Motivational Interventions for Risk Behavior: New Perspectives from the Mindset Theory

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"I've learned that people will forget what you said, people will forget what you did, but people will never forget how you made them feel."

- Maya Angelou

Abstract

Daily life is full of individual behaviors with the potential for negative consequences, whether in the form of drinking and the risk of addiction or in the form of taking medication and the risk of side effects. Many interventions are developed to motivate people to reduce risk behaviors, yet their effectiveness needs to be improved. The present thesis aims to contribute to advancements of present interventions by investigating the processes of changing risk behavior from the perspective of the mindset theory of action phases. The research spans three different risk behaviors, namely hazardous alcohol use, khat consumption, and non-adherence to antipsychotics.

The first research paper tested the hypothesis that the induction of a pre- or postdecisional mindset has consequences for the outcome of the standardized ASSIST-linked Brief Intervention to reduce risky alcohol use among German university students. More specifically, participants in a deliberative mindset should be more open-minded and less resistant towards the intervention than participants in an implemental mindset. In contrast to the hypothesis, the results revealed that participants in an implemental mindset decreased their alcohol use after the brief intervention, whereas participants in a deliberative mindset even increased their alcohol consumption. No group differences emerged regarding risk perception. The findings suggest the mindset induction as a promising moderator of the effects of the brief intervention and point out the role of the decision status interacting with the interventional components.

The second research paper investigated again the effects of activating a deliberative and an implemental mindset on the outcome of a brief intervention to reduce khat consumption among university students from Ethiopia. Additionally, we hypothesized that the ASSIST-linked Brief Intervention adapted for khat would lead to a greater reduction in khat use compared to a control condition. The results showed a decrease in the amount and frequency of

khat consumption, favoring the intervention group. Unlike the results of the first research paper, no significant differences regarding the mindset induction were detected. Furthermore, mental problems and change motivation were revealed as significant predictors of khat use.

Finally, the third research paper addressed the risk behavior of non-adherence to antipsychotics. Given that people with psychotic disorders face not only risks due to discontinuation of antipsychotic medication but also due to the intake, we developed and validated the Form to Assess Risk Perception of Antipsychotics (FRA; Fragebogen zur Risikowahrnehmung von Antipsychotika) in German. The results of an exploratory factor analysis with a sample of inpatients demonstrated the theoretically expected two-factor structure with one scale covering risk perception of taking antipsychotics and another scale covering perceived risks of discontinuation. Data from an online sample with outpatients demonstrated the convergent and discriminant validity of the questionnaire. The findings further indicated that the ratio of the two scores of the risk perception scales is associated with adherence and future risk behavior.

Taken together, the present thesis supports the effectiveness of the ASSIST-linked Brief Intervention within the scope of two risk behaviors and provides a new questionnaire to advance the understanding and treatment of another risk behavior. Beyond that, the findings of the three research papers converge to the conclusion that an individual's pre- or postdecisional state plays a crucial role in the outcome of specific interventional techniques to change risk behavior. Therefore, the thesis provides a framework for the integration of present risk theories into the mindset theory of action phases and points to novel ways to change risk behavior.

Zusammenfassung

Im Alltag bergen viele Verhaltensweisen das Potential für negative Konsequenzen. Sei es das Risiko für Abhängigkeit bei Alkoholkonsum oder das Risiko für Nebenwirkungen bei der Einnahme von Medikamenten. Einige Interventionen wurden dazu entwickelt, um zur Reduktion von Risikoverhalten zu motivieren, deren Effektivität jedoch verbesserungswürdig scheint. Ziel der vorliegenden Dissertation ist es zur Weiterentwicklung aktueller Interventionen beizutragen, indem aus der Perspektive der Theorie der Handlungsphasen (mindset theory of action phases) die Veränderungsprozesse von Risikoverhalten untersucht werden. Die Forschung umfasst dabei drei verschiedene Risikoverhaltensweisen: Riskanter Alkoholkonsum, Khatkonsum, und Non-Adhärenz bezogen auf Antipsychotika.

Der erste Forschungsartikel überprüfte die Hypothese, dass die Induktion einer prä- oder postdezisionalen Bewusstseinslage Konsequenzen auf das Ergebnis einer standardisierten Kurzintervention (ASSIST-linked Brief Intervention) zur Reduktion von riskantem Alkoholkonsum von deutschen Studierenden hat. Genauer gesagt, sollten Teilnehmende in einer abwägenden Bewusstseinslage unvoreingenommener und weniger resistent gegenüber der Intervention sein als Teilnehmende in einer planenden Bewusstseinslage. Konträr zur Hypothese, zeigten die Resultate, dass Teilnehmende in einer planenden Bewusstseinslage ihren Alkoholkonsum nach der Kurzintervention reduzierten, wohingegen Teilnehmende in einer abwägenden Bewusstseinslage ihren Alkoholkonsum sogar erhöhten. Es traten keine Gruppenunterschiede bezogen auf die Risikowahrnehmung auf. Die Ergebnisse stellen die Induktion von Bewusstseinslagen als einen vielversprechenden Moderator der Effekte der Kurzintervention dar und heben die Rolle des Entscheidungsstatus im Zusammenwirken mit interventionalen Komponenten hervor.

Der zweite Forschungsartikel untersuchte erneut die Effekte von aktivierten abwägenden oder planenden Bewusstseinslagen auf die Ergebnisse einer Kurzintervention, um

Khatkonsum unter äthiopischen Studierenden zu reduzieren. Zusätzlich wurde angenommen, dass die für Khat angepasste ASSIST-linked Brief Intervention zu einer stärkeren Reduktion von Khatkonsum führen würde als die Kontrollbedingung. Die Ergebnisse zeigten eine Reduktion der Menge und Häufigkeit von Khatkonsum, zugunsten der Interventionsgruppe. Anders als in den Ergebnissen des ersten Forschungsartikels, wurden keine signifikanten Unterschiede hinsichtlich der Induktion der Bewusstseinslagen entdeckt. Außerdem wurden psychische Probleme und Veränderungsmotivation als signifikante Prädiktoren von Khatkonsum aufgedeckt.

Schließlich befasste sich der dritte Forschungsartikel mit Non-Adhärenz von Antipsychotika als Risikoverhalten. Angesichts dessen, dass Personen mit psychotischen Störungen nicht nur mit den Risiken des Absetzens von Antipsychotika, sondern auch mit denen der Einnahme konfrontiert sind, entwickelten und validierten wir dazu den Fragebogen zur Risikowahrnehmung von Antipsychotika (FRA) in Deutsch. Die explorative Faktorenanalyse mit einer Stichprobe von stationären Patientinnen und Patienten ergab die theoretisch erwartete zweifaktorielle Struktur, mit einer Skala bezogen auf die Risikowahrnehmung der Einnahme von Antipsychotika und einer anderen Skala bezogen auf die wahrgenommenen Risiken des Absetzens. Daten einer Online-Stichprobe mit ambulanten Patientinnen und Patienten bestätigten die konvergente und diskriminante Validität des Fragebogens. Die Befunde ergaben zudem, dass das Verhältnis der zwei Skalen der Risikowahrnehmung in Zusammenhang mit Adhärenz und zukünftigem Risikoverhalten steht.

In der Summe stützt die vorliegende Arbeit die Wirksamkeit der ASSIST-linked Brief Intervention im Rahmen zweier Risikoverhaltensweisen und liefert einen neuen Fragebogen, um das Verständnis und die Behandlung eines weiteren Risikoverhaltens zu verbessern. Darüber hinaus legen die drei Forschungsartikel den Schluss nahe, dass der individuelle prä- oder postdezisionale Zustand eine entscheidende Rolle für das Resultat spezifischer

Interventionstechniken zur Veränderung von Risikoverhalten darstellt. Deshalb bietet die vorliegende Dissertation ein Modell an, wie aktuelle Theorien der Risikoforschung in MAP integriert werden können und zeigt neue Wege auf, wie Risikoverhalten verändert werden kann.

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List of Abbreviations

ASSIST	Alcohol, Smoking and Substance Involvement Screening Test
AUDIT	Alcohol Use Disorder Identification Test
BART	Balloon Analogue Risk Task
BI	Brief Intervention
BMQ	Beliefs about Medicines Questionnaire
BMQ-G-H	BMQ-S-Schädlichkeit
BMQ-G-O	BMQ-S-Übermäßiger Gebrauch
BMQ-S-C	BMQ-S-Befürchtungen
BMQ-S-N	BMQ-S-Notwendigkeit
CT	Cognitive Tests
DOSPERT	Domain-Specific Risk-Taking Scale
FAR	Fragebogen zur alkoholbezogenen Risikowahrnehmung
FRA	Form to Assess Risk Perception of Antipsychotics/ Fragebogen zur Risikowahrnehmung von Antipsychotika
KMM	Kurzfragebogen zum Medikamentenmissbrauch
KMO	Kaiser-Meyer-Olkin
MAP	Mindset Theory of Action Phases
MARS	Medication Adherence Rating Scale
PFA	Principal Factor Analysis
RP	Research Paper
SBI	Screening and Brief Intervention
SCL-K9	Symptom-Checkliste K9
SOCRATES	Stages of Change Readiness and Treatment Eagerness Scale
SOEP	Sozio-ökonomisches Panel
SRQ-20	Self-Reporting Questionnaire

SZP	Patient:innen mit Schizophrenie
TLFB	Timeline Follow-Back
TS	Taking Steps
URICA	University of Rhode Island Change Assessments
VSS-k	German short version of the University of Rhode Island Change Assessments
WHO	World Health Organization

I. Synopsis

"How can we induce people to look after their health?" (Giles, 2011, p.19). This question was identified by the US National Science Foundation as one of the top ten most pressing challenges for social scientists in 2011. Humanity is facing multiple risks to their health: Air pollution and climate change, noncommunicable diseases, such as diabetes and cancer, as well as influenza pandemics are the leading threats to global health in 2019 (World Health Organization, 2019). Various other health risks, such as alcohol use, obesity, medication non-adherence, or depression, can be directly or indirectly affected by changing individual behavior. Hence, plenty of theories investigate the genesis of risk behavior, and psychological interventions targeting behavior change to reduce risks have been developed (e.g., Brewer et al., 2004; Humeniuk et al., 2010; W. R. Miller & Rollnick, 2013; Rosenstock, 1974; Slovic, 1987; Weinstein, 1988). In the face of COVID-19 vaccine hesitancy (Troiano & Nardi, 2021) and low compliance with public health measures (Bargain & Aminjonov, 2020; Welter et al., 2021), their relevance regarding the aforementioned question – how to motivate people to healthy and non-risky behavior – is more apparent than ever. However, the effect sizes of many interventions aiming at decreasing risk behavior are still small (DiClemente et al., 2017; Saitz, 2014), raising a number of challenges: In order to improve interventional effects, we need a better comprehension of the psychological processes of risky and protective behaviors, in particular, of how people perceive risks and develop motivation to change risk behaviors as well as to initiate protective measures.

The goal of this thesis is to contribute new insights into the processes of changing risk behavior and the underlying mechanisms of interventions by offering a novel approach that connects existing clinical interventions with the *mindset theory of action phases* (MAP; Gollwitzer, 1999, 2012) from social psychology. This theory of motivational and decisional processes of behavioral change will be subsequently equipped with present risk theories as a promising tool to increase the effectiveness of behavioral interventions. Therefore, risk behaviors will be studied in three different specific contexts: hazardous alcohol use among

German university students, excessive khat use among Ethiopian university students, and non-adherence to prescribed antipsychotics among people with mental disorders.

The synopsis aims to illustrate all three lines of research and how they contribute to the overarching topic of the present thesis. In the first part, risk in general and three different risk behaviors will be briefly examined. Then, an overview of risk perception and associated theories about the link between risk perception and behavior will be presented. Subsequently, MAP will be introduced, and it will be outlined how this model can add a new perspective on the underlying mechanisms of interventions to change risk behavior. Then, the objectives of the three research papers that form the present thesis will be shortly described before the papers are presented in their entirety. The final section consists of a summary of the results of the three research papers embedded in a general discussion, which points out the implications of the current topic and concludes with future directions for risk research and related interventions.

Risk

Given its nature as an interdisciplinary concept, numerous definitions of risk exist. Most definitions in social and clinical psychology imply two aspects: (1) the probability of harm for something of human value (including humans themselves) and (2) the extent respectively severity of harmful consequences (Aven & Renn, 2009; Bodemer & Gaissmaier, 2015). Behaviors like tobacco use, unprotected sex, insufficient physical activity, unhealthy diet, non-adherence to medication, and drug or alcohol use increase the probability and extent of harmful consequences and can be considered risk behaviors (Baban & Craciun, 2007). Risk behaviors are intertwined with physical and mental health, and much of the preventable mortality and morbidity is linked to them (World Health Organization, 2022). Given that changing risk behaviors represents such a magnitude of research interest, the presented research will focus on three common risk behaviors. The subsequently described behaviors were chosen because they

represent intensively studied behaviors in clinical psychology due to their associations with mental disorders.

Three Forms of Risk Behavior

Alcohol Use. In many societies, alcohol is an inherent part of the social landscape and culture. Especially in an environment like Germany, where alcohol is the most frequently consumed psychotropic substance (Rauschert et al., 2022), the extent and the risk level of one's alcohol use can be easily repressed. However, in 2016, Germany was ranked with an annual per capita consumption of a total of 13.4 L of pure alcohol (mainly in the form of beer), higher than the average of 9.8 L for Europe, which is, in turn, above the global average of 6.4 L (World Health Organization, 2018). According to thresholds, more than an average consumption of 12g/24g of pure ethanol for women/men per day is defined as hazardous alcohol use (i.e., at-risk alcohol use) (Burger et al., 2004; Seitz et al., 2008). Data derived from the 2021 Epidemiological Survey of Substance Abuse (ESA) show that hazardous alcohol consumption is widely distributed with 21.9% of the respondents (corresponding to 7.9 million persons in the population; Rauschert et al., 2022), an increasing trend compared to the 2018 ESA (Atzendorf et al., 2019). In particular, men, younger people, smokers, those of higher monthly income, and those with higher and intermediate education levels are more likely to report hazardous alcohol use (Atzendorf et al., 2020; Garnett et al., 2022). Moreover, university students tend to engage more in hazardous alcohol use than their non-university peers, rendering them a high-risk group (Merrill & Carey, 2016; Wicki et al., 2010).

Focusing on university students, common drinking motives appear to be enhancement, social reasons such as "having a good time", "pleasure", or coping with stress, anxiety, ruminative thinking, or depressive symptoms (Pedrelli et al., 2016; Wicki et al., 2010). Alcohol use in universities takes a severe toll with estimated 599.000 injuries, 646.000 physical assaults, 97.000 sexual assaults and 1.825 unintentional deaths in 2001 – and these numbers are only

attributed to alcohol use among university students in the United States (Hingson, Zha, & Weitzman, 2009). Furthermore, harmful alcohol use can result in mental disorders and suicides (Borges et al., 2017). Beyond a considerable list of mental and physical harms, alcohol contributes to annual economic costs of approximately 26.7 billion euros in Germany, eclipsing the alcohol tax revenues of 3.2 billion euros (Atzendorf et al., 2019). To sum up, the World Health Organization (WHO; 2018, p.12) concludes that "the harmful use of alcohol is one of the leading risk factors for population health worldwide," with a persistent need for improved interventions.

Khat Use. The consumption of khat has been culturally deep-rooted in several countries around the Horn of Africa for centuries (Krikorian, 1984). Chewing the leaves and tender stems of the khat plant (*Catha edulis*) constitutes a traditional practice for specific groups. However, in the last few decades, khat use patterns are undergoing profound changes toward more excessive habits, making khat the main substance of abuse in several of these countries (Odenwald & al'Absi, 2017). Moreover, it has gained global prominence as a growing public health concern with increased international use, documented, amongst others, in Germany (Bongard et al., 2015), the United Kingdom (Griffiths et al., 2010), and the United States (Nakajima et al., 2017), though its use is often limited to immigrant populations. Nowadays, over 20 million people worldwide use khat regularly (Teklie et al., 2017).

