

**Attention to the here and now:  
The impact of mindfulness on performance  
in joint decision making**

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## **Chapter 1: General Introduction**

The present moments that interest us most are those that arise when two people make a special kind of mental contact—namely, an intersubjective contact. This involves the mutual interpenetration of minds that permits us to say, “I know that you know that I know” [...]. (Stern, 2004, p. 75)

Daniel N. Stern describes in his book “The present moment in psychotherapy and everyday life” (2004) ideal preconditions for joint decision making. Therein he outlines the *intersubjective meeting*, in which at least two persons are deeply aware of and share the lived experience of a present moment (Stern, 2004; see also: Bohleber, 2013; Jung, 1966). Examples of this kind of situation are the sudden but intense eye contact with a stranger in a subway or a longer than usual goodbye handshake between therapist and patient after having worked through a series of events, which deeply affected both of them. In these examples, both are aware of the experience of the other party, and – importantly – both are aware of the mutual participation in each other’s experience. This dissertation aimed at testing whether *shared present moment awareness* inherent in intersubjective meetings which occur for example in therapeutic interactions improve performance in joint decision making.

Decision making plays an important role in every organization. When organizations are faced with specific problems, usually experts from different departments are asked to form a group. For a determined period of time their mission is to handle a project that is to develop potential solutions to problems. The idea is to combine expert knowledge from different areas and different perspectives of experts to make high-quality decisions (e.g. Sundstrom, de Meuse, & Futrell, 1990). In a global economy, biases in decision making can have broad implications

(Milkman, Chugh, & Bazerman, 2009). For more than 30 years, research has addressed problems emerging out of such situations – labeled hidden profiles – in which decision relevant information is distributed among group members (Stasser, 1988; Stasser & Titus, 1985, 2003). In hidden profile research, information relevant for the best task solution is not right from the start available to all members. Group members are provided with different informational subsets that are composed of information which is shared with all of them (shared information) and with information which is held by only one member (unshared information). To come to the best decision, group members first need to share their unshared informational subsets (Stasser & Titus, 1985). If they do this successfully, these groups have the potential to outperform individual members. However, it has been well proven that such groups often make suboptimal decisions and do not live up to their full potential (for a meta-analysis, see Lu, Yuan, & McLeod, 2012). Instead of objectively sharing and receiving information, group members tend to show a confirmation bias. This means that members evaluate information to the extent to which it supports their own initial beliefs rather than equally weighting all information (Faulmüller, Mojzisch, Kerschreiter, & Schulz-Hardt, 2012; Greitemeyer & Schulz-Hardt, 2003; Sassenberg, Landkammer, & Jacoby, 2014).

Following the conceptualization by Stern (2004), the present dissertation proposes that individuals who share a present moment should make better joint decisions. Although research has not examined *shared present moment awareness* stricto sensu, they are closely related to the construct of *mindfulness*, as both concepts draw attention to the present moment. Although there has been strong interest in exploring mindfulness in recent years, research has mainly focused on the individual (within the person). By examining mindfulness in an interpersonal context, this dissertation brings together psychoanalytical conceptualizations and social psychological research. In doing so, it seeks to contribute to our

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understanding of *what* groups and dyads actually need for effective processes in joint decision making and whether mindfulness or a specific part of mindfulness might be helpful.

### **Excursus: Intersubjectivity theory in psychoanalysis**

Shared present moment awareness has been elaborated in psychoanalytical theorizing mainly as part of the intersubjective turn (cf. Bohleber, 2013). The intersubjective turn describes the change of a therapist's role as an objectively observing clinical authority sitting behind the lying client to a subjectively participating partner sitting face to face with the client, thus emphasizing the individual contact. Having its traditional roots in intrapsychic, dyadic or even triadic concepts, intersubjectivity considers more than the interactive regulation of experience and behavior. The idea of intersubjectivity is to move *beyond* the conceptualization of an isolated mind to reach a reciprocal and multilateral influence between at least two persons. Intersubjectivity emphasizes the dynamic and systemic understanding of the interplay of at least two different individuals in a given context (Bohleber, 2013; Jung, 1966; Orange, Atwood, & Stolorow, 2015). “Intersubjective systems theory seeks to comprehend psychological phenomena not as products of isolated intrapsychic mechanisms, but as forming at the interface of reciprocally interacting worlds of experience” (Stolorow, 2002, p.330). For example, the thoughts of another person cannot be understood in an isolated and ‘objective’ manner. It also depends on the given context in

which we ourselves are and on the given context of the other person<sup>1</sup>. This is why – in order to be able to receive information from another person in an unbiased way – Stern (2004) states that it is required that individuals encounter each other in the shared lived experience of a present moment. This means that individuals need to be fully aware of the dynamic nature of the current situation involving another person to “perforce adopt a dialectical procedure consisting in a comparison of [...] mutual findings” (Jung, 1966, p.5)<sup>2</sup>.

In sum, the intersubjective theory in psychoanalysis suggests that individuals need to share a present moment to be able to receive socially distributed information in an unbiased way. Thereby, it is, as an antecedent, crucial that individuals are not only aware of the other; they need also to focus on their own intrapersonal subjective experience to be able to receive information in an unbiased way. This state described in psychoanalytic theorizing is similar to mindfulness.

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<sup>1</sup> “We live surrounded by others’ intentions, feelings, and thoughts that interact with our own, so that what is ours and what belongs to others starts to break down. Our intentions are modified or born in a shifting dialogue with the felt intentions of others. Our feelings are shaped by the intentions, thoughts, and feelings of others. And our thoughts are cocreated in a dialogue, even when it is only with ourselves.” (Stern, 2004, p.77)

<sup>2</sup> “I must perforce adopt a dialectical procedure consisting in a comparison of our mutual findings. But this becomes possible only if I give the other person a chance to play his hand to the full, unhampered by my assumptions. In this way his system is geared to mine and acts upon it; my reaction is the only thing with which I as an individual can legitimately confront my patient.” (Jung, 1966, §2, p.5)

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### Mindfulness

Mindfulness has become very popular in psychological research. Rooted in Buddhist traditions, mindfulness is often presented as psychological constructs (Gethin, 2015) as a state and trait construct (Quaglia, Brown, Lindsay, Creswell, & Goodman, 2015), with various orientation. *Eastern* mindfulness was initiated by Kabat-Zinn and his colleagues for scholarly research in the 1970s (Hart, Ivtzan, & Hart, 2013). It has been shown to have remarkable effects across many domains, such as in mental and physical health, well-being, self-regulation, and interpersonal behavior (for reviews see Brown, Ryan, & Creswell, 2007; Creswell, 2017; Dane, 2011; Good et al., 2016). However, Eastern mindfulness is not an easy concept to define. There are two components of *Eastern* mindfulness, that appear in most of the definitions (Creswell, 2016). First, mindfulness has been defined as self-regulatory capacity with the attention being directed to internal and external stimuli of a present moment. Here, mindfulness is defined as “the state of being attentive to and aware of what is taking place in the present” (Brown & Ryan, 2003, p 822) or as “intentionally paying attention from one moment to the next” (Kabat-Zinn, 2014, p. 17). Second, many conceptualizations add an observing element (with the emphasize on internal stimuli) to the self-regulatory approach. In this case mindfulness is described as “a quality of relating to one’s experience within an orientation of curiosity, experiential openness, and acceptance” with “thoughts and feelings as passing events in the mind” (Bishop et al., 2004, p. 234). Mindfulness here refers to “the activation of an observing self that is “attuned” to an experiencing self” (Parker, Nelson, Epel, & Siegel, 2015, p. 226). Therefore, it can be difficult to understand the construct of Eastern mindfulness as it is very broad and unspecific. In bringing together several characteristics that are common to most conceptualization, Dane (2011) emphasizes the “wide attentional breadth” (p. 1001) inherent in mindfulness. He defines

mindfulness as a “state of consciousness in which attention is focused on present-moment phenomena occurring both externally and internally” (p. 1000).

In line with the conceptual differences, operationalizations of mindfulness differ from each other. According to Eastern mindfulness traditions, trainings or interventions in scholarly research usually involve meditative practices which are isolated from their traditional spiritual context (Garland et al., 2015; Pagnini, Bercovitz, & Langer, 2016). Trainings are usually based on an eight-week mindfulness based stress reduction course (MBSR) by Kabat-Zinn (2013). Based hereupon, related studies also include the full program (providing different meditation exercises which are repeated in weekly group sessions) (e.g. Jensen, Vangkilde, Frokjaer, & Hasselbalch, 2012; MacCoon, MacLean, Davidson, Saron, & Lutz, 2014; Shapiro, Jazaieri, & Goldin, 2012) or only parts of the program as for example a single short term meditation like the raisins exercise. Individuals are instructed to eat raisins mindfully (e.g. “What is the consistency of a raisin? What is the taste on the tongue?”) (e.g. Heppner et al., 2008; Hong, Lishner, Han, & Huss, 2011; Kabat-Zinn, 2003, 2013; Weger, Hooper, Meier, & Hopthrow, 2012). The raisins exercise is a training which is often used as a first exercise for beginners to get familiar with mindfulness (Kabat-Zinn, 2013). Although different meditative techniques suggest different results, studies that tested the concrete mechanisms of the different trainings are scarce (Creswell, 2016). Scholars differ in their opinion on what are main elements of mindfulness or just correlates, as for example acceptance. The question has been raised whether acceptance is a component or a consequence of state mindfulness (Dane, 2011). Mindfulness trainings are often treated as black box variable, they do not consider other concepts or processes that are not directly related to mindfulness. This is most evident in the above mentioned MBSR programs. As eight-week trainings are more complex

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than short term meditations. In eight-week group trainings compared to short-term meditations there occur also factors that are not attributable exclusively to mindfulness (Eberth & Sedlmeier, 2012; Sedlmeier et al., 2012). Short-term meditation seems to be a good manipulation with regard to state mindfulness as it isolates the effects of meditation from elements also inherent in MBSR programs (Hart et al., 2013). Thereby, the raisins exercise as a short-term mediation seems to be most suitable for novices in mindfulness meditation (Kabat-Zinn, 2013).

Besides the concept of the Eastern mindfulness mentioned above, there exists also an approach to mindfulness elaborated from the Western scientific perspective (Hart et al., 2013). In the 1970s, Ellen Langer (2014) and her associates studied the framework of mindfulness: “the notion of mindfulness develops gradually by looking at aspects of mindlessness and then at the other side of the coin” (Langer, 2014, p. 79). Here, mindfulness is contrasted with mindlessness. When being mindless, individuals resort to old routines and automated behavior that may have functioned before, but they ignore current contextual requirements (Langer, 2014; Langer & Moldoveanu, 2000; Pagnini et al., 2016), whereas mindfulness is defined as “the process of drawing novel distinctions” (p.1), a “simple act of noticing new things” that “refers to a specific “quality” of being in the moment” (Pagnini & Langer, 2015, p. 365). Although *Eastern mindfulness* and *Langerian mindfulness* are based on the active attention to present moment phenomena, *Langerian mindfulness* is different from its Eastern counterpart. Langer refers to a more specific process of cognitive differentiation, involving the discrimination of multiple categories and the awareness of external stimuli (Brown & Ryan, 2003; Dane, 2011; Pagnini & Philips, 2015; Reb & Choi, 2015; Sternberg, 2000; see Hart et al. 2013 for a more detailed comparision between Langerian and Eastern mindfulness).

In *Langerian mindfulness* a meditative practice is not mandatory (Pagnini & Philips, 2015). Here, mindfulness “is not a technique or something that happens. Mindfulness is both a trait and a state construct, which refers to a specific “quality” of being in the moment” (Pagnini & Langer, 2015, p. 365). This process is believed to improve the awareness of the environment, to increase openness to new information, and to enhance the detection of multiple perspectives in problem solving (Langer & Moldoveanu, 2000). Langerian mindfulness interventions are rather brief and usually focus on cognitive processes that foster individuals’ actively making a distinction or suppressing automatic processes such as stereotypes, prejudice, automated behavior (Langer, 2014; Langer, Djikic, Pirson, Madenci, & Donohue, 2010; Pagnini & Philips, 2015). For example, mindfulness was manipulated by instructing musicians to present subtle new nuances when playing a piece of music (Langer, Russel, & Eisenkraft, 2009) or in the manipulation of environmental cues to suppress automatic processes (e.g. effects of age cues on health like more personal control of nursing home residents) (Hsu, Chung, & Langer, 2010; Langer & Rodin, 1976).

To conclude, there are two different conceptualizations of mindfulness. Eastern mindfulness usually involves meditative practices with awareness of internal and external stimuli. Trainings may contain several components and are usually treated as a black box variable. In contrast, Langerian mindfulness is a psychological construct that refers to more specific cognitive processes of active distinction making with awareness of external stimuli.

### **Mindfulness and joint decision making**

As both constructs of mindfulness focus on directing one’s attention to the present moment, mindfulness may have an effect on joint decision making. Research on joint decision making consistently demonstrates that decision quality in hidden profiles suffers and that as a

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result groups do not achieve their full potential (Lu et al., 2012). In decision making, one of the main obstacles is the confirmation bias (cf. Lilienfeld, Ammirati, & Landfield, 2009; Nickerson, 1998). That means, when in a group information is distributed; members try to confirm the preferences they have developed, rather than being open to new information from others. As a result, they are biased, that means they adopt and share information which is in accordance with their perspective, which leads to suboptimal decisions, instead of objectively comparing given alternatives (e.g. Greitemeyer & Schulz-Hardt, 2003; Sassenberg et al., 2014). For example, two studies found, that individuals rated information from a transcript of a fictitious group discussion as more important when the information was consistent with their preference (Greitemeyer & Schulz-Hardt, 2003; Mojzisch, Grouneva, & Schulz-Hardt, 2010). In view of the confirmation bias, members need, in order to find the best solution for a hidden profile task, to compare different possible alternatives independently of their personal preference to be able to achieve the best decision-quality (Sassenberg et al., 2014). Both constructs of mindfulness (Eastern mindfulness and Langerian mindfulness) may influence joint decision making in a way that they draw the attention to what is happening in a present moment –however, in two different ways.

**Eastern mindfulness.** Mindfulness in the Eastern tradition (i.e. the wide attentional breadth) may in joint decision making reduce the capability of weighting pros and cons of different alternatives. The broad and judgment-free consciousness inherent in mindfulness may not help individuals clearly discriminate between alternatives. Mindfulness may influence how individuals receive information. There is evidence that mindfulness leads to an increased recall of related but not represented words, as in the Deese-Roediger-McDermott paradigm. That means, when individuals needed to recall words from a list of words (e.g. garbage,

waste, can) they after a mindfulness induction more often falsely remembered closely related words but which were not represented on the monitor (e.g. trash). Thereby, mindfulness was induced with an adapted breathing exercise part of the MBSR-program by Kabat-Zinn (2014) in which individuals are instructed to draw judgment-free attention to the moments of breathing (Wilson, Mickes, Stolarz-Fantino, Evrard, & Fantino, 2015).

Moreover, Dane (2011) proposed in a theoretical framework that the wide attentional breadth inherent in mindfulness may distract individuals from focusing their attention. In static tasks environment – as for example in hidden profiles – where processes of solving them are predictable and composed of a limited amount of information, broad awareness does not help in the sense of getting any additional task related information. Dynamic task environments in turn which are rather unpredictable with regard to their history and involve changes – like for example a task that changes as a function of a decision – may profit from mindfulness (Dane, 2011; Dane & Brummel, 2013; Edwards, 1962; Gonzalez, 2005). Empirical evidence supports this framework. It has been found that trait mindfulness had a negative influence on a static task with a limited amount of information and a positive influence on a dynamic task with an unclear quantity of information (Zhang, Ding, Li, & Wu, 2013).

Mindfulness has also been related to social and relationship outcomes (for a meta-analysis see Sedlmeier et al., 2012). A large body of psychological research reveals benefits of mindfulness in human relations (Barnes, Brown, Krusemark, Campbell, & Rogge, 2007; Hill & Updegraff, 2012; Sedlmeier et al., 2012; Winning & Boag, 2015). Particularly, mindfulness contributes to the amelioration of romantic (Barnes et al., 2007; Carson, Carson, Gil, & Baucom, 2007; Wachs & Cordova, 2007) and professional (Reb, Narayanan, & Chaturvedi, 2014)

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relationships, through greater empathy, compassion and perspective taking. However, the relationship focus of mindfulness may not foster decision quality in hidden profiles in which the primary goal is a decision and not to establish a good relationship. Moreover, the time consuming goal to establish a good relationship could inhibit individuals from focusing on the task and discriminating supporting or questioning pieces of information (Wittenbaum, Hollingshead, & Botero, 2004).<sup>3</sup>

All in all, it seems that Eastern mindfulness broadens the awareness to information in static tasks which is not necessarily related to performance. Eastern mindfulness may be an obstacle to tasks in which broad awareness is not helpful regarding the task solution, as it is for example in hidden profiles, where individuals need to discriminate between different decision alternatives.

