	*standardized CI*	*p*	*Estimates*	*std. Beta*	*CI*	*standardized CI*	*p*	*std. p*
Intercept	15.68	-0.00	13.15 – 18.22	-0.12 – 0.12	**<0.001**	15.44	-0.00	12.85 – 18.03	-0.12 – 0.12	**<0.001**	15.58	0.05	12.72 – 18.44	-0.10 – 0.20	**<0.001**	0.499
Trait Ambivalence	0.20	0.04	-0.45 – 0.84	-0.09 – 0.16	0.544	0.27	0.05	-0.39 – 0.94	-0.08 – 0.18	0.419	0.39	0.07	-0.34 – 1.11	-0.06 – 0.21	0.293	0.293
Objective Ambivalence						-0.14	-0.06	-0.45 – 0.17	-0.19 – 0.07	0.377	0.28	-0.00	-0.41 – 0.97	-0.19 – 0.19	0.432	0.984
Subjective Ambivalence											-0.07	-0.03	-0.69 – 0.56	-0.23 – 0.17	0.833	0.778
Objective Ambivalence x Subjective Ambivalence											-0.08	-0.07	-0.19 – 0.04	-0.17 – 0.04	0.206	0.206
Observations	256					256					256					
R^2 / R^2 adjusted	0.001 / -0.002					0.005 / -0.003					0.012 / -0.004					

Confirmatory information

	Model 1 Depth of Search (Confirmatory Information)					Model 2 Depth of Search (Confirmatory Information)					Model 3 Depth of Search (Confirmatory Information)					
Predictors	*Estimates*	*std. Beta*	*CI*	*standardized CI*	*p*	*Estimates*	*std. Beta*	*CI*	*standardized CI*	*p*	*Estimates*	*std. Beta*	*CI*	*standardized CI*	*p*	*std. p*
Intercept	7.48	0.00	6.07 – 8.89	-0.12 – 0.12	**<0.001**	7.38	-0.00	5.93 – 8.82	-0.12 – 0.12	**<0.001**	7.45	0.05	5.86 – 9.05	-0.10 – 0.19	**<0.001**	0.526
Trait Ambivalence	0.26	0.09	-0.10 – 0.62	-0.03 – 0.21	0.154	0.29	0.10	-0.08 – 0.66	-0.03 – 0.23	0.119	0.35	0.12	-0.05 – 0.76	-0.02 – 0.26	0.084	0.084
Objective Ambivalence						-0.06	-0.05	-0.24 – 0.11	-0.17 – 0.08	0.471	0.16	0.01	-0.23 – 0.54	-0.18 – 0.19	0.426	0.944
Subjective Ambivalence											-0.04	-0.03	-0.39 – 0.31	-0.23 – 0.17	0.826	0.775
Objective Ambivalence x Subjective Ambivalence											-0.04	-0.06	-0.11 – 0.03	-0.17 – 0.04	0.236	0.236
Observations	256					256					256					
R^2 / R^2 adjusted	0.008 / 0.004					0.010 / 0.002					0.016 / 0.001					

Disconfirmatory Information

	Model 1 Depth of Search (Disconfirmatory Information)					Model 2 Depth of Search (Disconfirmatory Information)					Model 3 Depth of Search (Disconfirmatory Information)					
Predictors	*Estimates*	*std. Beta*	*CI*	*standardized CI*	*p*	*Estimates*	*std. Beta*	*CI*	*standardized CI*	*p*	*Estimates*	*std. Beta*	*CI*	*standardized CI*	*p*	*std. p*
Intercept	7.94	0.00	6.52 – 9.35	-0.12 – 0.12	**<0.001**	7.71	0.00	6.26 – 9.15	-0.12 – 0.12	**<0.001**	7.78	0.05	6.19 – 9.37	-0.09 – 0.20	**<0.001**	0.478
Trait Ambivalence	0.06	0.02	-0.30 – 0.42	-0.10 – 0.14	0.758	0.13	0.04	-0.24 – 0.50	-0.08 – 0.17	0.495	0.19	0.07	-0.21 – 0.59	-0.07 – 0.20	0.347	0.347
Objective Ambivalence						-0.13	-0.10	-0.31 – 0.04	-0.23 – 0.03	0.129	0.11	-0.04	-0.28 – 0.49	-0.23 – 0.14	0.583	0.659
Subjective Ambivalence											-0.04	-0.03	-0.38 – 0.31	-0.23 – 0.17	0.842	0.784
Objective Ambivalence x Subjective Ambivalence											-0.04	-0.07	-0.11 – 0.02	-0.18 – 0.03	0.185	0.185
Observations	256					256					256					
R^2 / R^2 adjusted	0.000 / -0.004					0.009 / 0.002					0.017 / 0.002					

PART II

SEEING AMBIVALENCE:

INTERPERSONAL EFFECTS OF PERCEIVING TRAIT AMBIVALENCE

CHAPTER 4

OPEN FOR BUSINESS: HOW LEADER AMBIVALENCE FACILITATES UPWARD FOLLOWER COMMUNICATION VIA PERCEPTIONS OF INCREASED COGNITIVE FLEXIBILITY AND RESPONSIVENESS

This chapter is based on the following article:

Hohnsbehn, JM., Pauels, E. & Schneider, I.K. (2024). Open for business: how leader ambivalence facilitates upward follower communication via perceptions of increased cognitive flexibility and responsiveness. *Current Psychology 43*(48), 37026-37043. https://doi.org/10.1007/s12144-024-07127-6

Please note that some changes in formatting were undertaken to fit the layout of this dissertation. No changes were made to the content of the article.

Supplementary Materials are available at: https://osf.io/4vzms/?view_only=c63bd6b76bc5491eb6811dc5dd6c2d83.

Abstract

Leaders often find themselves in complex situations in which they must navigate competing and contradictory demands. Consequently, leaders often experience ambivalence. While followers pay close attention to leaders and use their leaders' behaviors and emotions as cues for modeling their own behavior, there is little empirical work exploring how followers perceive leader ambivalence and how these perceptions affect followers. Therefore, in three studies (total $N = 879$), we examined whether perceiving leader ambivalence could facilitate followers' willingness to speak up. We also investigated the underlying mechanism of this effect, testing whether perceptions of leader ambivalence led to inferences of both higher leader cognitive flexibility and responsiveness, which then would increase the likelihood that followers speak up. In line with our hypotheses, followers showed a greater willingness to speak up when perceiving an ambivalent leader than a non-ambivalent leader. This effect was serially mediated by perceptions of both increased leader cognitive flexibility and responsiveness. Study 3 also showed that when followers perceived an ambivalent leader, they expected fewer negative consequences when speaking up about a variety of issues (e.g., response to dissatisfaction). We discuss the implications of our findings for future research on ambivalence in leadership and organizational contexts.

Keywords: ambivalence, leadership, leader perception, cognitive flexibility, upward communication

4.1 Introduction

In business and organizational contexts, leaders regularly face complex situations in which they must find ways to navigate contradictory demands and balance multifaceted decisions (Ashforth et al., 2014; Denis et al., 2011; Guarana & Hernandez, 2015; Rothman & Melwani, 2017). Therefore, it is no surprise that such complex situations often leave leaders feeling ambivalent, that is, they simultaneously experience both positive and negative thoughts and feelings (Thompson et al., 1995).

Exploring the role of ambivalence in an organizational context specifically, scholars have theorized that ambivalence in leaders can increase their cognitive flexibility (Rothman et al., 2017), meaning that ambivalent leaders might be able to more easily "broaden the scope of their attentional span to attend to divergent perspectives but also engage in a balanced consideration of those perspectives" (Rothman & Melwani, 2017; p. 260). However, leaders do not operate in a vacuum and their primary effectiveness lies in their interactions with others. So, if it is the case that ambivalence leads to more cognitive flexibility in leaders, this begs the question of whether followers infer cognitive flexibility when their leader displays ambivalence.

Although there is no direct examination of the effect of leader ambivalence on perceptions of cognitive flexibility, research on perceptions of ambivalence has shown that people can and do recognize ambivalence and make social inferences based on this. For instance, people assume that ambivalent others are fairer, warmer and more willing to help than non-ambivalent others (Han et al., 2023). We suggest that people are also able to make inferences about the cognitive styles of ambivalent others, particularly cognitive flexibility and examined whether perceivers infer cognitive flexibility when confronted with ambivalent leaders. Additionally, since leader perceptions shape followers' behavior (Bass, 1999; Rogers & Ashforth, 2017), we also examined the downstream consequences of inferring greater cognitive flexibility from leader ambivalence in the present study. Specifically, we reason that because an ambivalent leader is perceived to be more cognitively flexible (i.e., evaluated as more capable of attending to

diverse perspectives) they are perceived to be more responsive to followers. We also examine whether this would, in turn, invite more follower engagement in the form of greater willingness to speak up to leaders (Detert & Burris, 2007; Rothman & Melwani, 2017). Promoting follower voice and listening to what employees have to say is an essential factor for the success of leaders and organizations. For example, getting feedback from employees that are close to day-to-day operations and are thus in a prime position to observe any arising issues helps to catch problems or inefficient procedures early (Burris & Sohn, 2021; Jha et al., 2019).

In what follows, we first review past research about the intrapersonal effects of ambivalence on cognitive flexibility, establishing that ambivalence is connected to greater cognitive flexibility in the individual which then can potentially be also inferred by others. Then, we address the theoretical work as well as indirect empirical evidence suggesting that followers do indeed perceive ambivalent leaders to have higher cognitive flexibility. After this, we delineate possible consequences of this perception chain: Namely, that because of their perceived higher cognitive flexibility, ambivalent leaders are expected to be more responsive which then increases followers' willingness to speak up. We then present three experiments that empirically test our predictions.

4.1.1 Leader Ambivalence, Cognitive Flexibility, and Responsiveness

Studies have examined how ambivalence can positively affect cognitive processes. Many studies that examined the benefits of ambivalence on cognitive processing, have focused on emotional ambivalence, which describes the concurrent experience of both positive and negative emotions (Fong, 2006; Larsen et al., 2001). For example, in one study, people who felt both happy and sad at the same time found more unusual connections between word sets (i.e., increased associative breadth) than people who felt only sad or only happy (Fong, 2006). Emotional ambivalence has also been associated with increased openness to the diverse perspectives and viewpoints of others: People who were feeling both happy and sad at the same time showed more interest in the opinions of others when deliberating on estimations for general

knowledge questions and seeking more information in a hypothetical scenario where they had to decide whether or not they would promote someone (Rees et al., 2013). This increased openness then results in more accurate judgments (Hostler & Berrios, 2021; Rees et al., 2013). These findings are in line with work that found that ambivalent cognition is connected to better creative performance through increased cognitive flexibility and broadened cognition (Wang et al., 2024).

The idea that ambivalence increases cognitive flexibility is also supported by the observation that trait ambivalence, the dispositional tendency to feel more ambivalent about more topics (Schneider et al., 2021; Simons et al., 2018), is associated with less cognitive bias. For instance, higher trait ambivalence is associated with greater consideration of diverse information to explain others' behavior (Schneider et al., 2021) and less biased decision making, for example, when testing hypotheses about others and when evaluating pro and contra statements for a decision (Hohnsbehn et al., 2022). Generally, intrapersonal conflicts, such as goal conflicts, cognitive conflicts, counterfactual thinking, and paradoxical thinking seem to enhance cognitive flexibility which helps individuals to consider alternative viewpoints, thereby reducing the extremity of their attitudes and mitigating polarization (Sassenberg & Winter, 2024). As ambivalence is per definition the simultaneous experience of both positive and negative (i.e., conflicting) thoughts and feelings (Thompson et al., 1995), it likely facilitates cognitive flexibility as well. Beyond the lab, this broader view during problem solving also extends to practice. For instance, German CEOs who were ambivalent towards the enlargement of the European Union in 2004 were more likely to take actions that were riskier, more comprehensive, and novel, suggesting a search for actions outside of routine terrains (Plambeck & Weber, 2009).

Thus, there is ample empirical support for the idea that experiencing ambivalence—also by leaders—facilitates cognitive flexibility, as evidenced by creative tasks, broader associations, and greater openness to diverse and divergent information. However, so far it is unclear whether followers infer this increase in cognitive flexibility when they perceive their leaders' ambivalence. Given that ambivalence is common in organizational contexts (Ashforth et al., 2014; Denis et al.,

2011; Guarana & Hernandez, 2015; Rothman & Melwani, 2017) and that leaders are often observed and function as role models for followers (Bass, 1999; Rogers & Ashforth, 2017) who try to interpret the leaders' behavior and actions (Schilling et al., 2022), it is important to understand how perceiving a leader as ambivalent affects followers.

Observing other people's emotional expressions indeed leads people to make inferences about another's cognitions (Hareli & Hess, 2010; Van Kleef et al., 2009). People then use these inferences on how the person evaluates a situation to make further inferences on that person, for example about their competence, social status and behavioral intentions (Lewis, 2000; Tiedens, 2001). Drawing on this research about the communicative function of emotions (Keltner & Haidt, 1999), Rothman and Melwani (2017) theorized in their functional theory of emotional complexity of leadership that when a leader expresses ambivalence—which fundamentally entails contradictory and divergent evaluations of the same event—it conveys to followers that the leader appraises this event in a careful and detailed way, appreciating its multiple facets.

So far, this theoretical assumption has not been tested directly. However, there is some research that offers indirect support for the idea that followers are sensitive to the ambivalence displayed by a leader. In one study, Guarana and colleagues (2023) found that followers tend to emulate their leaders when they are ambivalent. Specifically, they found that a leader's own ambivalence not only increases their own information-seeking behaviors, but also elicits more information-seeking in followers, especially in the context of complex projects. The authors do not elaborate on the mechanisms and inferences underlying this information seeking behavior. However, one explanation could be that the observed leader ambivalence as well as the increased information-seeking behavior could be associated with heightened impressions of cognitive flexibility because it is essential for a broader information search in general.

Based on the theoretical as well as empirical work on ambivalence in leaders reviewed above, we develop the following hypothesis:

Hypothesis 1: Followers evaluate an ambivalent leader as having more cognitive flexibility than a non-ambivalent leader.

Furthermore, we propose that this inferred cognitive flexibility may also lead followers to perceive an ambivalent leader as more receptive to diverse information. As part of their functional theory of emotional complexity of leadership, Rothman and Melwani (2017) propose that expressing emotional complexity (i.e., emotional ambivalence) signals that the leader is processing an event or situation in a nuanced way, open to consider different perspectives, both positive and negative ones. In fact, cognitive flexibility of a communicator has been found to be positively related to this communicator being evaluated as more responsive (Martin & Anderson, 1998). A study investigating leader ambivalence in organizational decision-making found that the more pronounced a leader's ambivalence towards an issue (i.e., similarly strong positive and negative evaluations of the same issue), the greater the organizational responsiveness regarding this issue (Plambeck & Weber, 2009). Although they did not directly test this in the study, the authors theorized that leaders' ambivalence may have increased organizational responsiveness by activating a broad set of responses in the form of inviting all subunits of an organization to contribute to solutions, regardless of whether the subunit sees the issue at hand positively or negatively (Plambeck & Weber, 2009). Building on this, our works expands the functional theory of emotional complexity in leaders (Rothman & Melwani, 2017) by adding responsiveness as a second mediator as well as providing a direct empirical test of the full model.

Hypothesis 2a: Followers evaluate an ambivalent leader as more responsive than a non-ambivalent leader

Hypothesis 2b: Cognitive flexibility mediates the relationship between leader ambivalence and perceived leader responsiveness.