In Ethiopia, the country assumed to be the place of origin of khat (Krikorian, 1984), 27% of men and 12% of women report having previously chewed khat in their lifetime, according to the Ethiopia Demographic and Health Survey 2016 (Central Statistical Agency, 2016). The khat exportation greatly contributes to Ethiopia’s national economy and makes khat one of the most-farmed crops there, topped only by grain, coffee, maize, and pulses, thereby representing a major income source for millions of farmers and traders (Megerssa et al., 2013). However, modern patterns of khat use constitute a harmful risk to the economic and health

status of Ethiopian society. The psychoactive compounds cathinone and cathine affect the central and peripheral nervous systems to some extent similarly to those of amphetamines (Kalix, 1990). Khat use, excessive use in particular, is associated with numerous health risks, ranging from somatic problems like cardiovascular and gastric disorders, mouth carcinoma, esophagitis, and reproductive dysfunctions (Al-Motarreb et al., 2010; Hassan et al., 2007; Mwenda et al., 2003) to mental health problems such as depression, anxiety, and psychosis (Duresso et al., 2018a; Odenwald et al., 2005; Widmann et al., 2014). In addition, users experience withdrawal syndromes (Duresso et al., 2018a), and studies indicate a high dependence potential (Kassim et al., 2013; Kassim et al., 2010). Especially among Ethiopian university students, khat chewing tends to be an increasingly popular habit (Alemu et al., 2020), driven by motives such as staying alert, a higher concentration when studying, relaxation, stress relief, and socializing (Adane et al., 2021). Despite these intentions, khat use is associated with poorer academic performance and an enhanced risk for mental disorders (Mekuriaw et al., 2020; Meressa et al., 2009). While it seems evident that there is a clear need for psychological interventions for harmful khat use and related health risks, the necessary research on khat-specified interventions is still lacking (Odenwald & al'Absi, 2017).

Non-Adherence to Medication. In numerous somatic and mental disorders medication plays an important role in treatment and symptom control. When it comes to taking medication, people often do not behave as agreed with their health care provider, which constitutes a specific risk behavior defined as (medication) non-adherence (Sabaté, 2003). Taking more than 70% of the prescribed medication is often ranked as "good" adherence (Kane et al., 2013), though the rating should further depend upon the extent, the type, and the context of medication, yet the concept of adherence might fall short of describing the interaction between patient and provider (Kane et al., 2013). The WHO described in its 2003 report on adherence that approximately half of the patients with chronic illnesses did not take their medication as prescribed (Sabaté, 2003).

Non-adherence is especially prominent amongst individuals with schizophrenia. Estimates suggest that 41-50% of schizophrenic patients are non-adherent (Lacro et al., 2002). They are less adherent to antipsychotics compared to persons receiving antidepressants or medications to treat physical disorders (Cramer & Rosenheck, 1998). At first sight, this type of behavior seems reasonable as adherence to antipsychotics poses a wide range of risks: Stressful side-effects like sedation, weight gain, dysphoria, sexual dysfunction, or extrapyramidal symptoms (Leucht et al., 2009; Moritz et al., 2009) and antipsychotics-related stigma (Townsend et al., 2022) add to other contributing factors of non-adherence. On the downside, non-adherence to antipsychotics is associated with an increased risk for relapse, symptom recurrence, poorer prognoses, hospitalization, violence, and a higher risk of suicide (Ascher-Svanum et al., 2006; Higashi et al., 2013; Law et al., 2008). Increased utilization of healthcare resources, in turn, results in higher economic costs (Dilla et al., 2013). Hence, it seems remarkable that physicians spend a mean of 49 seconds communicating all aspects of newly prescribed medications, according to a study from the United States (Tarn et al., 2008). A better understanding of the factors underlying non-adherence is necessary in order to improve interventions with regard to managing this particular risk behavior.

The Role of Risk Perception

How we perceive risk is proposed to have a fundamental role in shaping our decisions and behavior. Hence, risk perception is central to multiple health behavior-related frameworks, including the health belief model (Rosenstock, 1974), the precaution adoption process model (Weinstein, 1988), the protection motivation theory (Maddux & Rogers, 1983), and the psychometric paradigm (Slovic, 1987). While they address different types of risk perception, many models distinguish between cognitive, affective, or experiential components of risk perception (Ferrer & Klein, 2015). Brewer and colleagues (2004) specify the association between risk perception and risk behavior by means of three distinct hypotheses: (1) The *accuracy hypothesis* describes that one's personal risk perception at one time reflects the

magnitude of their risk behavior at the same time. (2) The *behavior motivation hypothesis* asserts that enhanced risk perception leads to preventive behavior or reduced risk behavior. (3) The *risk reappraisal hypothesis* describes the correction of one's risk perception after changes in related risk behavior. For instance, reduced risk behavior intended to reduce risk leads to decreased risk perception. Brewer and colleagues (2004) confirmed their hypotheses with the example of vaccination against Lyme disease, as people with higher risk perception were more likely to get vaccinated compared to those with lower perception (behavior motivation hypothesis). Engagement in protective health behavior (i.e., vaccination), in turn, led to decreased risk perception (risk reappraisal hypothesis), and people who got vaccinated correctly perceived their risk for infection lower than those who did not (accuracy hypothesis).

Moreover, ample evidence suggests that the accuracy of the perception of somebody's risk is often biased. People tend to underestimate their own risk compared with the risk of their related peer group, a phenomenon known as *unrealistic optimism* or also referred to as *optimistic bias* or *illusory optimism* (Weinstein, 1980; review by Shepperd et al., 2013). For example, college students showed unrealistic optimism about the likelihood of experiencing severe problems due to alcohol use, which again predicted subsequent adverse events of alcohol-related risk behavior (Dillard et al., 2009). Various other factors influence individual risk perception, such as age, sociocultural background, affective contextual factors, salience and availability of information, numeracy skills, and mental health status (e.g., Bodemer & Gaissmaier, 2015; Ferrer & Klein, 2015; Fischhoff et al., 2010; Kahan et al., 2007; P. A. Keller et al., 2002; Reyna et al., 2009; Sjöberg et al., 2004; Slovic, 1987).

Albeit meta-analyses of correlational (Brewer et al., 2007; Floyd et al., 2000; Milne et al., 2000) and, more importantly, experimental studies (Sheeran et al., 2014) support a significant association between risk perception and behavior, the effect sizes remain small (d_+ = .24 in Milne et al., 2000; d_+ = .23 in Sheeran et al., 2014). A growing body of literature

has explored how the relationship between risk perception and behavior is affected and has discussed several hypotheses about the varying findings (e.g., coping appraisals, different types of risk perception, improper measurement; Brewer et al., 2004; Ferrer & Klein, 2015; Sheeran et al., 2014). Some researchers have proposed another explanation for the inconsistent outcomes of risk behavior by taking MAP (Gollwitzer, 1990, 2012) into account (L. Keller & Gollwitzer, 2017; Sheeran et al., 2014). They highlight the difference between the processes driving decision formation and decision enactment and the additional strategies needed to bridge the gap between intention and behavior. From this perspective, the question arises whether changes in risk perception differ in their behavioral outcome depending on the actual decisional processes. If so, how can MAP be utilized to improve the effects of heightened risk perception on risk behavior and applied to clinical interventions?

The Mindset Theory of Action Phases

MAP (Gollwitzer, 1990, 2012) represents a prominent theory of goal pursuit by transitioning through four phases, divided into motivational and volitional processes, to achieve an individual goal. Each phase is characterized by distinct demands and challenges, requiring the activation of relevant cognitive procedures (i.e., the activation of specific mindsets). It is especially remarkable, that these mindsets evince a moment of inertia as their key qualities carry over from the cognitive task that originally evoked them to entirely unrelated tasks (Gollwitzer & L. Keller, 2016).

MAP starts with the *predecisional phase*, during which people decide whether or not to pursue a given goal (Gollwitzer, 1990). They contemplate the pros and cons of the desirability and feasibility of different behavior change options before they turn one option into a binding goal. This motivational phase is accompanied by the activation of the *deliberative mindset*. The characteristics of the deliberative mindset imply open-mindedness to processing incidental information (Fujita et al., 2007), a broader span of visual attention (Büttner et al., 2014),

unbiased information search (Bayer & Gollwitzer, 2005), and a realistic view of personal control and feasibility (Gollwitzer & Kinney, 1989). In addition, people deliberating a decision seem to be more likely to be persuaded by messages focusing on future outcomes (Nenkov, 2012).

After making a goal decision, initially described in MAP as crossing the metaphorical Rubicon (Heckhausen & Gollwitzer, 1987), people transition to the *preactional phase* and with this from motivational to volitional processes (Gollwitzer, 1990). In this phase, an *implemental mindset*, characterized by cognitive tuning towards planning the implementation of the chosen goal, takes over (L. Keller et al., 2019). This goes along mostly with the opposite features of a deliberative mindset. People in an implemental mindset exhibit more closed-mindedness by showing partial analysis of desirability-related information (Büttner et al., 2014), more visual attention towards goal-directed means (Doerflinger & Gollwitzer, 2020), more focus on pros than cons (Taylor & Gollwitzer, 1995), stronger shielding from incidental external influences (Gendolla et al., 2021), and greater illusions of control (Gollwitzer & Kinney, 1989). Furthermore, they show increased task performance (Armor & Taylor, 2003) and higher persistence regarding ambiguous tasks (Brandstätter & Frank, 2002). In this phase, people often struggle with initiating action or overcoming obstacles. In this case, the techniques of *mental contrasting* and *implementation intention*s have been proven to facilitate goal attainment effectively (for more details see Gollwitzer, 1999; Oettingen, 2012; for a meta-analysis, see Gollwitzer & Sheeran, 2006).

When a plan is made, it follows the initiation of the goal-directing action in the third phase, the *actional phase* (Gollwitzer, 1990). In this volitional phase, the actual goal-striving behavior takes place, bringing the individual closer to goal completion. People stay on track by focusing on cues and means, and by shielding from obstacles like temptations or alternative

goals (Shah et al., 2002). This coordination of behavior and determined goal pursuit is accompanied by an *actional mindset*.

Finally, when the goal-directed action ends, people need to evaluate whether the goal pursuit behavior was successful and whether the intended outcome was attained. They also question whether further striving is needed or whether goal intentions should be altered (Gollwitzer, 1990). This evaluation in the *postactional phase* is facilitated by an *evaluative mindset* and is associated with a shift back to motivational cognitive attunements (Gollwitzer, 1990). The postactional evaluation of outcomes and consequences appears to predict further subsequent intentions and behavior (Kwan et al., 2018).

Concerning risk perception, the implemental mindset of the preactional phase appears to be associated with more optimism regarding the exposure to risks than the deliberative mindset of the predecisional phase (L. Keller & Gollwitzer, 2017; Taylor & Gollwitzer, 1995). L. Keller and Gollwitzer (2017) reported that participants with an activated deliberative mindset condition were less affected by unrealistic optimism and perceived themselves as more vulnerable regarding the risk of negative life events (e.g., becoming obese, developing a drinking problem, contracting the flu) than participants with an activated implemental mindset. In addition to risk perception, they investigated the effects of mindsets on risk behavior, by utilizing the Balloon Analogue Risk Task (BART; Lejuez et al., 2002). The difference in participants' risk perception was mirrored by their expressed risk behavior, as participants in a deliberative mindset condition showed less risk-taking behavior in terms of fewer pumps and popped balloons in the BART. Likewise, Hügelschäfer and Achtziger (2014) investigated decision-making under risk in hypothetical financial gambles and found an induced implemental mindset to reduce risk aversion and to increase risk taking in female participants compared to an induced deliberative mindset. In male participants, the pattern was reversed, though. Male participants in a deliberative mindset took more risks than in an implemental

mindset. In sum, the type of mindset seems to affect how respective risks are perceived and taken, but it remains unclear in what way the activation of a specific mindset translates into effects on an unrelated task of risk behavior.

MAP and the Present Research on Risk

The mindsets of MAP, especially the deliberative and the implemental mindsets, have been intensively studied and have revealed a number of remarkable features. However, they have rarely been used to intentionally alter the reactions to risk-related interventions. Thus, this thesis investigates changing risk behavior in relation to an altered risk perception, but moreover, in relation to pre- and postdecisional phases and whether the induction of mindsets can influence the effectiveness of risk-related interventions. Considering the bigger picture, the perspective from MAP could contribute to a better understanding of risk dynamics by integrating present risk theories into MAP.

Research Paper I. The first article addresses risky alcohol use among university students and investigates the effects of induced mindsets on the effectiveness of a standardized brief intervention, the ASSIST-linked Brief Intervention. We proposed that activating a deliberative mindset versus an implemental mindset would increase the effectiveness resulting in enhanced risk perception and reduced alcohol use.

Research Paper II. Concerning excessive khat chewing among male university students from Jimma, Ethiopia, the effectiveness of a khat-adapted ASSIST-linked Brief Intervention to reduce khat use compared to a control condition is examined in the second study. Again, the effects of activating deliberative or implemental mindsets on the effectiveness of the brief intervention are additionally explored.

Research Paper III. In preparation for future interventions considering non-adherence to antipsychotics, the focus of the last research paper was the development and validation of a questionnaire to measure the perceived risks of intake and discontinuation of antipsychotics via

two scales: The Form to Assess Risk Perception of Antipsychotics (FRA). Associations between the antipsychotics-related risk perception, adherence and future risk behavior among patients with psychotic disorders are explored, bearing the accuracy hypothesis (Brewer et al., 2004) and the decisional state of the participants in mind.

II. Research Paper I

The Effects of Pre-Intervention Mindset Induction on a Brief Intervention to Increase Risk Perception and Reduce Alcohol Use among University Students: A Pilot Randomized Controlled Trial

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Abstract

Objective: Brief interventions based on personalized feedback have shown promising results in reducing risky alcohol use among university students. We investigated the effects of activating deliberative (predecisional) or implemental (postdecisional) mindsets on the effectiveness of a standardized brief intervention, the ASSIST-linked Brief Intervention. This intervention comprises a personalized feedback and a decisional balance exercise. We hypothesized that participants in a deliberative mindset should show better outcomes related to risk perception and behavior than participants in an implemental mindset. **Methods:** A sample of 257 students provided baseline measures on risk perception, readiness to change, and alcohol use. Of those, 64 students with risky alcohol use were randomly allocated to one of two mindset induction conditions – deliberative or implemental mindset. Thereafter, they received the ASSIST-linked Brief Intervention and completed self-report questionnaires on changes in risk perception, alcohol use, and readiness to change at postintervention and four-week follow-up. **Results:** In contrast to our hypotheses, the four-weeks follow-up revealed that participants in the implemental mindset consumed significantly less alcohol than participants in a deliberative mindset did. The former decreased and the latter increased their alcohol intake; resistance to the brief intervention was stronger in the latter condition. However, neither deliberative nor implemental mindset participants showed any changes in risk perceptions or in their readiness to change alcohol consumption. **Conclusions:** These findings suggest that mindset induction is a powerful moderator of the effects of the ASSIST-linked Brief Intervention. We argue that systematic research on mindset effects on brief intervention techniques aimed to reduce risky alcohol use is highly needed in order to identify the processes involved with commitment and resistance being the main candidates.

Introduction

Consuming alcohol in risky or hazardous amounts is common within different populations, but university students in particular represent a high-risk group. They are more likely to drink alcohol compared to non-college groups of the same age (Merrill & Carey, 2016; Schulenberg et al., 2017) and more likely to experience the negative consequences of their drinking patterns (Slutske, 2005). Negative consequences of risky alcohol drinking in young age range from drunk driving, starting physical fights, unsafe sex, academic difficulties to suicidal acts, developing alcohol dependence, heart problems, or cancer (Cortez-Pinto et al., 2010; Hingson, Edwards, et al., 2009). Alcohol consumption is common and widespread among German students, with 37% of them drinking alcohol at least once a week in the past 12 months and 42% reporting binge drinking in the last 30 days (Orth, 2017). For risky alcohol use, the estimated prevalence rates among students range from 20 to 30% (Akmatov et al., 2011; Ganz et al., 2017). In Germany, risky drinking is defined as an average daily consumption of more than 12 g pure ethanol in women and 24 g in men; 24 g corresponds to about 0,5–0,6 liter beer or 0,25–0,3 liter wine (Seitz et al., 2008). Binge drinking is defined as consuming approximately 40–60 g ethanol for women (60–70 g for men) on a single occasion (Gmel et al., 2011).

Although the consequences of hazardous alcohol use are well known, the discrepancy between knowledge of such negative consequences and exhibiting actual risky drinking behavior is widespread (Greenfield & Rogers, 1999; Klepper et al., 2016). Research on risk perception has attempted to explain the discrepancy between awareness of personal risks and risky alcohol use. For example, Wild and colleagues (2001) observed a tendency for optimistic underestimation of a personal experience of harm relative to comparable peers in at-risk drinking students, whereas students with low alcohol use showed no such optimistic bias. Health theories suggest risk perception to be a key factor when it comes to predicting preventive behavior (Brewer et al., 2007; Renner et al., 2007).