**Langerian mindfulness.** Langerian mindfulness (i.e. actively drawing novel distinctions) may help individuals in a hidden profile task discriminate between different alternatives while seeking a decision. More precisely, it has been theorized that, as a consequence of drawing novel distinctions, Langerian mindfulness leads to openness to multiple perspectives. When individuals do not just rely on old routines, they should be open to other perspectives instead of trying to confirm their initial learned perspective (Langer, 2014; Langer & Moldoveanu, 2000). For example, it has been found that when individuals learned mindfully about the usage of an object (e.g. a dog's chew toy) they are more open to multiple perspectives. Langerian mindfulness was induced by preventing mindlessness (i.e. automatic behavior) through a linguistic variation. For the mindfulness condition, conditional language was used to introduce

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<sup>3</sup> Whereas in other situations than a hidden profile task, good relationships can certainly be the precedent condition for a great performance (e.g. Gruenfeld, Mannix, Williams, & Neale, 1996; Haslam, Wegge, & Postmes, 2009).

information on an object (“this could be an X”) whereas absolute language was used in the mindlessness condition (“this is an X”). In the mindfulness condition participants generated more new ideas on how to differently use the object than when mindlessness was induced (Langer & Piper, 1987). In sum, this finding on Langerian mindfulness suggests, that when group members are encouraged to individually diverge from their initially learned perspective, they become more open to multiple perspectives. As hidden profile tasks require the discrimination between alternatives, individuals who are encouraged to be more open to new information and to points of view differing from their own ones (i.e. are more open to multiple perspectives) may perform better on a hidden profile task. Hence, openness to multiple perspectives may be an important component of Langerian mindfulness that may improve the decision quality of hidden profiles.

However, there are also findings suggesting that it might be more effective to induce openness to multiple perspectives between persons. Hidden profile research has found that group members make better decisions when they are familiar rather than not familiar with each other (Gruenfeld, Mannix, Williams, & Neale, 1996), when they value each other’s perspective in a separatist (i.e. when members value each other’s uniqueness) rather than a synchronous (i.e. when members value each other’s similarity) group orientation (Kolb & van Swol, 2016 or a critical group norm, Postmes et al., 2001), and when they jointly generate counterfactuals (i.e. joint “*if-only*” thoughts about *what might have been*) (Liljenquist, Galinsky, & Kray, 2004). All in all, studies that indirectly induced in different ways openness to multiple perspectives on a social level (i.e. between the persons).

To conclude, openness to multiple perspectives inherent in Langerian mindfulness may improve decision quality in hidden profiles. Whereas research on Langerian mindfulness suggests an individual factor

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of openness to multiple perspectives (Langer & Moldoveanu, 2000; Langer & Piper, 1987), prior research on the hidden profile suggested a social factor. On the individual level, persons may become more open to multiple perspectives when they are encouraged to diverge from their initial perspective. On a social level, the joint consideration of different alternatives should make individuals more open to multiple perspectives. Hence, by directly manipulating openness to multiple perspectives the present dissertation seeks to contribute to a better understanding of what individuals need to better perform in hidden profiles.

### **The current dissertation**

It is important to understand that, based on the phenomenon of intersubjective meetings reported in psychoanalysis; shared present moment awareness is suited to improve joint decision-makings. A key issue in research examining joint decision making in hidden profiles is that group members fail to process information in an unbiased way and fall short of reaching their full potential (e.g. Greitemeyer & Schulz-Hardt, 2003; Sassenberg et al., 2014). Thus, the goal of the current dissertation is to examine whether shared present moment awareness helps groups make better decisions. Therefore, shared present moment awareness was first manipulated with mindfulness and then with openness to multiple perspectives, an important feature of Langerian mindfulness (Langer, 2014; Langer & Moldoveanu, 2000) and factor in joint decision making (Gruenfeld et al., 1996; Kolb & van Swol, 2016; Liljenquist et al., 2004; Postmes, Spears, & Cihangir, 2001). Mindfulness was manipulated according to the Eastern tradition using a classical meditative procedure. Openness to multiple perspectives was directly manipulated with a newly developed manipulation which will be described in *Chapter 3*. Considering the more reciprocal information processing of groups, a more interpersonal approach was pursued. Mindfulness was manipulated first

mainly in dyads, then *intrapersonally* in each person as well as *interpersonally* between persons.

*Chapter 2* examines the influence of Eastern mindfulness meditation on computer-mediated interdependent tasks. In two studies, Eastern mindfulness was induced with the raisins exercise. In Study 1 the influence of mindfulness on decision-making was examined via a computer-simulated negotiation. In Study 2 mindfulness was tested in dyads with a computer-mediated joint decision task to test again the influence of mindfulness on performance and on the attention to social relations.

*Chapter 3* presents the findings of openness to multiple perspectives in dyads making joint decisions. Openness to multiple perspectives was manipulated with one or two pictures of a homonym – a word which has two different meanings. To examine whether openness to multiple perspectives needs to be socially or individually activated, the manipulation was conducted between the persons (i.e. implemented within the dyad) in Study 3 and additionally intrapersonally (i.e. implemented within the person) in Study 4. Please note that in *Chapter 3* I did not refer to Langerian mindfulness, see therefore p. 38.

Finally, the thesis closes in *Chapter 4* with the General Discussion of the empirical evidence reported in *Chapter 2* and *Chapter 3*. Strengths and limitations of the findings are discussed and compared with the psychoanalytical conceptualization of shared present moment awareness. Implications for further research and practical implications are provided.

Please consider that the empirical Chapters 2 and 3 have been written in a way that they can be read independently. As in both of them similar theoretical assumptions have been derived, they may contain some theoretical overlap. Furthermore, it is important to note that the studies which both empirical chapters are based on have been conducted in collaboration.

## **Chapter 2: The impact of mindfulness on computer-mediated task performance**

In today's organizations interdependent tasks (e.g. negotiations or group-decision makings) are often conducted with computer mediation. Two experiments examined whether mindfulness, known to improve face to face negotiations and decision makings, influences the performance in computer-mediated interdependent tasks. In Study 1, manipulated mindfulness led to a *worse* outcome in a simulated computer-mediated negotiation compared to a control group. In Study 2, induced mindfulness *undermined* the decision performance of dyads interacting via text-based computer-mediated communication compared to a no-mindfulness control group. At the same time attention to the social relation was higher in the mindfulness condition. Hence, mindfulness is detrimental to performing on interdependent tasks if interaction partners use it in computer-mediated communication, although it fosters attention to interpersonal relations. Implications for mindfulness research and for research on computer-mediated communication are discussed.

### **Introduction**

Computer-mediated communication (i.e. instant messaging or emailing) is an integral part of the means used to interact in today's work environments. For example, virtual teams whose members are working across geographic or organizational boundaries share and discuss information via computer mediation when they need to negotiate or come to joint decisions (Paul, Seetharaman, Samarah, & Mykytyn, 2004). Even face to face groups often fail to share, discuss, and integrate knowledge and thus their performance is below their potential (Hollingshead, 1996; Stewart & Stasser, 1995). In text-based computer-mediated

communication, performance on interdependent tasks is even worse (e.g., Heninger, Dennis, & Hilmer, 2006; Robert, Dennis, & Ahuja, 2008).

Research suggests that mindfulness influences how well information is integrated in face to face interactions (Dane, 2011; Garland et al., 2015; Langer & Moldoveanu, 2000). Moreover, it has been found that mindfulness improves performance in distributive face to face negotiations (Reb & Narayanan, 2014) and that it reduces biases in individual decision-makings (Hafenbrack, Kinias, & Barsade, 2014). Mindfulness enfolds its positive impact best in dynamic or information-rich and thus confusing tasks and social environments (Dane, 2011; Parker et al., 2015; Sedlmeier et al., 2012), and there is a body of evidence showing positive effects of mindfulness in dynamic and socially rich contexts (Hülsheger et al., 2014; Hülsheger, Alberts, Feinholdt, & Lang, 2013; Reb et al., 2014; Reb, Narayanan, & Ho, 2013). However, there is also evidence for a negative impact of mindfulness in contexts where these features are not provided ( e.g., false memory; Wilson, Mickes, Stolarz-fantino, Evrard, & Fantino, 2015).

Text-based computer-mediated communication is often not very dynamic and lacks social richness (Daft & Lengel, 1986; Sassenberg & Jonas, 2007). Therefore, the current research aimed to test whether mindfulness is beneficial to performance in computer-mediated negotiating and group decision-making or perhaps detrimental, considering the characteristics of this way of communication. Thereby, the current research is the first to test the impact of mindfulness on joint performance in computer-mediated interdependent tasks and, thus, it contributes to the understanding of task performance in computer-mediated communication and tests the impact of a mental state that may be not suitable in such situations, namely mindfulness.

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### **Mindfulness in the context of static task environments**

Mindfulness can be defined as an enhanced attention to and awareness of a present reality or current experience (Brown & Ryan, 2003). In addition, it is often described as a state of consciousness which relates to a "wide attentional breadth" (Dane, 2011, p. 1001), in both external and internal processes (Brown & Ryan, 2003). As a consequence, information processing is also getting more extensive, which is supposed to come along with higher openness and enhanced sensitivity to unexpected outcomes (Dane, 2011; Garland et al., 2015).

In contrast to the numerous gains of mindfulness, it might also hinder focusing on tasks in environments where attentional breadth (which is inherent in mindfulness) does not lead to access to additional task related information but to the perception of irrelevant and potentially distracting information (Dane, 2011). In line with this notion, it has been demonstrated that trait mindfulness is positively related to individuals' performance in a complex dynamic and unpredictable task environment, but not to performance in tasks within a static and predictable task environment (Zhang et al., 2013).

### **The effects of mindfulness on interpersonal processes**

The advantages of mindfulness are not restricted to a dynamic *task* environment, but they have also been demonstrated for social and relationship outcomes. Mindfulness is associated with better interpersonal outcomes (Sedlmeier et al., 2012) as it correlates with the quality of romantic (Barnes et al., 2007; Carson et al., 2007; Wachs & Cordova, 2007) and professional relationships (Reb et al., 2014). This might result from better interpersonal skills as for example better identifying the emotional state of another person (Winning & Boag, 2015). All in all, this suggests that mindfulness might direct the attention to social and relationship issues, which seems to be beneficial in many social situations such as negotiations where it is possibly useful to identify the emotional

state of another person. And indeed, a brief mindfulness exercise improved the outcome of face to face negotiations (Reb & Narayanan, 2014). However, research on the impact of mindfulness has not yet tested what will happen when social cues are lacking and the impact of mindfulness on identifying others' emotional state cannot unfold its potential as in text-based computer-mediated communication. In these cases mindfulness will definitely not be beneficial. It might even be detrimental to performance, because broad attention (i.e., the search for external information but which is not available) might lead people to considering irrelevant and distracting information (e.g., internal information about irrelevant own states).

### **Overview of Current Research**

Based on these considerations, we suggest that mindfulness might actually be detrimental to performance in computer-mediated negotiations or group decision-making. This is, because (a) the beneficial effects of mindfulness might not apply in these static task environments and (b) attention to interpersonal processes might occur only in socially rich media. We, thus, hypothesize that mindfulness reduces performance in computer-mediated interpersonal negotiations and group decision-making.

This prediction was tested in two studies using text-based computer-mediated communication. In Study 1, we investigated the influence of manipulated mindfulness on outcomes in a computer-mediated zero-sum negotiation with a simulated other person using a paradigm adapted from Van Kleef, De Dreu, Pietroni, and Manstead (2006). Study 2 likewise tested the impact of manipulated mindfulness on decision making quality in dyads using a chat for communication and a paradigm developed by van Ginkel and van Knippenberg (2008). This selection of tasks allows for testing the impact of mindfulness on two types of task performance in interpersonal computer-mediated setting. In the

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negotiation performance the individual benefit achieved *against* the interests of the interaction partner is the indicator of performance, whereas in the decision making task joint performance *together with* the interaction partner is the indicator of performance. We clearly instructed participants to pursue the respective goal, as we aimed to test the impact of mindfulness on both types of performance in the social context. We expected mindfulness to undermine performance in both cases based on the rational outlined above.

### **Study 1: computer-mediated negotiation**

#### **Method**

#### **Participants and Design**

Fifty users of a library of economics at a German university (women = 27, men = 21, no gender indicated = 2;  $M_{age} = 25.88$ ,  $SD = 9.52$ , range = 19-61) participated voluntarily and without receiving a compensation in an experiment with two conditions (mindfulness vs. control).<sup>4</sup>

#### **Procedure**

The study was conducted in a room equipped with six computers. After provision of informed consent, participants were seated in front of a computer and randomly assigned to one of the experimental conditions. In the mindfulness condition, participants listened to an audio file instructing them to eat two raisins mindfully (e.g. “What is the consistency of a raisin? What is the taste on the tongue?”, for details see

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<sup>4</sup> The experiment included a third condition in which participants were to reflect about negotiations in general *before* receiving any information about the current negotiation task. This condition was not included into the analysis, because many participants were unexperienced concerning negotiations and reported difficulties in following the instruction. What they reflected about, has actually not become clear.

appendix A, 93). This is a frequently used mindfulness exercise, applied in clinical as well as nonclinical settings and also in experimental research (Heppner et al., 2008; Hong et al., 2011; Kabat-Zinn, 2003, 2013; Reb & Narayanan, 2014; Weger et al., 2012). After one guided round with a raisin, participants were asked to repeat the exercise on their own with a second raisin. Participants in the control condition filled in a Sudoku puzzle. The goal of a Sudoku is to fill a 9x9 Sudoku grid with digits, where each row, each column and each of the 3x3 quadrants may contain every digit from 1 to 9 only once. A medium-difficult Sudoku puzzle was chosen as a task on which participants could get on within the given time frame. Both tasks were comparable because they require some attention, but are not very energy consuming. At the same time, they clearly differed in the attentional scope: the mindfulness condition induced a broad attentional scope, whereas the Sudoku condition induced focused attention. In both conditions, participants were interrupted after 9 minutes and asked to continue with the negotiation task.

**Negotiation task.** The negotiation task was an adapted version of the paradigm from Van Kleef, De Dreu, Pietroni, and Manstead (2006), which is characterized by the main features of a real-life negotiation: For the negotiator, the issues to be negotiated are of different importance, he/she knows only about his/her own scores, and the negotiations contain offer-counteroffer sequences (Van Kleef et al., 2006). Participants were assigned the role of the seller of a mobile phone. Their objective was to negotiate with the buyers three issues – the price, the warranty period, and the duration of the service contract. Participants were presented a score chart with nine possible levels of agreement to each of the three issues. If they sold the phone for 110€, they would yield 0 points (level 9 – the lowest level), and if they sold it for 150€, they would yield 400 points (level 1 – the highest level), with an increase of 50 points from level to level. For the warranty period, 9 months would yield 0 points (level 9),

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and 1 month 120 points (level 1) with increases of 15 points from level to level. As to the duration of the service, 1 month would yield 0 points (level 9), and 9 months would yield 240 points (level 1). Participants were informed that the best deal would be level 1-1-1 with a total outcome of 760 points and that they should aim at gaining as many points as possible. They were told that two buyers were interested and one had already made a proposal of 190 points. The second one was the negotiation partner and was simulated by the computer. They were informed that they would get for sure the 190 points already yielded with the first buyer, in case they would not be able to come to an agreement with the second buyer. Hence, 190 points was the minimum score participants received.

The second buyer, simulated by the computer, started to offer 8-7-8 in the first round (e.g. "I offer you price-warranty period-duration of service contract: 8-7-8"). In every round, the computer increased its offer step by step: 8-7-7 in round 2, then 8-6-7 in round 3, 7-6-7 in round 4, 7-5-7 in round 5, 7-5-6 in round 6 and 6-4-6 in round 7 (which equals to 315 points). After the first, the third and the sixth round, participants got an additional text message (similar to an instant message) from the simulated buyer reflecting a negative affect (e.g. "This makes me angry"). These messages were used to assure that participants understood that the negotiation partner strongly disagreed with their offers. No other information was provided. After every round participants could either agree with the offer by the computer or disagree and propose a different one. The negotiation ended, when an agreement was reached or participant's offer equaled or exceeded the offer which the computer would make in the next round (see Van Kleef et al., 2006).