4.1.2 Effects of Leader Ambivalence on Upward Follower Voice

If ambivalent leaders are perceived as both more cognitively flexible and responsive, thereby signaling that they are able to consider and integrate multiple perspectives, employees may feel more willing to speak up and express their viewpoints to them. Indeed, Rothman and Melwani (2017) further theorized that this is why leader ambivalence should also increase followers' engagement. An important form of follower engagement is whether followers speak up (i.e., voicing concerns, ideas, or suggestions; Viveros et al., 2018), often referred to as *employee voice*. Employee voice is the "communication of ideas, suggestions, and concerns, or opinions about work-related issues with the intent to improve organizational or unit functioning' (Morrison, 2011, p.375). Frequently, employee voice has an "upward" nature - meaning that when employees or followers speak up, it is directed at their leaders, who is "up" relative to them in the hierarchy. In line with this, we use the term *upward follower voice* throughout this paper. Upward follower voice is essential for the success of companies and organizations because it is connected to higher organizational effectiveness (Jha et al., 2019; MacKenzie et al., 2011), greater innovative behavior in the workplace (Chen et al., 2020; Miao et al., 2020; Tsameti et al., 2023) and more organizational engagement (Ruck et al., 2017). Followers profit as well: with higher voice, followers are more dedicated to their work (Hirschman, 1970), report greater well-being (Duan et al., 2020), and have greater job satisfaction (Nawakitphaitoon & Zhang, 2021; Tedone & Bruk-Lee, 2022).

Indirect evidence suggests that leader ambivalence might increase upward follower voice. Past work has shown that in response to an ambivalent negotiation partner, people are more likely to take the initiative to generate integrative solutions (Rothman, 2011; Rothman & Northcraft, 2015). Moreover, leader behaviors that signify openness and responsiveness to followers' perspectives have been shown to spur employee voice (T. W. Ng & Feldman, 2012). Also, supervisory responsiveness was found to be a motivating factor for employees to use their voice (Janssen & Gao, 2015). Given these findings, we propose the following hypotheses:

Hypothesis 3a: Higher leader ambivalence leads to a greater intent to use follower upward voice.

Hypothesis 3b: Perceptions of cognitive flexibility and responsiveness serially mediate the effect of leader ambivalence on the intent to use follower upward voice.

Fostering voice not only entails removing the first barriers along the way to using voice, it also entails clearing the hurdles after followers spoke up, paving the way for increased future voice behavior. In other words, leaders must follow up on and actively consider what employees tell them. If followers feel that a leader will not take their voice seriously, followers will not be inclined to speak up, especially regarding more sensitive issues. In addition, followers should not fear negative consequences as a result of speaking up. Unsurprisingly, fear of retaliation is significantly negatively related to followers' upward voice (Ng & Feldman, 2012), and when followers have more positive expectations about how leaders might react, they are more likely to use their voice (Gao et al., 2011). In terms of tangible consequences, leader responsiveness has been found to be a significant factor that determines whether voice leads to positive (e.g., employee retention) or negative outcomes (e.g., turnover; McClean et al., 2013). Based on our prediction that leader ambivalence leads to perceptions of both increased leader cognitive flexibility and leader responsiveness, we hypothesize the following:

Hypothesis 4a: Higher leader ambivalence leads followers to anticipate a more positive reception from their leader.

Hypothesis 4b: Perceptions of cognitive flexibility and responsiveness serially mediate the effect of leader ambivalence on anticipated positive leader reception.

In sum, we propose that expressing ambivalence can be beneficial for leaders. We investigate whether leaders who are high in trait ambivalence (Schneider et al., 2021) are perceived as more cognitively flexible, which in turn leads to them being seen as more responsive. Additionally, we examined how this perceived responsiveness impacts followers'

engagement (i.e., upward follower voice). Thus, the present research helps to better understand the consequences of leaders' ambivalence on followers as well as its underlying mechanism. As such, it also offers insights into how leader ambivalence could be leveraged to promote follower upward voice.

4.1.3 Research Overview

We conducted three preregistered online studies to test our hypotheses. In Study 1, we tested whether a leader high in trait ambivalence is perceived to be more cognitively flexible than a non-ambivalent leader (Hypothesis 1). We also tested whether a leader high in trait ambivalence is seen as more responsive than a non-ambivalent leader (Hypothesis 2a) and whether perceived cognitive flexibility mediates the effect of leader ambivalence on perceived leader responsiveness (Hypothesis 2b). In Study 2, we pursued two goals: first, to replicate the mediation model of Study 1 (Hypotheses 1, 2a and 2b) with a different leader ambivalence manipulation, and second, to investigate the direct consequences of perceiving a leader who is high in ambivalence as more responsive. We hypothesized that one consequence is that followers are more likely to speak up (i.e., there is greater follower upward voice; Hypothesis 3a). Specifically, we tested a serial mediation model examining whether followers would be more likely to speak up towards a leader who frequently expresses ambivalence versus a leader who does not, and whether this is the case because followers assume an ambivalent leader to possess greater cognitive flexibility and, thus, be more responsive (Hypothesis 3b).

The first aim of Study 3 was to conceptually replicate the hypotheses proposed in Studies 1 and 2: Is an ambivalent leader, compared to a non-ambivalent one, perceived as more cognitively flexible, and thus more responsive, evoking followers to speak up more (conceptual replication of Hypothesis 1-3b)? In addition to their willingness to speak up, we also asked how followers would expect their leader to react to their speaking up. We predicted that followers would anticipate a more positive reception from a leader with high versus low trait ambivalence (Hypothesis 4a), and that this effect would be serially mediated by perceptions of leader cognitive

flexibility and leader responsiveness (Hypothesis 4b). All data, materials, and analysis scripts are available at: https://osf.io/4vzms/?view_only=c63bd6b76bc5491eb6811dc5dd6c2d83.

4.2 Study 1

In Study 1, we examined whether an ambivalent leader (i.e., a leader with high trait ambivalence) is perceived as more cognitively flexible and, in turn, as more responsive to followers (Hypotheses 1 and 2).

4.2.1 Method

Participants and Design. Three hundred and one participants (M_{age} = 37.93, SD_{age} = 12.04; 148 male, 148 female, five other; total N = 301) were recruited via Prolific (www.prolific.co). As the materials were all in English and text-based, we activated multiple filters on Prolific to ensure that only native English speakers were able to participate. Namely, only participants whose first as well as fluent language was English, whose Nationality was USA and who had an approval rate of at least 90% were selected. The pre-registration for Study 1 can be found at: https://aspredicted.org/H1Q_QVH. Because of the novelty of this research question, we based the power analysis on a small to medium effect size of d = 0.3, power of .8, and alpha level of .05. The required sample size for a t-test with two independent means was 278. To ensure sufficient usable data points for the planned analysis, we rounded the sample size to 300. According to Fritz and MacKinnon (2007), such a sample size also ensures sufficient power to detect a mediation model with "halfway from small to medium" (path size = .26) a and b path sizes which requires a sample size of 162 for a power of .8, using a bootstrap test. Data were analyzed using RStudio version 1.4.1106 (RStudio Team, 2021).

Procedure and Materials. The participants read a short study introduction and provided their consent. Participants then read a short paragraph saying, "In this survey, we are interested in your impressions of leadership qualities. Please click continue to see a personality profile of John. He is a senior manager at a medium-sized company." The next page had the following instruction "Below, you see a personality questionnaire filled out by John. Please form an impression of him

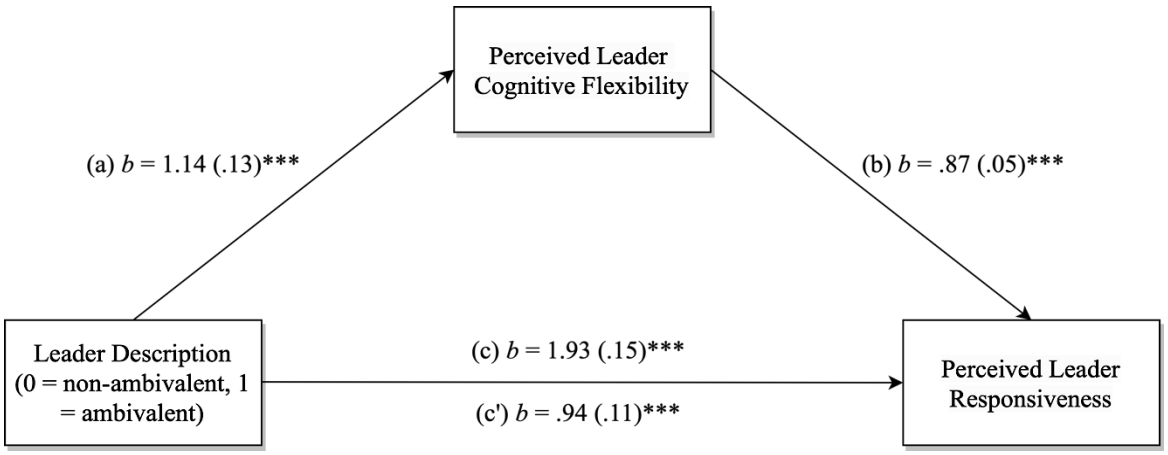
and his leadership qualities based on his responses to the questionnaire.". In this study, we define an ambivalent leader as a leader who is high on trait ambivalence (Schneider et al., 2021). In Study 1, we operationalized this as scores on a personality test scale. Half of the participants saw a personality profile of John that consisted of the Trait Ambivalence Scale (Schneider et al., 2021) that was supposedly filled out by John. For the non-ambivalent profile, the items were answered in such a way as to suggest that John was low in trait ambivalence (i.e., an average score of 1.7 on the Trait Ambivalence Scale ranging from 1 "Does not apply to me at all" to 7 "Totally applies to me"). For the ambivalent profile, the scores mirrored those of the non-ambivalent profile to convey that John is high in trait ambivalence (i.e., an average score of 6.3 on the Trait Ambivalence Scale; cf., Pauels, Schneider, et al., n.d.; both profiles can be found in Appendix A).

Below the personality profile, we asked all participants to answer three manipulation check questions on a scale from "1" ("Not at all") to "7" ("very much"), "John often has mixed thoughts and feelings", "John usually sees both the positive and the negative sides of things.", and "John often finds that there are pros and cons to everything.". We chose to operationalize leader ambivalence in terms of a leader's general tendency to experience ambivalence rather than describing a particular instance where the leader is ambivalent about a certain attitude object, because this enabled us to avoid any unwanted effects that may arise simply in association with a specific attitude object.

Next, we assessed how cognitively flexible the participants perceived John to be. To do this, we adapted the Cognitive Flexibility Scale (Martin & Rubin, 1995) to fit the situation of evaluating a leader by adapting the item wording of the original scale (Cronbach's $\alpha = .84$). The 12 items were rated on a 7-point scale (from 1= "not at all" to 7 = "very much"). Example items

Figure 4.1

Regression Coefficients for the Effect of Leader Description (Non-Ambivalent vs. Ambivalent Personality) on Perceived Leader Responsiveness as Mediated by Perceived Leader Cognitive Flexibility



Note. The regression coefficient for the effect of leader description on perceived leader responsiveness, controlling for perceived leader cognitive flexibility, is presented in parentheses. *** $p < .001$.

are "I would expect John in his role as senior manager to communicate an idea in many different ways", "I would expect John in his role as senior manager to avoid new and unusual situations." (reverse-coded), "I would expect John in his role as senior manager to be able to find workable solutions to seemingly unsolvable problems.". We calculated the mean cognitive flexibility rating by averaging the responses (after recoding items 2,3,5,10) across all items. The adapted Cognitive Flexibility Scale is presented in Appendix B.

Subsequently, we measured how responsive participants perceived John to be. To measure perceived responsiveness, we adapted the Perceived Partner Responsiveness Scale (Reis et al., 2018) to fit the situation of evaluating a leader (Cronbach's $\alpha = .98$). The 11 items were rated on a 7 -point scale (from 1= "not at all" to 7 = "very much"). Example items are: "I would expect John in his role as senior manager to make the employees feel cared for.", "I would expect John in his role as senior manager to make the employees feel like their abilities and opinions are valued.", and "I would expect John in his role as senior manager to be responsive to employees'

needs.". We calculated the mean perceived responsiveness rating by averaging the responses (after recoding items 5, 6,8, 9) across all items. The adapted Perceived Responsiveness Scale can be found in Appendix C. Finally, participants indicated their gender, age, native language, and comments. After completion, participants were thanked and debriefed.

4.2.2 Results and Discussion

First, we checked whether the participants successfully read through the manipulation. Indeed, participants in the ambivalence condition rated the described leader (i.e., supervisor John) as significantly more ambivalent than participants in the non-ambivalence condition (M = 6.50, SD = 0.65 vs. M = 1.80, SD = 0.95); $t(266.21) = 50.175$, $p < .001$). We hypothesized that participants would evaluate a leader as more cognitively flexible when they read that the leader has high versus low trait ambivalence (Hypothesis 1). In fact, reading about an ambivalent leader led participants to evaluate this leader as more cognitively flexible (on average 1.14 scale points higher) than a non-ambivalent leader, $b = 1.14$, $t(299) = 8.70$, $p < .001$. In addition, participants who read an ambivalent leader personality profile evaluated this leader as more responsive than those who read a non-ambivalent leader personality profile (M = 5.30, SD = 1.09 vs. M = 3.37, SD = 1.51; $t(272.65) = 12.72$, $p < .001$; *Cohen's d* = 1.47, 95%CI[1.21,1.72]) supporting Hypothesis 2a.

Table 4.1

Model Summaries for the Mediation Analysis in Study 1

Model	F	p	R^2
Leader Condition predicting perceived leader responsiveness	(1,299) = 161.4	< .001	.35
Leader Condition predicting perceived leader cognitive flexibility	(1,299) = 75.7	< .001	.20
Leader Condition and perceived leader cognitive flexibility predicting perceived leader responsiveness	(1,298) = 371.2	< .001	.71

Moreover, we expected that the effect of leader personality on perceived responsiveness would be mediated by how cognitively flexible the participants perceived the leader to be. To test this mediation, we followed the steps suggested by Baron and Kenny (1986; see Figure 4.1 for a diagram of the mediation model). Leader condition was a significant predictor of perceived responsiveness (i.e., total effect; mediation model summaries are shown in Table 4.1). The ambivalent leader condition showed greater perceived responsiveness than the non-ambivalent leader condition: the ambivalent leader was evaluated as more responsive (on average 1.93 scale points) than the non-ambivalent leader, $b = 1.93$, $t(299) = 12.70$, $p < .001$. Perceived cognitive flexibility was positively related to perceived responsiveness, $b = 0.87$, $t(298) = 19.43$, $p < .001$. Finally, the mediated relationship between leader condition and perceived responsiveness was examined for a drop in prediction when the mediator was added to the model (i.e., direct effect). Partial mediation was found, showing that the relationship between leader condition and perceived responsiveness remained significant after controlling for the mediator perceived cognitive flexibility, $b = 0.94$, $t(298) = 8.33$, $p < .001$.

We used a bootstrapping procedure with 5000 iterations to determine the magnitude of the indirect effect and its 95% confidence interval. This revealed that the indirect effect was .99, $SE = .11$, 95%CI[0.77,1.21]. As the confidence interval does not include zero, we can assume significant mediation. Therefore, the analysis supported Hypothesis 2b: Participants who read that a leader had an ambivalent personality evaluated the leader as more cognitively flexible and, in turn, as more responsive than a leader with a non-ambivalent personality profile.