Screening and Brief Intervention (SBI) is a preventive approach with proven effectiveness to reduce hazardous alcohol consumption that usually consists of an initial assessment, the feedback of the respective results, and additional short interventions; it can be delivered by professionals of different training levels (Kaner et al., 2018; O'Donnell, Anderson, et al., 2014). Although SBIs targeting college students are successful in reducing alcohol consumption and related negative consequences for up to four years afterwards (Scott-Sheldon et al., 2014), the effect sizes are quite small (d_+s = 0.07–0.14) when the interventions are compared to control groups. SBIs often incorporate elements that belong to the FRAMES model (Bien et al., 1993); in this model personalized feedback is a central element. For instance, M. B. Miller and colleagues (2005) report a significant reduction in drinking among college students for feedback interventions. Similarly, feedback as part of a brief alcohol intervention has proven effective for the prevention of alcohol misuse among first year students (Scott-Sheldon et al., 2014) and for the reduction of drinking among heavy alcohol consuming college students (Samson & Tanner-Smith, 2015). Decisional balance is another technique that is frequently used and effective as an additional part of SBIs for college students (M. B. Miller et al., 2005). A meta-analysis was able to show that most interventions with significant effects on college drinking were delivered face-to-face by skilled professionals while data on the length of the intervention were inconclusive (Carey et al., 2016). It is generally accepted that processes like resistance and reactance (e.g., a client rejects the intervention or the counselor) are related to reduced or lacking effects of interventions (W. R. Miller & Rollnick, 2013). Several studies made this observation with complex substance use disorder interventions (Longshore & Teruya, 2006) as well as brief alcohol advice (Pavey et al., 2018). Thus, interventions for heavy college drinkers need to be designed to minimize resistance (Carey & DeMartini, 2010).

A theoretical framework to study decisional processes related to behavior change is the mindset theory of action phases (Gollwitzer, 2012). According to this theory, different types of information processing are activated during the different stages of decision making and goal

pursuit. Furthermore, it suggests that in the predecisional stage, when facing the task to select suitable and feasible goals and deliberating the pros and cons of specific alternatives, a deliberative mindset is activated which is characterized by open-mindedness for processing new information (Büttner et al., 2014; Fujita et al., 2007), an impartial processing of information (Taylor & Gollwitzer, 1995), and a realistic view of control (Gollwitzer & Kinney, 1989). Once the decision is made and the task is to plan the implementation of the goal, an implemental mindset is activated which is characterized by mainly the opposite features: closed-mindedness by ignoring peripheral information (Bayer & Gollwitzer, 2005; Fujita et al., 2007), partial processing of desirability-related information by preferred thinking about pros over cons (Taylor & Gollwitzer, 1995), and optimistic beliefs about control and feasibility (Gollwitzer & Kinney, 1989; Puca, 2001). Moreover, L. Keller and Gollwitzer (2017) observed that asking participants to deliberate the pros and cons of an unresolved personal problem (i.e., activating a deliberative mindset) versus asking people to plan the implementation of a chosen project (i.e., activating an implemental mindset) leads to more realistic risk perceptions and less risk-taking behavior.

Knowing that deliberative versus implemental mindsets facilitate open-mindedness and closed-mindedness, respectively, and that clients' resistance is problematic for the effectiveness of any intervention, we assumed that being in a deliberative mindset would enhance the openness toward and reduce resistance to individualized alcohol risk feedback as it is part of SBIs. Additionally, we assumed that a deliberative mindset is associated with an increased risk perception and decreased risk taking. The present study thus scrutinized the impact of mindset induction on personalized alcohol risk feedback by inducing the mindset right before an SBI. We investigated whether an experimentally induced deliberative mindset translates into increased effects of SBI aimed to reduce risky alcohol use. More specifically, we hypothesized that activating a deliberative mindset versus an implemental mindset could enhance the

effectiveness of an alcohol SBI within university students resulting in increased alcohol risk perception, increased readiness to change, and decreased alcohol use.

Materials and Methods

Procedure and Design

This randomized controlled pilot intervention study involved university students with risky alcohol use. It consisted of three sessions (t0, t1 and t2) conducted at a university-based research lab: At t0, participants were screened for hazardous alcohol consumption and answered baseline questionnaires on risk perception and readiness to change alcohol use. Inclusion criteria were current student status and risky alcohol use (past year). Those who qualified were then invited to the second assessment (t1) and were randomly assigned to one of two double-blind experimental conditions, in which one of two mindsets (deliberative vs. implemental) was experimentally induced (see below).

One researcher who did not participate in the provision of the brief intervention (LK) implemented the random assignment. We used an online tool to generate a random allocation sequence using blocks of six random numbers of which three corresponded to each mindset. In the order of their enrollment via an online platform, participants were assigned to IDs and the predefined allocation sequence. For each participant, the allocated mindset manipulation was put into a manila envelope that had a post-it note with the participant's ID on its cover. The experimenters then gave each participant the manila envelope with their ID on it and left the room before participants opened it and entered the room only after participants put the mindset manipulation back into the envelope. A cover story was used that suggested that the mindset induction was unrelated to the rest of the study. More specifically, participants were told that the experimenter needed to prepare for the upcoming part of the experiment and that the participant could use this time by completing a questionnaire. This questionnaire (i.e., the

mindset manipulation) had its own informed consent and stated that it was designed by another group of researchers (i.e., the social psychology and motivation group).

After the mindset induction all participants received the ASSIST-linked Brief Intervention. Thereafter, participants answered self-report questionnaires (alcohol consumption, risk perception, and readiness to change) and participants' resistance (shown during the brief intervention) was rated by the counselors. Four weeks later, a follow-up assessment (t2) took place during which alcohol consumption, risk perception, and readiness to change were measured again. Primary outcome measures were changes in alcohol-related risk perception and alcohol use, secondary outcome measure was readiness to change. All participants were thoroughly debriefed at the end of the study. The trial started in the winter term 2017/18, recruitment was originally planned for two subsequent semesters between November 2017 and October 2018 and t2 assessments were planned to be terminated before the end of the teaching term.

Because no research has ever studied mindset induction effects on brief interventions before we originally estimated that a sample size of $N = 100$ would be required to achieve a power of .8 in a rmANOVA (time * group interaction effect, i.e., 2 * 3) assuming a medium effect size (eta squared = 0.09) and alpha = 0.05. Because of expected dropout, we originally planned to recruit up to 120 participants. We did not include a non-mindset control group as originally planned due to restricted resources. We decided to stop further recruitment after an interim analysis in February 2018 revealed the real effect sizes and an unexpected increase of alcohol use in one group.

The study protocol was approved by the Institutional Review Board of the University of Konstanz, Germany; the trial registry number is NCT03338491 (www.ClinicalTrials.gov). According to the IRB approval participants of the screening gave informed consent by clicking the respective button in the experiment management system. All participants of the intervention

study gave written informed consent. All intervention study participants were fully informed about the study after completing the follow-up assessment.

Participants

Two hundred fifty-seven students (72% female) of a German university were recruited via an experiment management system to participate in an online survey (t0) which included the screening for risky alcohol use. Of them, N = 113 students (i.e., 44%) exhibited hazardous alcohol consumption and were invited to the intervention session (t1). From this invited sample, n = 66 participated and were randomly assigned to one of two experimental conditions (mindsets: deliberative vs. implemental before receiving a brief intervention to reduce alcohol use). On average, participants (68% female) were 20.9 years of age (SD = 2.4; min = 18, max = 30). From this sample, n = 64 were reached at the four-weeks follow-up. The two participants who missed their t2 appointment did not answer further invitations. Fig 1 summarizes the participant flow.

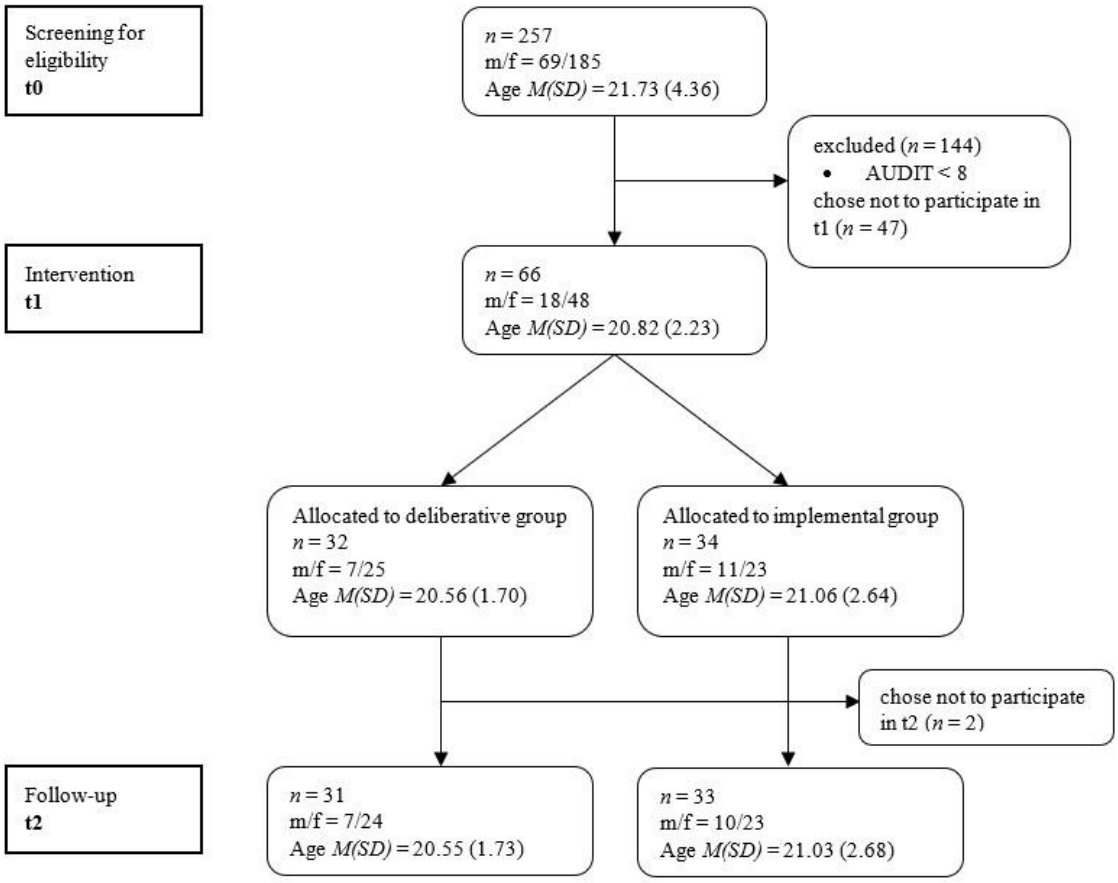
Measures and Instruments

Screening for Hazardous Alcohol Use. At t0 hazardous alcohol use was assessed by the Alcohol Use Disorder Identification Test (AUDIT; Barbor et al., 2001), a reliable and valid measure for risky alcohol use (Reinert & Allen, 2002). According to the suggestions of the WHO (Barbor et al., 2001), participants with an AUDIT score of eight or more were included into the study.

Alcohol Use and Risk-Taking Behavior. The timeline follow-back method (TLFB; Sobell and Sobell, 1996) was used to quantify actual alcohol use in the 28 days before t1 and t2, respectively. The TLFB is a reliable and valid calendar-based measure of daily alcohol use (Sobell et al., 2001). Via self-report, participants estimated their daily consumption retrospectively for the last 28 days before the assessment. Alcohol consumption was measured in standard drinks and the total number of standard drinks was used as main dependent variable.

Figure 1

Flow chart



Readiness to Change and Risk Perception. The German version of the Stages of Change Readiness and Treatment Eagerness Scale (SOCRATES) (Demmel et al., 2004; W. R. Miller & Tonigan, 1996) is a validated and reliable questionnaire for measuring the readiness to change problem drinking. The SOCRATES includes three subscales: Recognition, Ambivalence, and Taking Steps. Additionally, participants filled out the Precontemplation subscale of the validated German short version of the University of Rhode Island Change Assessments (URICA; VSS-k; Fecht et al., 1998). We used the Domain- Specific Risk-Taking Scale (DOSPERT; Weber et al., 2002) (Johnson et al., 2004) in its validated German version to assess general risk perceptions. The DOSPERT consists of 30 risks that have to be rated on the willingness to take each risk (e.g., "How likely is it that you are going camping in the wilderness?"). Furthermore, we used the German questionnaire "Fragebogen zur

alkoholbezogenen Risikowahrnehmung" (FAR; Klepper et al., 2016) to capture alcohol-related risk perceptions. The FAR consists of 20 items measuring alcohol-related risk perceptions in four domains: perceived personal vulnerability, peer vulnerability, affective risk perception, and precaution effectiveness. Each domain consists of five items evaluated on a five-point Likert scale. The SOCRATES, the URICA Precontemplation Scale, the FAR, and the DOSPERT were filled out at t0, t1, and t2. For SOCRATES and the URICA Precontemplation Scale, we modified the original Likert answer scales into visual analogue scales to prevent response biases due to repeated assessments (i.e. respondents remember their previous answers); we report percentage scores with 100% representing the highest possible value.

Resistance. After the ASSIST-linked Brief Intervention, the counselors rated how resistant they perceived the participants to be during the interview on a five-point answer scale (1 = "not at all" to 5 = "extremely high") addressing the question "How much resistance did the participant show during the intervention?". We included this rating during the last half of data collection for t1, which it was obtained for only a subset of our sample (n = 26) in order to perform an additional explanatory analysis. Because there was only one counselor present for each intervention session, there were no multiple ratings of resistance per participant.

Interventions

Mindset Manipulation. In research on the mindset theory of action phases, the deliberative and implemental mindsets are typically induced by a procedure developed by Gollwitzer and colleagues (overview by Gollwitzer & L. Keller, 2016). Both deliberative and implemental mindsets are assumed to carry over to different unrelated tasks, which the participants are asked to perform afterward. In our study, mindsets were activated as described in detail by L. Keller and Gollwitzer (2017). Participants in the deliberative mindset condition were instructed to name an unresolved interpersonal problem of the type "Should I leave it as is or should I try to make a change?", occupying their mind for which they had not made any decision yet whether to take action or not. They were asked to name their problem in the format

of “Should I do . . . or not?”. After that, participants were instructed to weigh positive and negative, immediate and long-term consequences of making or not making a change. In contrast, participants in the implemental mindset condition had to name an interpersonal project that they already had decided to resolve but had not initiated any actions yet. The project should have the form of “I intend to do . . .!”. Participants in the implemental mindset condition were then instructed to name five steps necessary for the completion of the project and specify where, when, and how they would implement these steps. We asked for problems/projects from the interpersonal domain, thus preventing participants naming alcohol related problems/projects. As a manipulation check, participants of both conditions were asked to mark their position on a decision timeline, indicating whether they saw themselves before or after making a decision in the selected problem/project; we measured the position on the timeline in cm from “0” (point of making a decision), with negative numbers indicating being before and positive numbers indicating being after the point of making a decision.

Brief Intervention. The ASSIST-linked Brief Intervention, consisting of the Alcohol, Smoking and Substance Involvement Screening Test (ASSIST) and the associated brief intervention (Humeniuk et al., 2010), is a standardized SBI that contains a strong personalized feedback element. With eight items, the ASSIST interview assesses the current and lifetime use of alcohol and other substances as well as substance-related symptoms. For each substance category, an individual risk score can be calculated determining a low-, moderate-, or high-risk level. The ASSIST interview achieves good reliability and validity (Humeniuk et al., 2008). In the standardized ASSIST linked Brief Intervention, participants receive feedback on the identified alcohol risk-score as well as information on related individual risks for social and health problems. The ASSIST-linked BI consists of ten steps that are centered on a personalized feedback (Part 1) and a decisional balance exercise (Part 2): 1. Asking clients if they are interested in getting to know their risk scores, 2. provision of personalized feedback, 3. giving advice how to reduce risk, 4. allowing clients to take responsibility for their choices, 5. asking

how concerned clients are, 6. balancing good things about alcohol use against 7. the less good things, 8. summarizing and reflecting the clients' statements with emphasis on less good things, 9. asking clients how concerned they are about the less good things, and 10. providing take-home materials (self-help booklet). When delivering the ASSIST-linked BI, motivational interviewing techniques are used to reduce clients' resistance and elicit change talk. The total duration of the ASSIST-linked Brief Intervention was about 30 min and was conducted by postgraduate psychology students who were intensively trained by licensed psychotherapists using a combination of theoretical and practical methods, including role plays and on site supervision.