## Measures

The number of points in the negotiation gained from round 1 – 7 was the major dependent variable (range 190 – 315 points). Furthermore, we measured whether participants agreed with an offer by the computer and in which round they did so.

## Results and Discussion

We predicted that participants in the mindfulness condition would perform worse in the negotiation task than participants in the control condition. To test our hypothesis a t-test for independent samples was conducted. This test indicated that, in line with the hypothesis, participants performed worse in the mindfulness condition ( $M = 209.00$ ,  $SD = 35.85$ ) than participants in the control condition ( $M = 235.40$ ,  $SD = 52.34$ ),  $t(42.46) = 2.08$ ,  $p = .044$ ,  $d = 0.59^5$ .

For exploratory reasons, we also analyzed the impact of mindfulness on other metrics in this task. On average, it took participants in the mindfulness condition ( $M = 2.36$ ,  $SD = 2.41$ ) one round less to negotiate than participants in the control condition ( $M = 3.48$ ,  $SD = 2.83$ ). This difference is, however, not statistically significant,  $t(48) = 1.51$ ,  $p = .139$ ,  $d = 0.43$ . The percentage of participants who reached an agreement did not differ between conditions,  $c^2(1) = 1.39$ ,  $p = .377$ ,  $d = .33$  (mindfulness: 56%, control condition: 72%).

Overall, these findings support our hypothesis that mindfulness leads to a poorer performance on a computer-mediated interpersonal task with high interdependence. Mindful people achieved worse outcomes for themselves. The exploratory analysis indicated no effects of mindfulness regarding the duration of the negotiation and the likelihood of reaching an agreement. Two key limitations of this study were addressed in a follow-

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<sup>5</sup> Variance differed between conditions. Therefore, the test and the degrees of freedom were adjusted accordingly.

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up study: (a) the interaction partner was simulated and (b) no manipulation check was assessed.

### **Study 2: Computer-mediated joint decision-making**

The aim of Study 2 was to replicate the results from Study 1 using a different task, namely decision making rather than negotiating, and a real rather than a simulated interaction partner. We studied the influence of mindfulness on decisions made by dyads in a computer-mediated discussion setting (addressing limitation (a) of Study 1). Thereby, we tested again whether mindfulness leads to a poorer performance in a computer-mediated setting. Furthermore, we also assessed the impact of mindfulness on attention to internal and external issues to address the limitation (b) of Study 1 (i.e., the lack of a manipulation-check). We assumed that mindfulness—due to the broader attention—leads to greater private and interpersonal awareness. Both aspects were assessed in separate measures that served as a manipulation check. The main prediction was that mindfulness would cause lower performance compared to a control condition. The control condition in Study 2 was altered in a way that rendered it more similar to the experimental condition: Participants had to listen to an audio file with a neutral content.

### **Method**

#### **Participants and Design**

Seventy-four undergraduate students (37 dyads) from a German university (55 women, 19 men;  $M_{age} = 24.32$ ,  $SD = 3.38$ , range = 19 - 35) participated in an experiment with two conditions (mindfulness vs. control) in exchange for €8. Due to technical problems, one additional dyad needed to be excluded from the analysis.

#### **Procedure**

Participants were invited to the lab in dyads for a study session on teamwork. After providing consent, they were seated in two separate

rooms. Dyads were randomly assigned to one of the two experimental conditions (i.e., both members of one dyad were in the same experimental condition). Mindfulness was induced by using the procedure applied in Study 1 (Hong et al., 2011; Kabat-Zinn, 2013; Reb & Narayanan, 2014). In the control condition, participants likewise listened to an audio file, this time providing information about containerized food transportation and using raisins as an example. Again, both conditions required some attention and low to medium effort, but differed in the breadth of attention which was crucial to our prediction. The two audio files had the same speaker, the same length, and they used the same welcome text, introduction, and farewell. In both conditions, two raisins were put next to the computer.

**Group decision task.** After the manipulation, participants first read on their own information about the task. Then they had to solve the task via text chat with the other person. The task was a German translation of the mini market task (van Ginkel, Tindale, & van Knippenberg, 2009; van Ginkel & van Knippenberg, 2008)<sup>6</sup>. Originally, the task was designed for three persons, we adapted it to two. Participants were told that they were members of a committee for the management of a small market center. They should advise the local government regarding three decisions for three stores. The decisions were to be made one after the other on the temperature in the market center, the division of the maintenance costs, and the organization of the marketing campaigns. Information regarding each of the three decisions was provided together with a list of potential decisions from which participants had to choose the appropriate ones like in a multiple choice item. As in the original materials by van Ginkel et al. (2009), there were five alternatives regarding the

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<sup>6</sup> For details see appendix C, p. 98. Task materials can be made available by the corresponding author upon request.

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temperature, ten alternatives regarding the maintenance costs, and seven alternatives regarding the marketing campaigns. For correct decision-making, participants needed to consider the perspectives of each aspect for the three stores. They were instructed to find a solution ideally suiting the needs of each of the stores. Besides several shared pieces of information per issue, each participant received one critical, unshared piece of information per task that was relevant for solving that task. This unshared information was also included to reduce the initial agreement about the solution within the dyad and thus to provide more room and need for discussion. The relevant pieces of information about the task were presented in a booklet which was available during task solving. For solving the task together, participants communicated with computer mediation, via a chat tool. In order to use neutral names, one participant had the name X, the other one the name Y. Subsequent to the chat, dyads filled out a brief questionnaire (joint solution, personal opinion) and completed measures of awareness and demographics.

### Measures

**Group performance.** Performance scores for decision quality were calculated considering the extent to which the decision of the three issues matched the best solution on the basis of all provided information. Following the rating procedure developed by van Ginkel et al. (2009), participants received 0 to 2 points in case of the temperature and 0 to 3 points for the other two issues, depending on the alternative they chose. The maximum score for the temperature related decision was lower, because there was a higher likelihood that participants guessed the right alternative given that this task provided only five alternatives whereas the other two provided more. The score for each choice represented the extent to which the respective alternative served the interest of the three parties (i.e., shops).

For each individual the score was summed up across the three issues. Higher scores should thus correspond to better decisions, because overall the three parties should be more satisfied. The maximum score was reached if the chosen decision was consistent with all available information, and was decreased if only one part of the information was included. Higher scores indicated a better performance. Because participants could enter the solution into the computer independently from one another, but were asked to come to a solution together, scores were averaged across individuals.<sup>7</sup> Thus, the score could range in total from 0 to 8 points.

**Attention to internal states.** To assess whether the mindfulness manipulation successfully altered the attention to internal states, we carefully chose four items of the private self-awareness scale from the questionnaire for the assessment of the self-awareness state (FESS) (Sassenberg, Boos, & Rabung, 2005), which reflects perceptual awareness. Items were rated on a five-item Likert scale “1=never true” to “5=always true” (e.g. “During the chat I was aware of my intentions”,  $\alpha = .78$ ). As the used items reflect a state of consciousness rather than cognitive operations, they are an indicator for mindfulness (c.f. Brown & Ryan, 2003).

**Attention to external issues.** In order to check whether mindfulness manipulation also raised a concern for external issues – here the relationship with the interaction partner -, we measured *interpersonal awareness* (for details see appendix A 94). To this end, we created seven new items for which participants had to indicate their agreement on a five-point Likert scale ranging from 1 = ”never true” to 5 = ”always true” (e.g. “During the chat I was concerned about our mutual understanding”,  $\alpha =$

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<sup>7</sup> There were no differences between individuals in a dyad.

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.63). One item was omitted from the scale to improve internal consistency at least slightly.

### Results and Discussion

#### Manipulation check

To test the effectiveness of the manipulation, a repeated-measures ANOVA with the condition (mindfulness vs. control) as between subject factor, the person within the dyad and the scale (private self-awareness vs. interpersonal awareness,  $r = .50$ ,  $N = 74$ ) as within subject factors was computed. Supporting the effectiveness of the mindfulness manipulation, there was a main effect of the manipulation on both measures,  $F(1, 35) = 5.37$ ,  $p = .026$ ,  $d = 0.76$ . Participants in the mindfulness condition reported a higher private self-awareness ( $M = 2.33$ ,  $SE = .16$ ) and higher interpersonal awareness ( $M = 3.14$ ,  $SE = .09$ ) than participants in the control condition (private:  $M = 1.69$ ,  $SE = .15$ ; interpersonal:  $M = 2.85$ ,  $SE = .09$ ), private:  $F(1, 35) = 8.68$ ,  $p = .006$ ,  $d = 1.00$ , interpersonal:  $F(1, 35) = 4.86$ ,  $p = .034$ ,  $d = .74$ .

#### Group performance

Regarding the effect of mindfulness on group performance, a t-test revealed a significant difference between the conditions,  $t(35) = 2.15$ ,  $p = .039$ ;  $d = .71$ . In line with the prediction, dyads in the mindfulness condition ( $M = 4.00$ ,  $SE = 0.59$ ) performed *worse* than dyads in the control condition ( $M = 5.58$ ,  $SE = 0.45$ ).

In line with our hypothesis, we found performance differences between mindful and non-mindful dyads working together on a computer-mediated decision-making task. Dyads in the non-mindfulness condition performed better than dyads in the mindfulness condition. In line with our intention, the manipulation check showed that dyads in the mindfulness condition spent more attention to internal states *and* to external issues (i.e., interpersonal awareness) than dyads in the control condition – even though the internal consistency of the interpersonal

awareness scale was low. This calls for a replication of the impact of mindfulness manipulations on the attention to interpersonal relations.

## Discussion of Chapter 2

The aim of the current research was to test whether mindfulness influences performance in computer-mediated tasks, namely negotiating and group decision-making. To our knowledge, the current studies are the first to examine the effects of mindfulness on performance in interdependent tasks conducted via computer-mediated communication. This is important because modern working life requires individuals more and more to process information together with computer mediation (Paul et al., 2004). Although it has been found that a brief mindfulness training improves face to face negotiations (Reb & Narayanan, 2014) and reduces decisional biases (Hafenbrack et al., 2014), we assumed that various positive effects of mindfulness would not generalize to joint task performance under conditions of computer-mediated communication. Using a well-established negotiation task (Van Kleef et al., 2006) and a group decision-making task (van Ginkel et al., 2009; van Ginkel & van Knippenberg, 2008), the results consistently supported our prediction, in Study 1 in a computer-mediated negotiation with a simulated interaction partner as well as in Study 2 in computer-mediated group decision-making with a real other person. Manipulated mindfulness revealed a worse outcome compared to the control condition. In addition, in Study 2 mindfulness increased attention to interpersonal issues, dyads were more aware of the relationship.

Across two studies using different interdependent tasks in different computer-mediated task environments, mindfulness consistently led to a poorer task outcome. It can be suggested that every mindfulness manipulation results in another effect (Sedlmeier et al., 2012). Given, that we applied only one manipulation of mindfulness the results should be

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replicated using a different procedure (e.g., a more complex mindfulness meditation training). In addition, we did not used other established control conditions, either mind wandering or asking participants to simply eat two raisons without further instruction. However, for the current hypothesis the differences in effort and duration could have been considered a confound. Therefore, we created new control conditions without this potential confound. We tried to compensate for this methodological difference compared to earlier research by using two different control conditions. Nonetheless, it would be interesting to know whether current results replicate with a control condition applied in earlier research.

Likewise, in earlier research individuals experienced in practising mindfulness showed different effects than novices (Brefczynski-Lewis, Lutz, Schaefer, Levinson, & Davidson, 2007; Hölzel et al., 2007, 2011; Taylor et al., 2011). Again, further research should consider experience in mindfulness practices and chronic mindfulness as potential independent variable and moderator.

At first glance, it might occur surprising that we did not find a substantial correlation between interpersonal awareness on decision quality ( $r = -.14$ ) and thus no indirect effect of the mindfulness manipulation via interpersonal awareness on decision quality in Study 2. Our reasoning in the Introduction might suggest that this is what we expected. However, thoroughly thought through this pattern is not all that surprising. Interpersonal awareness would not relate to performance when no or scarce social information is available as it is the case in computer-mediated communication (as in the current study setup), whereas it should have positive effects when such information is sufficiently available (as in face to face settings). Hence, in the light of this consideration, the pattern we found might be less surprising. However, as mentioned in the introduction (see section 1.2), mindfulness fosters interpersonal processes

(Parker et al., 2015; Sedlmeier et al., 2012). Therefore, it might lead to a focus on the relationship rather than on the task. If such information is not or barely available as in case of text-based computer-mediated communication, a focus on the relationship might be an indication for a distraction from the task that is ultimately detrimental to the task performance. This process should be tested in future research.

Alternatively, one might assume that another mechanism is at work, namely holistic vs. analytic processing. Mindfulness might facilitate holistic processing as it elicits openness to new experiences and a broad attentional scope. More concretely, in our manipulations participants were instructed to experience the raisons with all senses in the mindfulness condition, whereas in the control condition participants were asked to solve a Sudoku puzzle or process an audio file, which requires much more analytic processing. However, mindfulness is surprisingly not related to a holistic processing style but rather independent of the processing style (Zedelius & Schoeller, 2015). Furthermore, holistic processing might even be superior to analytic processing in collective decision making and negotiating, because analytic processing is related to a focus on the own perspective and confirmatory tendencies that harm performance in both task types (Galinsky, Leonardelli, Okhuysen, & Mussweiler, 2005; Sassenberg et al., 2014; Trötschel, Hüffmeier, Loschelder, Schwartz, & Gollwitzer, 2011). In any case, this remains speculative and further research is needed to explore the mechanisms underlying the current effects.

Our findings further support previous research showing that mindfulness is not beneficial to static and predictable task-environments (Zhang et al., 2013). As mindfulness enlarges awareness (Garland et al., 2015), it might only show its strengths in more dynamic environments (Dane, 2011; Langer & Moldoveanu, 2000). Similar to research on group decision-making (Brodbeck, Kerschreiter, Mojzisch, & Schulz-Hardt,

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2007; Sohrab, Waller, & Kaplan, 2015), it would be interesting to study mindfulness either on more complex and dynamic tasks (e.g. computer simulations) or in the field (for examples, see Hülsheger et al., 2014; Hülsheger, Alberts, Feinholdt, & Lang, 2013).

For computer-mediated working groups the current research clearly suggests that mindfulness is not the way to go – at least as long as these groups are task focused like in negotiations and joint decision making. Things might look different when it comes to conflict resolution or other relationship oriented requirements. Like any other intervention, mindfulness is not a one-for-all intervention. This suggests that the recent trend to apply mindfulness at the workplace (Dane, 2011; Hülsheger et al., 2014, 2013) needs to be implemented with close attention to when doing it and what kind of positive effects of mindfulness are to be expected and to the conditions under which this will not be the case, such as in computer-mediated task work.

Taken together, the current research extended our knowledge concerning the influence of mindfulness on the performance in computer-mediated interdependent tasks. It provided first evidence that the de-biasing effect of mindfulness might not be applicable to rather short computer-mediated interdependent tasks. In our studies, mindfulness had detrimental effects on performance outcomes of computer-mediated interdependent tasks. However, mindfulness may – through helping build up relationships – have effects on long-lasting interdependent tasks. More research is needed to test this assumption. Our research is among the first studying the impact of mindfulness in a computer-mediated setting and it is also one of the few that demonstrated detrimental effects of mindfulness (for further examples see: reduced problem solving through insight (Zedelius & Schooler, 2015), worse performance on static tasks (Zhang et al., 2013), and increased false-memory susceptibility (Wilson et al., 2015). Hence, across the board there are not many positive effects that can be

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expected of mindfulness interventions – definitely not for joint performance on interdependent tasks in computer-mediated communication. More generally, mindfulness research should be regarded with care, because as often in the early phase of research in a field, it might have been the enthusiasm of researchers about the research topic that led to a positive publication bias, as it has for instance already been acknowledged for the health sector (Coronado-Montoya et al., 2016). Our research thus contributes to the early steps of unbiasing the understanding of the whole range of effects elicited by mindfulness interventions.

## Introduction to Chapter 3

Chapter 2 found initial evidence that Eastern mindfulness does not support performance in a hidden profile task. Although there is a lot of evidence of the beneficial effects of mindfulness, state mindfulness manipulated with a short meditation exercise with raisins did not enhance performance in computer mediated interdependent tasks. As Eastern mindfulness generally seems to enlarge awareness (Dane, 2011; Garland et al., 2015), state mindfulness (at least manipulated with the raisins exercise) might hinder decision quality in hidden profiles (in which a strong focus on information might be more suitable).