4.3 Study 2

The results of Study 1 show that an ambivalent leader is perceived as more cognitively flexible and, in turn, as more responsive towards followers than a non-ambivalent leader. In Study 2, we expanded this model to include possible consequences on the followers' side. According to Rothman and Melwani's (2017) reasoning, a leader who is perceived as cognitively flexible and responsive can spur greater intent among followers to engage and speak up.

Therefore, the purpose of Study 2 was to test whether the mediation model found in Study 1 leads to greater follower upward voice when the leader is ambivalent. In this study, we also used a different manipulation of leader ambivalence.

4.3.1 Method

Participants and Design. Three-hundred participants participated in Study 2. Participants were recruited using Prolific (www.prolific.co). For the same reasons of comprehension as in Study 1, we set the same filters beforehand (the only difference was that we changed the filter "Nationality" to UK) on Prolific so that only native speakers were able to participate. This means that we did not need to exclude any participants from the collected dataset. Thus, the final dataset for Study 2 consisted of 300 participants (M_{age} = 36.15, SD_{age} = 13.96, 93 male, 205 female, one other, and one person preferred not to indicate any gender).

The pre-registration for Study 2 can be found here: https://aspredicted.org/2YS_ZMD. As in Study 1, we based our power analysis on a small-to-medium effect size of d = 0.3. and a power of .8, and an alpha level of .05. Therefore, the required sample size for a t-test with two independent means was 278, which was increased to 300 to ensure that we had sufficient usable data points for the planned analysis. Data were analyzed using RStudio version 1.4.1106 (RStudio Team, 2021).

Procedure and Materials. After reading a short study introduction and providing their consent, participants started the main study with the leader manipulation (cf., Pauels, Dorrough, et al., n.d.) that was announced with a short paragraph saying "In this survey, we are interested in your impressions of leadership qualities. Specifically, we would like you to imagine that you just started a new job at a medium-sized company with John as your supervisor. Please click on 'continue' to learn more about John." In Study 2 we realized high and low ambivalent leaders through descriptions of potential leaders by colleagues. Participants continued to read "Your new supervisor John: You have just started a new job at a medium-sized company. Your immediate supervisor, the department manager, is called John. At lunch, you ask your new colleagues about

John. Here is how your colleagues describe your new supervisor:" Below, people saw a total of four speech bubbles. Two of these were constant ("I have been working for John for a long time. He is a very kind person, reliable, and team-oriented."; "We get along very well and enjoy working for him.") and the remaining two varied across conditions (see the manipulation for both conditions in Appendix D). In the ambivalent condition we inserted information suggesting that the new supervisor John was high in trait ambivalence, adapting the constructs from the trait ambivalence scale in Study 1 and rewriting them to written speech. Participants read "He [John] is a person who often feels mixed about issues, instead of being only for or against, he usually sees both positive and negative sides to things. He feels that there are both pros and cons to most things." And "Yes, that sometimes makes him [John] conflicted or torn.". In the non-ambivalent condition, participants read "He [John] is a person who often feels one-sided about issues. Instead of seeing both positive and negative sides to things, he usually is either for or against them. He feels that something is just good or just bad." And "Yes, he [John] is rarely conflicted or torn." We then presented the participants with the same manipulation questions as described in Study 1.

Next, we assessed perceived cognitive flexibility (Cronbach's $\alpha = .87$; Martin & Rubin, 1995) and perceived responsiveness (Cronbach's $\alpha = .96$; Reis et al., 2018) of the supervisor John using the same measures as in Study 1. Finally, we measured participants' tendency to speak up at their hypothetical new job with John as their immediate supervisor using a scale developed by Liu and colleagues (2010; Cronbach's $\alpha = .90$). We used nine items which were rated on a 7-point scale, from 1= "not at all" to 7 = "very much". Sample items are "I would develop and make recommendations to John concerning issues that affect the company.", "I would communicate my opinions about work issues to John even if my opinion is different, and John disagrees with me", and "I would give constructive suggestions to John to improve his work.". Lastly, participants indicated their gender, age, native language, and comments. After completion, participants were thanked and debriefed.

4.3.2 Results and Discussion

First, we checked whether participants successfully read through the manipulation: participants in the ambivalence condition rated supervisor John as significantly more ambivalent than participants in the non-ambivalence condition (M = 6.36, SD = 0.69 vs. M = 2.09, SD = 1.35); $t(222.53) = 34.449$, $p < .001$).

The first goal of Study 2 was to replicate the mediation model found in Study 1 (Hypotheses 1 and 2). In other words, can we find again that a leader being described as ambivalent leads to perceiving the leader as more cognitively flexible and, in turn, as more responsive than a non-ambivalent leader? First, we found that participants who read an ambivalent personality description of the leader evaluated this leader as more responsive than those who read a non-ambivalent leader personality description (M = 6.04, SD = .71 vs. M = 4.62, SD =1.21); $t(239.66) = 12.41$, $p < .001$; *Cohen's d* = 1.43, 95%CI[1.18,1.69].

Testing simple mediation, we found that leader condition was a significant predictor of perceived responsiveness (i.e., the total effect). Reading about an ambivalent leader led participants to evaluate him as more responsive than participants who read that the leader was non-ambivalent, $b = 1.42$, $t(298) = 12.41$, $p < .001$. Second, reading about an ambivalent leader led participants to evaluate him as more cognitively flexible than a non-ambivalent leader (the a pathway), $b = 1.48$, $t(298) = 12.64$, $p < .001$. Controlling for the leader condition, perceived cognitive flexibility was positively related to perceived responsiveness, $b = 0.61$, $t(297) = 13.90$, $p < .001$. Finally, the mediated relationship between leader condition and perceived responsiveness was examined for a drop in prediction when the mediator was added to the model (i.e., the direct effect). Partial mediation was found, showing that the relationship between leader condition and perceived responsiveness remained significant after controlling for the mediator perceived cognitive flexibility, $b = 0.51$, $t(297) = 4.63$, $p < .001$. We used a bootstrapping procedure with 5000 iterations to determine the magnitude of the indirect effect and its 95% confidence interval. This revealed that the indirect effect was .91, SE = .10, 95%CI [0.72,1.10]. As the confidence

interval does not include zero, we can assume significant mediation and were therefore able to replicate the mediation model of Study 1.

Serial Mediation Model. Having replicated the mediation model of Study 1, the next goal of Study 2 was to expand this model. We hypothesized that when participants read about an ambivalent leader (versus a non-ambivalent leader), they would show greater intent to speak up towards this leader. Crucially, we expected this effect to be serially mediated by perceived cognitive flexibility and perceived responsiveness of the leader. That is, because participants perceived an ambivalent leader (compared to a non-ambivalent leader) to have more cognitive flexibility and, in turn, greater responsiveness, they would show greater intent to speak up towards this leader. To test this prediction, we added participants' intent to speak up as the criterion to the previous mediation model, with perceived flexibility and responsiveness as serial

Figure 4.2

Serial Mediation Model of Study 2 With Followers' Intent to Speak Up as the Dependent Variable

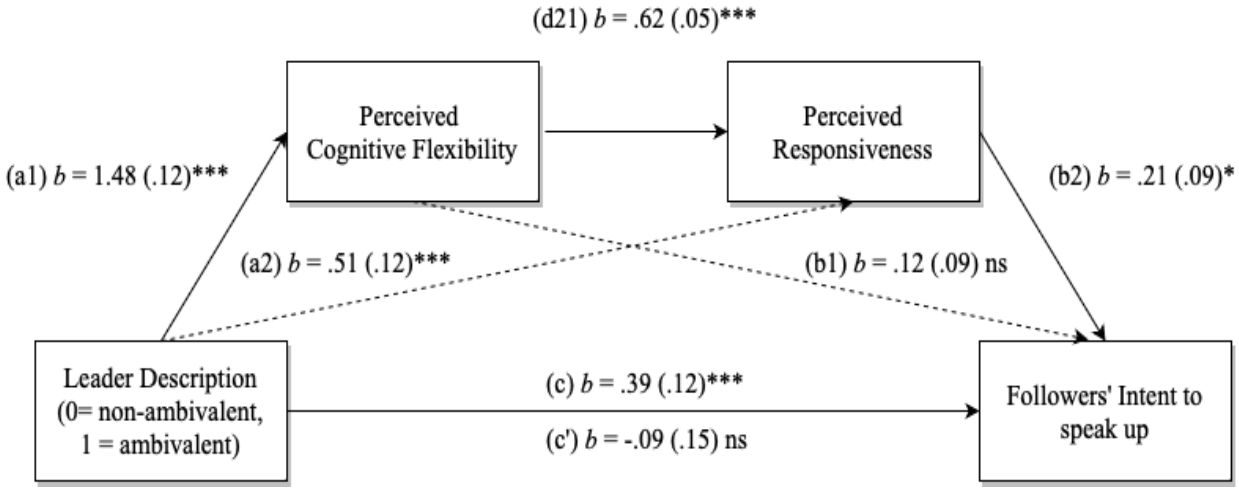


Figure 4.2. Serial Mediation Model of Study 2 with followers' intent to speak up as the dependent variable. Regression coefficients are not standardized but all variables were measured on a 7-point Likert Scale. *$p < .05$; ***$p < .001$; *ns* not significant.

mediators between leader ambivalence and intent to speak up. The complete serial mediation is shown in Figure 4.2.

The leader condition had a significant positive effect (0 = non-ambivalent leader, 1 = ambivalent leader) on participants' intent to speak up (ambivalent condition: M = 4.97, SD = .95; non-ambivalent condition: M = 4.59, SD = 1.18). That is, the total effect of the leader condition on participants' intent to speak up (i.e., c path) was b[total] = .39, $t(298) = 3.13$, $p < .01$. Accounting for the two mediators perceived cognitive flexibility and perceived responsiveness, the indirect effect (c' path) of the leader condition on followers' intent to speak up was b[direct] = - 0.09, $t(296) = -0.56$, $p = .576$. The indirect effect of perceived cognitive flexibility and perceived responsiveness between the leader condition and followers' intent to speak up was b[indirect] = 0.19, SE = 0.07, 95% CI[0.02, 0.36]. Because the confidence interval does not cross zero, we assume significant serial mediation. In accordance with our hypothesis, this means that ambivalent leaders were seen as having more cognitive flexibility and, consequently, were evaluated as more responsive than non-ambivalent leaders. This perception of an ambivalent leader led participants to show greater follower upward voice. That is, we can conclude that followers would be more likely to speak up (e.g., to suggest improvements or point out mistakes) to an ambivalent leader than to a non-ambivalent one.

4.4 Study 3

The results of Study 2 showed that perceiving an ambivalent (versus a non-ambivalent) leader led to greater voice intent. This seems to be the case because ambivalent leaders are perceived as more cognitively flexible and, in turn, more responsive towards their followers. In Study 3, we examined this mechanism in more concrete terms. That is, we investigated the effect of leader ambivalence on follower upward voice in more tangible workplace scenarios, rather than looking at the overall intent to speak up at work. To do this, we created three short workplace scenarios in which the target of communication was upward, that is, the communication was directed at a leader. The scenarios dealt with situations that involved communicating ideas of improvement, voicing dissatisfaction, and speaking up about ethical concerns. Based on the results so far, we expected that followers would report a greater

likelihood of speaking up in each of these scenarios when they communicate to an ambivalent leader versus a non-ambivalent leader. Taken together, we expect that this is the case because an ambivalent leader is seen as more cognitively flexible and more responsive. Assessing the intent to speak up in response to such scenarios instead of scales, thereby using a different way to measure and operationalize follower upward voice, also represents methodological benefits as this reduces common method bias.

Additionally, we wanted to zero in on followers' expectations in terms of how the leader would receive their upward communication. That is, we looked at whether followers perceive the leader to have the "willingness to act on input" (Rothman & Melwani, 2017). Additionally, we investigated whether followers expected their voice to have an impact and whether they feared negative consequences as a result of speaking up.

4.4.1 Method

Participants and Design. Two hundred seventy-eight participants participated in Study 3. Participants were recruited using Prolific (www.prolific.co). For the same reasons of comprehension as in the prior studies, we had the same filters as in Study 2 in place on Prolific so that only native English speakers were able to participate. This means that we did not need to exclude any participants from the collected dataset. Thus, the final dataset for Study 3 consisted of 278 participants (M_{age} = 40.31, SD_{age} = 14.43, 136 male, 140 female, one other, and one person preferred not to indicate any gender).

The pre-registration for Study 3 can be found here: https://aspredicted.org/blind.php?x=4FM_MXW. As in Studies 1 and 2, we based the power analysis on a small-to-medium effect size of d = 0.3. and a power of .8, and an alpha level of .05. Therefore, the sample size required for a t-test with two independent means was 278. As we did not have to exclude any participants in Studies 1 and 2 due to the language filter set beforehand to only include native English speakers, for Study 3, we did not round up to 300 participants but

instead collected the exact 278 participants. Data were analyzed using RStudio version 1.4.1106 (RStudio Team, 2021).

Procedure and Materials. After reading a short introduction to the study and giving their consent, participants started the main study with the leader manipulation that we used in Study 2 (cf., Pauels, Dorrough, Kühlkamp, & Schneider, n.d.; for a detailed description, see the Method Section of Study 2 and Appendix D). The participants then responded to the manipulation check items used in Studies 1 and 2. Next, we assessed perceived cognitive flexibility (Cronbach's $\alpha = .86$; Martin & Rubin, 1995) and perceived responsiveness (Cronbach's $\alpha = .96$; Reis et al., 2018) of the presented supervisor John using the same measures as those used in Studies 1 and 2 (see Appendices B and C).

The participants were then presented with three workplace scenarios. Thematically, the scenarios were created to cover the three situations suggested by Brinsfield et al. (2009) to investigate voice behavior: speaking up when someone has an idea of improvement, when there is an ethical or fairness concern, and when someone is dissatisfied (all scenarios can be found in Appendix F). We based the "idea of improvement" scenario on a situation where the idea of improvement is to create an email chain to increase communication efficiency on a website explaining what upward communication is (Birt, 2023). Inspiration for the "response to dissatisfaction" came from a case study report on employee voice (King et al., 2021). Lastly, we based the "Ethical and fairness concerns" scenario on a vignette developed by Ruiz-Palomino and colleagues (2019).

For each scenario, we asked participants how likely it would be for them to talk to John about the raised issue (7-point scale from "Not very likely" to "Very likely"). After this, we asked participants for each scenario separately to imagine that they had told John about the issue and asked them to respond to three items that assessed how they would expect John (their supervisor) to react if they had chosen to talk about the issue raised in the scenario. Namely, we asked whether they would expect John to take them seriously, whether they would expect their

feedback to have an impact, and whether they would expect negative consequences for themselves as a result of telling John about the issue. For all three items, participants responded on a 7-point scale from "Not at all" to "very much".

To calculate our first dependent variable, we averaged the three items assessing participants' likelihood of speaking up for each scenario to an overall "likelihood to speak up" score (Cronbach's $\alpha = .55$). Therefore, the higher the score, the greater the likelihood that participants would speak up across all three scenarios. For the overall "expected positive reception" score, we first recoded responses on the items that they would expect negative consequences and then averaged all nine responses (Cronbach's $\alpha = .83$).

After completing the short workplace scenarios, participants filled in a short version of the Voice scale by Liang et al. (2012; Cronbach's $\alpha = .91$). Following the procedure of Sherf and colleagues (2021) we used three promotive and three prohibitive items from the original scale. This reduced scale has been added for exploratory purposes. Lastly, participants indicated their gender, age, what they thought the study was about, and comments. After completion, participants were thanked and debriefed.