Statistical Procedures and Handling of Missing Data

One person declined to act on the implemental mindset instructions. All other data for this participant were obtained and thus handled in an intention-to-treat analysis. For replacement of missing data due to dropout (two participants), the multiple imputation technique was used (Little's MCAR test, χ^2 (22) = 28.24, p = .168). In addition to the reported results below, we analyzed the data excluding these three participants to see if our conclusions would change but they did not.

To test for baseline differences between mindset groups, χ2-tests were performed for categorical variables and univariate ANOVAs for continuous variables. If Levene tests revealed heterogeneity of variances, Mann-Whitney tests were used instead. For the manipulation check item, a *t*-test was used to check whether participants in the implemental mindset group rated themselves differently from participants in the deliberative mindset group on the timeline concerning their decision state. To assess the effects of the mindset induction, we subjected the variables of interest (i.e., risk perception, readiness to change, precontemplation) to a 2 between (Mindset: deliberative versus implemental) x 3 within (Time: t0, t1, t2) ANOVA. The Greenhouse-Geisser adjustment was used to correct for violations of sphericity. We also utilized the same type of ANOVA to compare the two mindset groups concerning the change

of the total alcohol use from t1 to t2. We chose ANOVAs as many findings speak for the robustness of the analysis of variance concerning violated assumptions, such as non-normally distributed data (Harwell et al., 1992; Schmider et al., 2010). Homogeneity of variances was asserted using Levene's test that showed that equal variances could be assumed, except for the variable of precontemplation. To test for differences in the resistance rating between the two mindset groups, a Mann-Whitney U test was performed. Results with a Type I error rate of $p < 0.05$ in two-sided tests were considered statistically significant. Analyses were performed using SPSS version 25.

Results

All initially included participants were included into analysis.

Baseline Characteristics and Manipulation Check

The two experimental groups did not differ in baseline characteristics: gender distribution, χ^2 (1) = 0.91, p = .34, age, $F(1, 64) = 0.81$, p = .37, or pre-intervention AUDIT scores nor alcohol consumption, Fs(1, 62) < 1. On average, participants drank around 39.4 (*SD* = 23.1) standard drinks in the month before t1. Baseline risk perceptions (general and alcohol-related), readiness to change, and precontemplation were similar in both groups as described in Table 1, all ps ≥ .135.

The manipulation check indicated that the mindset induction was successful. The two groups differed on the decision timeline, $t(58.0) = 2.41$, p = .019, with participants in the deliberative mindset condition indicating to be before the decision (*Med* = - 2.4 cm) and participants in the implemental mindset condition indicating to be right at the decision (*Med* = 0.0 cm).

Table 1

Baseline characteristics of the sample

	Total Group (*N* = 66)	Implemental Mindset (*N* = 34)	Deliberative Mindset (*N*= 32)	*p*[5]
Age	20.8 (2.2)	21.1 (2.6)	20.6 (1.7)	.371
Gender				
female	48 (72.7%)	23 (67.6%)	25 (78,1%)	.339
male	18 (27.3%)	11 (32.4%)	7 (21.9%)	
AUDIT	12.11 (3.7)	11.7 (3.9)	12.5 (3.3)	.363
DOSPERT	3.7 (0.7)	3.8 (0.8)	3.6 (0.7)	.498
FAR-PPV[1]	1.8 (0.5)	1.8 (0.5)	1.8 (0.5)	.908
FAR-PV[2]	2.2 (0.7)	2.2 (0.8)	2.2 (0.7)	.820
FAR-ARP[3]	3.1 (1.0)	3.1 (1.1)	3.0 (0.9)	.720
FAR-PE[4]	1.6 (0.5)	1.6 (0.6)	1.5 (0.4)	.638
SOC-Recognition	111.3 (124.5)	123.3 (149.8)	98.6 (91.2)	.425
SOC-Ambivalence	108.4(92.4)	111.9 (96.2)	104.7 (89.5)	.754
SOC-Taking Steps	184.7 (187.8)	218.3 (200.2)	149.1 (169.6)	.135
URICA Precontemplation	36.6 (18.2)	34.7 (20.5)	38.6 (15.4)	.166

Note. We report *M*(*SD*) or *N* (%). [1] FAR subscale perceived personal vulnerability. [2] FAR subscale peer vulnerability. [3] FAR subscale affective risk perception. [4] FAR subscale precaution effectiveness. [5] Results of the comparison between mindset conditions

Mindset Effects on SBI Outcomes

Risk Perception. To test our hypothesis that participants differ in their general risk perception over time depending on whether they are in a deliberative versus an implemental mindset, a repeated-measures ANOVA was conducted. It revealed no significant main effect for mindset condition, $F(1, 64) = 0.87$, $p = .356$ $\eta_p^2 = .013$, and no significant interaction between mindset condition and time, $F(1.7, 107.7) = 0.66$, $p = .496$, $\eta_p^2 = .010$, although there was a significant main effect for time, $F(1.7, 107.7) = 6.69$, $p = .003$, $\eta_p^2 = .095$. Participants increased their general risk perception as measured by the DOSPERT over the course of the three sessions (see Table 2). Furthermore, general risk perception as measured in the DOSPERT correlated with alcohol consumption both at t1 and t2, $r(n = 66) = .29$, $p = .017$, and $r(n = 66) = .38$, $p = .001$, respectively (see Table 6 Appendix). Repeating the rmANOVA with gender as an additional IV revealed no gender effects at all.

Table 2

Outcome variables

Variable	Group	Baseline (t0)	Post (t1)	Follow-up (t2)
Alcohol Standard Units[1]	Implemental Mindset	-	35.71 (22.73)	29.81 (24.09)
	Deliberative Mindset	-	43.29 (23.22)	50.70 (33.96)
DOSPERT	Implemental Mindset	3.75 (0.80)	3.81 (0.73)	3.97 (0.68)
	Deliberative Mindset	3.63 (0.69)	3.70 (0.60)	3.76 (0.53)
FAR-PPV[2]	Implemental Mindset	1.79 (0.51)	1.81 (0.48)	1.86 (0.58)
	Deliberative Mindset	1.80 (0.55)	1.87 (0.48)	1.87 (0.43)
FAR-PV[3]	Implemental Mindset	2.18 (0.79)	2.22 (0.68)	2.09 (0.74)
	Deliberative Mindset	2.22 (0.71)	2.30 (0.56)	2.19 (0.61)
FAR-ARP[4]	Implemental Mindset	3.11 (1.08)	3.16 (0.96)	3.06 (0.94)
	Deliberative Mindset	3.02 (0.93)	3.33 (0.79)	3.32 (0.99)
FAR-PE[5]	Implemental Mindset	1.64 (0.62)	1.54 (0.43)	1.65 (0.49)
	Deliberative Mindset	1.51 (0.37)	1.53 (0.44)	1.56 (0.38)

Variable	Group	Baseline (t0)	Post (t1)	Follow-up (t2)
SOC-Recognition	Implemental Mindset	123.32 (149.77)	134.53 (128.64)	124.31 (145.89)
	Deliberative Mindset	98.63 (91.16)	106.69 (95.77)	101.85 (91.30)
SOC-Ambivalence	Implemental Mindset	111.85 (96.17)	107.91 (74.65)	99.87 (91.48)
	Deliberative Mindset	104.66 (89.53)	102.75 (84.61)	106.62 (83.64)
SOC-Taking Steps	Implemental Mindset	218.32 (200.20)	244.21 (190.21)	234.93 (191.02)
	Deliberative Mindset	149.06 (169.56)	183.53 (154.32)	176.73 (146.96)
URICA Precontemplation	Implemental Mindset	34.66 (20.45)	28.65 (18.61)	28.34 (18.52)
	Deliberative Mindset	38.59 (15.43)	31.22 (15.97)	27.55 (15.17)

Note. We report *M* (*SD*). [1] Alcohol Standard Units consumed in the past 24 days. [2] FAR subscale perceived personal vulnerability. [3] FAR subscale peer vulnerability. [4] FAR subscale affective risk perception. [5] FAR subscale precaution effectiveness

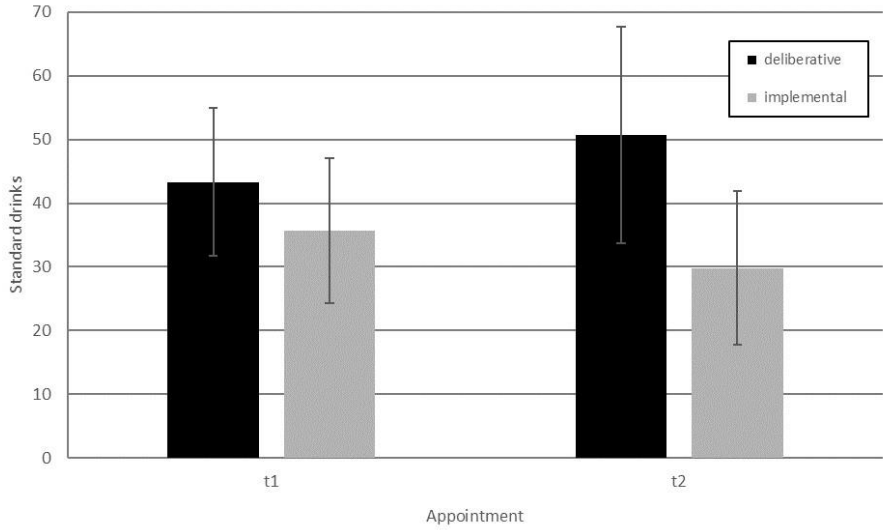
Testing whether alcohol-related risk perceptions changed depending on the mindset condition, repeated-measures ANOVAs revealed no significant interactions between mindset condition and time, all Fs ≤ 1.12, all ps $\geq .329$, all η_p^2s $\leq .017$, nor significant main effects, all Fs ≤ 1.48, all ps $\geq .232$, all η_p^2s $\leq .023$, in all four FAR domains. Including gender into the rmANOVA revealed a significant two-way interaction between time and gender for the personal vulnerability domain but no interactions with mindset condition. It also revealed an interaction between gender and mindset condition for the affective risk perception domain. There were no gender effects found for the other two domains. However, the personal

vulnerability domain correlated with alcohol consumption both at t1 and t2, $r(n = 66) = .25$, $p = .040$, and $r(n = 66) = .31$, $p = .013$ (see Table 6 Appendix).

Alcohol Use. When comparing the two mindset conditions with respect to the total alcohol consumption over time (t1, t2), we observed a significant decrease of alcohol consumption for the implemental mindset condition and an increase in the deliberative mindset condition. Hence, the ANOVA showed a significant main effect for the mindset condition, $F(1, 64) = 5.72$, $p = .020$, $\eta_p^2 = .082$, no effect of time, $F(1, 64) = 0.09$, $p = .768$, $\eta_p^2 = .001$, but a significant interaction between mindset condition and time $F(1, 64) = 6.74$, $p = .012$, $\eta_p^2 = .095$. Post-hoc paired t-tests revealed that participants in the implemental mindset condition exhibited a trend in reducing their alcohol intake by an average of almost 6 standard drinks between t1 and t2, $t(33) = 1.56$, $p = .129$, while participants in the deliberative mindset condition significantly increased their alcohol intake on average by more than 7 standard drinks between t1 and t2, $t(31) = 2.16$, $p = .038$. Alcohol intake did not differ between mindset conditions at t1, $F(1, 64) = 1.80$, $p = .185$, $\eta_p^2 = .027$, but did differ at t2, $F(1, 64) = 8.39$, $p = .005$, $\eta_p^2 = .116$. These findings are illustrated in Fig 2. Repeating this analysis with gender as an additional factor revealed no significant gender effects.

Figure 2

Amount of alcoholic standard drinks in the 4 weeks before and after the intervention



Note: We report means and standard deviation.

Readiness to Change. Exploring readiness to change, a repeated-measures ANOVA showed no statistically significant interaction between time and mindset group, all Fs ≤ 0.49, all ps ≥ .577, all η_p^2s ≤ .008, nor significant main effects, all Fs ≤ 2.44, all ps ≥ .118, all η_p^2s ≤ .037, in all three subscales. Furthermore subjecting Precontemplation to a repeated-measures ANOVA, the results revealed no significant main effect for mindset condition, $F(1, 64) = 0.27$, $p = .608$, $\eta_p^2 = .004$, but a significant main effect of time, $F(2, 128) = 11.01$, $p < .001$, $\eta_p^2 = .147$, indicating that scores on the Precontemplation scale decreased over the course of the three sessions of our experiment. However, the interaction between mindset condition and time did not reach statistical significance, $F(2, 128) = 0.79$, $p = .457$, $\eta_p^2 = .012$. In Table 2, we provide an overview of the average scores for each of the outcome variables. Including gender in the rmANOVAs revealed no interactions between mindset and gender; all three SOCRATES subscales showed an interaction between time and gender, and Precontemplation showed a gender main effect.

Resistance (Exploratory Analysis). We then compared resistance as rated by the counselors between the deliberative and implemental mindset conditions and found that participants in the deliberative mindset condition showed more resistance to the intervention than participants in the implemental mindset condition, $U = 38.00$, $p = .016$.

Discussion

In the present study, we investigated the influence of a mindset induction on the effectiveness of a standardized SBI protocol, the ASSIST-linked BI, containing a personalized alcohol feedback and a decisional balance exercise to reduce risky alcohol use among university students. We found that activating an implemental mindset in participants before the intervention took place showed a reduction of alcohol use in the subsequent four weeks after the intervention, while the participants who had been placed in a deliberative mindset actually showed an increase in drinking. While this was independent of the participants' gender, it is in contrast to our hypotheses: We had expected that the induction of a deliberative versus an implemental mindset would enhance the acceptance of the alcohol feedback and, thus, increase participants' risk perceptions and readiness to change, leading to reductions in alcohol consumption. Contrary to our hypotheses, risk perception and readiness to change remained unchanged and participants in the implemental mindset condition showed reduced risk behavior compared to participants in the deliberative condition. Also contrary to our assumptions, implemental mindset participants showed less resistance during the brief intervention compared to deliberative mindset participants, as rated by their respective counselor who was blind to the participants' mindset conditions after delivering the SBI. Thus, our empirical results demonstrate mindset effects that are opposite to our hypotheses. Still, they hint at mindset induction as a potentially powerful intervention tool, and they raise questions regarding the mechanisms and cognitive processes underlying our results.

But how can we explain our results? The manipulation check suggests that the deliberative and implemental mindsets were induced as intended. Still, resistance occurred to a higher extent during the SBI in the deliberative compared to the implemental mindset group, which was unexpected. What could be the reasons for this unexpected occurrence of resistance? One possible explanation relates to the components of the intervention used. The ASSIST-BI does entail two components, a. the personalized feedback and b. the decisional balance exercise. With respect to the first component, we see no reason why the deliberative mindset participants did not benefit from the open-mindedness associated with the deliberative mindset in their processing of the personalized feedback. In related mindset studies, deliberative mindset participants were indeed found to effectively adjust their risk perception after negative feedback more so than implemental mindset participants (L. Keller & Gollwitzer, 2017). Please note, however, that because of how we designed our intervention sessions and measured resistance, we cannot provide inter-rater reliability as only one counselor was present at each intervention session.

The second component of the ASSIST-BI, the decisional balance exercise, might therefore be more relevant to explaining our unexpected results in the deliberative mindset group. In their review on decisional balance procedures, W. R. Miller and Rose (2015) conclude that employing this technique with undecided individuals will decrease commitment for change because the benefits of the status quo are brought to one's attention and "sustain talk" is elicited. They refer to a number of studies that report this effect: For example, in a series of experimental studies with university students, Nenkov and Gollwitzer (2012) showed that predecisional individuals reduced their commitment to pursuing a given goal after they had participated in a decisional balance exercise regarding this goal. In a clinical sample with heavy college drinkers, Carey et al. (2006) report that a basic Brief Motivational Intervention (BMI) consisting of personalized feedback of alcohol risk levels and psychoeducation had better drinking and risk outcomes than an enhanced BMI in which a decisional balance exercise was added to the basic

module. Also Krigel et al. (2017) showed that a decisional balance exercise did not increase outcomes in student smokers not intending to quit. The specific challenges of a decisional balance exercise with predecisional clients that need to be met by therapists are highlighted by Gaume et al. (2016). These authors evaluated a brief MI aimed to reduce alcohol use among young heavy drinkers and found that inexperienced therapists provoked an increase in drinking when performing motivational interviewing less skillfully than experienced therapists. The studies by Carey at al. and Krigel at al. described above also employed inexperienced therapists; the interventions were either implemented by trained graduate students or basic training level therapists newly trained in motivational interviewing.