In empirical chapter 3 we focused more specifically on the cognitive mechanism which we supposed is leading to a better decision quality in hidden profiles, namely openness to multiple perspectives. Although it is supposed to be an important feature of Langerian Mindfulness (Langer, 2014; Langer & Moldoveanu, 2000; Sternberg, 2000) we chose to manipulate openness to multiple perspectives directly, to be able to draw strong conclusions about its effect. Moreover, this procedure better enabled us to elaborate social and individual antecedents of openness to multiple perspectives. As we will see, openness to multiple perspectives seems to be inherent in a lot of other concepts<sup>8</sup> and can be related to Jung's (1966) dialectical attitude.

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<sup>8</sup>As for example counterfactual thinking (Liljenquist et al., 2004), group orientation (Kolb & van Swol, 2016), group norms (Postmes et al., 2001), critical thinking (Halpern, 1998), devil's advocacy (Waddell et al., 2013), the dialectical inquiry approach (Schweiger et al., 1986), considering the opposite (Lord et al., 1984; Nemeth et al., 2001), taking an outsider perspective (Milkman et al., 2009), and motivational factors like the feeling to be understood (Faulmüller et al., 2012).

**Chapter 3: Openness to multiple perspectives improves task performance in dyads**

Research on group decision making relying on the hidden profile paradigm has long focused on the reasons why groups fail to make an optimal decision. Less attention has been paid to the antecedents of satisfying group functioning with regard to decision making. We propose that openness to multiple perspectives is the key to good performance when working jointly under conditions of hidden profiles, because recognizing that a perspective differing from the one's own perspective might be right is a prerequisite for solving such tasks. Two studies with dyads found that (a) jointly considering multiple perspectives (compared to negotiating contradictory opinions) and (b) individually learning in sequential order about two correct interpretations of a stimulus – both in a task before and independent of the hidden profile – improves hidden profile performance. Future directions in research and practical implications of openness to multiple perspectives are discussed.

**Openness to multiple perspectives improves decision making performance in dyads**

Expert groups (i.e., groups of people with different task relevant knowledge) in politics and business are frequently asked to make or propose decisions. Due to the diverse knowledge and the different perspectives that come together in such groups, they could have a potential for high quality decisions. However, research using the hidden profile paradigm (Stasser & Titus, 1985) – a setting very similar to expert groups – has consistently demonstrated that groups make suboptimal decisions in such situations (for a metaanalysis, see Lu, Yuan, & McLeod, 2012). A key reason is that individuals focus narrowly on information confirming the opinion they have formed before the group discussion (Faulmüller,

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Kerschreiter, Mojzisch, & Schulz-Hardt, 2010; Greitemeyer & Schulz-Hardt, 2003; Sassenberg et al., 2014) – rather than being open to multiple perspectives (e.g., other members' perspectives besides their own one). Intuitively following this confirmatory tendency prevents considering relevant alternative information and perspectives, potentially changing one's opinion and, thus, performing well (cf., Milkman et al., 2009).

In individual decision making, it is the consideration of alternative perspectives that is known to have a debiasing effect (Lilienfeld et al., 2009; Lord, Lepper, & Preston, 1984; Nemeth, Connell, Rogers, & Brown, 2001). However, in the context of group decision making with hidden profile situations, research has suggested different strategies to improve performance, which have in common that they make people more *open to multiple perspectives* (e.g., interpersonal familiarity; Gruenfeld, Mannix, Williams, & Neale, 1996, a separatist group orientation Kolb & van Swol, 2016, see also Postmes, Spears, & Cihangir, 2001, or a counterfactual mind-set Galinsky & Kray, 2004; Liljenquist, Galinsky, & Kray, 2004). However, on a common ground, positive effects in group decision making were only observed when strategies were implemented during social interactions within a group.

Because the manipulations or interventions applied in all these studies indirectly targeted openness to multiple perspectives, it can be assumed that openness to multiple perspectives manipulated directly in its purest form might facilitate hidden profile performance. Thus, to increase openness to multiple perspectives, it is relevant to understand whether the strategy needs to be implemented during social interaction or whether an individual-related implementation will suffice. Therefore, the current research aimed to test the impact of a social level (i.e. implemented in social interactions) and an individual level (i.e. implemented for each single member) manipulation – both increasing openness to multiple perspectives – on decision-making performance in hidden profile tasks. In

doing so, we aimed to contribute to an understanding of the preconditions of high performance in experts groups and heterogeneous teams – two types of groups created frequently to support or make far-reaching decisions in politics and business.

### **The necessity of considering multiple perspectives to solve hidden profiles**

In the hidden profile paradigm (Stasser & Titus, 1985), participants are provided with different informational subsets before making a decision in a group. Each subset supports an alternative different from the information available to all members of the group (i.e., the correct solution). That means some information is given to all of them (shared information) and other information only to one member (unshared information). On the whole, hidden profiles represent situations in which the potential for groups to outperform individuals is particularly high (Stasser & Titus, 1985). Living up to this potential – that means solving a hidden profile – requires that group members also consider information contradicting their own opinion and, thus, multiple perspectives (i.e., the own and the others' perspective). Here and in what follows, an *opinion* is defined as a specific preference for a decision alternative, whereas we will use the term *perspective* to describe, more broadly, one's own or another person's view on a certain target.

In recent years, clear evidence has been collected showing that intra-individual processes substantially contribute to the fact that groups do not use their full potential – because members stick to their own opinion and do not sufficiently consider others' perspectives. For example, Greitemeyer and Schulz-Hardt (2003) found that when solving a hidden profile task, individuals tend to evaluate other perspectives (i.e., new information mentioned by others) with regard to correspondence with their own initial opinion. If a piece of information spoke in favour of the recipient's initial opinion, it was evaluated as more favourable than a piece

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of information questioning his / her initial opinion. Individuals, thus, showed a confirmation bias. The authors supposed that even during a group discussion, individuals preferably process information that is consistent with their opinion, which thus confirms their initial beliefs (Greitemeyer & Schulz-Hardt, 2003; see also Sassenberg et al., 2014; Faulmüller, Mojzisch, Kerschreiter, & Schulz-Hardt, 2012). In other words, group members are likely to suppose that their initial opinion is adequate and are not aware of the validity and the implications of other perspectives for a good task performance. This means that they are not open to multiple perspectives and, therefore, fail to reach an optimal decision in hidden profile tasks.

### **How to improve openness to multiple perspectives**

Research on individual decision making clearly suggests that openness for and the consideration of multiple perspectives debiases judgments and improves decision making performance (Lilienfeld et al., 2009; Lord et al., 1984; Nemeth et al., 2001). Research on hidden profile situations has, to the best of our knowledge, not directly addressed the role of openness to multiple perspectives in hidden profile situations. However, there are at least three interventions that have been found to improve the decision-quality of hidden profiles, the effects of which could be attributed to members' openness to multiple perspectives.

First, groups consisting of individuals familiar with each other performed better on a hidden profile task, compared to groups formed ad hoc with individuals who had met never before (Gruenfeld et al., 1996). The authors suggested that people not knowing each other might be less willing or able than people familiar with each other to consider each other's perspectives (Gruenfeld et al., 1996). Hence, according to the authors' reasoning, familiarity increases performance in hidden profile tasks, because it facilitates openness to the others' perspectives. However,

this provides at best indirect evidence for the impact of openness to multiple perspectives.

Second, two studies found that valuing the uniqueness of each group member and a norm to criticize each other improves hidden profile performance (Kolb & van Swol, 2016; Postmes et al., 2001). To be more precise, Kolb and van Swol (2016) compared groups with a separatist orientation to groups with a synchronous orientation. In the separatist orientation condition, members first had to individually answer questions, reflecting the *uniqueness* of every group member's role; then, they had to read out loud together a poem, that means each member had to read out single lines. In the synchronous orientation condition, members individually responded to statements about *similarity* in groups and, then, had to simultaneously read out loud together a poem. When group members were more sensitive to the uniqueness of each member's role (i.e., in the separatist group orientation), they performed better in hidden profile tasks than when they valued similarity more (i.e., in the synchronous orientation). Similarly, Postmes et al., (2001) implemented either a norm for criticizing or a norm for keeping up consensus in groups. They found that groups in the criticising condition performed better in a hidden profile task than groups in the consensus condition. The findings of both studies also point to the impact of openness to multiple perspectives on decision-quality in hidden profile tasks, because valuing each group member's uniqueness and having a norm for criticizing each other in some way emphasize the importance of openness to other perspectives compared to one's own opinion. At the same time, both studies used a control condition pointing out similarity and conformity within the group. This condition might likewise have contributed to the effect of the manipulations by increasing confirmatory tendencies.

Third, a counterfactual mind-set enhances the consideration of alternatives in creativity tasks and in hidden profile tasks (Galinsky &

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Kray, 2004; Kray, Galinsky, & Wong, 2006). In a number of studies, a counterfactual mind-set was manipulated by facing participants with the description of a situation where they were (vs. were not) likely to think about what would have happened if things had gone differently. After that, they were asked to work on the key task – here a hidden profile. When they were socially activated (i.e., group members jointly answered what might have happened), a counterfactual mind-set enhanced the performance in hidden profile situations (Galinsky & Kray, 2004; Kray & Galinsky, 2003; Liljenquist et al., 2004).

However, these benefits of counterfactuals in group decision making seem to depend on how those counterfactuals were generated. In confirmation of this thesis, Liljenquist et al. (2004) found that a counterfactual mind-set activated on a social level (i.e., collectively thinking about *what might have been*) led to a better decision performance than a control task requiring social interaction with no preceding counterfactual mind-set induction beforehand. In contrast, the individual level activation of a counterfactual mind-set (i.e., individually thinking about *what might have been*) led to a worse performance than a control task which each group members performed alone. Moreover, when a counterfactual mind-set was activated on a social level, the number of counterfactual thoughts positively correlated with *synergistic coordination* (i.e., coder's judgment about members' sharing and integration of information and perspectives within a group) and presumably enabled individuals to better coordinate their thoughts among each other. As the authors did not report a relation between synergistic coordination and performance it remains, however, unclear whether synergistic coordination actually did cause the difference in the performance.

Most relevant for the current context is that the impact of the counterfactual mind-set implemented on a social level is consistent with the assumption that openness to multiple perspectives improves

performance in hidden profile tasks. This social counterfactual mind-set induction simulates alternative thoughts in response to divergent points of view in a way that members need to build on each other's perspectives – meaning that they have to accept the validity of each other's perspectives. In contrast, when a counterfactual mind-set is induced in an individual, s/he relates the simulation to her / his own thoughts and, thus, acceptance of others' perspectives is not required. Accordingly, it is in line with our reasoning that this intervention does not assert a positive impact on hidden profile performance.

In sum, three manipulations and measures on the social level have been shown to improve decision-quality of hidden profiles: *familiarity* (Gruenfeld et al., 1996), a *separatist group orientation* (Kolb & van Swol, 2016) or a critical group norm, Postmes et al., 2001), and a collectively activated *counterfactual mind-set* (Liljenquist et al., 2004). Though they all implied (in different ways) openness to multiple perspectives, none of these prior studies sought to induce in the first place openness to multiple perspectives. The present line of studies, therefore, aimed to close this gap.

We argue that when group members are directly prompted for openness to multiple perspectives, they reach a better decision in hidden profiles. Openness to multiple perspectives requires more than bringing together proponents of different perspectives in a group or dyad, because there is still room for confirmatory thinking rendering it unnecessary to accept the validity of others' perspectives. We propose that in social level interventions (i.e., when individuals interact), members become open to multiple perspectives and, thus, perform better in hidden profile tasks when they have to *discuss multiple valid perspectives* (rather than negotiating own opinions). In other words, we assume that *jointly* experiencing the validity of multiple perspectives – before working on a hidden profile task – will subsequently facilitate performance in the hidden profile task, compared to when each member starts out with a

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different valid perspective and they all may learn no earlier than during the social interaction about the perspective of the respective others. Different opinions at the beginning of a task lead to a confirmation bias, just as in hidden profile tasks. However, being simultaneously faced with multiple valid perspectives as a group or a dyad and dealing with this ambiguity by talking about it might render individuals open to multiple perspectives in later tasks.

In sum, we predict (Hypothesis 1) that when two interacting individuals are faced with multiple valid perspectives in a task, this will lead to better later hidden profile performance than when each of them proceeds from a different perspective in the first task.

The hidden profile research summarized above has only successfully implemented social inductions of openness to multiple perspectives and Liljenquist et al. (2004) explicitly found that the counterfactual mind-set improves only hidden profile performance when it is activated jointly, but not when it is implemented individually. However conceptually, openness to multiple perspectives is a psychological state. Therefore, it should also be possible to activate this state individually. Indeed, there is research on judgments indicating that openness to multiple perspectives can be implemented individually. Lord et al. (1984) for instance found that (a) explicitly instructing individuals to think about alternatives and (b) making alternatives more salient leads to more correct, unbiased judgments (for a similar argument see Lilienfeld et al., 2009; Milkmen et al., 2009). The argument underlying this work is that when holding a certain opinion, the serious consideration of another opinion or perspective will unbias judgments and decisions in that domain.

This setup might also facilitate openness to multiple perspectives in an individual-level intervention beyond a specific domain, which is what the current research sought to test. As members, however, tend to confirm their initial opinion (Greitemeyer & Schulz-Hardt, 2003), the

crucial issue is that they need to recognize as valid a further perspective besides their own initial perspective. Hence, when members individually make the experience that their own initial perspective may not sufficiently reflect the situation at hand but that there is another valid perspective, they might likewise become more open to multiple perspectives (from others) in subsequent situations. Accordingly, we propose that on the individual level, a successful intervention enhancing openness to multiple perspectives and, thus, improving performance in a subsequent hidden profile task requires that members, at some point during the intervention, experience the insufficiency of their initial opinion(s). To be more precise, we hypothesize that individually *realizing* that the own perspective is not the only valid perspective in a task will subsequently lead to better hidden profile performance than learning about multiple valid perspective at a time (Hypothesis 2). This difference should be crucial because holding an opinion and then learning that this opinion is only one out of many other possible perspectives is what hidden profiles require. By contrast, when one is in the beginning faced with equally valid perspectives, one is encouraged to believe to have at her/his disposal all information necessary to form an opinion, which is unrelated to the demand of properly solving a hidden profile task.

### The present research

Two experiments were conducted, where the first one tested social level intervention and Hypothesis 1, and the second one tested the social level intervention and the individual level intervention implied in Hypothesis 2. In addition, Study 4 also tested whether (a) facing interacting individuals with multiple valid perspectives at a time and (b) making individuals realize that they do not hold the only valid perspective improves subsequent hidden profile performance due to higher openness to multiple perspectives.

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The studies employed a newly developed paradigm in which the manipulation of openness to multiple perspectives took place before participants worked on a hidden profile task. In the initial task, depending on the experimental condition, one or two meanings of a homonym (i.e., a word that is spelled the same as another one, but has a double meaning, e.g. “to lie” can mean to intentionally tell a falsehood vs. to rest in a horizontal position) were activated by a picture. Then, individuals had to answer a set of carefully constructed questions that fitted one, the other, or both meanings of the homonym. Perspectives were generated by displaying pictures representing one or two meanings of the homonym (for details see appendix B, 95).

Study 3 compared the hidden profile performance of dyads where both were presented with the two meanings of the homonym at the same time (i.e., both members were faced with multiple perspectives) with that of dyads where each of the members was initially presented with a different meaning of the homonym (i.e., in each member a different perspective was induced) as basis for a joint discussion. Study 4 compared dyads composed of individuals who had individually been presented with either (a) one valid perspective each and then learnt about the other one or (b) were from the beginning on each presented with two valid perspectives. In addition, this study included also the condition from Study 3 in which the members of the dyad were presented simultaneously with both meanings of the homonym and then they discussed the questions about the homonym – the condition predicted to deliver a better performance in Study 3. The subsequent hidden profile task was an established business case (van Ginkel et al., 2009; van Ginkel & van Knippenberg, 2008). Study 4 tested whether the impact of the manipulations on hidden profile performance were in line with our rational mediated by higher openness to multiple perspectives.

### **Study 3: Social level intervention**

#### **Method**

##### **Participants and Design**

Ninety-six students (48 dyads, 23 in the shared homonym condition and 25 in the distributed-homonym condition) from a German university (87 women, 9 men,  $M_{age} = 22.95$  years,  $SD = 3.32$ , range = 19 - 35) participated in an experiment with two conditions (social level: shared homonyms vs. distributed homonyms). Six dyads needed to be excluded<sup>9</sup>. Participants received 8 Euros as compensation.