4.4.2 Results and Discussion

Indirect Effect of Ambivalence on Responsiveness via Cognitive Flexibility. First, we checked whether participants successfully read through the manipulation and found that participants in the ambivalence condition rated supervisor John as significantly more ambivalent than participants in the non-ambivalence condition ($M = 6.36$, $SD = 0.74$ vs. $M = 2.01$, $SD = 1.17$); $t(235.37) = 38.00$, $p < .001$). We aimed to again replicate the mediation model that we found in Study 1 and replicated in Study 2. In the mediation analysis, reading about an ambivalent leader led participants to evaluate that leader as more responsive than when participants read that the leader was non-ambivalent (i.e., total effect), $b = 1.51$, $t(276) = 14.35$, $p < .001$. Second, reading about an ambivalent leader led participants to evaluate this leader as more cognitively flexible than a non-ambivalent leader, $b = 1.64$, $t(276) = 15.14$, $p < .001$. After adjusting for leader

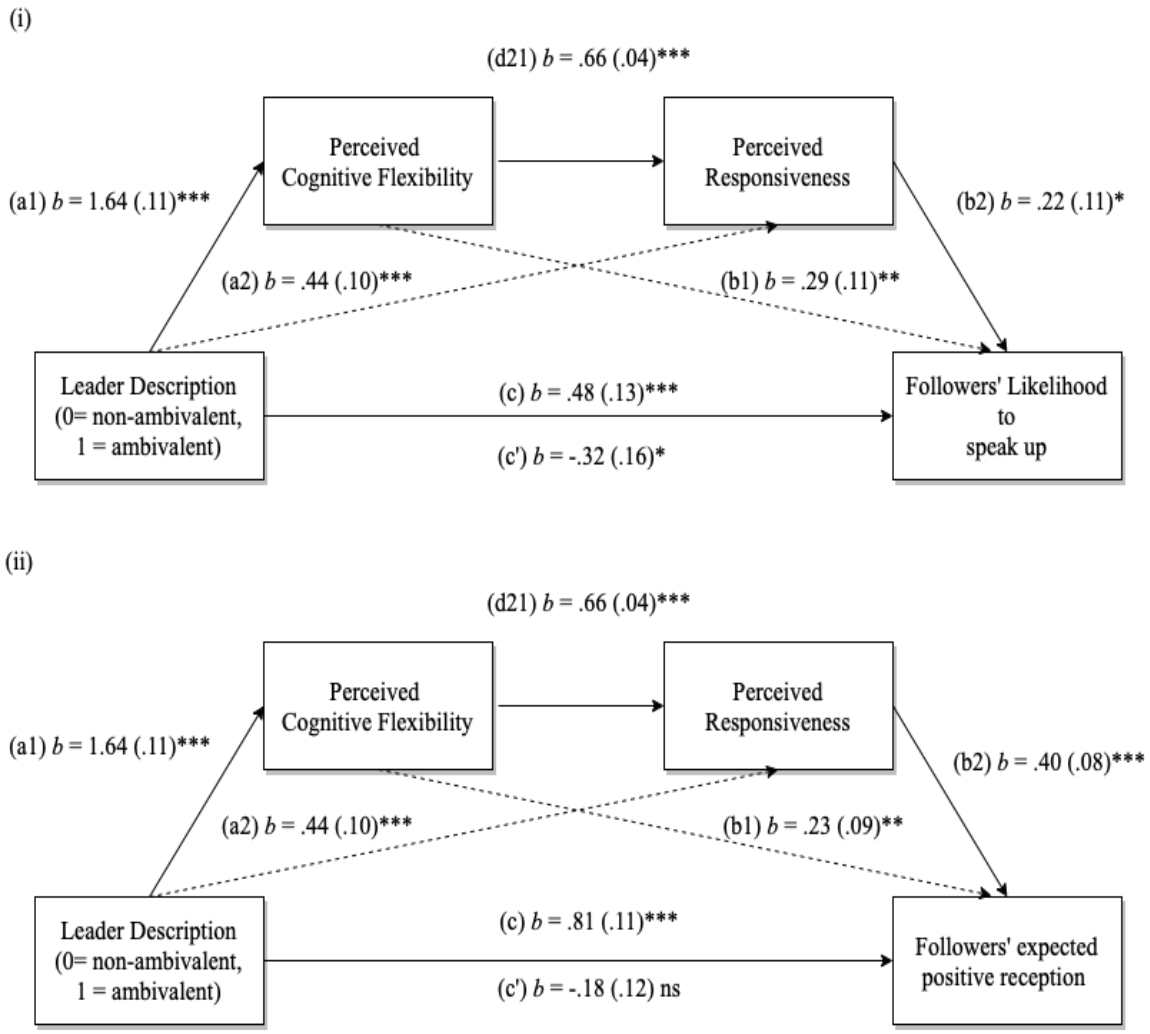
condition, perceived cognitive flexibility was positively related to perceived responsiveness, b = 0.65, $t(275) = 15.09$, $p < .001$. Finally, the mediated relationship between leader condition and perceived responsiveness was examined for a drop in prediction strength when the mediator was added to the model (i.e., direct effect). Partial mediation was found, showing that the relationship between leader condition and perceived responsiveness remained significant after controlling for the mediator perceived cognitive flexibility, $b = 0.44$, $t(275) = 4.15$, $p < .001$. The bootstrapping procedure with 5000 iterations revealed that the indirect effect was 1.08, $SE = .09$, 95%CI [0.90, 1.25]. Because the confidence interval does not include zero, we can assume significant mediation and were thus able to replicate the mediation model of Study 1 and Study 2.

Serial Mediation Model with Likelihood to Speak Up. Having replicated the mediation model of Studies 1 and 2, we set out to test the hypothesis that the leader condition influences followers' intent to speak up about different workplace scenarios. Specifically, we expected that followers would be more likely to speak up when they read that their leader is ambivalent than when their leader is non-ambivalent. Additionally, we predicted that this effect would be serially mediated by perceived cognitive flexibility and perceived responsiveness of the leader: followers have a higher likelihood of speaking up because they perceive an ambivalent leader (compared to a non-ambivalent leader) to have more cognitive flexibility and, in turn, perceive that the leader is more responsive. The complete serial mediation is shown in Figure 4.3 (i).

The leader condition had a significant positive effect (0 = non-ambivalent leader, 1 = ambivalent leader) on followers' likelihood to speak up (c path), b[total] = 0.48, $t(276) = 3.85$, $p < .001$, while the indirect effect (c' path) of leader condition on followers' likelihood to speak

Figure 4.3

Serial Mediation Models of Study 3 With Followers' Likelihood to Speak Up as the Dependent Variable (I) and Followers' Expected Positive Reception as Dependent Variable (II)



Note. Serial mediation models of Study 3 with followers' likelihood to speak up as the dependent variable (i) and followers' expected positive reception as dependent variable (ii). Regressions coefficients are not standardized but all variables were measured on a 7-point Likert scale. *p < .05; **p < .01; ***p < .001; ns = not significant.

up—accounting for the two mediators perceived cognitive flexibility and perceived responsiveness – was b[direct] = - 0.32, $t(274) = -1.99$, $p < .05$. The substantial decrease and change in direction from total to direct effect indicates mediation via the indirect path: the effect of leader condition through both perceived cognitive flexibility and perceived responsiveness on

followers' likelihood to speak up was *b*[indirect] = 0.24, *SE* = 0.13, 95% CI[0.00, 0.48]. While leader conditions did affect followers' likelihood of speaking up across the three scenarios in the way we predicted, we cannot assume that there is significant serial mediation because the confidence interval includes zero.

Serial Mediation Model with Expected Positive Reception. We proposed that followers would expect their speaking-up to be better received (i.e., their speaking-up would be taken seriously, would have an impact, and would not lead to negative personal consequences) by an ambivalent leader versus a non-ambivalent leader. Additionally, we predicted that this effect would be serially mediated by perceived cognitive flexibility and perceived responsiveness of the leader: followers expect better reception when they speak up because they perceive an ambivalent leader (compared to a non-ambivalent leader) to have more cognitive flexibility and, in turn, infer that the leader is generally more responsive. The complete serial mediation is shown in Figure 4.3 (ii).

As can be seen in Figure 4.3, the total effect of leader condition on followers' expected positive reception (the c path) is *b*[total] = 0.86, *t*(276) = 7.13, *p* <.001, while the indirect effect (c' path) of leader condition on followers' expected positive reception – accounting for the two mediators perceived cognitive flexibility and perceived responsiveness – *b*[direct] = -0.22, *t*(274) = -1.57, *p* = .117. This substantial change from the total (c path) to the direct effect indicates that mediation occurred via the indirect path. The indirect effect of perceived cognitive flexibility and perceived responsiveness between the leader condition and followers' expected positive reception was *b*[indirect] = 0.48, *SE* = 0.10, 95% CI[0.29, 0.68]. Because the confidence interval does not cross zero, we can assume significant serial mediation.

To sum up, this means that ambivalent leaders were seen as more cognitively flexible and, consequently, were evaluated as more responsive than non-ambivalent leaders. This led participants to expect a more positive reception of their speaking up to an ambivalent leader than to a non-ambivalent one.

Exploratory Analysis. For exploratory purposes, we included another well-established scale to measure voice (Liang et al., 2012). Indeed, participants who read an ambivalent personality description of the leader indicated higher voice than participants who read a non-ambivalent leader personality description (M = 5.40, SD = .92 vs. M = 4.72, SD = 1.15), $t(264.51) = -5.44$, $p < .001$; *Cohen's d* = 0.65, 95%CI[.41, .89]. We also ran the confirmatory serial mediation model with voice as the dependent variable (bootstrap analysis with 5000 samples), leader condition as the independent variable, perceived leader cognitive flexibility, and perceived leader as sequential mediators. This analysis revealed that while there was a direct effect of leader condition on voice $b = 0.68$, $t(276) = 5.43$, $p < .001$, this was not serially mediated by perceptions of cognitive flexibility and responsiveness (95%CI for the indirect effect: -0.11 to 0.38).

In an exploratory fashion, we also investigated whether the type of scenario had an effect on the likelihood of speaking up as well as the expected positive reception. We found a main effect of scenario type on the speaking-up score, $F(2, 552) = 15.46$, $p < .001$, $\eta_p^2 = .05$. Voice reported in both the idea of improvement scenario (M =5.35, SE = 0.09, p<.01) and the response to dissatisfaction scenario (M = 5.53, SE = 0.08, $p < .001$) was significantly higher than voice reported in the ethical concern scenario (M = 4.95, SE = 0.09). The idea and dissatisfaction scenarios did not differ significantly ($p = .160$). Similarly, there was a main effect of scenario type on the expected positive reception score, $F(2, 552) = 37.53$, $p < .001$, $\eta_p^2 = .12$. Expected reception reported in both the idea of improvement scenario (M = 4.35, SE = 0.05, $p < .001$) and the response to dissatisfaction scenario (M = 4.29, SE = 0.05, $p < .001$) was significantly lower than in the ethical concern scenario (M = 4.72, SE = 0.05). The expected positive reception scores for the idea of improvement and dissatisfaction scenarios did not differ significantly ($p = .369$). These results make sense because it is probably difficult to speak up about ethical issues and, in the scenario, a colleague committed the ethical transgression, which likely increased the barrier to speak up.

4.5 General Discussion

Ambivalence is a ubiquitous experience for leaders in the workplace (Ashforth et al., 2014; Denis et al., 2011; Guarana & Hernandez, 2015; Rothman & Melwani, 2017). As ambivalence has been connected to increased cognitive flexibility at the intra-individual level, we were interested in whether followers would also infer cognitive flexibility when perceiving leader ambivalence. In other words, do followers perceive an ambivalent leader to possess greater cognitive flexibility than a non-ambivalent one? If so, what are the downstream consequences of such perceptions? To answer these questions, the aim of this paper was to experimentally test whether leader ambivalence is related to perceptions of cognitive flexibility and whether this affects two important organizational outcomes: responsiveness and follower upward voice. We examined this in three empirical studies.

Across all studies, we found that leader ambivalence was positively associated with perceptions of cognitive flexibility. This suggests that perceivers use information about leader ambivalence to make inferences about a leader's cognitive style and processing. We also examined whether perceived cognitive flexibility has implications for organizational processes related to successful leadership. In particular, we examined whether leader ambivalence is associated with perceived responsiveness. Indeed, ambivalent leaders were perceived to be more responsive to employees, and perceived cognitive flexibility partially accounted for this effect. This means that followers evaluated the ambivalent leader as more responsive to them because they viewed the leader as more cognitively flexible (i.e., to have a greater capacity to consider alternatives for handling a problem, making conscious decisions, and communicating ideas in different ways).

Going a step further in examining the consequences of leader ambivalence, we expanded this mediation pattern by probing its effects on followers' engagement. In line with our expectations, we found that followers were more likely to speak up (i.e., greater upward voice) to an ambivalent versus a non-ambivalent leader. We found this not only for broader statements capturing the overall intent to speak up(wards) (Study 2), but also for the willingness to speak up

across several more tangible workplace scenarios that dealt with more intricate work issues (i.e., speaking up about being dissatisfied with something the leader initiated; Study 3).

Our work contributes to the understanding of perceptions of ambivalence, particularly in the workplace context. We provide empirical evidence that followers infer cognitive flexibility from ambivalence in leaders which then positively affects followers' upward voice. That is, we found that followers exhibited higher levels of engagement, manifested through increased intent for upward voice, when perceiving a leader with high trait ambivalence. Contrary to our findings, previous research has indicated a negative relationship between observing an ambivalent leader and follower engagement in the form of task engagement (Lim et al., 2021). At first glance, the different effects of leader ambivalence on follower engagement seem puzzling. However, a closer look at the types of ambivalence investigated in these studies provides insight into why there are diverging effects. For example, Lim and colleagues (2021) used leaders' expressions of emotional ambivalence (i.e., transitory emotional state, for instance, happy and sad at the same time) in their studies, while we provided descriptions that suggest an ambivalent personality (i.e., based on trait ambivalence; Schneider et al. 2021). Potentially, these references to how the leader acts in general led participants to make inferences at the trait level and to understand that the leader's ambivalence they viewed referred to a general style. On the other hand, state ambivalence might be more limited in providing evidence on leadership style, because it is a snapshot and only related to a single instance.

Thus, ambivalence arguably can have both negative (e.g., increased perceived unpredictability and lowered task engagement; Lim et al., 2021) and positive consequences (e.g., information seeking; Guarana et al., 2023) and the present work offers a piece in the puzzle of when leader ambivalence can be beneficial versus when it is not. Having mixed results in terms of positive and negative consequences reflects a wider picture of ambivalence research (i.e., including both intra- and interpersonal contexts). For example, in research on attitudinal ambivalence which is defined as evaluating an attitude object as both positive and negative at the

same time (Schneider & Schwarz, 2017; Thompson et al., 1995; van Harreveld et al., 2015) it has been primarily investigated how ambivalent attitudes negatively affect decision making, information processing (e.g., Van Harreveld, Van der Pligt, et al., 2009) as well as attitude strength and stability (Armitage & Conner, 2004; Luttrell et al., 2016). For attitude researchers, ambivalent attitudes were not predictive of behavior or future attitudes, possibly steering attention towards negative outcomes. Conversely, emotional ambivalence researchers have focused on how emotions influence creativity, associative breadth and cognitive processing. In doing so, they investigated how ambivalence affects unrelated tasks (such as performance on association tasks or general knowledge estimation tasks), which can shed light on the potential functionalities of ambivalence (Fong, 2006; Rees et al., 2013). Similarly, the development of the Trait Ambivalence Scale (Schneider et al., 2021) has facilitated the exploration of non-traditional questions regarding how a general tendency towards ambivalence, independent of specific objects or situations, influences behavior and cognition.