In sum, our unexpected results in the deliberative mindset condition may be explained by the following arguments: While the feedback part of the study could have worked in the intended direction, the subsequent decisional balance exercise probably overwrote it with opposing effects. In our decisional balance exercise the counselors also asked about the perceived good aspects of alcohol; this question could have triggered sustain talk that counteracted behavior changes. Our counselors had little motivational interviewing experience and might not have managed to maneuver around sustain talk that counteracted the positive personalized feedback effects. Additionally, the counselors' attempts to control sustain talk may have provoked resistance which further worsened the intervention effects.

With respect to the implemental mindset group, we expected that the feedback part of the intervention was received with less openness. With respect to the decisional balance exercise part, Nenkov and Gollwitzer (2012) and W. R. Miller and Rose (2015) report that a decisional balance exercise engaged in by postdecisional individuals strengthens goal commitment and respective goaldirected behavior. The authors explain this phenomenon by pointing to postdecisional defensiveness (Nenkov & Gollwitzer, 2012) and efforts to reduce cognitive dissonance (W. R. Miller & Rose, 2015), leading to selectively favoring arguments in support of the prior taken decision. Unfortunately, we did not measure commitment itself but

only outcomes that implied heightened commitment. However, in our study, the prior taken decision used to induce an implemental mindset was not related to the question of whether or not to reduce alcohol use. Therefore, the critical question is, how could it happen that alcohol use decreased even though the implemental mindset was induced by planning the implementation of a completely unrelated decision? Therefore, it cannot be postdecisional defensiveness or attempts to reduce cognitive dissonance, which would only make sense when the decision and the respective subsequent decisional balancing exercise are targeting the same decision problem. Obviously, the decisional balancing exercise in our implemental mindset group must have evoked different cognitive mechanisms, all to be explored in future studies. These studies might want to explore whether the implemental mindset is implicitly carried over to a question not yet decided, and that information on pros and cons of alcohol use is now processed as if a decision has already been made. Supportive evidence for this possibility comes from our follow-up assessment where we directly asked our participants whether they intended to reduce alcohol use right after the intervention or not; the majority answered "no", without differences between mindset groups (p = .230). Additional support comes from the observation that participants in the implemental mindset showed behavior change without the expected change in the underlying motivational factors, readiness to change and risk perceptions. In addition, a further possibility is that the implemental mindset leads to an implicit decision regarding the question at hand (i.e., "reduce alcohol use or leave it as it is?"), a cognitive process of „jumping to decisions" (analogous to „jumping to conclusions").

In sum, our unexpected results raise a number of new questions. An experimental approach to answer these questions about the processes elicited by the two distinct components of the ASSIST-BI and their differential interaction with deliberative and implemental mindsets would require a 2 (mindsets: deliberative vs. implemental) x 2 (component: feedback vs. decisional balance exercise) x 2 (level of counselors' motivational interviewing experience) with separate measures of resistance and commitment ratings as well as subsequent behavioral

change. It is hypothesized that among the clients of inexperienced counselors deliberative mindset participants would show low resistance during personalized feedback and high resistance after a decisional balance exercise, and the opposite pattern for commitment. A standardized training would help to implement the different MI skill levels of therapists, e.g. a training for using the different methods to evoke change talk or to avoid sustain talk. Implemental mindset participants are expected to show the opposite pattern to the deliberative mindset participants for resistance and commitment after a decisional balance exercise irrespective of counselors' experiences with motivational interviewing; it remains unclear how this group would respond to a personalized feedback procedure. Furthermore, the participants' alcohol use should reflect the expected finings for resistance and commitment.

We also found that risk perception and readiness to change were not influenced by the brief intervention in both mindset groups. This is in line with a recent systematic review where both constructs did not emerge as mediators of intervention effects regarding the reduction of college student drinking (Reid & Carey, 2015). But although no support was found for our hypotheses that the specific mindset during an intervention has an influence on the change of the variables risk perception and readiness to change alcohol consumption, it does not necessarily imply that there are no mindset and intervention effects on these variables. It would be premature however to conclude that these variables were unresponsive as we did not study their trajectories. We measured them at baseline, just after the intervention and follow-up one month later. Based on the risk reappraisal hypothesis (Brewer et al., 2004) one would expect that after a behavior change, risk perception is adapted; in the case of implemented alcohol use reduction, alcohol risk perception (especially the domain perceived personal vulnerability) should eventually decrease. In our study, the timing of assessment of risk perception might not have captured this dynamic. In order to measure trajectories of risk perception, a more frequent measurement in everyday life would be necessary, such as ecological momentary assessment.

Several limitations of the present study should be noted. The major limitation are the missing no-mindset and no-intervention control groups. Thus, the reduction of alcohol consumption after the brief intervention cannot be clearly attributed to the induction of an implemental mindset compared to a deliberative mindset. Also, we cannot say whether mindset induction alone without brief intervention would already affect alcohol use. The present results need to be replicated in a study with a more complete design that contains an additional control group without any mindset induction, and control groups which receive no brief intervention after the deliberative or implemental mindset inductions. A further limitation is that the counselors were no experienced therapists trained in motivational interviewing. Instead, we used a manualized version, the ASSIST-linked Brief Intervention, due to restricted resources. Moreover, all outcomes were assessed by self-reports which are vulnerable to social desirability (van de Mortel, 2008). A final limitation is the non-representative sample consisting mostly of female students in their first semester, which was due to our recruiting strategy.

Conclusion

In the present study, deliberative versus implemental mindsets were induced before participants received a standardized SBI containing personalized feedback and a decisional balance exercise to reduce risky alcohol consumption. Alcohol use reduced clearly in the implemental mindset group in the four weeks after the intervention, while it increased in the deliberative mindset group. Participants showed no meaningful changes in readiness to change and alcohol- related risk perceptions. The present study offers useful insights into drinking behavior in a student sample of risky drinkers and into the mechanisms related to the effectiveness of brief interventions on risky drinking.

III. Research Paper II

Brief Intervention and Mindset Induction to Reduce Khat Use among Ethiopian Students – a Randomized Controlled Trial

Natascha Büchele, Lucas Keller, Mekdem Tesfamichael Hassen, Matiwos Soboka, Marina Widmann, Anja C. Rukundo-Zeller, Eva Barnewitz, Yimenu Yitayih, Sabine Schiller, Jael Senger, Kristina Adorjan, Marie-Claire Kabengele, Michael Odenwald

Abstract

University students in Ethiopia often use the natural stimulant khat to boost academic performance. However, they can experience mental and somatic problems as well as withdrawal symptoms, while interventions helping to reduce khat use are lacking. The study aimed to investigate the effectiveness of the standardized ASSIST-linked Brief Intervention. Additionally, we explored the effects of a mindset induction, which was activated beforehand, on the outcome of the intervention. A sample of 322 university students from Jimma, Ethiopia, were randomly assigned (1) to the ASSIST-linked Brief Intervention adapted for khat or cognitive tests as a control condition and (2) to either a deliberative or an implemental mindset induction. The results revealed a significant decrease in the amount and frequency of khat use in the two weeks after the intervention, with the brief intervention group showing a significantly greater reduction in frequency than the control group. No significant effects emerged regarding the mindset induction. Moreover, we found khat use was affected by psychopathological symptom load and motivation to change khat use. The findings indicate that the adapted ASSIST-linked Brief Intervention can be promising in reducing khat use. Implications for research to enhance the effectiveness of khat-reducing interventions are discussed.

Introduction

The leaves of the khat tree (*Catha edulis*) are a natural psychoactive substance widely cultivated in African and Arab countries and native to Ethiopia (Krikorian, 1984). The psychostimulant effects of its main biochemically active constituents, cathinone and cathine, on the central and peripheral nervous systems are somewhat similar to those of amphetamines (Kalix, 1990). In recent years, khat chewing has become an increasingly common habit beyond original local customs and religious traditions. However, it is associated with numerous somatic and mental health problems, including addiction problems (Odenwald & al'Absi, 2017). Khat users frequently report withdrawal symptoms (i.e., feeling depressed, fatigue, memory impairment, hypersomnia, altered stress response) and impairments in social and occupational functioning (Abdeta et al., 2017; Al-Motarreb et al., 2010; Odenwald & al'Absi, 2017). According to the 2011 Ethiopian demographic health survey data, the khat chewing prevalence rate was 15.3% (Haile & Lakew, 2015). Notably, high rates of khat use have also been reported among university students: Meta-analyses indicated that one in five students in Ethiopian universities used khat, with the highest prevalence observed in the Oromia region (Alemu et al., 2020; Gebrie et al., 2018). Students reportedly often start chewing khat during their first year of university (Abdeta et al., 2017) and do so mainly for khat's supposed property to boost concentration levels and alertness as well as facilitate relaxation, socializing, and stress relief (Adane et al., 2021). Empirically, however, khat use is associated with poor academic performance, presumably as a consequence of extended time for chewing and recovering from its effects (Alemu et al., 2020; Meressa et al., 2009).

Despite the fact that many khat users want to reduce or stop their khat use, these attempts often fail: Duresso et al. (2018a) monitored an unaided quit attempt of 60 Ethiopian students who were moderate khat users using electronic diaries. Only 7% managed to achieve four weeks of abstinence, and most experienced significant withdrawal symptoms and cravings (Duresso et al., 2018b). Though these findings show the range of problematic consequences resulting

from excessive khat use and the difficulties in stopping it, there is insufficient research about interventions to reduce khat use (Odenwald & al'Absi, 2017), and a lack of programs specifically targeting students (Ahmed et al., 2020).

One type of intervention with a potential high applicability are Screening and Brief Interventions (SBIs) (Humeniuk et al., 2012). SBIs represent a well-established approach in reducing substance use behavior, typically encompassing one to five sessions, with robust empirical support for decreasing moderate alcohol use (O'Donnell, Wallace, & Kaner, 2014) and to a smaller extent for other substance use (DiClemente et al., 2017; Saitz, 2014). SBIs usually incorporate a standardized screening for substance use, a structured feedback on screening outcomes and additional interventional elements (Saitz, 2014), often based on the FRAMES principles (Bien et al., 1993) and techniques of motivational interviewing (W. R. Miller & Rollnick, 2013).

The ASSIST (Alcohol, Smoking, and Substance Involvement Screening Test)-linked Brief Intervention developed by the WHO (Humeniuk et al., 2010) was positively evaluated in a large international study involving several types of substances (Humeniuk et al., 2012). Widman and colleagues (2017) developed an adapted version of the ASSIST-linked Brief Intervention for khat users and evaluated it in a controlled study. They found a significantly larger decrease in khat-use time for the intervention group compared to the assessment control group; however, effect sizes were small. They also reported that the intervention was less effective among participants with comorbid psychopathology. Considering this and the lack of evidence regarding khat-related interventions, the question arises whether additional intervention components could enhance the effects of a brief intervention.

Increasing the Effectiveness of an SBI with Mindsets

In general, commitment and change motivation are well-known mechanisms for ceasing risky or adopting healthy behaviors (DiClemente et al., 2017). The mindset theory of action

phases (Gollwitzer, 1990, 2012) provides a theoretical framework for motivational and decisional processes related to behavior change. It proposes that an individual passes through different phases in goal pursuit, each with its tasks and challenges. Phase-specific cognitive procedures (i.e., mindsets) are activated to overcome these challenges. Crucially, this activation can carry over to other unrelated tasks. A peculiarity researchers have used to study the mindsets' characteristics and, more recently, investigate how they interact with other interventions.

In the *predecisional* stage, when contemplating the desirability and feasibility of a goal is needed, a deliberative mindset is activated. This mindset is associated with open-minded and impartial information processing and a realistic view of control and feasibility (e.g., (Brandstätter et al., 2015; Doerflinger & Gollwitzer, 2020; Fujita et al., 2007). In contrast, one transitions to the *preactional* stage after making a decision. In this phase, an implemental mindset takes over that is characterized by cognitive tuning towards planning the implementation of the goal (L. Keller et al., 2019). This goes along with more closed-mindedness (Büttner et al., 2014), more focus on pros than cons (Taylor & Gollwitzer, 1995), illusions of control (Gollwitzer & Kinney, 1989), and increased illusory optimism regarding one's performance (Puca, 2001) or encountering adverse events (L. Keller & Gollwitzer, 2017).

Regarding the increased open-mindedness of the deliberative mindset, one would expect that inducing a deliberative mindset before an SBI would increase the SBI's effectiveness. In a study testing this idea in the context of risky drinking among college students, Büchele and colleagues (2020) combined deliberative versus implemental mindsets with the ASSIST-linked Brief Intervention. The authors included students who exhibited risky drinking but motivation to change alcohol use was no pre-requirement for study participation. Contrary to expectations, participants in an implemental mindset during the SBI managed to reduce their alcohol consumption in the four weeks after the intervention compared to the four weeks before the

intervention. Participants in a deliberative mindset during the SBI even increased their alcohol consumption (Büchele et al., 2020). So, the increased open-mindedness caused by the deliberative mindset appeared to be counter-productive in the case of risky drinking (Nenkov & Gollwitzer, 2012).

The Present Research

The present study aimed to investigate the effectiveness of the adapted version of the ASSIST-linked Brief Intervention in reducing khat consumption among university students in Jimma, Ethiopia. First, we expected reductions in the amount and frequency of khat use in the experimental group after receiving the ASSIST-linked Brief Intervention and no change in khat use in a control group. Second, we investigated the downstream consequences of experimentally induced mindsets on the outcome of the brief intervention. Among participants with the explicit wish to reduce their khat consumption, we expected that participants differ in their khat use after the intervention depending on the induced mindset (Gollwitzer, 2012).

Methods

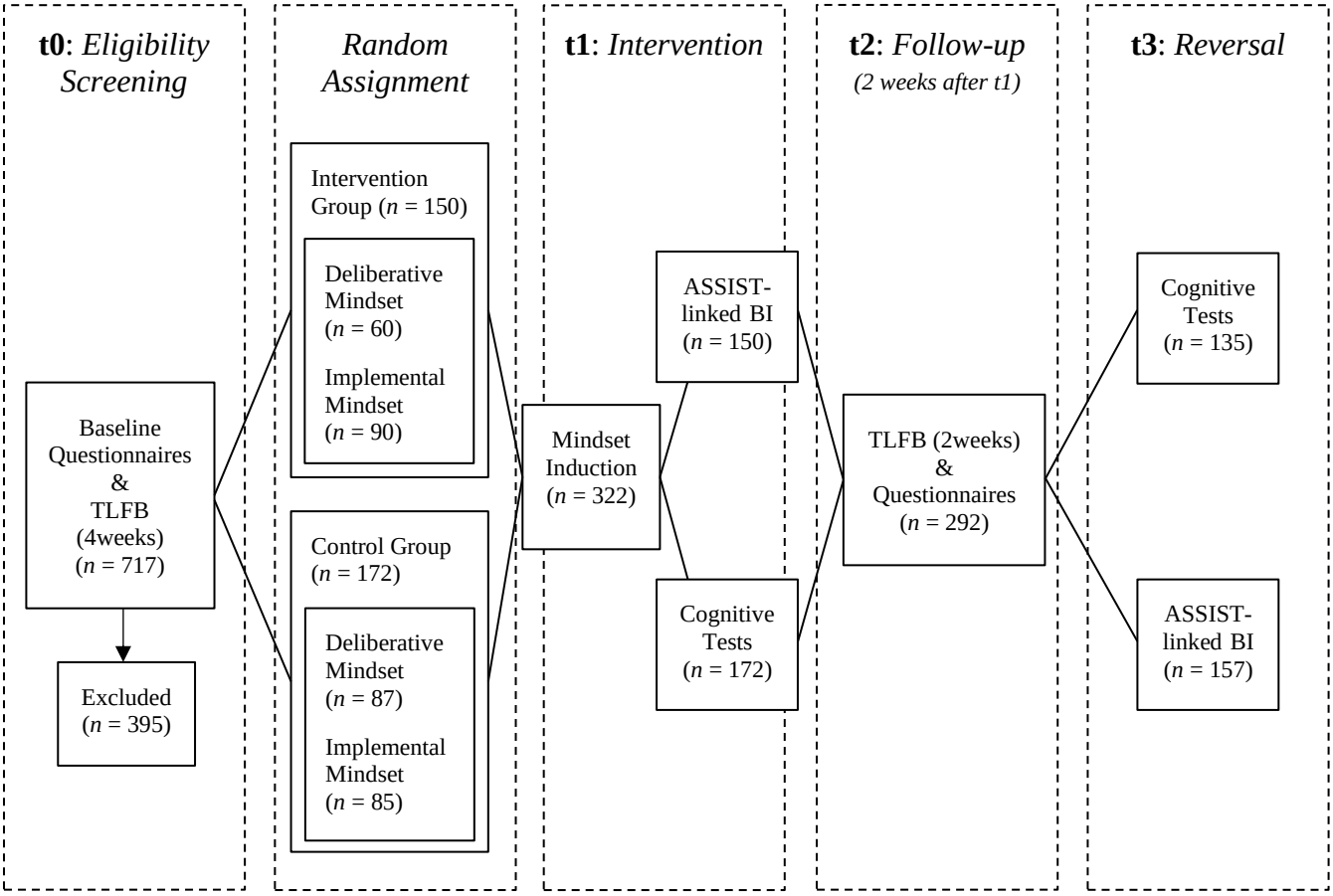
Design

For this randomized controlled intervention study, a sample of khat-using students from Jimma University who wished to cut down or stop their khat use was recruited and screened (see selection criteria below) (Hassen et al., 2021). In a second step, eligible individuals were invited for the treatment trial and randomly assigned (1) to the experimental group who received the ASSIST-linked Brief Intervention (BI) or the control group who participated in cognitive tests (CT) and (2) to one of the two mindset conditions, the deliberative versus the implemental mindset. In total, the study comprised four appointments: Screening at t0, mindset induction and BI or CT at t1, a follow-up at t2 (two weeks after t1), and a reversal between the BI and CT groups at t3 (see Figure 3). An originally planned control condition for the mindset factor (i.e., with no mindset induction) had to be omitted because of the delayed onset of the study (see

next paragraph), as we expected difficulties in recruiting the necessary number of participants in the remaining time. The same is the case for the planned observation period of four weeks before and after t1. We collected data for the four weeks before t1 but had to cut the follow-up period to two weeks to be able to conclude the study.