##### **Procedure**

Participants were invited for a study session on teamwork<sup>10</sup>. Upon arrival in the lab, dyads were randomly assigned to one of the two experimental conditions on the group level. Participants were seated opposite to each other, each in front of a laptop. Screens were arranged in a way that each participant could see only his / her own screen. After reading the information about the study and filling out the informed consent, participants started the experiment on the computer. In the beginning, they were asked to find common answers to a set of questions about “*Kraulen*”. *Kraulen* is a German homonym for doing the front crawl or ruffling a cat’s or dog’s fur. According to these two meanings, two different images were presented on the laptops – in different ways, depending on the experimental condition. In the *shared homonyms*

<sup>9</sup> In one dyad there was a high-school student who accidentally got into the sample, one dyad did not talk during the manipulation and did thus not follow the instructions, for two dyads substantial parts of the data were lost due to technical problems, and in the final two dyads at least one person knew the group task in advance (i.e., performance data are not valid in this case).

<sup>10</sup> There were always invited groups of five participants. Two people who had not met before were selected; the others participated in an independent study.

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condition, both participants were presented with the picture of a swimmer as well as with the picture of a cat being ruffled. In the *distributed homonym* condition, each participant saw only one picture (e.g. either the cat or the swimmer). Next, ten items about *Kraulen* were presented one by one on the screen (e.g., first item “*Kraulen* is good for you”; sixth item “Everyone can do *Kraulen*”; last item “For *Kraulen* you need swimwear.”). The items were carefully constructed in a way that they focused more and more on one of the meanings of the homonym to guide participants in finding out the meaning of the homonym. Participants were asked to discuss with each other whether to agree or disagree with each item and to reach – if possible – a consensus. Each of them responded to the questions on his / her own computer. In sum, the shared homonyms manipulation aimed at implementing multiple perspectives. The different meanings of the two pictures were accessible to both participants from the beginning on and participants in this condition had to deal with the different meanings (i.e. perspectives) together (as a joint task), as they explicitly needed to discuss the two perspectives. In the distributed condition, in contrast, each individual started the discussion based on one of the different (i.e. the own) perspectives. Accordingly, participants in this condition had, in the beginning, different perspectives and only later they (possibly) learnt about the other person’s alternative (e.g., that the participant himself or herself was referring to “*Kraulen*” as swimming and the other one to “*Kraulen*” as ruffling a cat). This later setting is similar to the standard condition in a hidden profile and, therefore, a suitable control condition. After the tenth question about the homonym, participants were asked to reflect briefly and to put down some notes about what had happened while they answered the homonym questions. After the manipulation, participants continued with the hidden profile task.

**Hidden profile task.** First, participants read information about the task on their own. The task was an adapted version of the Mini Market task (van Ginkel et al., 2009; van Ginkel & van Knippenberg, 2008). We translated it into German and adjusted it to two persons. In this task, participants are asked to support a local government in three decisions regarding the setup of a small market centre. To make an optimal decision, participants needed to consider different priorities (the temperature in the market centre, the distribution of the maintenance costs, and the organization of the marketing campaigns) of three different stores (a bakery, a florist shop, a greengrocery) and were asked to come up with a solution that would be equally ideal for all stores. Each participant received shared pieces of information<sup>11</sup> and one unshared piece of information regarding each of the three issues, one after the other. The unshared information was crucial to solve the task correctly, as is usually the case in hidden profiles. These pieces of information were presented in a booklet which was provided during the task. Then, participants were asked to discuss each of the three decisions face-to-face with the other person (i.e., to come up with a solution that would be optimal for all three stores). For example, for the florist shop the temperature was a very important issue, because flowers bloom longer and can be sold longer when stored at a lower temperature; in contrast, for the greengrocery this was not as important as the greengrocery would keep the vegetables in cold storage rooms. While solving the task, participants could directly enter their joint answers into a form on the laptop. For each item, participants were to choose one out of alternative responses (e.g., the temperature:

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<sup>11</sup> Issue 1 temperature:8 shared pieces of information; issue 2 distribution of maintenance costs:5 shared pieces of information; issue 3 organization of marketing campaigns: 1 shared piece of information

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20°C, 18°C, 16°C, 14°C, or 12°C).<sup>12</sup> Finally, participants completed individual measures, including whether they knew the task, answered demographic questions, and a number of concepts unrelated to the current research question.

### Measures

**Group performance.** Following the scoring scheme for this task developed by van Ginkel et al. (2009), dyads received between 0 and 8 points, depending on how well the chosen selected alternative mirrored the interests of all stores (based on the whole set of information). Scores were averaged between the individuals of a dyad across the three decisions, because they were asked to come to a solution together, but both had to enter the solution into their own computer. Differences between individuals in a dyad occurred only in two cases. Higher scores reflected a higher performance.

### Results and discussion

We predicted that participants would perform better in the shared homonyms condition than in the distributed homonyms condition. A t-test indicated that, in line with the prediction, participants performed better in the shared condition ( $M = 6.64$ ,  $SE = .35$ ) than in the distributed condition ( $M = 5.36$ ,  $SE = .48$ ),  $t(45) = 2.07$ ,  $p = .043$ ,  $d = .618$ .

This study provided support for Hypothesis 1 that the awareness of all participants of multiple perspectives at the onset of a discussion (shared homonyms condition) facilitates the subsequent performance in a hidden profile task, compared to when participants hold only one (i.e., their own) perspective in the beginning (distributed homonym condition). We assumed that openness to multiple perspectives was higher after individuals had realized together in a discussion that there were multiple

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<sup>12</sup> Materials are available from the corresponding author open request.

valid perspectives, compared to when each individual entered the discussion with a different perspective. Whether the shared homonyms condition actually increased the openness to multiple perspectives remained open and was therefore tested in Study 4. Participants' communication during decision making was videotaped. Raters were asked to evaluate videos of the communication regarding openness to multiple perspectives.

In addition, Study 4 aimed to test whether openness to multiple perspectives induced on the individual level can also increase hidden profile performance (i.e., Hypothesis 2). Therefore, it used the same paradigm as Study 3 but applied the following adaptations. First, besides the shared homonyms condition from Study 3, two conditions in which participants were individually faced with the homonym were implemented. In one of them, only one meaning was made salient and the other one had to be concluded in the process of filling in the questionnaire (individual-sequential); in the other condition, both meanings of the homonym were made salient before participants answered the questionnaire (individual-parallel). Second, interactions within the dyad were videotaped in Study 4 and rated for openness to multiple perspectives to test whether this openness, indeed, drives the performance effect of the intervention.

#### **Study 4: individual level intervention**

#### **Method**

#### **Participants and Design**

Hundred-and-fifty-eight students (79 dyads) from a German university (women = 120; men = 37; not defined = 1;  $M_{age} = 22.59$  years,  $SD = 3.75$ , range = 18 - 33) participated in an experiment with three conditions (shared homonyms vs. individual-sequential vs. individual-parallel). Five further dyads needed to be excluded, because they had

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participated in a similar study and had been debriefed about hidden profile tasks. Participants received 8 Euros as compensation. In addition, a 25€ voucher was awarded to the best performing dyad.

### Procedure

The procedure was nearly the same as in Study 3, this time shared homonyms, individual-parallel and individual-sequential groups were compared. Upon arrival in the lab, dyads were randomly assigned to one of the three conditions. In the *shared homonyms condition*, the procedure was the same as described in Study 3. In the two individual conditions participants were first seated in separate cubicles. As long as participants were in the cubicles, the two individual conditions differed only regarding the way the pictures of the swimmer and the ruffled cat were displayed: In the *individual-sequential* condition, participants initially were presented with only one picture (either the swimmer or the cat). In the other condition, the *individual-parallel* condition, participants were presented with both pictures from the beginning on. Then, participants in both individual conditions had to answer individually the same ten items as in Study 3. In doing so, participants in the individual-sequential condition were likely to guess the other meaning of the homonym, because some of the ten items related to the meaning not shown in the picture they were presented with (either the cat or the swimmer). In other words, participants in this condition experienced, at some point, the insufficiency of their perspective and needed to consider the other meaning (i.e., be open to another perspective). However, participants in the individual-parallel condition did not need to develop this openness, because they were not forced to deal with the different perspectives to the same extent as individuals discussing the perspectives in a dyad (shared homonym condition) and as individuals taking one and then discovering the valid other perspective (individual-parallel). Finally, both members of a dyad were guided together into one room, where they worked together on the

hidden-profile task as in the socially shared condition (and more generally in Study 3).

### Measures

**Group performance.** Group performance was assessed using the same scoring scheme as in Study 3.

**Video data.** Two raters who were blind for the experimental condition and the hypothesis judged whether the dyad considered the multiple perspectives of the parties involved in the business scenario (i.e., the shop keepers). Raters watched the videotapes and were instructed to judge, on a seven-point scale ranging from “1 = never true” to “7 = always true”, whether “the dyad repeatedly considered the different perspectives of the shopkeepers, e.g. in summarizing relevant information or in giving reasons for an alternative”. Raters were made familiar with the task to enable them to judge the quality of exchanged information. Because of technical problems, the video of one dyad was lost, yielding  $N = 78$  cases of dyads in the analysis involving the ratings. To test inter-rater reliability, more than one third of the videotapes (29 out of 78) were double coded. The interclass correlation (ICC) was high. The average measure ICC was .898 with a 95% confidence interval from .783 to .952. Furthermore, we measured the time in seconds dyads needed to make the three decisions of the mini market task as a control variable.

### Results and discussion

**Performance.** We predicted that participants under the shared homonyms and the individual-sequential condition would perform better than under the individual-parallel condition. A one-way ANOVA with three groups (shared homonyms vs. individual-sequential vs. individual-parallel) with performance as dependent measure revealed that there was a significant difference between conditions in joint performance,  $F(2,76) = 3.45$ ,  $p = .037$ ,  $d = .602$ . Planned contrasts (shared-homonyms: 1, individual-sequential 1, individual-parallel -2) revealed, in line with

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Hypothesis 2, that the shared homonyms condition ( $M = 5.65, SE = .34$ ) and the individual-sequential condition ( $M = 5.81, SE = .34$ ) significantly improved performance compared to the individual-parallel condition ( $M = 4.65, SE = .34$ ),  $t(76) = 2.61, p = .011, d = .606$ , whereas the shared homonyms condition and the individual-sequential condition did not differ,  $t(76) = -.32, p = .752, d = .080$ .

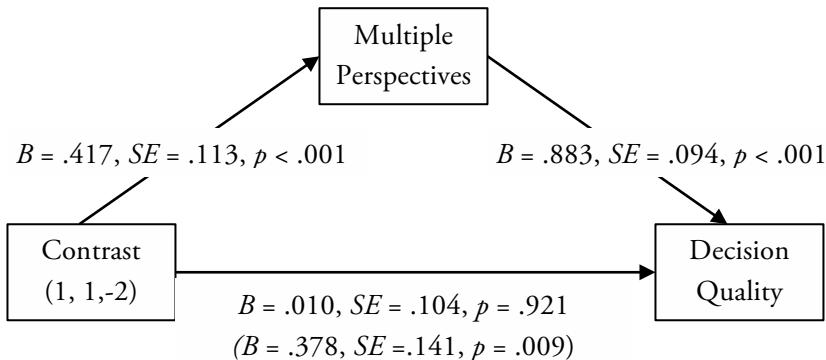
**Coding of videos.** The duration of the discussions of the hidden profile task did not differ between experimental conditions,  $F(2,75) = 1.40, p = .25, d = .386$ , between shared homonyms ( $M = 555.57, SE = 45.04$ ), individual-sequential ( $M = 534.81, SE = 43.79$ ) and individual-together ( $M = 456.81, SE = 43.29$ ), meaning that in all conditions it took participants approximately the same time to reach a decision.

**Openness to multiple perspectives.** We tested the prediction that the shared homonyms and the individual-sequential condition lead to more openness to multiple perspectives than the individual-parallel condition using a one-way ANOVA with three groups (shared homonyms vs. individual-sequential vs. individual-parallel) and coding of the multiple perspectives as a dependent measure. Results revealed that there was a significant difference between conditions with multiple perspectives,  $F(2,75) = 6.49, p = .003, d = .834$ . Indeed, planned contrasts (1, 1, -2) showed that openness was higher in the shared homonyms ( $M = 4.15, SE = .29$ ) and individual sequential condition ( $M = 4.35, SE = .31$ ) than in the individual parallel condition ( $M = 3.00, SE = .29$ ),  $t(75) = 3.57, p < .01, d = .29$ , whereas the former two conditions did not differ,  $t(75) = -.48, p = .64, d < .01$ .

To test whether the consideration of the different perspectives positively mediated the impact on decision-quality, we used mediation analysis based on bootstrapping (5000) (Preacher & Hayes, 2008). The first contrast (1, 1, -2) was used as independent variable, decision-quality as dependent variable, and coding of the multiple perspectives as mediator.

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The orthogonal other contrast (1, -1, 0) was entered as a covariate. This revealed a significant indirect effect,  $B = .368$ ,  $SE = .106$ ,  $CI_{95\%} = [.176, .599]$ , whereas the direct effect became insignificant (see Fig. 1).



**Fig. 1.** Mediation analysis with the independent variable contrast (1, 1, -2), the multiple perspectives as a mediator, and decision-quality (i.e., the performance of the dyad) as dependent variable.

The results of Study 4 indicated, in line with the prediction, that when dyads discussed multiple perspectives before working on a hidden profile task (i.e., in the shared homonym condition) or when individuals experienced that there was another valid perspective than their own initial opinion before working together in a dyad (i.e., in the individual-sequential condition), the hidden profile performance was better than in the control condition (i.e., the individual-parallel condition) implemented here. This effect is due to the consideration of multiple perspectives in the group discussion, which facilitates group performance. Hence, the manipulation in the shared homonyms and the individual-sequential condition seemed to elicit openness to multiple perspectives. Given that

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the openness to multiple perspectives is structurally necessary to perform well in a hidden profile task, it is not surprising that both measures correlated very highly in Study 4. Nonetheless, the openness codings shed light into the process during group discussions.

### Discussion of Chapter 3

The aim of the current research was to extend our understanding of how to improve performance in hidden profile tasks. Prior research had provided indirect evidence that openness to multiple perspectives is a key to high hidden profile performance and that this is most successful when implemented on a group level (Gruenfeld et al., 1996; Kolb & van Swol, 2016; Liljenquist et al., 2004). Our research is the first to *directly* target openness to multiple perspectives. In two studies, we demonstrated that facing dyads and individuals (in different ways) with multiple valid perspectives can facilitate subsequent performance in a hidden profile task. When, on the social level, both members were aware of the validity of two perspectives or when, on the individual level, individuals recognized the validity of a perspective other than their own, this was beneficial for the performance in a subsequent unrelated hidden profile task, compared to when both members of a dyad initially held different opinions (like in a usual hidden profile task) or when individuals were informed about multiple perspectives at a time. These findings suggest that two processes might facilitate hidden profile performance via openness to multiple perspectives: First, a shared acceptance on the social level that there are multiple valid perspectives on the problem at hand and, second, individuals' willingness to consider a perspective other than the own initial one. Further research should seek to gain deeper insights into the nature and function of these processes.

Going beyond previous studies which implemented manipulations only on a group level (Gruenfeld et al., 1996; Kolb & van Swol, 2016;

Liljenquist et al., 2004), we demonstrated that individual level manipulations are, likewise, increasing the openness to multiple perspectives. On the social level and on the individual level, different manipulations are needed to make people more open to multiple perspectives and to improve performance. In dyads multiple perspectives known to all members lead to higher hidden profile performance (compared to distributed opinions), whereas on the individual level, gradually understanding the validity of multiple perspectives leads to higher performance (compared to knowing about multiple perspectives from the beginning on). At first glance, it might occur surprising that informing about multiple perspectives in a step-by-step manner has other effects for individuals than for dyads. However, this finding is actually in line with other research on hidden profiles: Liljenquist et al. (2004) found that implementing a counterfactual mind-set on a group level has a positive effect on performance in a hidden profile task, whereas implementing it on an individual level has a negative effect. Similarly, a prevention focus facilitates performance on analytic tasks (comparable to hidden profile tasks) when these are solved individually, but it undermines performance in hidden profile tasks when individuals believe to work in a group (Sassenberg et al., 2014). In all these cases, the social vs. individual setting alters the impact of the respective manipulation on information processing and subsequent performance. This is due to the different conditions for the implementation and the application of strategies and mind-sets resulting from social vs. individual settings. In the current case, it seems likely that discussing multiple valid perspectives on a social level requires to acknowledge the validity of the multiple perspectives, whereas when an individual just possesses a piece of information, without discussing it with somebody else, striving for consistency might lead to integrating the multiple perspectives into one joint opinion (e.g., "The experimenter wants me to apply the meaning of the homonym that fits the

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respective statement best"). Similarly, holding one and being as an individual faced with another valid perspective might actually lead to recognizing that there is a second valid perspective, whereas being faced with another valid perspective supported by another individual might lead to finding compliance with the own perspective rather than actually recognizing the validity of that other perspective. Further research is required to test the validity of this interpretation.