Addressing this mixed picture, Rothman and colleagues (2017) developed a theoretical framework to understand the dual nature of ambivalence, in which they describe moderators of the consequences of ambivalence. For example, ambivalence may lead to more cognitive flexibility in a psychologically safe environment in which people are free to take risks, speak freely, and do not have to fear embarrassment. However, when these conditions are not given, ambivalence can result in cognitive inflexibility, which can lead to adverse outcomes, such as narrow thinking or decision paralysis. However, many of these assumptions have not yet been tested, and empirically examining the moderators and underlying mechanisms of why and for whom ambivalence can be beneficial is a fruitful avenue for future research.

Our work also has implications for research aimed at understanding how to increase follower upward voice. Since greater upward communication (i.e., employee voice) has been associated with a host of positive outcomes such as greater job satisfaction (Nawakitphaitoon & Zhang, 2021) and lower turnover rates (Croucher et al., 2012), it is important to understand the

factors that foster follower engagement in the form of greater upward communication. In line with work showing that leaders' traits are connected to follower upward voice to a greater degree than followers' personality (Kamal Kumar & Kumar Mishra, 2017), we show that one such leader characteristic that can influence followers' upward communication is leader ambivalence.

Our results imply that organizations could benefit from recognizing and even fostering leader ambivalence to enhance upward voice among followers. This, in turn, could lead to improved organizational outcomes such as higher innovation and effectiveness. This makes it an appealing question of how leaders could deliberately increase their trait ambivalence to spur these positive outcomes. One way to cultivate such leader ambivalence, could be for leaders to clearly define pros and cons of a given topic and communicate them to their followers. In line with this, leaders could also learn to regularly express their subjective experience of ambivalence, voicing to their followers that they feel mixed about a certain topic. Developing such interventions where leaders would learn to express ambivalence deliberately and constructively in their communication and their demeanor might be a promising line of inquiry that not only holds academic interest but also practical significance as it aims to improve outcomes in organizations.

The present work is a valuable addition to the literature on leader ambivalence, as it empirically tests effects that so far have either only been theorized in the literature (i.e., Rothman & Melwani, 2017) or have been observed correlationally (i.e., Plambeck & Weber, 2009). In an experimental context, we were able to demonstrate that ambivalent leaders are perceived to be more cognitively flexible and responsive, while also strongly indicating that leader ambivalence positively affects followers' intent to speak up about a variety of work issues. Our experimental design allowed us to systematically compare the effect of an ambivalent versus a non-ambivalent leader on followers' upward communication.

Strengthening confidence in our results, we were able to replicate both simple and serial mediation models across multiple studies. Further, we did so with varying materials – for example, using different leader trait ambivalence manipulations, as well as using scales and

scenarios to measure followers' intent to speak up, which further reinforces the reliability of our results. Additionally, we increased the strength of our results by deliberately focusing on immediate supervisors as the target of follower upward voice. As they are the link between followers and higher up management (B. Kaufman, 2003), immediate supervisors seem to play a crucial - but so far mostly underappreciated - role in empowering followers to use their voice (Townsend & Mowbray, 2020).

It is important to note that we worked with hypothetical scenarios rather than examining real-life follower-leader dyads. Hypothetical scenarios, while valuable for initial investigations, may not fully capture the complexity of real-world leadership dynamics. In real organizational settings, employees observe and interact with their leaders over time, which can influence their perceptions of leader ambivalence and its impact on their behavior. However, hypothetical scenarios allow us to manipulate specific traits and control for extraneous variables, thereby providing clear insights into causal relationships. For instance, in our studies, participants were able to clearly distinguish between ambivalent and non-ambivalent leaders, which allowed us to measure the direct effects of perceived ambivalence on cognitive flexibility, responsiveness, and intent to speak up. In contrast, real-world observations might be influenced by numerous factors such as past interactions, organizational culture, and personal biases, which can complicate the interpretation of results. However, real-world studies are essential for validating the findings from hypothetical scenarios and understanding their applicability in practical settings. While the majority of our sample (with an average age of 38.16, *SD* = 13.48) can be assumed to have relevant working experience [3] and can probably draw on past experience when asked to imagine themselves in a work scenario, an important next step would be to validate the present results in

[3] While we did not directly ask participants to indicate their employment status in our surveys, it is possible to gain insight into this from the demographic data provided by the recruiting platform (prolific.co) we used for data collection. As we retrieved the data a few months after running the studies, the majority of the participant demographic data had unfortunately expired (46.70%) by then. However, we can say that at least 32.00% indicated employment (either full-time, part-time, or due to start a new job within the next month). The remaining participants (21.30%) fell into other employment categories (N/A, unemployed, not in paid work, other). That data can be found here https://osf.io/4vzms/?view_only=c63bd6b76bc5491eb6811dc5dd6c2d83.

field studies. Although the effects of leader ambivalence on followers' intent to speak up need to be validated in real-life organizational contexts, the present studies provide a solid experimental foundation for future field studies.

In addition to exploring the influence of different leader characteristics, follower characteristics may also mediate the effect of leader ambivalence on follower upward voice. In other words, is there a follower characteristic that pairs well with high leader trait ambivalence, perhaps even further enhancing upward communication? Conversely, is there a follower trait that, in combination with high leader trait ambivalence, leads to more negative effects? One such factor could be, for example, followers' personal need for closure, which describes that a person generally desires a high degree of certainty, as demonstrated by, for example, making decisions quickly, having strong opinions, and disliking ambiguity (Webster & Kruglanski, 1994). It is therefore conceivable that followers who have a high need for closure may attribute less competency and agency to an ambivalent leader than to a non-ambivalent one, ultimately leading to negative outcomes. This then would be in line with past work finding that expressions of ambivalence can lead to being perceived as more submissive (Rothman, 2011). Underpinning that a trait match might be important for the emergence of more positive effects, recent theorizing suggests that followers with high integrative complexity might especially profit from having an ambivalent leader (Q. Zhao & Zhou, 2021).

4.5.1 Conclusions

There is a growing body of work showing that there can be benefits to leaders who are ambivalent. Consistent with this work, we found that ambivalent leaders were perceived by followers as more cognitively flexible and, in turn, more responsive than non-ambivalent leaders. Crucially, this perception of the leader had downstream consequences, such that followers were more likely to use their voice and speak up towards an ambivalent leader and were less concerned about their speaking up having negative consequences. Increasing followers' upward voice is not a small feat, and there is certainly no one-size-fits-all solution. However, considering the host of

positive outcomes it is associated with, both for the organization and its followers, it is worthwhile to invest in creating a culture that fosters followers' upward voice. The present work suggests that such a culture would likely be one that also allows for, or even encourages, leader ambivalence.

Data Availability Statement

The datasets generated by the survey research during and analyzed during the current studies as well as the study materials and preregistrations are available in the Open Science repository (OSF), https://osf.io/4vzms/?view_only=c63bd6b76bc5491eb6811dc5dd6c2d83.

Supplemental Materials for Chapter 4

(All materials can also be found here: https://osf.io/4vzms/?view_only=c63bd6b76bc5491eb6811dc5dd6c2d83)

Appendix A

Leader Manipulation Study 1 (cf. Pauels, Rothman, & Schneider, n.d.)

Ambivalent personality Profile of John:

In the following, we will to ask you a few questions about your personality.

For each statement, indicate how much it applies to you. There are no right or wrong answers, we are interested in how you see yourself.

	Does not apply to me at all	2	3	4	5	6	Totally applies to me
My thoughts are often contradictory.	○	○	○	○	○	○	◉
Many topics make me feel conflicted.	○	○	○	○	○	◉	○
I usually see both the positive as well as the negative side of things.	○	○	○	○	○	◉	○
I often experience both sides of an issue pulling on me.	○	○	○	○	○	○	◉
I often find that there are pros and cons to everything.	○	○	○	○	○	○	◉

	Does not apply to me at all	2	3	4	5	6	Totally applies to me
I often feel torn between two sides of an issue.	○	○	○	○	○	◉	○
Most of the time, my thoughts and feelings are not necessary in accordance with each other.	○	○	○	○	◉	○	○
Sometimes when I think about a topic, it almost feels like I am physically switching from side to side.	○	○	○	○	○	◉	○
My feelings are often simultaneously positive and negative.	○	○	○	○	○	○	◉
I often experience that my thoughts and feelings are in conflict when I'm thinking about a topic.	○	○	○	○	○	◉	○

Non-ambivalent personality Profile of John:

In the following, we will to ask you a few questions about your personality.

For each statement, indicate how much it applies to you. There are no right or wrong answers, we are interested in how you see yourself.

	Does not apply to me at all	2	3	4	5	6	Totally applies to me
My thoughts are often contradictory.	●	○	○	○	○	○	○
Many topics make me feel conflicted.	○	●	○	○	○	○	○
I usually see both the positive as well as the negative side of things.	○	●	○	○	○	○	○
I often experience both sides of an issue pulling on me.	●	○	○	○	○	○	○
I often find that there are pros and cons to everything.	●	○	○	○	○	○	○
	Does not apply to me at all	2	3	4	5	6	Totally applies to me
I often feel torn between two sides of an issue.	○	●	○	○	○	○	○
Most of the time, my thoughts and feelings are not necessary in accordance with each other.	○	○	●	○	○	○	○
Sometimes when I think about a topic, it almost feels like I am physically switching from side to side.	○	●	○	○	○	○	○
My feelings are often simultaneously positive and negative.	●	○	○	○	○	○	○
I often experience that my thoughts and feelings are in conflict when I'm thinking about a topic.	○	●	○	○	○	○	○

Appendix B

Measure Leader Cognitive Flexibility

We based the measurement of cognitive flexibility on the Cognitive Flexibility Scale by Martin and Rubin (1995). To fit the situation of evaluating a leader, we adapted the item wording of the original scale. The items were rated on a 7-point scale, from 1= "not at all" to 7 = "very much".

I would expect John in his role as senior manager...
...to communicate an idea in many different ways. (1)
...to avoid new and unusual situations. (2R)
...to feel like he never gets to make decisions. (3R)
...to be able to find workable solutions to seemingly unsolvable problems. (4)
...to seldom have choices when deciding how to behave. (5R)
...to be willing to work on creative solutions to problems. (6)
...to be able to act appropriately in any given situation. (7)
...to behave based on conscious decisions that he makes. (8)
...to have many possible ways of behaving in any given situation. (9)
...to have difficulty using his knowledge on a given topic in real-life situations. (10R)
...to be willing to listen and consider alternatives for handling a problem. (11)
…to have the self-confidence necessary to try different ways of behaving. (12)

We calculate the mean cognitive flexibility rating by averaging the responses (recoding items 2,3,5,10) across all items.

Reference

Martin, M., & Rubin, R. (1995). A New Measure of Cognitive Flexibility. Psychological Reports, 76, 623–626.

Appendix C

Measure Perceived Leader Responsiveness

We based the measurement of responsiveness on the Perceived Partner Responsiveness Scale by Reis, Lee, O'Keefe, and Clark (2018). To fit the situation of evaluating a leader we adapted the item wording of the original scale. The items were rated on a 7 -point scale, from 1= "not at all" to 7 = "very much":

I would expect John in his role as senior manager…
...to make the employees feel cared for. (1)
...to make the employees feel like their abilities and opinions are valued. (2)
...to be responsive to employees' needs. (3)
...to be interested in what employees are thinking and feeling. (4)
...to ignore the employees' side of the story. (5R)
...to ignore the things that are most important to the employees. (6R)
...to try to see where the employees are coming from (7).
...to dismiss the employees' concerns too easily. (8R)
...to NOT accept the employees' feelings and concerns. (9R)
...to really listen to the employees. (10)
...to be understanding towards the employees. (11)

We calculate the mean perceived responsiveness rating by averaging the responses (recoding items 5, 6,8, 9) across all items

Reference

Reis, H. T., Lee, K. Y., O'Keefe, S. D., & Clark, M. S. (2018). Perceived partner responsiveness promotes intellectual humility. Journal of Experimental Social Psychology, 79, 21–33.

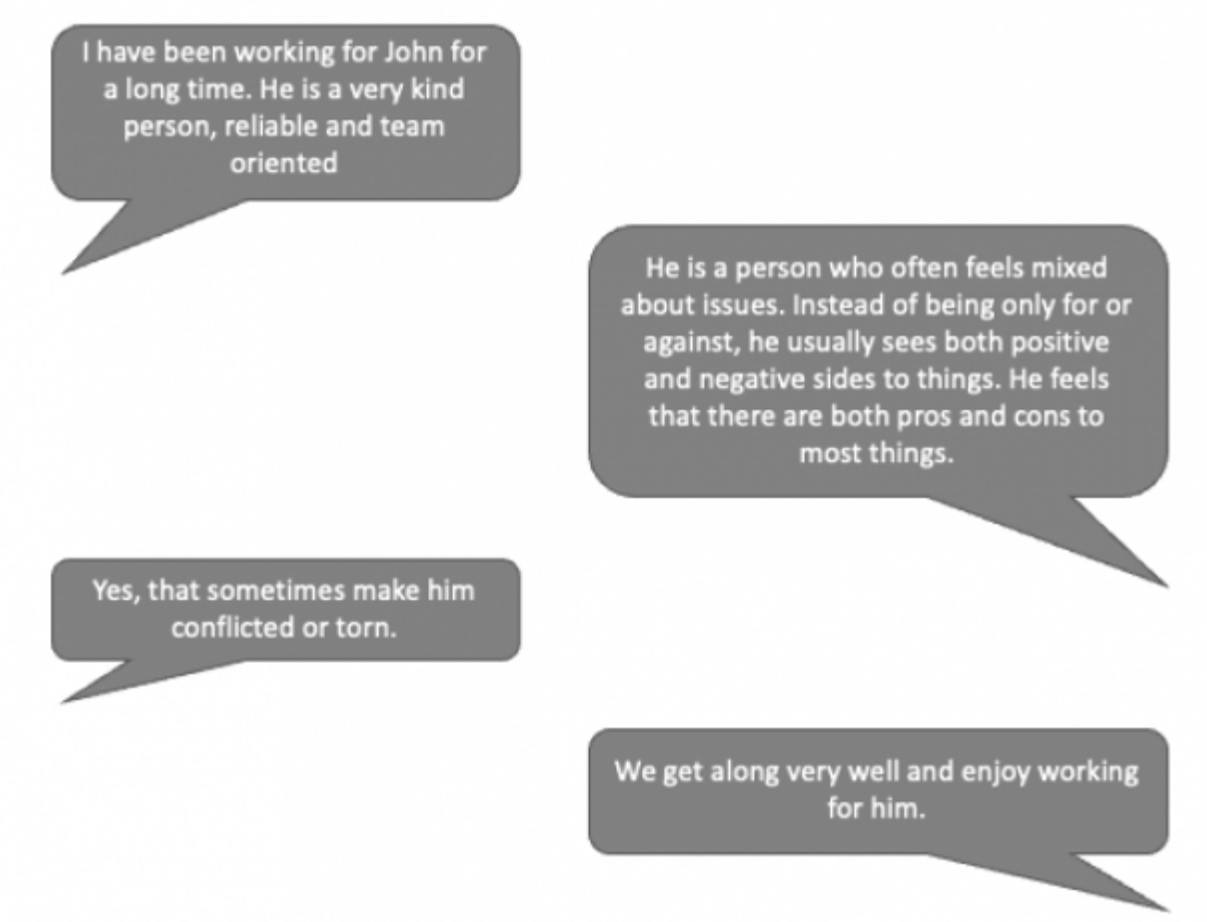
Appendix D

Leader manipulation (cf. Pauels, Dorrough, Kühlkamp, & Schneider, n.d.)