Figure 3

Study Design



Study Setting

The study was implemented at the Jimma University campus, a university with over 40,000 students located in the southwestern part of Ethiopia, known as a traditional khat growing region. Data collection was initially scheduled to coincide with the start of the university term in October 2018. However, due to rising inter-ethnic violence and a resulting governmental decision to postpone the start of the term, the students, who mainly live in state-run

accommodations, were not allowed to return to Jimma for some weeks. As a result, data collection took place from November to December 2018.

Recruitment, Procedure, and Participants

For recruitment, we distributed leaflets about the study's general purpose and selection criteria on the university campus. Interested participants with an initial motivation to reduce or cease their khat use could attend a short preparation workshop about the purpose and procedure of the study, including information about the BI. After giving their informed consent, 717 participants (98.7% male) completed the baseline screening (t0) comprising a set of self-report questionnaires. Of these, 322 were included in the trial (see criteria below) and attended t1. Based on the random assignment, the deliberative or the implemental mindset was first induced, and then the participants either received the ASSIST-linked BI or completed the Raven Matrices test (Raven, 2003). Two weeks later, 292 participants were reached up to answer follow-up questionnaires. At t3, the intervention group completed the Raven Matrices, while the control group received the BI for ethical reasons. Sample characteristics are described in Table 3.

Table 3

Socio-demographic characteristics and baseline variables of the study participants

	Intervention Group		Control Group		Total	*p*-value
	Deliberative	Implemental	Deliberative	Implemental		
Participants (%, *n*)	18.8% (55)	27.4% (80)	28.4% (83)	25.3% (74)	100% (292)	-
Socio-demographics						
Age (*M*, *SD*)	22.22 (1.51)	22.27 (1.63)	21.99 (1.56)	21.99 (1.63)	22.11 (1.58)	.640
Relationship status (% single, *n*)	61.8 % (34)	55.0% (44)	60.2% (50)	58.1% (43)	58.6% (171)	.754
Religion (% Islam, *n*)	30.9% (17)	32.5% (26)	32.5% (27)	28.4% (21)	31.2% (91)	.875
Study vear (*M*, *SD*)	5.49 (1.03)	5.49 (1.11)	5.33 (0.98)	5.50 (0.95)	5.45 (1.02)	.611
Khat use						
Khat use bundles (of 28 days) (*M*, *SD*)	37.18 (46.97)	31.12 (32.64)	31.20 (31.69)	34.47 (44.52)	33.14 (38.56)	.877
Khat use days (*M*, *SD*)	13.76 (9.08)	14.36 (8.67)	15.36 (9.44)	15.92 (8.85)	14.93 (9.01)	.576
Taking Steps (*M*, *SD*)	27.35 (7.83)	25.85 (7.78)	25.39 (7.58)	26.93 (7.16)	26.27 (7.58)	.400
SRQ (*M*, *SD*)	6.42 (5.70)	5.79 (5.46)	6.40 (5.74)	5.80 (5.36)	6.08 (5.54)	.885

Inclusion and Exclusion Criteria. The first level selection criteria were khat use in the last four weeks before study participation, an interest in psychological assistance services to reduce or cease khat use, and current student status. We only included students in the second year and above, as most students start chewing khat during their first year of university (Abdeta, Tolessa, Adorjan, & Abera, 2017). We also excluded participants who did not provide complete data (2

missing items per questionnaire were tolerated). The characteristics of this first-stage sample are reported by Hassen et al. (2021).

A second step of selection for the clinical trial was necessary. Due to the very small number of female participants we only included male participants in our analyses as khat use among women, despite its rapid increase, is still socially stigmatized and therefore underreported (Yitayih & van Os, 2021). Because of the unexpected high prevalence of severe mental health problems which impair the effect of brief interventions (see Widmann et al., 2017), further exclusion criteria had to be implemented before inclusion into the trial (and participants were accordingly referred to or informed about the student or psychiatric clinic): acute suicidality ($N = 53$), self-reported lifetime and current episodes of severe mental disorders (e.g., schizophrenia), severe alcohol use (AUDIT > 15) or any lifetime illicit substance use (22 cannabis, 10 heroin, 14 other opiates, 11 cocaine, 9 amphetamine, 5 hallucinogens, 9 inhalants, 3 methadone, 3 barbiturates, and 3 sedatives), or no fluency in all three study languages.

T0 and t2 assessments took place in classrooms in groups of up to 11 participants, where they anonymously filled in self-report questionnaires on tablet computers using Qualtrics (www.qualtrics.com); instructions and technical assistance were provided by a study team member. To assure data protection, participants did not fill in names but instead an individual code. T1 and t3 sessions took place at the counselors' offices in a 1:1 interaction.

The study was approved by the Institutional Review Boards of Jimma University (Ethiopia) and the University of Konstanz (Germany); the trial registry number is NCT03730805. All participants received detailed information on the study purpose and procedure in their preferred language (Amharic, Afaan Oromoo, or English) and were only included in the study after giving their informed consent. The study was funded by the University of Konstanz.

Instruments

All materials were provided in English, Afaan Oromoo, and Amharic, the commonly spoken languages for the region and university campus. This paper only describes the questionnaires relevant to the present research question in detail. Further details on the questionnaires part of the overarching research project, plus the detailed translation procedure, are described elsewhere (Hassen et al., 2021).

Assessing Khat Use: The Timeline Followback. We used an adapted version of the *Timeline Followback* (Sobell & Sobell, 1996) to assess the amount and frequency of khat use in the 28 days before t1 and the 14 days after t1. The TLFB is a reliable and valid retrospective calendar-based method, originally developed to measure alcohol use but also validated for other substances and in cross-cultural studies (Robinson et al., 2014; Sobell et al., 2001). Via self-report, participants estimate their daily khat use for the respective time frame by two measures: consumed standard bundles of khat and days of khat use. Standard units of khat bundles were presented together with descriptions and photos. To define the standard units, we conducted a local market survey as performed previously by Widman et al. (2014); further details in Hassen et al. (2021).

To make it easier for participants to recall their consumption, they first had the chance to fill in a personal calendar, marking significant events or routines (e.g., sports classes) across the 28 or 14 days of assessment before t1 and after t1, respectively. These events were then presented again when participants had to indicate the number of consumed units for each day. After the first week of data collection for t1, we added a check to the TLFB that participants must give a response for each day of the assessment period. This led to a low number of missing values for the TLFB measure (85 out of 11298 possible values, 0.8%).

Readiness to Change. The Stages of Change Readiness and Treatment Eagerness Scale (W. R. Miller & Tonigan, 1996) comprises 19 items to assess readiness to change substance

use in relation to the transtheoretical model of behavior change. Each item describes how someone might feel about their substance use and is answered on a 5-point-Likert-scale from "strongly disagree" to "strongly agree." Sum scores of corresponding items yield three scales: Recognition, Ambivalence, and Taking Steps (TS). For instance, high scores for TS indicate that a change in substance use and corresponding successes are already experienced. In contrast, low scores indicate that no change in substance use has recently been made. We translated the questionnaire to Amharic and Oromoo and changed the wording from "drug" to "khat" (e.g., *"I was using Khat too much at one time, but I've managed to change that"*; TS scale). For this adapted version, the internal consistency of the subscales recognition ($\alpha s \geq .75$) and TS ($\alpha s \geq .82$) were good but only acceptable for ambivalence ($0.48 \leq \alpha \leq 0.60$), which is in line with the results of the original version developed for alcohol abuse (W. R. Miller & Tonigan, 1996). For our analyses, we only used TS as it is the best indicator for implementing actions related to reducing or ceasing khat use.

Mental Health. We assessed the current symptom load with the Self-Reporting Questionnaire (SRQ-20), which was developed by the WHO as a screening tool for mental disorders (Harding et al., 1980). The SRQ-20 consists of 20 questions about common mental health problems, answered in a dichotomous yes/no format. It has been used in numerous settings, and an Amharic translation, validated in Ethiopia (Hanlon et al., 2008), and an Afaan Oromoo translation, developed in one of our previous studies (Adorjan et al., 2017), were available. Internal consistencies for the three language versions in our study were good to excellent (Hassen et al., 2021). SRQ cut-offs often vary depending on culture; based on a study from Youngmann et al. (2008), a cut-off score of 8 or more was considered a sign of severe mental distress.

Interventions

Mindset Manipulation. To induce deliberative and implemental mindsets, we applied the standard experimental manipulation developed by Gollwitzer and colleagues (2016) and described in detail by L. Keller et al. (2019). One crucial part of this procedure is that the deliberative and implemental mindsets are evoked by unrelated decision problems and carry over to ostensibly unrelated subsequent tasks, like, in our case, the khat-related intervention. Therefore, participants are asked to come up with a personal task that is unique to them.

In the deliberative mindset condition, participants named an unresolved personal problem for which they had not yet made any decision regarding whether to make a change. The chosen problem should be in the format of "Should I do… or not?". After naming the problem, participants reflected on the positive and negative, immediate and long-term consequences of taking action and sticking to the status quo.

Participants in the implemental condition were asked to name a personal project for which they had already made a decision to take action but had taken no further steps so far. The chosen project should be in the format of "I intend to…!". Then, they listed five steps necessary to complete the project and specified when, where, and how they planned to implement each step.

ASSIST-Linked Brief Intervention. The ASSIST-linked BI combines a screening tool followed by an intervention. The screening identifies the current and lifetime use of different substance types (tobacco products, alcohol, cannabis, cocaine, amphetamine-type stimulants, sedatives, hallucinogens, inhalants, opioids, and other drugs) with eight items and generates an individual risk score (low, moderate, or high) for each substance with related health problems. The BI contains ten standardized steps, which are the personalized feedback on risk scores, the decisional balance exercise, and the provision of self-help materials.

The ASSIST achieved good validity and reliability (Humeniuk et al., 2008; WHO, 2002). With its numerous available translations, the results of the ASSIST-linked BI show effectiveness generalized across countries. Therefore, the WHO recommends it for intercultural use (Humeniuk et al., 2012).

As there were no translations to Amharic or Afaan Oromoo available for our use, we translated the ASSIST screening, the accompanying BI material, and a self-help booklet into Amharic and Afaan Oromoo based on the version reported by Widmann et al. (2017) which added khat to the main list of substances. Adopting from Widmann et al. (2017) , risk scores were based on the same ranges used for alcohol (0-10, 11-26, 27+) rather than on the ranges for illegal substances, as khat use is legal and culturally integrated in Ethiopia. The ASSIST-linked BI was conducted by Ethiopian counselors, psychiatric nurses, and psychologists from Jimma University student clinic and psychiatric clinic. All interviewers received an intensive 2-week training on conducting the ASSIST-linked BI, including motivational interviewing skills, and the study procedure and assessment tools. This training was provided by an international group of licensed psychologists, psychotherapists, and researchers.

Statistical Procedures

As preliminary analyses, we compared the four group conditions regarding socio-demographic characteristics, readiness to change, mental health variables, and khat use with the Kruskal-Wallis test using SPSS version 29.

Furthermore, we fitted (generalized) linear mixed-effects models to the data in our main analyses, utilizing the lme4 package (Bates et al., 2015) for R (R Development Core Team, 2008). We use models with the maximal random effects structure (Barr et al., 2013), meaning that we specify random intercepts for participants but also random slopes for the within-participant variable. This way of analyzing the data has important advantages when it comes to statistical power, as individual observations can be analyzed instead of having to rely on

averages over multiple observations. Further, missing values in either TLFB assessment (pre- or post-intervention) are less of an issue compared to analyses using aggregated scores for the number of khat bundles consumed or the number of days on which khat was consumed.

Results

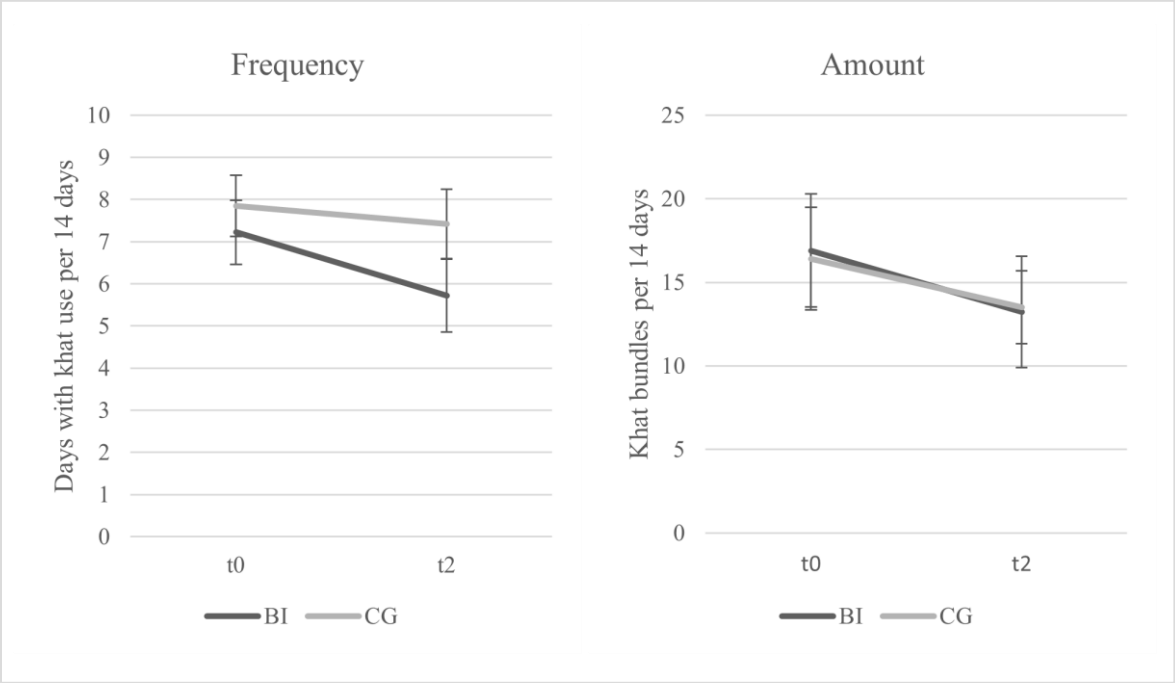
Preliminary Analyses

We analyzed participants' khat consumption in the 28 days before and the 14 days after the intervention. There are two dependent variables, the number of bundles consumed per day and whether participants consumed any khat on a specific day.