Results in Study 4 and in particular the mediation analysis of the rated communication support our prediction that, on the social level, knowing multiple perspectives and, on the individual level, accepting the insufficiency of the own perspective, makes individuals actually more open to multiple perspectives. In both conditions, participants considered multiple perspectives during task solutions more, which led to a higher decision quality in the dyad.

It might be considered as a limitation of the current research that dyads were used rather than three-person groups as is done in most other hidden profile studies. However, we implemented within the dyads a hidden profile as originally defined by Stasser and Titus (1985). Hence, the current research can also be seen as the extension of an effect to dyads that had before been demonstrated only in groups. Likewise, different from most other hidden profile research, participants in the current study had to make three decisions rather than one. This renders the study setting more similar to realistic settings where groups of experts rarely have to make only one single decision.

The current findings have a clear practical implication: So far, research often focused on individuals' and groups' deficits during the work on hidden profile tasks. Our study provided the ground for interventions to improve performance in hidden profile tasks and expert groups more generally. Other techniques that have been shown to improve the decision quality of hidden profiles, like devil's advocacy (the devil's advocate

questions the assumptions presented by other group members and tries to show why these recommendations should not be implemented) (Waddell, Roberto, & Yoon, 2013), enhanced aversive conflict experience and, thus, may hinder decision implementation. Mechanisms that may also be helpful to overcome the confirmation bias are (to name only a few) the dialectical inquiry approach (in the dialectical inquiry approach two subgroups debate contrary recommendations taken from the same data set) (Schweiger, Sandberg, & Ragan, 1986), consideration of the opposite (Lord et al., 1984; Nemeth et al., 2001), taking an outsider perspective (Milkman et al., 2009), critical thinking (Halpern, 1998), and motivational factors like the feeling to be understood (Faulmüller et al., 2012).

Our study highlights an efficient and easy way how to get individuals to become more open to multiple perspectives in order to better solve a hidden profile. On the social level, group members need to handle different perspectives. In expert groups this could be done by discussing the different similarly relevant criteria that need to be fulfilled by a decision at hand (e.g., financial, ecological, social). On the individual level, group members need to be willing to distance themselves from their personal opinion. This could be implemented by taking the other group members' perspective before trying to relate the information which those communicated to one's own opinion, and recognizing that the own opinion may be only one perspective among many others. Thus, openness to multiple perspectives involves the awareness of the possibility that oneself may be wrong in order to prevent the confirmation bias. Further research should develop and test the impact of interventions with regard to multiple perspectives, which can be implemented in real world groups.

Beyond that, as the confirmation bias may be one of the most problematic principles of human reasoning (Lilienfeld et al., 2009; Nickerson, 1998), openness to multiple perspectives might not only

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improve teamwork, it may also prevent in many contexts misunderstandings, conflicts, and jumping to conclusions (for similar arguments regarding individual decision making see Lilienfeld et al., 2009; Milkman et al., 2009). This openness also implies that one is able to admit not knowing, whether his / her own perspective is right or wrong. Openness to multiple perspectives could thus be a basic principle to be followed by individuals, groups, companies, or societies with regard to respectful and appreciative processes of interaction with one another. Taken together, our results are a first promising step showing that manipulating the conditions of access to perspectives, in order to make people more open to multiple perspectives, is an effective and relatively easy way to improve the performance in hidden profile tasks. The results provide evidence that when, on the social level, members need to handle different perspectives and, on the individual level, need to give up their own opinion, individuals get more open to multiple perspectives and show a better joint hidden profile performance. Our research is, to the best of our knowledge, the first to directly test the influence of openness to multiple perspectives and contributes to a better understanding of what individuals need to jointly come to high-quality decisions. Thereby, it does not only shed light on the processes allowing for good decisions in expert groups, it might also inspire real world interventions.

## Chapter 4: General Discussion

The aim of this dissertation was to answer the research question whether shared present moment awareness is a means to improve on joint decision making. Thereby, this dissertation sought to combine psychoanalytical conceptualizations with social psychological research. Based on the closely related concept of mindfulness (i.e. present moment awareness), the goal was to test whether shared present moment awareness enhances the performance of decision making dyads. Therefore we investigated in a first step the impact of classic mindfulness meditation training on joint decision making via computer mediation. This is a first attempt to study the effects of mindfulness in social contexts, and more specifically in social decision making. We predicted that mindfulness can have detrimental effects on computer mediated interdependent tasks due to its wide attentional breadth. In a second step, we investigated the influence of openness to multiple perspectives, an important feature of Langerian mindfulness. It was predicted that openness to multiple perspectives would improve performance.

The first empirical part, *Chapter 2*, examined the influence of Eastern mindfulness on performance during a decision making task via computer-mediated communication. In two studies, mindfulness was manipulated with a short meditation exercise in which participants were instructed to eat raisins mindfully (e.g. with regard to what is the taste of the raisin on the tongue? What is the consistency of the raisin?) (e.g. Heppner et al., 2008; Hong, Lishner, Han, & Huss, 2011; Kabat-Zinn, 2003, 2013; Weger, Hooper, Meier, & Hopthrow, 2012). Across both studies, findings demonstrated that mindfulness is detrimental to decision quality. In Study 1 mindfulness decreased the decision quality in a computer-mediated negotiation with a simulated interaction partner and

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in Study 2 in a computer-mediated joint decision making task with a real other person.

The second empirical part, *Chapter 3*, tested the influence of openness to multiple perspectives on the performance of dyads solving a hidden profile task. Openness to multiple perspectives was theorized to be an important feature of Langerian mindfulness (Langer, 2014; Langer & Moldoveanu, 2000) and a performance improving factor of group intervention studies (Gruenfeld et al., 1996; Kolb & van Swol, 2016; Liljenquist et al., 2004; Postmes et al., 2001). Openness to multiple perspectives was manipulated directly with a new manipulation, namely with one or two pictures of a homonym (i.e. a word with two meanings), developed exclusively for this research. The results show that openness to multiple perspectives manipulated in Study 3 on a social level between dyads and moreover in Study 4 on an individual level within persons improved participants' performance. In addition, a mediation analysis found that multiple perspectives were considered more on the individual as well as on the social level, which improved subsequent performance in a hidden profile task.

It is important to bear in mind that this research with the manipulation of shared present moment awareness covers only a small part of the intersubjective theory in psychoanalysis (e.g. Stern, 2004; Jung, 1966; Orange et al., 2015). Besides shared present moment awareness, shared lived experience is an important feature hereof. In addition to mindfulness, research offers further concepts that could help to extrapolate the psychoanalytical concept to a more controlled setting. For example in an unpublished study we also tested whether I-sharing improves hidden profile performance (Grapendorf & Sassenberg, 2014). I-sharing is a construct developed by Pinel, Long, Landau, Alexander, and Pyszcynski (2006). When individuals I-share, they believe that they share the same subjective experience with another person. However, no differences were

found between I-sharing dyads and a control condition (for details see appendix D, 106). A generalization of lab studies is not always possible. An example that controlled lab situations are not generalizable to more complex real life situations is the minimal group paradigm. This paradigm only discriminates between groups when the conditions of the paradigm are met. Minimal conditions are required for stable and strong effects. However, as soon as conditions are violated (e.g. people speak with each other), they no longer discriminate between groups (c.f. Diehl, 1990). On a more general level, distinctions between experience-based constructs and evaluation-based constructs should be regarded with caution. Results from controlled lab studies are not always generalizable to the field; complex real life situations (e.g. psychoanalytical phenomena) cannot be transferred just like that to empirical research.

This dissertation focuses on antecedents of group functioning on hidden profile performance. Whereas Eastern mindfulness decreased the performance in interdependent tasks via computer-mediated communication, openness to multiple perspectives increased decision quality of dyads in a hidden profile task which was conducted face-to-face. The current dissertation contributes to our understanding of what groups need on the individual level and on the social level in order to perform better.

### **Strengths and Limitations**

A major strength of this dissertation is that psychoanalytical theorizing was combined with social psychological research in terms of concepts and methods. Psychoanalytical conceptualizations highlight the potential of interpersonal contacts. Therefore psychoanalytical theorizing gave the idea to investigate mindfulness in an interpersonal context and to expand prior work that applies mindfulness mainly as a mental (i.e. individual) construct (e.g. Quaglia et al., 2015). In addition, chapter 3

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provides a framework for future studies on interdependent tasks, focusing on the process of how people acknowledge perspectives different from their own.

Across all studies of this dissertation differences in performance were found. Two different interventions were used, Eastern mindfulness and openness to multiple perspectives which were diametrical in their impact on decision quality. Mindfulness led to a poorer performance in computer-mediated interdependent tasks whereas openness to multiple perspectives improved the performance of joint decision making. Therefore this dissertation contributes to our knowledge about strategies that can improve decision making (c.f. Milkman et al., 2009). However, a note of caution is advised here since the studies were conducted in different media environments (computer-mediated communication in Study 1 and Study 2 and face-to-face communication in Study 3 and Study 4). It may be the case therefore that performance differences result from the different media used.

Chapter 2 highlights that a wide attentional breadth inherent in mindfulness is detrimental to tasks the primary goal of which is a decision. In two different tasks we found that mindfulness is diminishing performance with regard to interdependent tasks via computer mediation. In Study 1 mindfulness was detrimental to decision quality in a negotiation with a simulated other and in Study 2 in a joint decision-making task with a real other. To my knowledge, these studies are the first that examine mindfulness in a computer-mediated interdependent task. These results are important, as meanwhile computer-mediated communication is an essential part of our day-to-day work (Paul et al., 2004) and mindfulness is more and more applied in real work settings (Good et al., 2016).

A major strength of Chapter 3 is the successful application of a newly developed intervention in hidden profile dyads, namely openness to

multiple perspectives. Openness to multiple perspectives improved the decision quality of dyads in a hidden profile task when openness to multiple perspectives was induced with different interventions on a social level and on an individual level. Dyads performed better on hidden profiles when on the social level persons jointly considered the validity of two different perspectives and on the individual level accepted the insufficiency of their own perspective.

The small sample sizes (Study 1 N = 50; Study 2 N = 37 dyads, Study 3 N = 48 dyads, Study 4 N = 79 dyads) limit the conclusion drawn from the current findings. Note, however, that we found in Chapter 2 the same effect in two different tasks when using the same intervention; Chapter 3 reports that findings of Study 3 were replicated in Study 4. Our findings are promising and should be investigated with different and more complex tasks (e.g. in field studies with real teams, or on creativity tasks) and larger sample sizes.

### **Theoretical implications and directions for future research on mindfulness**

#### **Mindfulness-related concern for others**

There is clear evidence that Eastern mindfulness fosters social and relationship outcomes (Sedlmeier et al., 2012; c.f. Good et al., 2016). As outlined in Chapter 1, a great number of studies show effects of mindfulness on human relations, such as the facilitation of romantic (Barnes et al., 2007; Hill & Updegraff, 2012; Sedlmeier et al., 2012; Winning & Boag, 2015) and professional (Reb et al., 2014) relationships. Particularly, these effects on relationships might be influenced by mindfulness through greater compassion, empathy and perspective taking (Condon, Desbordes, Miller, & DeSteno, 2013; Dekeyser, Raes, Leijssen, Leysen, & Dewulf, 2008; Krasner, 2009). Across both studies we found that mindfulness decreased the decision quality in tasks in which the

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primary goal was to make a decision and not to establish a good relationship. Results indicate that mindfulness primarily evokes concern for others and not a focus on a task. Thus mindfulness seems to be detrimental to interdependent tasks the primary goal of which is to make a decision and not to build a relationship. Interpersonal awareness or a good relationship did not support task performance in the tasks. In contrast, when the concern to build up a relationship supports task performance, mindfulness may be beneficial (e.g. Reb & Narayanan, 2014; Reb, Narayanan, & Chaturvedi, 2014; Reb, Narayanan, & Ho, 2013). Mechanisms underlying these effects of mindfulness on task performance remain to be determined.

### **Shared mindfulness in a computer mediated environment**

Research on mindfulness is driven by an individualistic orientation which disregards potential effects of mindfulness when it is shared. Although there is research labeled as social mindfulness (Van Doesum, Van Lange, & Van Lange, 2013; Van Lange & Van Doesum, 2015), this research does not examine the consequences of mindfulness between persons. As psychological findings reveal that experiences are more intense when they are shared (Boothby, Clark, & Bargh, 2014; Shteynberg, 2015; Shteynberg, Hirsh, Galinsky, & Knight, 2014), shared mindfulness may well have strong effects which may differ from its individual effects. We found a detrimental impact of mindfulness in two different interdependent tasks, whereas Reb and Narayanan (2014) found conducive effects in a distributive negotiation tasks. However, there are important differences. We manipulated mindfulness in Study 2 between the dyads (i.e. both members of a dyad were either in the mindfulness or control condition), while Reb and Narayana (2014) manipulated mindfulness within the dyads (i.e. a dyad was always composed of a member of the mindfulness and one of the control condition). Furthermore, persons communicated in Study 2 via instant messaging

while Reb and Narayanan (2014) used face-to-face communication. Hence, it is possible that the performance differences between the studies are confounded. On the one hand, mindfulness-related concern for others may be intensified when mindfulness is shared and may therefore diminish the task performance. Surprisingly, there exists little research focusing on the consequences in social interactions when a state of mindfulness is shared (cf. Moskowitz, 2005). On the other hand, performance may be confounded by the richness of the medium used. To date, there has been little agreement on the influence of media richness. It has been found that a richer medium (e.g. face-to-face) outperforms a leaner medium (e.g. instant messaging) on solving a hidden profile task (Kerr & Murthy, 2009) whereas no difference was found between face-to-face negotiations and computer mediated negotiations (Galin, Gross, & Gosalker, 2007). Future work should explore underlying questions, such as how mindfulness influences performance when mindfulness is shared (vs. not) and when the medium is rich (vs. not).

### **Contextual dependency of mindfulness**

The wide attentional breadth inherent in mindfulness, as postulated by Dane (2011), may be beneficial in a dynamic task environment but costly in a static task environment. Findings of Study 1 and Study 2 provide some support that mindfulness is detrimental in a static task environment, which is similar to findings by Zhang et al. (2013). In our studies, participants had to solve a task with a limited amount of information relevant for the decision. However, these findings differ from Good et al.'s (2016) assumption. In their model they propose that mindfulness affects performance even on tasks in a static environment, through attentional qualities like stability, control, and efficiency. Future research should determine the specific mechanisms of mindfulness in task performance in specific contexts and propose a more consistent model (c.f. Good et al., 2016). Thereby, future research should

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control whether the effects of mindfulness are confounded by other factors like for example test effort or the kind of meditation. Initial evidence found by Jensen et al. (2011) suggests that many studies showing attention improvements after mindfulness trainings may be seriously confounded by test effort. Furthermore studies lack of control for specific effects of the different operationalizations of mindfulness. In a meta-analysis, it has been found that mean effect sizes differ between more complex meditations (e.g. mindfulness based stress reduction with weekly meetings and several meditation trainings) and shorter meditations (e.g. one meditation training) (Eberth & Sedlmeier, 2012). Again, further research is needed to address differential effects of the specific context.

### **Theoretical implications and directions for future research on group decision making**

#### **Openness to multiple perspectives**

Openness to multiple perspectives seems to be one of the purest factors improving decision making. Based on findings of Langerian mindfulness (Langer, 2014; Langer & Moldoveanu, 2000; Langer & Piper, 1987) and joint decision making (Gruenfeld et al., 1996; Kolb & van Swol, 2016; Liljenquist et al., 2004; Postmes et al., 2001), we newly developed an easy but effective training to enhance the consideration of different perspectives in groups. In two studies, dyads performed better on a hidden profile task when they jointly considered different perspectives before doing a hidden profile task or when they individually realized the validity of another perspective. Openness to multiple perspectives can thus be a compelling cognitive strategy to improve joint decision making. It is important to note that openness to multiple perspectives is different from perspective taking. Whereas perspective taking means to understand the perspective of another person (Davis, 1983), openness to multiple

perspectives is the acceptance of different views and judgments of stimuli, which implies the possibility that oneself may have wrong information.