Ambivalent Leader Condition:

Your new supervisor John.

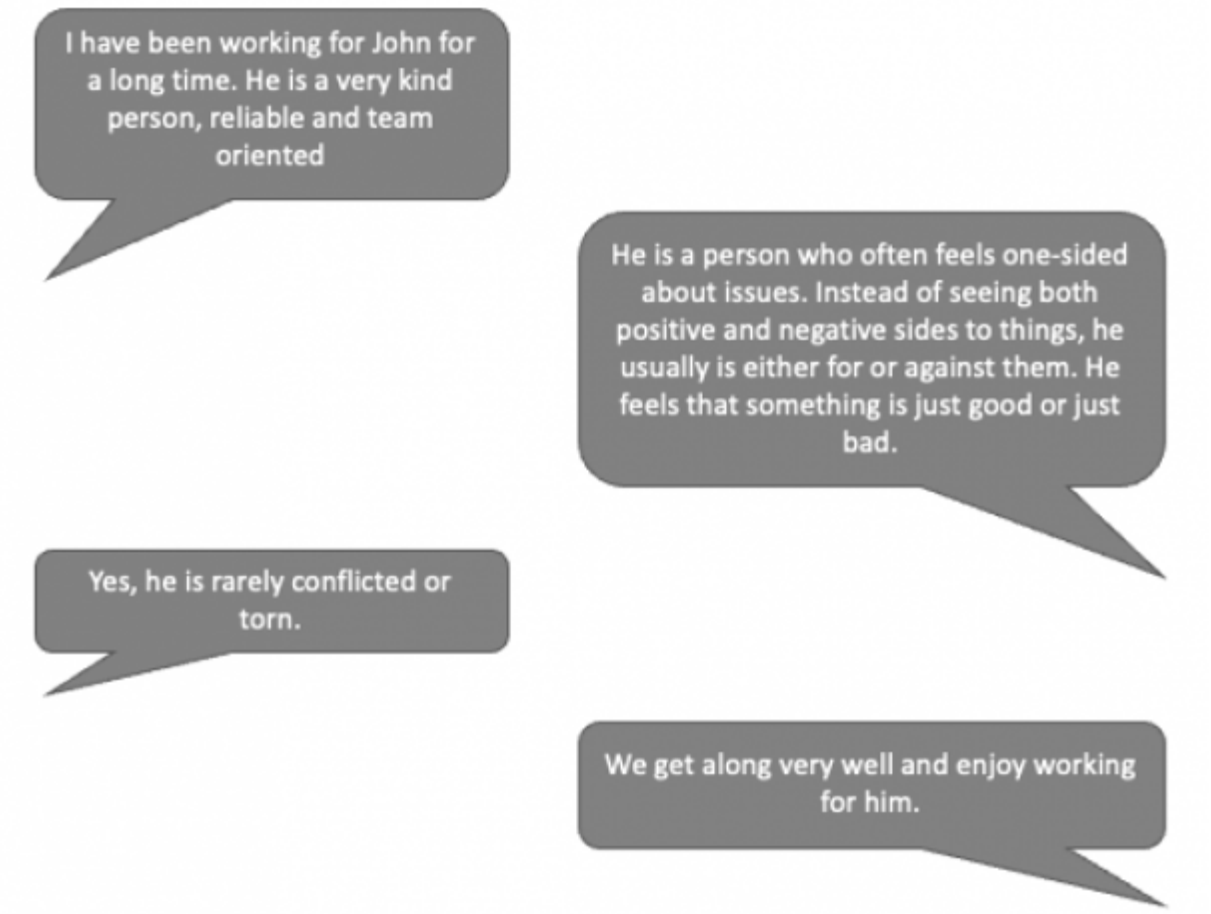
You have just started a new job at a medium-sized company. Your immediate supervisor, the department manager, is called John. At lunch, you ask your new colleagues about John. Here is how your colleagues describe your new supervisor:



Non-Ambivalent Leader Condition

Your new supervisor John.

You have just started a new job at a medium-sized company. Your immediate supervisor, the department manager, is called John. At lunch, you ask your new colleagues about John. Here is how your colleagues describe your new supervisor:



Appendix E

Speaking Up/ Upward Voice Measure (adapted from Liu et al., 2010)

We are also interested in how you would expect to interact with your new supervisor John based on your impression of him. Again, there are no right or wrong answers.

Items were rated on a scale from 1 ("Not at all") to 7 ("Very much")

1) I would develop and make recommendations to John concerning issues that affect the company.
2) I would speak up and influence John regarding issues that affect the company.
3) I would communicate my opinions about work issues to John even if my opinion is different, and John disagrees with me.
4) I would speak to John with new ideas for projects or changes in procedures.
5) I would give constructive suggestions to John to improve his work.
6) I would point out to John to eliminate redundant or unnecessary procedures.
7) If John made mistakes in his work, I would point them out and help him correct them.
8) I would try to persuade John to change organizational rules or policies that are nonproductive or counterproductive.
9) I would suggest to John to introduce new structures, technologies, or approaches to improve efficiency.

Liu, W., Zhu, R., & Yang, Y. (2010). I warn you because I like you: Voice behavior, employee identifications, and transformational leadership. The Leadership Quarterly, 21(1), 189-202.

Appendix F

Workplace scenarios

1. Idea of improvement

   You notice that a delay in communication between upper management and your direct supervisor John limits the amount of time you and other employees of the marketing team have to complete a marketing campaign for the company. You have the idea to establish a direct email channel where upper management can send information directly to you and the marketing team. You think this could increase efficiency.

2. Response to dissatisfaction

   Your supervisor John created an online reward system that allows employees to recognize each other's extra work. John had been advocating for such a system for some time and finally gotten the go from upper management. While everyone in the department has access to the same system, you notice that it is significantly easier for the office staff to give each other recognition. In contrast, you and other colleagues who often have to go out to clients and take business trips have to take out extra time to give the reward. This has the potential to impact your and your colleagues bottom line, meaning that you would either have to work harder or risk getting disciplined. As a consequence, you feel dissatisfied and poorly treated.

3. Ethical or fairness concern

   Your colleague, who also was hired recently, is anxious to create a good impression on your mutual supervisor John. Hence, to maximize his sales volume your new colleague, occasionally, exaggerates the value and benefits of the company products with full intention to persuade customers to purchase the products. You feel that this deception of the customers is unethical and might hurt the company's reputation in the long run.

CHAPTER 5

GENERAL DISCUSSION

As outlined in the introduction, the present dissertation was guided by two central questions:

1. Following a growing line of research highlighting the benefits of ambivalence and challenging its predominantly negative conceptualization, what more can we learn about the functional role of ambivalence in both intra- and interpersonal decision-making processes?

2. Furthering past research that mostly investigated the effects of ambivalence experienced in the moment (i.e., state ambivalence), how are individual differences in ambivalence related to outcomes in intrapersonal as well as interpersonal processes?

Using these questions as a foundation, this dissertation seeks to expand the understanding of ambivalence beyond the existing literature. First, it challenges the prevalent notion of ambivalence as merely a negative or conflict-laden state (Newby-Clark et al., 2002; Van Harreveld, Van der Pligt, et al., 2009). By systematically examining situations where ambivalence might actually be beneficial, this work contributes to a more nuanced understanding of ambivalence as a potentially adaptive response in decision-making. In particular, this dissertation examined how ambivalence can foster balanced cognitive processing at the intrapersonal level (Chapters 2 and 3) and shape perceptions of cognitive flexibility and responsiveness in interpersonal contexts (Chapter 4). In doing so, it directly addresses the first research question by reframing ambivalence from a predominantly negative experience to one that may have important functional advantages in both intrapersonal and interpersonal judgments.

Second, while much of the existing research has focused on state ambivalence, which captures the momentary experience of ambivalence, this dissertation highlights the importance of investigating trait ambivalence—a stable individual difference in the tendency to experience ambivalence (Schneider et al., 2021; Simons et al., 2018). Examining trait ambivalence offers a unique perspective, as trait variables can provide greater predictive power for understanding long-

term patterns of behavior and decision-making (Roberts et al., 2007; Rustichini et al., 2016). Unlike state ambivalence, which fluctuates with context and stimulus, trait ambivalence reflects how individuals tend to react to conflicting information and experiences. This dissertation thus bridges the gap between transient emotions, attitudes, and enduring personality traits, offering a more comprehensive understanding of ambivalence and its adaptive potential across both intrapersonal and interpersonal domains.

To address the two central questions, this dissertation is organized into two main parts. Part I, titled "Being Ambivalent: Trait and State Ambivalence in Intrapersonal Decision-Making Contexts" (Chapters 2 and 3), investigated whether trait and state ambivalence are associated with more balanced information processing in intrapersonal decision-making. Specifically, it examined how ambivalence influences the processing of confirmatory and disconfirmatory information, aiming to determine whether individuals who experience more ambivalence engage with information in a less biased way.

Specifically, Chapter 2 addressed whether trait ambivalence is associated with more balanced information processing in relation to confirmation—a cognitive strategy that describes the tendency to seek, interpret, and prioritize information that are in line with one's existing beliefs or expectations (Butera et al., 2018; Klayman, 1995). While confirmation can be viewed as a general cognitive strategy (for a discussion see Butera et al., 2018), it often culminates in confirmation bias, a well-documented cognitive pitfall that can lead to suboptimal decision-making across a variety of domains, from financial investments to scientific reasoning (Nickerson, 1998; Oswald & Grosjean, 2004). Specifically, my co-authors and I examined the link between trait ambivalence and confirmation, focusing on whether individuals higher in trait ambivalence are less prone to confirmatory information processing across a series of decision-making tasks. Prior research has mainly focused on state ambivalence and its temporary effects on cognitive processing, but this chapter addresses the unexplored question of whether trait ambivalence is associated with similar adaptive effects in the specific realm of confirmation.

The results showed that individuals higher in trait ambivalence consistently exhibited reduced confirmation. That is, they engaged in more disconfirmatory strategies when testing assumptions in small decision tasks, adopted a more balanced approach to gather information for hypothesis testing, and demonstrated less evaluation bias, meaning that they rated confirmatory and disconfirmatory information as more equally important and credible. A meta-analysis confirmed the robustness of this relationship. These findings extend the ambivalence literature by offering new insights for understanding how individual differences are connected to mitigated bias in decision-making.

Building on the findings of Chapter 2, Chapter 3 investigated how both trait and state ambivalence are related to the real-time acquisition of confirmatory and disconfirmatory information, thereby going beyond explicit evaluations and reported intent which was captured in the research of Chapter 2. Using a process-tracing paradigm, my co-author and I were able to measure the time participants spent viewing (i.e., acquiring) disconfirmatory and confirmatory information during a comprehensive decision-making task, relating these acquisition times to their trait and state ambivalence. Based on the findings of Chapter 2, we hypothesized that both higher trait and state ambivalence would be associated with reduced acquisition of confirmatory information and increased acquisition of disconfirmatory information. Contrary to these expectations, the preregistered analyses revealed no significant relationship between (trait or state) ambivalence and the ratio of confirmatory versus disconfirmatory information acquired.

However, exploratory analyses provided a more nuanced picture. When participants were categorized based on the type of information they spent the longest time acquiring, objective ambivalence was linked to dominant disconfirmatory information acquisition, while subjective ambivalence was associated with dominant confirmatory information acquisition. These findings suggest that subjective ambivalence may amplify bias, whereas objective ambivalence promotes more balanced information processing. It is important to note, however, that these results are based on exploratory analyses and should be interpreted with caution.

Together, the findings from Part I of this dissertation, which focused on ambivalence in intrapersonal processes, offer a more nuanced understanding of how trait and state ambivalence influence decision-making. For trait ambivalence, robust evidence, supported by meta-analytic findings, shows that it is consistently associated with reduced confirmation in the evaluation of information, intended information acquisition, and hypothesis testing. However, no significant relationship was found between trait ambivalence and actual information acquisition in tasks involving implicit measures. This null finding may not necessarily indicate the absence of an effect but could be due to an underpowered study design that overestimated the expected effect size. This point will be revisited in section 5.3 of this chapter, where potential methodological considerations and future research directions are discussed.

In contrast, state ambivalence, particularly objective ambivalence, showed tentative but promising evidence of being associated with more balanced processing of confirmatory and disconfirmatory information. Although these findings emerged from exploratory analyses, they suggest intriguing possibilities and fruitful avenues for future research, particularly in understanding how different forms of ambivalence influence decision-making processes. Taken together, the findings in Part I highlight the importance of distinguishing between trait and state ambivalence and their distinct roles in decision-making contexts. They also underscore the need for further research using richer measures of real-time information processing to clarify when and how ambivalence promotes balanced information processing.

Building on this intrapersonal perspective, Part II, titled "Seeing Ambivalence: The Interpersonal Effects of Perceiving Trait Ambivalence" (Chapter 4), shifts focus from how ambivalence influences one's own decision-making to how observers perceive individuals who are frequently ambivalent and how this in turn affects the observers' choices. This part examined whether people infer greater cognitive flexibility from someone described as high in trait ambivalence, particularly in leadership contexts, and whether these perceptions affect how they interact with and respond to such individuals.

Given that leaders frequently experience ambivalence due to the complex and often conflicting demands of their role (Ashforth et al., 2014) and that perceptions in leadership contexts are especially consequential (Bass, 1999; Schilling et al., 2022), in Chapter 4 we examined whether followers perceive ambivalent leaders as more cognitively flexible and how this perception affects leader-follower dynamics. We hypothesized that perceived cognitive flexibility would lead followers to see ambivalent leaders as more responsive, which in turn would encourage greater upward communication—the willingness of employees to speak up with suggestions, concerns, or observations of unethical behavior (Morrison, 2011). Across three preregistered studies, we found consistent support for this serial mediation model: Ambivalent leaders were indeed perceived as more cognitively flexible, which led to higher perceived responsiveness and, ultimately, to an increased likelihood of upward communication from followers.

To our knowledge, this study provides the first experimental evidence confirming the previously theorized link between leader ambivalence and perceived cognitive flexibility (Rothman & Melwani, 2017). By identifying cognitive flexibility as a key psychological mechanism, the study highlights how follower perceptions of leader ambivalence can enhance leader-follower interactions and improve organizational communication. In addition to advancing theory, these findings offer a new perspective on prior research. For example, research has linked perceiving an ambivalent leader to reduced follower engagement (Lim et al., 2021). The research in Chapter 4 suggests that this discrepancy may result from differences between a leader displaying trait versus state ambivalence. Specifically, perceiving trait ambivalence may foster engagement due to its implied predictability, whereas displays of momentary state ambivalence may imply unpredictability. Future empirical testing of this distinction would further refine theoretical models on the functional and dysfunctional outcomes of ambivalence in leadership, offering valuable insights into when ambivalence is likely to enhance or hinder organizational effectiveness.

As such, the findings presented in this dissertation contribute to multiple theoretical frameworks by deepening our understanding of how ambivalence influences intrapersonal cognition and interpersonal perception. While past research has primarily focused on the disruptive effects of ambivalence, the results from this dissertation highlight its potential benefits, both when people experience and when they perceive ambivalence. Also, the evidence suggests that different forms of ambivalence—trait versus state, objective versus subjective—exert distinct effects on decision-making and social perception. These findings call for a more nuanced approach to ambivalence in psychological theories, extending beyond traditional models that emphasize conflict resolution. Below, I discuss how this work refines and extends existing models of ambivalence, including the ABC Model of Ambivalence (van Harreveld et al., 2015), the MAID Model (Van Harreveld, Van der Pligt, et al., 2009), as well as concerning its interpersonal implications for the Social Functional Theory of Emotions (Rothman & Melwani, 2017).