On average, students consumed around 33.14 (*SD* = 38.56) khat bundles on around 14.93 (*SD* = 9.01) days in the month before the intervention. As described in Table 3, we detected no baseline differences between the four groups regarding socio-demographic variables, TS and SRQ scores, or khat use, indicating successful randomization. From a descriptive view, we see a reduction in the frequency and amount of khat use after the intervention favoring the BI group versus the control group (see Figure 4), but no differences regarding the mindset conditions.

Figure 4

Frequency and amount of khat use per 14 days before and after the intervention



Note: We report means and confidence intervals of 95%

Testing Intervention Effects

We analyzed participants' khat consumption in the 28 days before and the 14 days after the brief intervention. This renders two dependent variables, the number of bundles consumed per day and whether participants consumed any khat on a specific day.

For the analysis of the probability of consuming khat on a specific day, we first fitted generalized linear mixed-effects models regressing the probability to have consumed khat on whether participants were in the intervention or control group, whether they were in the implemental or deliberative mindset condition, and a time factor that encompasses whether consumption data was from before or after t1 with allowing for random variation in slopes for the latter as well as random intercepts for each participant. Moreover, we controlled for symptom load and change motivation by using the SRQ score and the score of the TS subscale of the SOCRATES, respectively. These analyses revealed no significant main effects of the

mindset induction, nor any 2-way or 3-way interactions with the mindset induction. Neither did the analyses for the number of consumed khat bundles on a given day. Adding the 2-way and 3-way interactions never improved model fit; all *p*s ≥ .162. Therefore, we dropped the mindset induction and its interactions from the analyses reported in the manuscript, but they can be found in the Appendix (see Further Analyses (Research Paper II)).

Analyzing the data without considering the participants' mindset revealed main effects for symptom load, $b = 0.07$, $z = 2.96$, $p = .003$, and change motivation, $b = -0.05$, $z = -2.93$, $p = .003$, meaning that the likelihood to have consumed on a day was significantly increased for participants with higher symptom load but reduced for participants with higher change motivation. There was no significant main effect of the intervention ($b = -0.36$, $z = -1.33$, $p = .185$) which would have indicated a difference in baseline likelihood of consumption. Similarly, there was no significant main effect of time ($b = -0.25$, $z = -1.17$, $p = .243$) which would have indicated that the likelihood to consume differed in the control condition between before and after t1. However, the 2-way interaction between intervention and time was significant in the full model, $b = -0.65$, $z = -2.06$, $p = .040$. This indicates that the intervention group's likelihood to consume differed between before and after t1. Consistently, adding the 2-way interaction significantly increased explanatory power, $\chi(1) = 4.05$, $p = .044$. In contrast, further adding the two- and three-way interactions between time, the intervention, and symptom load or change motivation, respectively, did not increase explanatory power, all $\chi(3)$s ≤ 4.94, *p*s ≥ .176.

Next, we moved on to analyze the control and intervention groups separately because of the significant 2-way interaction between intervention and time. In the control group, no significant effects emerged, all *p*s ≥ .051. In the intervention group, there was a strong negative effect of time, $b = -0.89$, $z = -3.94$, $p < .001$. Again, symptom load was positively related, $b = 0.07$, $z = 2.18$, $p = .029$, and change motivation was negatively related, $b = -0.06$, $z = -2.85$,

p = .004, to the likelihood of consuming khat on a given day. Further adding the two-way interactions between time and symptom load or change motivation, respectively, did not increase explanatory power in the intervention and control groups; all $\chi(1)$s $\leq$ 2.53, ps $\geq$ .111.

For the analysis of bundles before and after the intervention, we fitted similar linear mixed-effects models regressing the number of consumed bundles on a given day on the same predictors (i.e., whether participants were in the intervention or control group and a time factor that encompasses whether consumption data was from before or after t1) with allowing for random variation in slopes and intercepts for each participant. Again, we controlled for symptom load and change motivation. This analysis revealed significant main effects of change motivation, b = −0.02, t(292.3) = −2.60, p = .010, symptom load, b = 0.02, t(292.4) = 2.18, p = .030, and time, meaning that participants consumed fewer bundles after t1 than before, b = −0.20, t(291.0) = −2.04, p = .042. The main effect of the intervention or its 2-way interaction with time was not significant, $|b|$s $\leq$ 0.06, ps $\geq$ .659, as was adding the 2-way interaction, $\chi(1)$ = 0.20, p = .659. Similarly, further adding the possible two- and three-way interactions with either symptom load or change motivation did also not increase the explanatory power of the models; all $\chi(3)$s $\leq$ 3.94, ps $\geq$ .268.

Nevertheless, we further looked at the control and intervention groups separately to uphold the similarity to the analyses with the likelihood of consumption on a given day as the dependent variable. In the control group, we observed negative main effects of time, b = −0.20, t(157.2) = −2.10, p = .038, and symptom load, b = 0.03, t(157.1) = 2.28, p = .024, but not change motivation, b = −0.01, t(156.8) = −1.27, p = .206. In the intervention group, a slightly more substantial effect of time, b = −0.26, t(134.4) = −2.41, p = .017, was accompanied by a significant main effect of change motivation, b = −0.03, t(135.6) = −2.53, p = .013. This time, symptom load was not significant, b = 0.02, t(135.1) = 0.85, p = .399. Further adding the two-

way interactions between time and symptom load or change motivation, respectively, did not increase explanatory power in the intervention and control groups; all $\chi(1)$s ≤ 1.57, ps $\geq .210$.

Taken together, while we find some decrease in the number of consumed khat bundles from before t1 to after t1, this effect is not specific to the intervention group but also emerges in the control group, meaning that participants consume fewer bundles of khat after t1 compared to before. However, the decrease in bundles seems stronger in the intervention group than in the control group.

Discussion

This study's main objective was to investigate the effectiveness of an adapted SBI. We used the ASSIST-linked BI to help Ethiopian students reduce their khat use and further test the effects of induced mindsets on the outcome of the BI. First, we found a reduction in the frequency of khat use favoring the intervention group versus the control group. We observed a general decrease in consumed khat bundles in both groups after t1, which was stronger for the intervention group than the control group. Still, the effects of the BI on khat use were relatively small: In the two weeks after the intervention, the brief intervention group consumed 3.67 bundles and 1.50 days less on average, whereas the control group consumed 2.90 bundles and 0.43 days less. So, our hypotheses can only be partially confirmed. However, the results point out the positive potential of BIs, but considering the small preliminary effects, various influential factors need to be addressed. This matches recent reviews (DiClemente et al., 2017; Saitz, 2014), which not only reflect the small effect sizes of SBIs and the even smaller effects when it comes to other drugs than alcohol but also discuss possible additional factors determining the success of SBIs.

Our data reveals two relevant factors: comorbid psychopathology and change motivation. We observed psychopathological symptom load and change motivation as significant predictors of khat consumption. Khat use frequency and amount were lower among participants with fewer

mental problems and more change motivation. This aligns with results from a randomized controlled study by Widmann et al. (2017), who found the ASSIST-linked BI less effective among khat users with comorbid depression and PTSD. Perhaps due to our recruitment strategy of explicitly offering psychological advice, our sample had a surprisingly high rate of comorbid mental health problems (Hassen et al., 2021). Recalling the results from Duresso et al. (2018a), we additionally assume that many participants probably experienced severe withdrawal and craving symptoms similar to psychopathological symptoms (e.g., enhanced distress, emotional reactivity, nervousness), which could impede the khat reduction even more.

Additionally, the quantity of prior khat use could represent a further relevant aspect: There was a wide variance of consumption patterns in our sample, from occasional to heavy khat use. This, again, could have been a consequence of the recruitment strategy, as students with heavy khat use are more likely to experience adverse effects and, therefore, might be more interested in receiving psychological advice. Following the recommendations in the ASSIST's manual, BIs were neither designed for clients with low substance use nor substance dependence. Effectivity has mainly been found for clients with moderate risks with respect to substance use (Humeniuk et al., 2010). Nevertheless, other authors report that heavier khat users were more successful in maintaining abstinence than participants with lower khat use (Duresso et al., 2018b). The authors posited a possible relation between higher khat use and higher commitment to change substance consumption but pointed out the need for further research. Overall, the amount of the consumed substance seems to play a substantial role in the intervention's effectiveness, but further research is needed.

Moreover, our results showed significant reductions of khat amount in both the intervention and control groups at follow-up. One explanation could be that taking part in an intervention study, even when being in the control group, that included the assessment of one's khat use with the TLFB calendar as well as the self-report questionnaires regarding related problems could

have encouraged a reflective deliberative process about one's khat use and motivated behavior change similar to the intervention. This might have lessened the difference between intervention and control conditions. Another follow-up assessment, sometime later, may provide additional helpful answers to this question as well as investigating the sustainability of the instigated behavior change. Overall, our results show the expected effects, though to a smaller extent. The data was more favorable in the BI condition, which speaks for the potential benefits of SBIs to reduce khat use.

Concerning the influence of mindset induction on the efficacy of BI, we found no considerable effects regarding a deliberative mindset induction before the ASSIST-linked BI when compared to an implemental mindset induction. However, it is still important to discuss several implications resulting from the two mindset conditions. A deliberative mindset is associated with increased open-mindedness, less defensiveness, and less illusory optimism regarding risk perceptions (relative to an implemental mindset). Thus, in line with the hypothesis from the study of Büchele and colleagues (2020), participants in a deliberative mindset should have shown more openness and a more realistic awareness for their risk, which in turn should have led to them experiencing a more effective BI and a larger reduction of their substance use. Nevertheless, neither our nor the results from Büchele and colleagues (2020) could confirm this hypothesis, which the latter authors attributed to the decision state of the participants and referred to previous research: Nenkov and Gollwitzer (2012) found that asking participants to engage in a renewed deliberation of a decision might increase commitment when participants are already decided and lower it when participants are still undecided. In the study of Büchele and colleagues (2020), eligibility was not limited to students motivated to change alcohol use, so participants in a deliberative mindset (i.e., in a predecisional phase) could have been still undecided about their consumption. A subsequent deliberation of the pros and cons, as is also instigated during the BI, might have prolonged the decision to change. Alternatively, participants in an implemental mindset (i.e., in a postdecisional phase) might have been eager

to "jump to a decision" to reduce their alcohol consumption. The renewed deliberation increased their commitment to this path of action. Therefore, we limited the current investigation to participants interested in reducing or even ceasing their khat use. As our findings cannot confirm the results of Büchele and colleagues (2020), we assume that participants in our study might have already made the decision to change their khat use and therefore the assigned deliberation might have activated such post-decisional defensiveness (Nenkov & Gollwitzer, 2012) and enhanced their commitment. Meanwhile, some undecided participants in a deliberative mindset might have indeed been more open to the SBI, and in the end, both effects cancelled each other out.

The lack of a control condition regarding the mindset factor renders it impossible to reach a definite answer. However, some support for this possibility comes from the observation that participants with measured higher change motivation (i.e., in a postdecisional state) were more likely to exhibit lower khat use. Still, on the other hand, we found no interaction between change motivation and mindset condition. Moreover, we found surprisingly low change motivation scores despite our explicit recruitment strategy targeting people who are willing to reduce or cease their khat use. However, it is to note that there are some concerns regarding the chosen instrument for change motivation, given that the SOCRATES is situated within the framework of the transtheoretical model of change. This model has been rarely applied to the Ethiopian culture or khat consumption, and there is too few evidence for the validation of the Amharic and Afaan Oromoo adaption. Therefore, any interpretation should be made with caution.

Limitations

Due to the mentioned rising inter-ethnic violence and related political transitions before and during data collection, we had to make some short-time changes to the study design (e.g., shortening the duration of the assessment following t1), which caused some methodological

challenges. When replicating this study, a longer follow-up period would be more optimal as well as implementing a control condition where no mindset is induced.

Furthermore, we relied on self-report and did not include an objective verification of the khat use (e.g., urine analyses). Therefore, participants might have reported false khat use rates, possibly due to social desirability. Socially desirable answers could additionally have been enhanced by the missing blindness of the interviewers for the allocation between the intervention and control groups. Blindness was only ensured for the mindset conditions. Laboratory tests for khat use and blindness could have served as prevention regarding social desirability bias or recall bias.

We must take into account that the validity of the ASSIST and ASSIST-linked BI adapted for khat needs further examination. There are different arguments about whether to set the risk levels for khat comparable to alcohol, as it is culturally and socially similarly integrated, or comparable to drugs (Odenwald et al., 2010). Therefore, the adequate interpretation of khat use in the ASSIST-linked BI cannot be fully guaranteed. Our results justify the investment in further studies on a khat-version of the ASSIST-linked BI.

Conclusion

In the present study, the observed high rates of khat use and comorbid mental problems clearly showed the need for offering services to help students reduce their khat consumption. Khat use decreased in both groups but more markedly in the intervention group. Participants with less psychopathological symptoms and more change motivation reported lower khat use. Although interactions with the included mindsets did not reach significance, our findings provide an indication of the influence of the mindset in the changing process. Hence, the results provided initial support for the efficacy of an adapted BI and raised the question of whether the benefits of SBIs are specific to particular groups concerning various characteristics like psychopathology, change motivation, and mindset respectively decision state. More research

about effective interventions and the mechanisms behind them is necessary to increase the success rates for those seeking to reduce or cease khat use.

IV. Research Paper III

For Risks and Side Effects Consult Your… Patients: Development and Validation of the Form to Assess Risk Perception of Antipsychotics (FRA)

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Abstract

Background: There is a lack of understanding regarding adherence to antipsychotic medication, although antipsychotics pose a critical aspect of schizophrenia treatment. The specific assessment of perceived risks of intake and discontinuation of antipsychotics could contribute to the explanation of adherence. **Objective**: An explorative study was carried out to develop and evaluate the Fragebogen zur Risikowahrnehmung von Antipsychotika (FRA; Form to Assess Risk Perception of Antipsychotics). **Method**: Outpatients and inpatients with an F2 diagnosis were included. We conducted item selection and exploratory factor analysis to examine validity with Sample 1 (N = 120). Afterwards, convergent and discriminant validity was assessed with an online Sample 2 (N = 39). **Results**: The exploratory factor analysis revealed the theoretically expected two-factor structure. Correlations with adherence measurements and specific medication-related questionnaires supported convergent and discriminant validity. **Conclusion**: The FRA as a measure for perceived risks of antipsychotics could improve the understanding of adherence and treatment approaches. Further prospective confirmatory studies are needed.

Bei Risiken und Nebenwirkungen fragen Sie Ihre… Patientinnen und Patienten: Entwicklung und Validierung des Fragebogens zur Risikowahrnehmung von Antipsychotika (FRA)

Zusammenfassung

Theoretischer Hintergrund: Das Verständnis der Antipsychotika-Adhärenz ist lückenhaft, obwohl sie ein Grundpfeiler der Schizophrenie-Behandlung darstellt. Die spezifische Erfassung der Wahrnehmung von Risiken bei Einnahme sowie Absetzen von Antipsychotika könnte zur Erklärung der Adhärenz beitragen. **Fragestellung**: Explorative Studie zur Entwicklung und ersten Evaluierung des Fragebogens zur Risikowahrnehmung von Antipsychotika (FRA). **Methode**: Basierend auf theoretischen Überlegungen wurde ein Itempool für die Risikowahrnehmung des Absetzens und Einnehmens von Antipsychotika generiert. Eingeschlossen wurden ambulante und stationäre F2-Patient_innen. Stichprobe 1 (N = 120) diente zur Itemselektion und explorativen Faktorenanalyse (faktorielle Validität). Anhand Online-Stichprobe 2 (N = 39) wurde die diskriminante und konvergente Validität analysiert. **Ergebnisse**: Die explorative Faktorenanalyse ergab die theoretisch erwartete zweifaktorielle Struktur. Die Korrelationen des FRA zu Adhärenzmaßen und spezifischen Medikamentenfragebögen unterstützten die konvergente und diskriminante Validität. **Schlussfolgerungen**: Der FRA als Erhebungsinstrument der Wahrnehmung von Antipsychotika-Risiken könnte das Verständnis von Antipsychotika-Adhärenz und von Behandlungsansätzen verbessern. Prospektive konfirmatorische Studien müssen durchgeführt werden.