Openness to multiple perspectives on decision making is comparable to existing research on debiasing techniques on the individual level like considering the opposite (Lord et al., 1984) and on group approaches like dialectical inquiry and devil's advocacy (Schweiger et al., 1986). Considering the opposite is a corrective strategy for social judgment. Individuals in this approach are explicitly instructed to consider the opposite of stimuli or are indirectly made aware of opposite possibilities. Similarly to current research, individuals involved in this approach are made aware of another perspective. Considering the opposite led to more objectivity concerning the assimilation of new evidence and hypotheses testing instead of following instructions to be as fair and correct as possible (Lord et al. 1984). In research on group approaches Schweiger et al. (1986) found mechanisms to improve the level of decision making groups. Groups instructed to debate different perspectives (in the dialectical inquiry or in the devil's advocacy) were more effective than groups asked to find a consensus. However, these group approaches may enhance aversive conflict experience and may therefore inhibit the decision implementation (Schweiger et al., 1986; Waddell et al., 2013). Openness to multiple perspectives creates an added value. Unlike the interventions by Schweiger et al. (1986) and Lord et al. (1984), openness to multiple perspectives is induced independently from the task (i.e. before the task and not during the task). An important undertaking of future research should be further exploring openness to multiple perspectives as an efficient and easy way to realize good decisions.

### **Individual and social level interventions**

In previous research, social level interventions have mainly been suggested to exclusively improve joint decision making (e.g. Kolb & van Swol, 2016; Liljenquist et al., 2004). To date, there exists no systematic

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understanding of whether social level interventions are essential to improve solving hidden profiles tasks or whether individual level interventions are also suitable. In the current research, interventions on the social and on the individual level improved hidden profile performance. Our research supports the idea that individual *and* social level interventions are potential antecedents to improve hidden profile performance. However, there is much room for further progress in determining how far reaching individual level interventions and group level interventions are and how these interventions should be designed. It may be the case therefore that individually realizing the existence of different perspectives countervails against social level interventions. For example, it has been found that groups who were trained apart but received information about the others' skills showed a performance comparable to that in a group task with members who were trained together (Moreland & Myaskovsky, 2000). Small individual level interventions may be very efficient to foster hidden profile performance. For example, it has been found that a nonconsciousness goal conflict made people think about different perspectives during individual decision making (Kleiman & Hassin, 2013). Further research should determine when individual level and when social level interventions are more appropriate.

### **Openness to multiple perspectives and diversity**

Within research on group norms it has been found that when information is distributed, groups that value diversity perform better than groups that value similarity (Homan, van Knippenberg, Van Kleef, & De Dreu, 2007; Kolb & van Swol, 2016; Postmes et al., 2001). Groups in which the diversity in certain personality profiles was made salient and whose members initially had different decision preferences performed better when they valued diversity rather than similarity (Homan et al., 2007). As current research in Chapter 3 did test openness to multiple

perspectives also on heterogenous groups (i.e. always one member of the dyad was provided with information favoring the correct solution), it would be interesting to examine the role of openness to multiple perspectives on homogenous and consensus seeking groups (i.e. both members are provided with information favoring one and the same wrong solution). There is research demonstrating that homogenous groups with a preference for an inferior decision hardly ever solve a hidden profile task whereas groups with different decision preferences do so (Schulz-Hardt, Brodbeck, Mojzisch, Kerschreiter, & Frey, 2006). It is possible that openness to multiple perspectives might well influence the solution rate of homogenous groups. Openness to multiple perspectives should lead individuals more to looking for the reasons of the other opinion. However, this remains speculative, there is more research needed that validates our results on different tasks.

### **Practical implications**

#### **Practical implications of mindfulness**

Results of Chapter 2 have a clear cut practical implication. Mindfulness should not be used when people have to come to joint decisions via computer mediation in negotiations and tasks. Mindfulness has been shown to be beneficial when working in other task environments (Hülsheger et al., 2014, 2013). On a more general level, interdependent tasks via computer mediations should be regarded with caution. A meta-analysis revealed that decision making groups are more effective and satisfied when they communicate face-to-face than via computer mediation (Baltes, Dickson, Sherman, Bauer, & LaGanke, 2002). When, however, communication via computer mediation is not avoidable, individuals who communicate mediated by a computer could compensate the rather impersonal context by sharing more personal information (Moore, Kurtzberg, Thompson, & Morris, 1999).

## **Practical implications of openness to multiple perspectives**

Results of Chapter 3 suggest that openness to multiple perspectives may be beneficial to work teams and more specifically to interdisciplinary work teams. Openness to multiple perspectives could support individuals to accept the validity of different points of view and not to blindly accept them but rather to be open (c.f. Lilienfeld et al., 2009). Jumping prematurely to conclusions might be prevented. In day-to-day work openness to multiple perspectives could be established with small exercises. On the individual level, persons could take “a step back” and reassess their own perspective. On the social level, groups should clearly appreciate and search for different and distinct viewpoints. Openness to multiple perspectives seems to be a small but very efficient cognitive strategy to understand another perspective, thus counteracting a potential confirmation bias.

## **Conclusion**

The construct of mindfulness was used more interpersonally to bring psychoanalytical theorizing and social psychological research together. Psychanalytical theorizing suggests that shared present moment awareness enables individuals to receive socially distributed information in an unbiased way. However, it is difficult to generate a controlled situation in which individuals experience a shared present moment. As the state described in psychoanalytical theorizing is strongly related to mindfulness, we used mindfulness to extrapolate the concept of shared present moment awareness to research. Whereas we found that Eastern mindfulness is not helping individuals in the enhancement of joint decision making, openness to multiple perspectives does so. Openness to multiple perspectives was implemented by an intervention developed exclusively for this research. It is supposed to be an important feature of Langerian mindfulness (Langer, 2014; Langer & Moldoveanu, 2000) as well as of

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joint decision making (Gruenfeld et al., 1996; Kolb & van Swol, 2016; Liljenquist et al., 2004; Postmes et al., 2001). When individuals were open to multiple perspectives they valued the unique viewpoint of another person more. Furthermore we found evidence that they not only appreciated the other viewpoint but that they were able to compare mutual findings which led individuals to a better decision quality (c.f. Jung, 1958/1966). To conclude, our research demonstrates that it is worth studying specific cognitive mechanisms of mindfulness.

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## Appendix A: Chapter 2

### Mindfulness manipulation

Setzen Sie sich bequem und aufrecht hin. Lassen Sie ihre Schultern hängen und versuchen sich zu entspannen.

Sie haben zwei Rosinen vor sich liegen.

Nehmen Sie eine einzelne Rosine in die Hand.

Betrachten Sie die Farbe und Form der Rosine. Schauen Sie die Rosine so an, wie wenn Sie noch nie zuvor eine Rosine gesehen hätten. Wie sieht die Rosine aus? Was hat sie für Farben? Was für eine Form? Was für eine Oberfläche?

Wie riecht die Rosine?

Schließen Sie Ihre Augen.

Fühlen Sie, wie die Rosine auf der Hand liegt. Wie schwer oder leicht sie ist.

Nehmen Sie die Rosine zwischen Daumen und Zeigefinger. Spüren sie, wie weich oder wie hart die Rosine ist. Sie spüren die Textur der Rosine zwischen den Fingern, die Höhen und Tiefen.

Woher kommt die Rosine wohl? Welche und wie viele Menschen waren an ihrem Entstehungsprozess beteiligt?

Beobachten Sie jeden Gedanken und jedes Gefühl das kommt, egal wie positiv oder negativ es ist.

Und schließlich mit Achtsamkeit, bringen Sie die Rosine zu Ihren Lippen. Die Hand wird ganz automatisch in die richtige Position gebracht. Sie bemerken den Speichelfluss in ihrem Mund – wie der Körper sich zum Essen vorbereitet.

Legen Sie die Rosine auf Ihre Zunge. Wie fühlt sich die Rosine auf der Zunge an? Können Sie sie schon schmecken? Schmeckt Sie an verschiedenen Stellen im Mund unterschiedlich?

## APPENDIX

Sie beginnen ganz langsam die Rosine zu kauen, und nehmen den Geschmack der Rosine im Mund wahr. Wenn Sie sich bereit fühlen zu schlucken, betrachten Sie den Impuls wie er kommt, um zu schlucken. Wie ist ihre Stimmung? Wie lange können sie den Nachgeschmack wahrnehmen?

Bitte wiederholen sie die Übung mit der zweiten Rosine noch mal, diesmal ohne verbale Anleitung, ganz in Ruhe.

*Dann:* „Sie haben jetzt noch Zeit das Erlebnis in sich nachklingen zu lassen und sich zu entspannen“

„Kehren Sie jetzt wieder mit der Aufmerksamkeit in den Raum zurück und machen Sie mit der Aufgabe weiter.“

### **Interpersonal awareness scale (Study 2)**

Die folgenden Aussagen bewerten Sie bitte danach, inwieweit sie auf Sie während des Chats zutrafen. Während des Chats...

...habe ich auf die Stimmung geachtet

...war mir wichtig, zu wissen, ob wir auf derselben Frequenz waren oder nicht.

...habe ich darauf geachtet, mit der anderen Person in Kontakt zu treten

...habe ich auf gegenseitiges Verständnis geachtet

...habe ich mich gefragt ob ich der anderen Person menschlich näher oder zu nah komme

...habe ich darauf geachtet, wer von uns wie viel Einfluss ausgeübt hat

## Appendix B: Chapter 3

Herzlich willkommen!

Vielen Dank, dass Sie an unserer Studie teilnehmen!

In der Studie bitten wir Sie **mit einer anderen Person<sup>13</sup> / zuerst alleine und anschließend mit einer anderen Person<sup>14</sup>** ein paar kurze Fragen zu beantworten. In Folge bitten wir Sie mit der anderen Person eine Aufgabe zu lösen: Dabei sind sie in der Rolle eines Komitee-Mitgliedes, welches Entscheidungen treffen muss. Lesen Sie und folgen Sie den Anweisungen sorgfältig, das wird es Ihnen einfacher machen, die Aufgabe gut zu lösen. Diese Studie wird bessere Ergebnisse erzielen, desto besser Sie die Aufgabe verstehen und sich darauf einlassen.

Vielen Dank für Ihre Mitarbeit

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<sup>13</sup> Social condition – shared homonyms / distributed homonyms

<sup>14</sup> individual sequential and individual parallel condition

## APPENDIX

**Social condition (Study 3 and Study 4) – shared homonyms  
Person 1 and person 2.**

**Bitte bewerten Sie gemeinsam folgende Aussagen über Kraulen.**



**Social condition (Study 3) – Distributed homonyms**

**Person 1.**

**Bitte bewerten Sie gemeinsam folgende Aussagen über Kraulen.**



**Person 2.**

**Bitte bewerten Sie gemeinsam folgende Aussagen über Kraulen.**



## APPENDIX

### Individual sequential condition (Study 4)

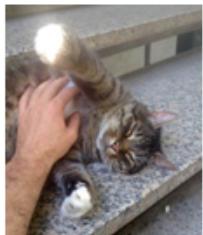
Person 1.

**Bitte bewerten Sie folgende Aussagen über Kraulen.**



Person 2.

**Bitte bewerten Sie folgende Aussagen über Kraulen.**



**Individual parallel condition (Study 4)**

**Person 1 and person 2.**

**Bitte bewerten Sie folgende Aussagen über Kraulen.**



**Questions about “Kraulen” (all conditions in Study 3 and Study 4)**

1. Kraulen tut gut.
2. Menschen können Kraulen.
3. Kraulen ist gesund.
4. Kraulen kann man nicht überall.
5. Kraulen erfordert Technik.
6. Jeder kann Kraulen.
7. Man kann nicht "einfach so" Kraulen.
8. Kraulen kann man im Wasser.
9. Man kann alleine Kraulen.
10. Man braucht Badesachen zum Kraulen.

## APPENDIX

### Appendix C: Mini market task

**Vielen Dank, dass Sie an dieser Studie teilnehmen. Sie unterstützen uns darin in unserer Forschung!**

**Auf den folgenden Seiten finden Sie genauere Informationen zur Aufgabe, die sie mit der anderen Person lösen werden. Lesen Sie alle Informationen sorgfältig durch.**

#### **Generelle Informationen**

Eine Bäckerei, ein Blumenladen und ein Gemüseladen befinden sich im Wohngebiet eines kleinen Vorortes. Die Läden befinden sich sehr nahe nebeneinander, aber weit entfernt von allen anderen Läden in der Gegend. Im Gemeinderat läuft gerade ein Projekt, um die Gegend für die BewohnerInnen attraktiver zu gestalten. Es soll untersucht werden ob es möglich ist, eine Einkaufspassage zu eröffnen, in dem sich die 3 Läden befinden. Die Idee ist, die Einkaufspassage so zu gestalten, dass das Einkaufs-Erlebnis für die Kunden angenehmer ist. Das heißt, dass sich in der Einkaufspassage öffentlicher Raum, einige Bänke und Brunnen, sowie einige Dienstleistungen wie Bankautomaten befinden sollen. Die jeweiligen Manager der 3 Läden begrüßen diese Idee und denken, dass dies höhere Absätze für sie abwerfen wird.

Jedoch sind sich die Manager der Geschäfte bei einigen wichtigen Themen nicht einig, wie die Einkaufspassage genau organisiert werden soll. Da es zu lange dauern würde, wurden sie vom Gemeinderat als Mitglied eines Komitee berufen, das sich um alle organisatorischen Angelegenheiten kümmern soll, bei denen sich die 3 Parteien nicht einigen können.

Es ist nun Ihre Aufgabe sich 1.) ein Bild von der Angelegenheit zu machen und 2.) mit dem anderen Komitee-Mitglied eine Empfehlung aussprechen, wie sich der Gemeinderat entscheiden sollte.

Es gibt 3 verschiedene Angelegenheiten, bei denen noch eine Entscheidung getroffen werden muss. Diese sind:

- Die Raumtemperatur in der Einkaufspassage
- Die Verteilung der Wartungskosten für den Gebäudekomplex
- Die Organisation von Marketing-Kampagnen

Betrachten Sie dabei die 3 Entscheidungen als unabhängig voneinander!

## APPENDIX

**Bitte entscheiden Sie mit der andern Person über die Raumtemperatur in der Einkaufspassage.**

Die Temperatur wird zentral geregelt sein (also wird die Temperatur in allen 3 Läden gleich sein). Das ist am ökonomisch sinnvollsten.

Die Temperatur wird über Türluftschleier in den Eingangsbereichen und Heizkörper in der ganzen Einkaufspassage geregelt sein.

Die Bäckerei bevorzugt eine angenehme Temperatur. KundInnen müssen in der Regel ein paar Minuten warten, bis sie bedient werden können. Das Warten ist komfortabler, wenn die Temperatur angenehm ist. Im Geschäft sollte es deswegen 20 Grad Celsius haben.

Der Gemüseladen hat Möglichkeiten, das Obst und Gemüse zu kühlen, bis es verkauft wird.

Während der Öffnungszeiten wird die Temperatur der Einkaufspassage das ganze Jahr über gleich sein.

Der Gemüseladen bevorzugt eine Temperatur von 20 Grad Celsius.

Aus wirtschaftlichen Gründen wird, sobald eine Temperatur ausgewählt ist, diese für eine relativ lange Zeit bestehen bleiben.

**Person 1:** KundInnen des Gemüseladens müssen nie lange warten (im Durchschnitt 4 Minuten weniger als in der Bäckerei, und 3 Minuten weniger als im Blumenladen). Das Obst und Gemüse ist für gewöhnlich verkaufsfertig

und muss nur bezahlt und manchmal gewogen werden. Des Weiteren ist im Gemüseladen für gewöhnlich nicht so viel los.

**Person 2:** Für den Blumenladen ist die Temperatur ein sehr wichtiges Anliegen, da Blumen bei geringer Temperatur länger blühen (und somit länger verkauft werden können). Der Blumenladen bevorzugt eine niedrige Temperatur von 15 Grad Celsius.