5.1 Theoretical Implications

Although the results across the three empirical chapters align with emerging research showing that ambivalence also has adaptive potential in both intra- and interpersonal contexts, ambivalence arguably has had somewhat of a bad reputation. As it fundamentally constitutes a consistency violation (Festinger, 1957), research in (social) psychology has conceptualized ambivalence as a state of conflict (Priester & Petty, 1996; Thompson et al., 1995) that induces discomfort and thus has focused on how it can be resolved (Nordgren et al., 2006; Van Harreveld, Van der Pligt, et al., 2009). Departing from this traditional view, recent research has begun to investigate whether ambivalence may also have functional benefits (e.g., Fong, 2006; Hostler & Berrios, 2021; Pillaud et al., 2018; Rees et al., 2013), a line of research the present dissertation expands on.

Still, in attitude research, ambivalence has been predominantly regarded as unhelpful in predicting behavior or consistent future attitudes because it has been viewed as the opposite of a

strong attitude (Armitage & Conner, 2004; Bargh et al., 1992; Sparks et al., 2004). This perspective emphasizes the conflict and discomfort associated with ambivalence, which becomes especially pronounced when a decision is imminent and when there is pressure to resolve conflicting thoughts and feelings. This notion is captured in key theoretical frameworks such as the MAID (Model of ambivalence-induced discomfort; Van Harreveld, Van der Pligt, et al., 2009) as well as the ABC (Affect, Behavior, Cognition) Model of Ambivalence (van Harreveld et al., 2015). As such, the present findings have significant implications not only for understanding the potential benefits of ambivalence, but also for refining the MAID and ABC models of ambivalence. These models have primarily focused on ambivalence as a source of discomfort and decision-making challenges, whereas the present findings highlight that ambivalence may also serve as an adaptive resource, offering a more comprehensive perspective on its functional roles in judgment and behavior.

5.1.1 Revisiting the MAID Model and Integration with the ABC Model of Ambivalence

The MAID Model (Van Harreveld, Van der Pligt, et al., 2009) posits that the discomfort caused by ambivalence is the key driver of systematic processing, motivating individuals to seek resolution when facing co-occurring contrasting evaluations. According to this framework, people engage in effortful cognitive processing primarily as a means to reduce the psychological discomfort associated with ambivalence. The findings from this dissertation partially support this assumption but also suggest that the model's strict emphasis on discomfort as the primary mechanism may be overly narrow. Specifically, Chapter 3 showed that while subjective ambivalence, which can be viewed as a proxy of negative affect, did predict information acquisition to some extent, objective ambivalence also influenced information acquisition directly, suggesting that co-occurring contrasting evaluations may shape cognitive processing even in the absence of strong subjective discomfort.

Moreover, these results highlight a potential distinction between discomfort-driven processing (as proposed by the MAID Model) and a more neutral, curiosity-driven cognitive

engagement. The MAID Model conceptualizes ambivalence primarily as a conflict to be resolved, whereas the findings of this dissertation, particularly regarding trait ambivalence, suggest that ambivalence may also facilitate more balanced information processing without the need for discomfort to be the motivating factor. Future refinements of the MAID Model may benefit from differentiating between discomfort-driven systematic processing and a broader, less affectively charged pathway through which ambivalence fosters cognitive flexibility.

Building on this, the ABC Model of Ambivalence (van Harreveld et al., 2015) extends the MAID Model by focusing not only on discomfort as a driver of cognitive engagement but also on the specific mechanisms through which ambivalence shapes affect, behavior, and cognition. One assumption of the ABC Model is that individual differences moderate the extent to which objective ambivalence translates into subjective ambivalence and, subsequently, into cognitive consequences. The findings from this dissertation provide preliminary empirical support for this claim, demonstrating that trait ambivalence influences the relationship between objective ambivalence and subjective ambivalence, which in turn shapes information processing. Although these insights are based on exploratory analyses, they contribute to a more nuanced understanding of the interplay of state and trait ambivalence and subsequent information processing.

The ABC Model of Ambivalence (van Harreveld et al., 2015) also proposes that subjective ambivalence is the primary mechanism through which objective ambivalence influences cognition and behavior. That is, it posits that individuals experience evaluative conflict (i.e., objective ambivalence), which gives rise to felt discomfort (i.e., subjective ambivalence), which then motivates cognitive and behavioral adjustments. The exploratory findings from this dissertation partially support this assumption but also suggest that the model's straightforward path from objective ambivalence to subjective ambivalence to downstream consequences may require refinement. Specifically, while subjective ambivalence did mediate the relationship between objective ambivalence and cognitive processing, objective ambivalence also had direct

effects on information acquisition, above and beyond subjective ambivalence. This suggests that subjective ambivalence may not always be the sole driver of cognitive processing outcomes and that, in some cases, objective ambivalence itself may influence information engagement, even when subjective discomfort is not strongly pronounced.

A related implication concerns the nature of objective ambivalence itself. The prevailing assumption in ambivalence research is that objective ambivalence is purely a structural measure, reflecting the extent of co-occurring contrasting evaluations without necessarily involving an experiential component. However, the exploratory findings of this dissertation regarding state ambivalence raise the possibility that objective ambivalence may already contain some degree of experience or awareness, albeit not necessarily negatively charged in the way subjective ambivalence is conceptualized. In other words, what is currently termed subjective or "felt" ambivalence in the literature may primarily capture the negative or discomforting aspects of holding conflicting evaluations, while objective ambivalence could reflect a broader, more neutral awareness of attitudinal conflict—or rather the co-occurrence of contrasting evaluations. If this is the case, the current distinction between objective and subjective ambivalence may require further theoretical refinement to account for different types of "felt" ambivalence, not just the "discomforting" kind but also a more neutral or even constructive awareness of co-occurring contrasting evaluations.

Given that some of the discussed results largely emerged from exploratory analyses, they should be interpreted with caution, and further research is needed to systematically test when subjective ambivalence functions as a necessary mediator and when objective ambivalence might exert direct effects. The present findings can speak to the "C" (cognition) in the ABC model of ambivalence, and to some degree also to the "B" (behavior), as seeking disconfirmatory or confirmatory information is itself a behavioral act. Nonetheless, these findings suggest that future refinements of the ABC model could benefit from a more multi-faceted perspective: one that recognizes that subjective ambivalence may not always be the only pathway through which

evaluative conflict influences cognition and behavior. Instead, it may be possible, with more future research for a stronger basis, to integrate a new pathway that represents the positive consequences of objective ambivalence on information processing and behavior.

5.1.2 Integration with Theory on the Functional Aspects of Ambivalence

As mentioned above, next to the more traditional view, other research on ambivalence began to uncover its potential benefits, focusing on how mixed emotions (i.e., emotional ambivalence) might broaden cognitive processing, enhance creativity, and support associative thinking (e.g., Fong, 2006; Hostler & Berrios, 2021; Rees et al., 2013). As such, it seems that emotional ambivalence research was thus instrumental in shifting the focus to how ambivalence might serve adaptive functions under certain circumstances, such as when it influences unrelated tasks like creativity tasks or general knowledge estimation.

Connecting to this line of research, the findings of this dissertation advance our understanding of how ambivalence can be beneficial in both intra- and interpersonal contexts. Chapter 2 demonstrated that trait ambivalence consistently reduces confirmation, supporting theoretical assumptions that link ambivalence to increased cognitive flexibility (Rothman & Melwani, 2017). Chapter 3, though presenting a more complex and mixed picture, revealed that different forms of ambivalence (objective and subjective) exert distinct and sometimes opposing influences on cognitive processing and did not find a consistent correlation of trait ambivalence with information acquisition. These findings underscore the importance of considering both positive and negative consequences of ambivalence and their potential moderators, as proposed by Rothman et al.'s (2017) framework for understanding ambivalence as a dual-nature construct.

Finally, Chapter 4 showed that people, in an organizational context, inferred more cognitive flexibility when a person (i.e., their new manager) was described as high (versus low) in trait ambivalence. Crucially, this perception had knock-on effects: ambivalent leaders were perceived as more responsive which led to followers being more likely to speak up. Thereby, these findings offer empirical support for the social functional theory of emotions (Rothman &

Melwani, 2017) which posits that ambivalent individuals (i.e., leaders) are perceived to possess more cognitive flexibility, which, in turn, has positive downstream consequences on follower proactivity. While offering empirical support for the broader theoretical assumptions, one important difference should be noted. Namely, that originally Rothman and Melwani (2017) assumed that trait ambivalence should actually be a negative influence. They concluded this because previous research on trait-level emotional complexity highlights its association with poorer outcomes. Specifically, individuals with high trait affective complexity tend to be emotionally hyper-reactive, experience dysregulated responses, and struggle to adapt effectively to their environments (Beal & Ghandour, 2011; Eid & Diener, 1999). Such emotional variability can result in negative affect, heightened neuroticism, and reduced psychological well-being, ultimately impairing cognitive flexibility and adaptability (Kuppens et al., 2010). However, our results imply quite the opposite: that it is possible for trait ambivalence to be perceived as a signal of greater cognitive flexibility in certain contexts. Although it needs to be noted that trait affective complexity and trait ambivalence are to be conceptually differentiated, with trait ambivalence being less focused on emotional volatility and capturing more of how people tend to react towards the simultaneous co-occurrence of positive and negative evaluations.

Taken together, the current research contributes to advancing the theoretical understanding of ambivalence. Particularly, by looking at how individual differences in ambivalence are correlated with outcomes in intrapersonal as well as interpersonal decision-making, the present research offers insights into the correlates of trait ambivalence and how to integrate this form of ambivalence in existing ambivalence models. The broader implications of this research challenge the assumption that discomfort due to evaluative conflict should always be mitigated. Instead, ambivalence may serve as a tool for growth and wisdom. Drawing from Weick's (1998) concept of the "attitude of wisdom," the dissertation suggests that ambivalence can enhance our ability to embrace complexity and uncertainty. To be clear, this is not to say that ambivalence should never be resolved or can always be harnessed for the better, but rather that a

reconceptualization to include its functional aspects is not only useful and long overdue but would also have far-reaching implications for theories of cognition, motivation, and behavior.

Interestingly, this shift in how ambivalence is conceptualized is not unique to psychology. Other disciplines, including sociology and philosophy, have also moved away from viewing ambivalence solely as a problematic state. In sociology, for example, ambivalence has increasingly been understood as an adaptive response to navigating complex social roles, rather than merely a source of tension (Jacobsen, 2023). Similarly, in philosophy, ambivalence was once regarded as a weakness in agency, but more recent perspectives suggest that holding contrasting evaluations can be a rational response to complex, value-laden decisions rather than an impediment to action (Coates, 2017; Feldman & Hazlett, 2020). This broader interdisciplinary shift reflects an increasing recognition that ambivalence is not merely something to be overcome but can also serve a functional role in people's decision-making. The findings of this dissertation contribute to this evolving perspective, demonstrating that ambivalence, particularly at the trait level, may foster openness to disconfirmatory information, rather than solely motivating conflict resolution.

5.2 Practical Implications

The findings of this dissertation have practical implications for individual decision-making and organizational leadership. By reframing ambivalence as a potential asset rather than a liability, this research highlights actionable strategies for leveraging its benefits across various domains. The results from Chapters 2 and 3 suggest that ambivalence, particularly at the trait level, can reduce confirmation and promote more balanced information processing. These findings could be applied in fields where unbiased judgment is critical, such as healthcare, law, and policymaking. For example, training programs could be developed to help individuals embrace ambivalence as a cognitive tool, encouraging them to reflect on conflicting perspectives rather than seeking only confirmatory evidence. The results also underscore the value of interventions such as "consider-the-opposite" exercises (Lord et al., 1984), which explicitly encourage people to engage with counterarguments, and thus could enhance cognitive openness, leading to more

accurate, less biased decisions. Additionally, the distinction between objective ambivalence and subjective ambivalence could be leveraged in interventions aimed at promoting cognitive flexibility while minimizing discomfort. Programs that help individuals recognize and utilize their objective ambivalence while managing the emotional discomfort of subjective ambivalence could improve decision-making.

Understanding factors that mitigate confirmation bias is particularly crucial in today's information ecology, where AI-powered tools increasingly reinforce users' existing beliefs and many AI chatbots and search engines are designed to optimize engagement by providing affirming responses, which may unintentionally amplify confirmation bias rather than challenge it (O'Leary, 2025). In this context, interventions promoting cognitive flexibility become even more vital, helping individuals critically evaluate AI-generated content rather than passively accepting affirming narratives.

While abundant research has documented cognitive biases such as confirmation bias, work on how to effectively reduce their impact remains scarce (Lilienfeld et al., 2009; Nickerson, 1998). Existing approaches, such as training critical thinking skills or educating people about the existence of biases, often show limited transfer across domains and low effectiveness (Arkes, 1981; Norman et al., 2017; Willingham, 2008). Given the role of ambivalence in promoting balanced information processing, these findings point to a novel perspective in designing interventions: leveraging the natural experience of ambivalence and reframing it as a constructive mindset. Education systems, for example, could integrate the acknowledgment and constructive handling of conflicting information into critical thinking curricula, preparing students for a world where misinformation, polarization, and complexity are increasingly prevalent (Del Vicario et al., 2019; Shtulman, 2024). Similarly, in public discourse, leaders and public figures who openly grapple with complex decisions rather than offering simplistic narratives may foster trust (Pauels, E., Dorrough, A., et al., n.d.) and engagement with nuanced discussions.

The results of Chapter 4 suggest that ambivalence in leaders is associated with perceptions of responsiveness and cognitive flexibility, fostering greater upward communication. This highlights the value of ambivalence as a leadership trait, particularly in environments that require adaptability and openness to diverse perspectives. Leadership development programs could incorporate modules that help leaders recognize and leverage their ambivalence as a strength. Leaders could be trained to model ambivalence in a way that signals openness and a willingness to engage with complexity, encouraging employees to voice diverse viewpoints. Ambivalence may be particularly advantageous in change management contexts, where leaders must balance competing stakeholder demands and navigate uncertain terrain. By embracing ambivalence, leaders can promote a culture of collaboration and innovation, fostering better decision-making and team dynamics. Taken together, this dissertation highlights ambivalence as a potentially powerful and economical psychological resource that could be harnessed to improve decision-making outcomes at individual, organizational, and societal levels.

5.3. Limitations and Future Directions

While this dissertation provides valuable insights into the role of trait and also state ambivalence in decision-making and interpersonal dynamics, several limitations warrant consideration. These constraints highlight areas where caution is necessary in interpreting the findings and point to avenues for future research.

One potential limitation concerns the generalizability of the findings due to the reliance on online participant samples, which was largely necessitated by data collection constraints during the COVID-19 pandemic. While these online samples tend to be more varied in terms of demographics and life experience than the traditional convenience samples often drawn from student populations (Buhrmester et al., 2011; Chandler et al., 2019; Landers & Behrend, 2015), they may still not fully capture how ambivalence operates in high-stakes decision-making environments, such as organizational leadership. Additionally, the controlled nature of experimental settings, particularly the use of hypothetical decision-making scenarios, may limit

the ecological validity of the findings. Future research could address this limitation by conducting field studies rooted in real-world settings to examine how ambivalence unfolds in naturalistic settings to deepen our understanding of its role in decision-making and interpersonal dynamics.

Another methodological challenge is reflected in the null findings from the preregistered analyses of Chapter 3. While these analyses did not reveal robust effects of trait or state ambivalence on confirmation in information acquisition, this does not necessarily rule out the possibility of such relationships. In fact, exploratory analyses in Chapter 3 suggested patterns that hint at the potential influence of ambivalence on information acquisition, particularly when considering subjective versus objective ambivalence. The absence of significant preregistered findings therefore raises questions about the sensitivity of the current task design. It is possible that subtle or context-dependent effects of ambivalence on information acquisition were not detected because the measures used may not have been fine-grained enough, or because the study design lacked the statistical power to capture these nuanced relationships. Future research could address these methodological challenges by employing more comprehensive decision-making scenarios that potentially allow for more variance in search and acquisition patterns. Additionally, more refined measures of information processing could be used in future studies, such as for example eye-tracking (Wedel et al., 2023), to better identify how trait ambivalence may shape actual information acquisition in decision-making contexts.

Beyond methodological considerations, this dissertation also raises important theoretical questions about the complexity of both trait and state ambivalence as well as their correlates and consequences in the realm of information processing and decision-making. All in all, the literature on ambivalence and information processing presents a mixed picture: while some studies suggest that ambivalence narrows information processing by biasing attention towards pro-attitudinal information (Nordgren et al., 2006; Sawicki et al., 2013), others find that ambivalence can broaden perspectives and foster more balanced evaluation (Rees et al., 2013; Schneider et al., 2021).

While models the ABC Model (van Harreveld et al., 2015) and the MAID Model (Van Harreveld, Van der Pligt, et al., 2009) have largely focused on the discomfort that ambivalence can create as the driving force of its effects, other research has highlighted ambivalence's duality and aimed to synthesize the complex picture of ambivalence research findings (Rothman et al., 2017). This work identifies key moderators, such as decision-making contexts, relational norms, and psychological safety, that determine whether ambivalence potentially fosters cognitive flexibility and positive engagement or, conversely, leads to rigidity and disengagement. For instance, when people are not forced to make binary choices, ambivalence can promote flexibility and openness to diverse perspectives. Similarly, in secure, cooperative relationships, ambivalence encourages thoughtful engagement and integrative responses, whereas a lack of psychological safety often leads to conflict or disengagement.

However, despite this framework, most of these proposed moderators remain largely untested and under-examined in the empirical literature. Unfortunately, this dissertation did not systematically investigate moderators either, limiting the present work's ability to directly contribute to clarifying the conditions under which ambivalence, trait or state, has positive or negative effects. Nonetheless, the findings of this dissertation offer inspiration for future research with the goal to systematically test moderators to better understand how ambivalence operates in intrapersonal decision-making and interpersonal contexts.

For example, future studies could take a closer look at the moderating effects of negative affect. Research has suggested that when state ambivalence induces negative affect, people focus on emotional coping mechanisms such as biased processing. That is, when people experience negative affect because due to experiencing ambivalence they are more likely to engage in biased processing, such as confirmatory information processing (Clark et al., 2008; Sawicki et al., 2011, 2013) as a means to quickly reduce the negative experience (Nordgren et al., 2006; Van Harreveld, Van der Pligt, et al., 2009). Consequently, it has been theorized that when having

mixed feelings elicits negative affect, this could lead to cognitive *in*flexibility (Rothman et al., 2017).

Therefore, the beneficial effects of ambivalence may only occur when a person is not experiencing negative metacognitive emotions with regards to their ambivalence. One way future research could test this assertion is by comparing two conditions: (1) framing of ambivalence as a negative state (e.g., participants could read a text describing ambivalence primarily as an uncomfortable experience of conflict and indecision; cf. Bell & Esses, 2002) leading them to feel negative about their ambivalence and (2) framing of ambivalence as a beneficial state (participants will read a text describing ambivalence as a positive and usual experience). Probably, participants in the negative ambivalence condition would then demonstrate more confirmatory information processing than participants in the positive ambivalence condition, because their information processing is more biased due to their high motivation to decrease their ambivalence-induced negative affect.

Alternatively, it would be interesting to measure negative affect in a more unobtrusive way and use physiological indices of negative affect, such as high arousal as detectable in heart rate, muscle tension (Zellars et al., 2009) or skin conductance (Figner & Murphy, 2011), that could then be correlated with the degree to which a person is ambivalent as well as subsequent decision-making performance. Supposedly, under conditions where ambivalence is associated with strong physiologically experiences indicating negative affect, there will be more biased information processing as people would like to quickly resolve the negative state they are in due to their ambivalence. However, when ambivalence is not strongly associated with physiologically measurable negative affect, then people should demonstrate more balance in their decision-making.

To better understand the role of negative affect in ambivalence, future research should examine how state and trait ambivalence interact in this regard. For example, do individuals high in trait ambivalence experience less negative affect when they encounter ambivalence in the

moment, perhaps because they are accustomed to such experiences? In other words, might a chronic tendency toward ambivalence buffer the discomfort of situationally mixed feelings, thereby fostering unbiased information processing? It is conceivable that high trait ambivalence attenuates the negative affect caused by experiencing ambivalence in the moment because individuals have habituated, therefore having reduced emotional reactivity when they are ambivalent. Indeed, people can emotionally habituate to unpleasant stimuli (Yang et al., 2025). Maybe the same is true for people who often experience ambivalence in their lives (i.e., who are high in trait ambivalence) and over time do not find it as distressing when they are ambivalent in the moment.

Conversely, it could also be the case that frequent exposure to ambivalence sensitizes individuals to its discomfort, exacerbating the negative affect associated with momentary ambivalence. If we understand subjective ambivalence as a proxy for negative affect or psychological discomfort, then the findings presented in Chapter 3 would align more with the latter prediction, as trait ambivalence appeared to strengthen the link between objective and subjective ambivalence. However, this was an exploratory result and should be interpreted with caution. Clearly, future research is needed to systematically investigate the interplay between objective, subjective, and trait ambivalence to clarify their connections to negative affect and discomfort, thereby elucidating how they differentially shape decision-making and emotional outcomes.

Another factor that may shape the outcomes of ambivalence is whether it is incidental or integral to the decision at hand (cf. Rees et al., 2013). Some research suggests that unrelated (incidental) ambivalence may lead to more balanced decision-making, whereas task-relevant (integral) ambivalence may amplify bias. However, past research has not systematically tested this distinction. The findings of this dissertation suggest that trait ambivalence, which is unrelated to the specific decision at hand, was associated with more balanced processing, whereas subjective ambivalence, which was task-related, was linked to confirmatory biases. However, the present

results also suggest that objective ambivalence, which also represents a form of integral ambivalence, is related to benefits information processing. This presents a complex picture underscoring that future research is needed to systematically compare both types of ambivalence to determine when ambivalence enhances or impairs decision-making.

In addition to the "integral versus incidental" distinction, the differentiation of cognitive versus affective ambivalence offers another valuable avenue for understanding ambivalence's effects. In formulating the MAID Model, Van Harreveld et al. (2009) also discussed the differentiation of affective and cognitive components that can make up ambivalence, thereby creating intracomponent ambivalence (only cognitive or only affective components) or intercomponent ambivalence (both cognitive and affective components). Ultimately, they argue that regardless of the nature of the components, it all constitutes a conflict in its traditional definition (K. Lewin, 1935) and therefore can be treated the same.

However, treating all kinds of ambivalence the same is possibly painting with too broad a brush. While the MAID Model (Van Harreveld, Van der Pligt, et al., 2009) treats all ambivalence as generalized conflict, recent work (e.g., W. J. R. Ng et al., 2022) suggests that the nature of the components, whether cognitive, affective, or a mix of both, can help to understand the correspondence between subjective and objective ambivalence. What they found was that the degree to which objective ambivalence translates into subjective ambivalence depends on whether the message aligns with the affective–cognitive orientation of the topic. Specifically, when a message matches the topic's affective or cognitive nature (e.g., a logical message about a cognitively oriented topic like vaccination), subjective ambivalence is more likely to reflect objective ambivalence. Conversely, when a message mismatches the topic's orientation (e.g., an emotional appeal for a cognitive topic), this correspondence weakens. Importantly, this effect is especially pronounced when the message is counter attitudinal, that is, when it contradicts the receiver's existing attitude. Thus, not only does the nature of cognitive-affective components shape when people feel subjectively ambivalent (W. J. R. Ng et al., 2022), but this could also have

important consequences for how they engage with information. Given that subjective ambivalence is associated with confirmatory information processing, identifying the conditions that heighten subjective ambivalence could help explain when individuals are more prone to seeking attitude-consistent information.

Other research has also emphasized the role of meta-bases, which describes whether individuals primarily rely on emotions (affective meta-bases) or beliefs (cognitive meta-bases) when forming attitudes, in predicting how affective versus cognitive components in objective ambivalence influence subjective ambivalence (See & Luttrell, 2021). This matching hypothesis proposes that subjective ambivalence is stronger when the type of conflict aligns with an individual's dominant meta-base (affective or cognitive)—that is, when people say that they formed an attitude on the basis of emotions rather than beliefs, if they are ambivalent in terms of affective aspects concerning the attitude object, they would report stronger subjective ambivalence as compared to when they are ambivalent in terms of more cognitive aspects. In their studies, See and Luttrell (2021) examined attitudes towards cats and dogs, identified through pilot testing as topics with affective meta-bases, meaning participants' attitudes were driven more by emotions than by beliefs. Participants reported separately their positive and negative emotional and cognitive reactions, allowing the researchers to calculate both intra-affect and intra-cognition conflict using the formula usually used for calculating objective ambivalence (Thompson et al., 1995). Results revealed that intra-affect conflict (IAC) strongly predicted subjective ambivalence, while intra-cognition conflict (ICC) did not, confirming that emotional conflict drives ambivalence for affectively based topics. This finding highlights the importance of distinguishing between emotional and cognitive conflicts when studying ambivalence, as their predictive power depends on the attitudinal context.

This component-based perspective could also be used to refine the concept of trait ambivalence. Individual differences in dispositional ambivalence may not simply reflect a general tendency toward evaluative inconsistency but rather can be distinguished by sensitivity to

particular types of contrasting, co-occurring evaluative components. For instance, individuals high in trait ambivalence may experience more ambivalence because their attitudes frequently combine either discrepant affective or cognitive elements, or because they are especially sensitive to inconsistencies within their dominant evaluative basis (e.g., affective versus cognitive orientations). This component-based view based on findings from Ng and colleagues (2022) and See and Luttrell (2021) suggests trait ambivalence could encompass distinct profiles, some rooted primarily in recurring emotional contrasts, others in recurring cognitive discrepancies, and others in persistent affect-cognition incongruence. Future research could evaluate whether breaking trait ambivalence down into different components aimed at tapping into contrasting affective versus cognitive evaluative co-occurrence could enhance the predictive value of trait ambivalence and whether this would warrant extending the Trait Ambivalence Scale (Schneider et al., 2021, 2022) by developing corresponding sub scales.

While this dissertation provides evidence that ambivalence can reduce confirmation (bias) and increase disconfirmatory information processing, it remains unclear why ambivalence leads to these effects. One potential mechanism is divergent thinking, where individuals higher in ambivalence consider multiple perspectives before making a decision (Guilford, 1967; Runco & Acar, 2019). Future studies could directly test whether (trait) ambivalence enhances divergent thinking and hypothesis testing, possibly using creativity tasks or real-world decision-making scenarios. Additionally, since it has been found to related to making more accurate forecasts by way of acquiring more information, it would be interesting to see how the actively open-minded thinking (AOT; Haran et al., 2013) relates to trait ambivalence.

Building on the findings of Chapter 4, future research should further explore what moderates how trait ambivalence is perceived in interpersonal contexts, especially in the realm of leadership and organizational decision-making. For example, follower characteristics, such as personal need for cognitive closure (Webster & Kruglanski, 1994) or integrative complexity (Q. Zhao & Zhou, 2021), may systematically influence how ambivalence is perceived. Followers high

in need for closure may judge ambivalent leaders as lacking clarity or authority, whereas those high in integrative complexity may construe the same behavior as thoughtful and inclusive.

Moreover, the research presented in Chapter 4 focused only on immediate supervisors, leaving open questions about how hierarchy moderates these effects. Specifically, it remains unclear whether ambivalent leaders are perceived differently depending on their position within an organization. At lower ranks, ambivalence may signal openness and inclusivity, making it a desirable trait. However, at higher ranks, such as among CEOs or senior executives, followers may expect decisiveness and view ambivalence negatively. Future research should investigate whether the hierarchical level of the leader moderates the effects of ambivalence on leader perceptions and follower behavior. These considerations suggest that perceptions of ambivalence are likely context-dependent, shaped by factors such as observer characteristics and hierarchical level, highlighting the need to test these potential moderators empirically

5.4 Conclusion

The findings of this dissertation contribute to a growing body of research that seeks to add to the traditional conceptualization of ambivalence—not merely as a evaluative conflict to be resolved but as a state as well as trait that can have adaptive value in both intra- and interpersonal contexts. Through the studies I conducted, I provide evidence that ambivalence, particularly at the trait level, facilitates balanced information processing, and affects how individuals perceive and respond to others who express ambivalence. By extending past work that has primarily focused on state ambivalence, this dissertation I highlight the importance of recognizing stable individual differences in ambivalence and their implications for decision-making and social interactions.

At the intrapersonal level, findings from Chapters 2 and 3 suggest that ambivalence, rather than being inherently a negative influence on decision-making, can promote more balanced information processing. In contrast to long-standing assumptions that ambivalence leads to biased processing, my results indicate that trait ambivalence, and to some extent objective

ambivalence, are associated with reduced confirmatory processing and a fairer evaluation of information. However, subjective ambivalence, defined as the felt experience of conflict (Priester & Petty, 1996), was linked to increased confirmation in exploratory analyses, suggesting that the experience of ambivalence may play a crucial role in shaping its cognitive effects.

At the interpersonal level, the findings of Chapter 4 shed light on how ambivalence is perceived in organizational contexts. While ambivalence has often been associated with indecision and uncertainty, my research provides the first experimental evidence that individuals who exhibit trait ambivalence are perceived as more cognitively flexible. In leadership settings, I show that this perception translates into greater perceived responsiveness, ultimately promoting more follower communication. This suggests that, in intrapersonal contexts, trait ambivalence can be positively received by others. However, my findings also point to potential boundary conditions; these effects may not be universal, and further research is needed to determine how trait ambivalence is perceived by different people and across different hierarchical positions.

More broadly, my findings challenge the traditional view of ambivalence as a state to be resolved and overcome. Instead, I argue that ambivalence, especially as a dispositional tendency, can be seen as a reflection of cognitive complexity and openness to diverse perspectives. This aligns with emerging perspectives in psychology, sociology, and philosophy that emphasize the potential benefits of ambivalence in fostering adaptive thinking, creativity, and deeper engagement with complex issues. Whether in intrapersonal decision-making, leadership, or social interactions, ambivalence may serve as an important mechanism that allows individuals to constructively navigate an increasingly complex world.

At the same time, this dissertation also highlights the need to find out more about boundary conditions. The benefits of ambivalence are not universal but may depend on contextual and individual factors, including how ambivalence is experienced and the demands of the decision-making context. Future research should further explore these moderators to develop

a more comprehensive framework for understanding when ambivalence is likely to be beneficial versus detrimental in decision-making.

In sum, my dissertation research provides empirical support for the idea that ambivalence can be an asset in certain contexts. By refining theoretical models and highlighting new areas for research, I contribute to a broader reevaluation of ambivalence—not as a barrier to effective decision-making, but as a potential resource for navigating complexity, fostering openness and engagement as well as promoting more balanced information processing.

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