Aufgrund des Ofens in der Bäckerei ist es dort immer etwa 4 oder 5 Grad Celsius wärmer als im Rest der Einkaufspassage

Es gibt fünf verschiedene Möglichkeiten, die Raumtemperatur festzulegen.  
**(Scores)**

- |          |     |
|----------|-----|
| 1a) 20°C | (1) |
| 1b) 18°C | (1) |
| 1c) 16°C | (3) |
| 1d) 14°C | (2) |
| 1e) 12°C | (1) |

## APPENDIX

**Bitte entscheiden Sie mit der andern Person über die Verteilung der Wartungskosten der Einkaufspassage.**

Die Wartung der Einkaufspassage (Putzdienste, Reparaturen, etc.) wird zentral verwaltet. Wartungskosten, die sich auf etwa 1000 Euro pro 3 Monate belaufen werden, werden also auf die 3 Parteien verteilt. Es gibt verschiedene Möglichkeiten die Kosten zu verteilen:

Symmetrisch: Alle Läden bezahlen den gleichen Betrag (ca. 330 Euro alle 3 Monate)

2a) Bäckerei 330 - Blumenladen 330 -Gemüseladen 330 (1)

Halb-symmetrisch: Ein Laden bezahlt mehr als die anderen beiden, allerdings bezahlen die anderen beiden Läden gleich viel. Die Möglichkeiten sind:

2b) Bäckerei 400 - Blumenladen 300 - Gemüseladen 300 (2)

2c) Bäckerei 300 - Blumenladen 400 - Gemüseladen 300 (1)

2d) Bäckerei 300 - Blumenladen 300 - Gemüseladen 400 (1)

Hierarchisch: Alle Läden bezahlen verschiedene Geldbeträge (zum Beispiel 400-350-250). Die Möglichkeiten sind:

2e) Bäckerei 400 - Blumenladen 350 - Gemüseladen 250 (4)

2f) Bäckerei 400 - Blumenladen 250 - Gemüseladen 350 (1)

2g) Bäckerei 350 - Blumenladen 400 - Gemüseladen 250 (3)

2h) Bäckerei 350 - Blumenladen 250 - Gemüseladen 400 (1)

2i) Bäckerei 250 - Blumenladen 400 - Gemüseladen 350 (1)

2j) Bäckerei 250 - Blumenladen 350 - Gemüseladen 400 (1)

Die Bäckerei bevorzugt die Verteilung 2i/2j, gefolgt von 2c/2d, dann 2a, dann 2g/2h, und schlussendlich 2e/2f.

Der Blumenladen bevorzugt die Verteilung 2f/2h, gefolgt von 2b/2d, dann 2a, dann 2e/2j, und schlussendlich 2g/2i.

Der Gemüseladen bevorzugt die Verteilung 2e/2g, gefolgt von 2b/2c, dann 2a, dann 2f/2i, und schlussendlich 2h/2j

Die Läden werden jeden Tag am Ende des Tages gereinigt. Zusätzlich werden alle Läden einmal pro Woche gründlicher gereinigt. Wenn irgendetwas in der Einkaufspassage kaputt geht, wird es ersetzt oder repariert, egal in welchem Laden es passiert ist.

Aufgrund der Aktivitäten wie Backen oder Brot und Kuchen schneiden, wird die Bäckerei mehr Reinigungsdienste in Anspruch nehmen. Obwohl die Bäckerei es vorzieht, so wenig wie möglich zu zahlen, sieht das Management ein, dass es nicht unangemessen ist, mehr als die anderen Läden für die Wartungsdienste zu zahlen. Das Management wird nicht zu fordernd sein und die Kooperation der anderen Parteien riskieren.

**Person 1:** Der Gemüseladen hat, verglichen mit den anderen zwei Läden, ein relativ geringes Einkommen. Das Management geht davon aus, dass von ihrem Laden nicht viel Wartungsdienste in Anspruch genommen werden. Das Management ist also wirklich nicht bereit, mehr als 250 Euro alle 3 Monate zu zahlen.

**Person 2:** Der Blumenladen bevorzugt, etwas weniger zu zahlen, weil er glaubt, nicht so viele Wartungen zu benötigen. Wenn die Angestellten Blumen schneiden oder neu arrangieren, putzen sie danach sofort selbst. Das Management ist nicht bereit mehr als 330 Euro alle 3 Monate zahlen. Jedoch bewertet das Management diese Anliegen als nicht wichtig genug, um deswegen die Kooperation mit den anderen Parteien zu riskieren.

**Person 2:** Der Gemüseladen hat, verglichen mit den anderen zwei Läden, ein relativ geringes Einkommen.

Alle 3 Läden haben bereits sehr gute Erfahrung mit der Firma gemacht, die für die Reinigungsarbeiten zuständig sein wird und sind sehr zufrieden mit ihr.

## APPENDIX

**Bitte entscheiden Sie mit der andern Person über die Organisation der Marketingkampagne der Einkaufspassage.**

Es gibt verschiedene Wege, wie die Marketing-Kampagnen organisiert werden könnte:

- 3a) Eine komplett kollektive Kampagne für die ganze Einkaufspassage. Jeder Laden zahlt 1000 Euro alle 3 Monate. (1)
- 3b) Eine komplett kollektive Kampagne für die ganze Einkaufspassage. Jeder Laden zahlt 750 Euro alle 3 Monate. (3)
- 3c) Eine komplett kollektive Kampagne für die ganze Einkaufspassage. Jeder Laden zahlt 500 Euro alle 3 Monate. (4)
- 3d) Eine kollektive Kampagne in der den 3 Läden individuelle Aufmerksamkeit zukommt. Jeder Laden zahlt 1000 Euro alle 3 Monate. Ein bisschen mehr als die Hälfte des Geldes wird für die einzelnen Läden investiert. (1)
- 3e) Eine kollektive Kampagne, in der den 3 Läden individuelle Aufmerksamkeit zukommt. Jeder Laden zahlt 750 Euro alle 3 Monate. Ein bisschen mehr als die Hälfte des Geldes wird für die einzelnen Läden investiert. (1)
- 3f) Eine kollektive Kampagne, in der den 3 Läden individuelle Aufmerksamkeit zukommt. Jeder Laden zahlt 500 Euro alle 3 Monate. Ein bisschen mehr als die Hälfte des Geldes wird für die einzelnen Läden investiert. (2)
- 3g) Getrennte Kampagnen: Das Management der jeweiligen Läden wird sich jeweils nur um die Kampagne des eigenen Ladens kümmern. (1)

Die Bäckerei will eine komplett kollektive Kampagne, bei der nicht mehr als 750 Euro ausgegeben wird. Der Grund für diese Wahl ist, dass die Bäckerei glaubt, dass mehr Kunden für die Einkaufspassage automatisch mehr Kunden

für die Bäckerei bedeuten. Das Management ist überzeugt, dass eine komplett kollektive Kampagne für die Einkaufspassage in mehr Umsatz resultiert als eine Kampagne für die Bäckerei alleine.

**Person 1:** Der Gemüseladen will eine komplett kollektive Kampagne, in der nicht mehr als 750 Euro ausgegeben wird. Der Grund für diese Wahl ist, dass die Beschäftigten des Gemüseladens bei einer komplett kollektiven Kampagne viel weniger Zeit in Meetings verbringen müssen, die um die Organisation der Kampagne und verwandte Themen gehen. Der Gemüseladen ist ein relativ kleiner Laden mit wenigen Angestellten, der Inhaber (und Manager) des Ladens glaubt deshalb, dass er es sich nicht leisten kann, seine wertvolle Zeit mit Aktivitäten, die sich um Werbung drehen, verbringen sollte.

**Person 2:** Der Blumenladen will nicht zu viel für Werbung ausgeben will. Das Management befürchtet, dass die Kosten für eine kollektive Kampagne viel höher sein werden, als der Laden es sich leisten kann. Bei früheren Werbekampagnen hat der Blumenladen ungefähr 480 Euro alle 3 Monate ausgegeben.

## APPENDIX

### **Appendix D: The impact of I-sharing on hidden profile performance**

We used the same experimental set up like in Study 2. Instead of mindfulness we manipulated I-sharing. Hundred undergraduate students (50 dyads) from a German university (86 women, 14 men.  $M_{age} = 23.40$ , range = 18 - 35) participated in an experiment with two conditions (I-sharing vs. control). Because of technical problems, five dyads needed to be excluded. 24 dyads participated in the I-sharing condition, 21 dyads participated in the control condition.

Participants were invited to the lab in dyads for a study session on the influence of online communication in teamwork. I-sharing was induced with a computerized version of the game Imaginiff (Pinel & Long, 2012; Pinel, Long, & Crimin, 2008). In this game, participants play ostensibly with another person and are asked to imagine a celebrity (e.g., Heidi Klum) as something different (e.g. a musical instrument), then participants had to choose which category the celebrity fits best (e.g., violin, triangle, organ, saxophone). After 12 trials, the ostensible answers of the other person appeared on the screen. In the I-sharing condition, there were always 8 out of 12 trials identical with the other person. In the control condition, all answers of the trials were different (c.f. Pinel & Long, 2012).

After the manipulation, participants continued to work on the same task as described in Study 2 (see p. 29). As in Study 2, participants solved the task via instant messaging. To test the effect of I-sharing on performance, a t-test was computed,  $t(43) = -.50$ ,  $p = .620$ ,  $d = -.47$ . There were no significant differences between the I-sharing ( $M = 2.33$ ,  $SD = 1.43$ ) and the control condition ( $M = 2.14$ ,  $SD = 1.06$ ).

To conclude, even though our manipulation of I-sharing closely resembled the original manipulation (Pinel & Long, 2012; Pinel et al., 2008), there were no performance differences between dyads in the I-sharing and in the control condition. This manipulation of I-sharing

seems to be not appropriate to influence the performance of dyads on a hidden profile task. Furthermore, the paradigm of I-sharing seems not generalizable to other situations. This might possibly be explained by the fact that the context in our study was richer than the context used by Pinel (2006, 2008). In our study always two persons were jointly tested; they saw each other when entering the lab and had to introduce each other via a video conference tool. Unavoidably, participants had more social cues from each other than those in the studies by Pinel (2006, 2008) who simulated another person with the computer. Possible therefore that the manipulation did not work. On a more general level this is comparable with the minimal group paradigm (Diehl, 1990). This paradigm only discriminates between groups when the minimal conditions of the paradigm are met. As soon as conditions are violated (e.g. people speak with each other), they no longer discriminate between groups.

## **Summary**

This dissertation examines conditions which support joint decision making. Based on the intersubjectivity theory in psychoanalysis it was examined whether mindfulness or a component of mindfulness improves joint decision making in hidden profile tasks. Previous research on hidden profiles – a paradigm in joint decision making – has established that when group members are provided with different informational subsets, they fail to achieve their full potential. If members considered all information they are provided with in equal measure, they would come to the best decision alternative. However, instead of being equally open to all relevant information, members show a confirmation bias. They evaluate information in a way that confirms their own informational subset and rather chose an inferior decision alternative. In extrapolating shared present moment awareness using mindfulness (i.e. present moment awareness), this dissertation investigates whether mindfulness or a certain part of mindfulness enhances joint decision making.

In a first step, the influence of a classic mindfulness meditation on computer mediated decision making was tested. In Study 1, mindfulness meditation was tested in a decision making task via computer-simulated negotiation, in Study 2 in a computer mediated joint decision making task of a hidden profile. Across both studies, mindfulness was detrimental to performance. Findings indicate that mindfulness meditation is not an intervention to be used in computer mediated joint decision making.

In a second step, the impact of openness to multiple perspectives on dyads solving a hidden profile task was examined. Openness to multiple perspectives is a component of mindfulness and seems to be a principal factor of successful joint decision making. In two studies openness to multiple perspectives was found to improve the outcome of a joint decision making task. In Study 3, the joint consideration of multiple

valid perspectives improved the outcome of the task compared to the mere negotiation of positions. In Study 4, besides the joint consideration of multiple perspectives, sequentially realizing on an individual level that there is still another perspective than the initial one improved the performance, compared to immediately dealing with two perspectives. The findings demonstrate that when individuals change their way of looking at things, by either accepting the validity of multiple perspectives on a social level or by accepting the validity of another perspective than the initial one, their performance gets improved.

In using mindfulness in an interpersonal context we extrapolated social psychological research with psychoanalytical conceptualizations. More specifically, openness to multiple perspectives seems to be an important cognitive mechanism inherent in mindfulness and a successful factor in joint decision making.

The present research has several practical implications. First, mindfulness should not be applied as an intervention for improving decision making via computer mediation. Second, in individual and joint decision making, persons should “make a step back” and search actively for alternative points of view.

### **Deutsche Zusammenfassung**

Im Rahmen der Dissertation werden Bedingungen untersucht, die Entscheidungen verbessern können. Vor dem Hintergrund des intersubjektivistischen Ansatzes der Psychoanalyse wird untersucht, ob Achtsamkeit oder eine Komponente von Achtsamkeit die Qualität gemeinsamer Entscheidungen in *hidden profiles* verbessert. Im Forschungs-paradigma des *hidden profiles* wurde bisher gezeigt, dass wenn Gruppenmitglieder über unterschiedliche Informationen verfügen, diese unter ihren Leistungsmöglichkeiten bleiben. Wenn Mitglieder alle zur Verfügung gestellten Informationen gleichmäßig berücksichtigen würden, kämen sie zu einer besseren Entscheidung. Jedoch zeigen Gruppenmitglieder, statt offen für die relevanten Informationen eines anderen zu sein, einen Bestätigungsfehler (engl. *confirmation bias*). Informationen werden so ausgewählt, dass sie die eigenen Informationen bestätigen. In der Folge wird eine schlechtere Entscheidung getroffen. In der Dissertation wird untersucht, ob die gemeinsame Ausrichtung der Aufmerksamkeit auf einen gegenwärtigen Moment durch Achtsamkeit (engl. *mindfulness*) oder eine Komponente von Achtsamkeit gemeinsames Entscheiden verbessert.

In einem ersten Schritt wurde in zwei Studien der Einfluss einer klassischen Achtsamkeitsübung auf computervermittelte Entscheidungen überprüft. In Studie 1 wurde der Einfluss einer Meditationsübung auf Entscheidungen in einer computervermittelten Verhandlung untersucht, in Studie 2 auf eine computervermittelte gemeinsame Entscheidungsaufgabe. Über beide Studien hinweg verringerte Achtsamkeit die Leistung. Die Ergebnisse lassen darauf schließen, dass Achtsamkeit bei computervermittelten gemeinsamen Entscheidungen nicht die Intervention der Wahl ist.

In einem zweiten Schritt wurde der Einfluss von Offenheit für multiple Perspektiven auf von Dyaden gemeinsame getroffene Entscheidungen in einem hidden profile untersucht. Offenheit für multiple Perspektiven ist dabei eine Komponente von Achtsamkeit und scheint auch ein zentrales Element bei erfolgreichen Gruppenentscheidungen zu sein. In zwei Studien wurde herausgefunden, dass Offenheit für multiple Perspektiven die Qualität der gemeinsam getroffenen Entscheidungen verbessert. In Studie 3 verbesserte das gemeinsame Betrachten von mehreren gültigen Perspektiven, verglichen mit dem bloßen Verhandeln von Positionen, die Aufgabenleistung. In Studie 4 führte, neben dem gemeinsamen Betrachten von mehreren gültigen Perspektiven, das sequentielle Realisieren, dass es noch eine andere Perspektive als die ursprüngliche gibt, auf individueller Ebene, verglichen mit der sofortigen Zugänglichkeit beider Perspektiven zu besseren Leistungen. Die Ergebnisse zeigen, dass wenn Personen die Art und Weise verändern, wie sie Dinge betrachten, indem sie auf sozialer Ebene die inhaltliche Gültigkeit von mehreren Perspektiven akzeptieren oder auf individueller Ebene die Validität einer anderen Perspektive als die ursprüngliche, sich die Leistung verbessert.

Indem Achtsamkeit in einem interpersonalen Kontext untersucht wurde, wurden psychoanalytische Konzepte auf sozialpsychologische Forschung übertragen. Offenheit für multiple Perspektiven scheint ein wichtiger kognitiver Mechanismus innerhalb von Achtsamkeit als auch zugrundeliegender Faktor bei erfolgreichen gemeinsamen Entscheidungen zu sein.

Die Forschungsergebnisse haben mehrere praktische Implikationen. Zum einen sollte bei computervermittelten Entscheidungen Achtsamkeit nicht als Intervention verwendet werden. Zum anderen sollten Personen bei individuellen oder gemeinsamen Entscheidungen „einen Schritt zurück machen“ und bewusst nach alternativen Sichtweisen suchen.

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