Einführung

Antipsychotika stellen in der Behandlung von Patient_innen mit Schizophrenie (SZP; ICD-10 F20) eine essenzielle Komponente dar (DGPPN e.V., 2019). Jedoch ist die Non-Adhärenzrate[1] mit 41 –50% (Lacro et al., 2002) hoch. Häufige Gründe für Non-Adhärenz bilden belastende Nebenwirkungen wie Gewichtszunahme, Sedierung, sexuelle Funktionsstörungen, Dysphorie, Schlafstörungen und extrapyramidalmotorische Störungen, außerdem ein schwaches therapeutisches Bündnis und mangelndes Ansprechen auf die Medikation (Leucht et al., 2009; Löffler et al., 2003). Non-Adhärenz ist mit einem höheren Risiko an Rückfällen und Hospitalisierung (Law et al., 2008), schlechteren Krankheitsprognosen (Ascher-Svanum et al., 2006) sowie einem höheren suizidalen Risiko (Higashi et al., 2013) assoziiert. Demzufolge sind SZP mit möglichen Risiken sowohl durch Adhärenz als auch durch Non-Adhärenz bzgl. verschriebener Antipsychotika konfrontiert, was bei vielen Betroffen mit einer Ambivalenz bzgl. dieser Medikamente verbunden ist (Samalin et al., 2016).

Die Haltung von SZP gegenüber wahrgenommenen Risiken und Vorteilen der antipsychotischen Medikation wird als entscheidender Prädiktor für Adhärenz postuliert (Kane et al., 2013). Theoretische Konzepte der Risikowahrnehmung aus der Präventionsforschung beschreiben einen positiven Zusammenhang zwischen geringer Risikowahrnehmung und der Ausübung von Risikoverhalten (z. B. Kondomnutzung; „accuracy hypothesis“) und sehen eine hohe Risikowahrnehmung als Motiv für präventives Verhalten (z. B. Impfangebot wahrnehmen; „behavior motivation hypothesis“) (Brewer et al., 2004). Klare Effekte einer höheren Risikowahrnehmung auf Präventivverhalten wurden für verschiedene Risikodomänen (z. B. Suchtmittelkonsum und Ernährung) bestätigt (Sheeran et al., 2014). Diesem Ansatz

[1] Gemäß WHO wird Adhärenz als das Ausmaß, in welchem das Verhalten einer Person mit den gesundheitlichen Empfehlungen übereinstimmt, definiert Sabaté (2003). In unserer Studie werden alle nicht mit Behandler_innen abgesprochenen Veränderungen der vereinbarten Medikation als non-adhärentes Verhalten verstanden.

zufolge sollte die individuelle Wahrnehmung von Risiken von Antipsychotika (d. h. die Wahrnehmung eines geringen Risikos der Einnahme und eines hohen Risikos des Absetzens) ein Prädiktor für die verordnungskonforme Einnahme darstellen. Bislang wurde jedoch die individuelle Risikowahrnehmung von SZP bei der Untersuchung von Adhärenz nicht angemessen berücksichtigt (Moritz et al., 2013). Entsprechende Instrumente wie der Medication Adherence Questionnaire (Morisky et al., 1986) oder die Medication Adherence Scale (Thompson et al., 2000) fokussieren auf das verschreibungskonforme Einnahmeverhalten, ob die Einnahme beispielsweise vergessen oder bei Symptomveränderung beendet wird, und vernachlässigen die subjektiv wahrgenommenen Risiken der Einnahme und des Absetzens. Der Drug Attitude Inventory (Hogan et al., 1983) und der Beliefs about Medicines Questionnaire (Horne et al., 1999) stellen hingegen neben erklärenden Faktoren wie der Krankheits- und Behandlungseinsicht die Haltung zu Medikamenten in den Fokus und bewerten dabei, ob Medikamente als notwendig wahrgenommen werden und welche Sorgen hinsichtlich der Medikation bestehen. Risiken im Zusammenhang mit der Einnahme werden in diesen Fragebögen meist zusammengefasst erfragt und dabei nicht spezifisch für Antipsychotika sondern allgemein für Medikamente. Die Forschung zur Frage, warum SZP Medikamente einnehmen oder nicht einnehmen, ist daher lückenhaft und aufgrund des wiederholt nachgewiesenen Zusammenhangs von Risikowahrnehmung und Risikoverhalten liegt es nahe, dass für ein besseres Verständnis der Einnahme von Antipsychotika Instrumente benötigt werden, welche die individuelle Risikowahrnehmung von SZP differenziert und spezifisch für Antipsychotika messen.

Vor diesem Hintergrund wurde der *Fragebogen zur Risikowahrnehmung von Antipsychotika* (FRA) in Selbst-Bericht-Format für Patient_innen mit psychotischen Störungen (der Einfachheit halber weiter mit SZP abgekürzt) entwickelt, der sowohl wahrgenommene Risiken bei Einnahme der Antipsychotika (z.B. Nebenwirkungen) als auch Risiken bei Absetzen (z. B. Rückfall) erfasst. Es wurden zwei aufeinander aufbauende explorative

querschnittliche Studien mit folgenden Zielen durchgeführt: (1) die Selektion geeigneter Items aus einem initialen Itempool und Prüfung der Faktorstruktur (Stichprobe 1) sowie (2) die initiale Validierung des neu etablierten Fragebogens (Stichprobe 2). Wir erwarten dabei signifikante Korrelationen von inhaltlich ähnlichen Konstrukten (konvergente Validität) mit der Risikowahrnehmung bzgl. des Absetzens (z. B. Medikamentenadhärenz und wahrgenommene Notwendigkeit der Medikamenteneinnahme) und bzgl. der Einnahme (z.B. Befürchtungen zur Schädlichkeit von Medikamenten) sowie Nullkorrelationen mit theoretisch nicht verwandten Konstrukten (problematischer Medikamentenkonsum und allgemeine Risikobereitschaft; diskriminante Validität). Siehe Abschnitt zur statistischen Analyse für die detaillierte Darstellung der Hypothesen.

Methoden

Stichproben und Durchführung

Für die Stichprobe 1 wurden N = 123 SZP in stationärer Behandlung im Zentrum für Psychiatrie Reichenau und in ambulant betreuten Wohngruppen kooperierender Institutionen zwischen Mai 2019 und Oktober 2021 rekrutiert. Einschlusskriterien waren die selbstberichtete Diagnose einer Störung aus dem psychotischen Spektrum, das durch die jeweilige Einrichtung bestätigte Vorliegen einer F2- Störung (ICD-10 Kapitel „Schizophrenie, schizotype und wahnhafte Störungen“) sowie die Verschreibung antipsychotischer Medikation durch behandelnde Ärzt_innen. Ausgeschlossen wurden Personen, deren akuter Zustand oder mangelnde Deutschkenntnisse der Beantwortung des Fragebogens nach Erachten der Mitarbeiter_innen der Einrichtungen entgegenstanden. Von den 123 rekrutierten Personen brach eine Person während der Teilnahme ab. Zwei Personen wurden ausgeschlossen, weil sie mehr als 50% aller Fragen nicht beantwortet hatten, womit Fragebögen von N = 120 ausgewertet werden konnten (Alter: 18 –70 Jahre, M = 37.73, SD = 12.10; 36.7% weiblich, 61.7% männlich, 1.7% divers; Schuljahre: M = 11.01, SD = 2.30). 91.7% der SZP berichteten

atypische Antipsychotika einzunehmen, 14.2% gaben typische Antipsychotika an und 5.0% konnten ein Medikament nicht benennen oder waren sich bzgl. der Art eines Medikamentes unsicher. Alle SZP wurden über Ablauf, Anonymität und Freiwilligkeit der Studie aufgeklärt und unterschrieben die Einwilligungserklärung. Fragebögen wurden im Anschluss im Paper-Pencil Format selbstständig ausgefüllt. Die Teilnahme dauerte ca. 20–40 Minuten und wurde mit einem 10-Euro Gutschein entlohnt.

Eine zweite Stichprobe von N = 95 Proband_innen wurde über Foren, Blogs, und Facebook-Gruppen von Selbsthilfegruppen, sowie über das Ex-In-Projekt und den Bundes sowie den baden-württembergischen Landesverband der Psychiatrieerfahrenen rekrutiert. Zur besseren Generalisierung der Ergebnisse sollten in der zweiten Stichprobe SZP aus anderen Settings als Stichprobe 1 befragt werden. So sollte mittels Onlinebefragung eine nicht-akut betroffene und selbstbestimmt lebende Gruppe erreicht werden. Interessierte erhielten über die Befragungssoftware Qualtrics (https://www.qualtrics.com) einen Link zur Befragung und führten diese online durch. Einschlusskriterien waren die selbstberichtete Diagnose einer Störung aus dem psychotischen Spektrum und Verschreibung von Antipsychotika. Alle Teilnehmenden wurden über Inhalt, Ablauf und Anonymität der Datenerhebung aufgeklärt und willigten ein bevor sie mit der Bearbeitung des Fragebogens beginnen konnten. Am Ende jeder Befragungsseite war eine Schaltfläche sichtbar, die angeklickt werden konnte, wenn die Befragung abgebrochen und die Einwilligung zurückgezogen werden wollte. Von 95 SZP zogen 19 ihre Einwilligung während der Studie zurück, weitere 11 wurden ausgeschlossen, da sie angaben, dass keine Psychose oder die Verschreibung von Antipsychotika vorlag, 26 SZP hatten die Befragung nicht abgeschlossen, wodurch sich letztlich eine Stichprobe von N = 39 ergab (Alter: 18 –69 Jahre, M = 44.22, SD = 11.74; 46.2% weiblich, 53.8%männlich; Schuljahre: M= 12.21, SD = 1.56; Antipsychotika: 94.9% atypisch, 7.7% typisch, 74.4% unsicher bzgl. eines oder mehrerer Medikamente). Die Online-Befragung dauerte ca. 20–40

Minuten und wurde nicht entlohnt. Die Datenerhebung erfolgte von Juli 2021 bis September 2021. Beide Studien wurden von der lokalen Ethikkommission der Universität Konstanz geprüft und genehmigt.

Instrumente

Zunächst gaben Teilnehmer_innen beider Stichproben soziodemographische Informationen wie Alter, Geschlecht und Bildungsstatus an und wurden nach den Namen ihrer aktuell verschriebenen Antipsychotika gefragt (Stichprobe 2 wurde zur Unterstützung eine Liste mit gängigen Produktnamen präsentiert).

Der Fragebogen zur Risikowahrnehmung von Antipsychotika (FRA). Ausgangspunkt der Fragebogenentwicklung war ein Pool von 40 Items, der basierend auf vorhandener Literatur (z. B. Fenton et al., 1997; Kane et al., 2013; Weiss et al., 2002) entwickelt wurde, geleitet von der Idee, mit zwei Skalen die wahrgenommenen Risiken bezogen auf (1) die Einnahme und (2) das Absetzen der verordneten Antipsychotika zu erheben. Ein Item besteht aus zwei Teilen: einem von zwei Satzanfängen, welche die Einnahme oder das Absetzen als Bezugspunkt definieren (damit wird die Skalenzugehörigkeit bestimmt) und einem von 20 Satzenden, die jeweils ein subjektives Risiko beschreiben, das mit der Einnahme oder dem Absetzen in Verbindung stehen könnte (siehe Tabelle 4 für die Items des FRA nach Itemreduktion). Durch die vollständige Kombination der beiden Satzanfänge und der 20 Satzenden entstehen 40 Items. Die Reihenfolge, in welcher Satzanfänge und -enden kombiniert und im Fragebogen präsentiert werden, wurde zufällig ermittelt. Die abgefragten Risiken wurden aus vordefinierten Risikobereichen zusammengestellt, welche in beiden Skalen repräsentiert werden sollen: Die Risikobereiche umfassen die Entwicklung psychotischer Symptome und somatischer Nebenwirkungen, aber auch Konsequenzen für die Bereiche Arbeit, Sozialleben, Finanzen und persönliche Freiheit. Der Begriff „Neuroleptika“ wurde bewusst anstatt „Antipsychotika“ verwendet, da wir im klinischen Alltag erleben, dass SZP

dieser Begriff eher geläufig ist. Jedes Item wurde auf einer 5-stufigen Likert-Skala von 1 („sehr niedrig“) bis 5 („sehr hoch“) bewertet. Pro Skala können ein Summenwert und Mittelwert aus den darunter gefassten Items berechnet werden, welche die Risikowahrnehmung für das jeweils gemessene Konstrukt quantitativ beschreiben. Zudem kann ein Differenzwert beider Skalen (Mittelwert Skala Absetzen minus Mittelwert Skala Einnahme) gebildet werden: Werden die Risiken bzgl. des Absetzens höher bewertet als die der Einnahme, fällt dieser Wert positiv aus und werden die Risiken des Absetzens niedriger bewertet als die der Einnahme, wiederum negativ.

Tabelle 4

Schwierigkeitsindizes, Trennschärfen und Faktorladungen der selektierten Items

					Faktorladung > 0.4	
Skala	**Item**	**Itemformulierung**	P_i	r_{it}	**A**	**E**
Wenn Sie Ihre Neuroleptika **absetzen,** wie hoch ist Ihr persönliches Risiko, dass...						
A	1	… psychotische Symptome (z.B. […]) stärker werden?	56.46	.57	.70	
A	2	… Sie einen Rückfall erleiden?	64.08	.64	.79	
A	3	… Sie psychotische Symptome weniger gut unter Kontrolle haben?	60.50	.64	.79	
A	4	… Sie sich schlechter konzentrieren können?	56.99	.57	.70	
A	5	… Sie wegen der Nichteinnahme von Neuroleptika in Konflikt mit Familie, Freunden oder Betreuungspersonal geraten?	53.99	.60	.70	
A	6	… Ihre sozialen Beziehungen leiden ([…])?	50.84	.65	.71	
A	7	… Sie stigmatisiert werden (z.B. […])?	52.97	.65	.72	
A	11	... Sie körperlich krank werden oder sich bestehende Krankheiten verschlimmern?	32.50	.55	.41	
A	17	… Sie Schulden machen, Rechnungen nicht bezahlen können, oder kein Geld mehr haben?	40.47	.61	.58	
A	18	… Sie nicht mehr arbeiten können (z.B. […])?	53.81	.71	.78	
A	19	… Sie in Ihrer Freiheit eingeschränkt werden (z.B. […])?	51.69	.53	.65	
A	20	... Sie Ihre Tagesstruktur verlieren ([…])?	50.85	.68	.76	

Skala	Item	Itemformulierung	P_i	r_{it}	Faktorladung > 0.4 A	Faktorladung > 0.4 E
Wenn Sie Ihre Neuroleptika **weiter einnehmen,** wie hoch ist Ihr persönliches Risiko, dass...						
E	1	… Sie Schulden machen, Rechnungen nicht bezahlen können, oder kein Geld mehr haben?	23.74	.51		.54
E	3	… Sie nicht mehr arbeiten können (z.B. […])?	32.14	.59		.60
E	4	… Sie in Ihrer Freiheit eingeschränkt werden (z.B. […])?	23.73	.47		.49
E	6	… Sie sich gedämpft oder wie in Watte eingepackt fühlen?	42.92	.54		.58
E	11	… Sie wegen der Einnahme von Neuroleptika in Konflikt mit Familie, Freunden oder Betreuungspersonal geraten?	22.25	.49		.54
E	14	… Sie psychotische Symptome weniger gut unter Kontrolle haben?	27.99	.40		.45
E	15	… Sie sich schlechter konzentrieren können?	39.41	.57		.60
E	16	… Sie sich allgemein träge oder müde fühlen?	53.42	.55		.59
E	17	… Sie an Gewicht zunehmen?	59.83	.42		.48
E	18	… Sie unter z.B. Muskelschmerzen, Zittern der Hände, Bewegungsunruhe oder Steifigkeit leiden?	45.94	.48		.58
E	19	… Sie körperlich krank werden oder sich bestehende Krankheiten verschlimmern?	34.40	.66		.73
E	20	… Sie unter Sedierung, Heißhunger oder Speichelfluss leiden?	54.27	.51		.62

Anmerkungen: Absetzen (A), Einnahme (E). Die tabellarische Anordnung der Items entspricht nicht der Reihenfolge im Fragebogen.

Folgende standardisierte Fragebögen wurden Stichprobe 2 zur Validierung des FRA in der Reihenfolge, wie sie im Folgenden dargestellt werden, vorgelegt.

Medikamentenadhärenz. Subjektive Medikamentenadhärenz wurde mittels der deutschen Übersetzung der *Medication Adherence Rating Scale* (MARS; Thompson et al., 2000) erfasst, die als ein reliables und valides Instrument zur Messung der Medikamentenadhärenz bei SZP gilt (Fialko et al., 2008). Der Fragebogen beinhaltet 10 Items, welche im Ja / Nein-Format beantwortet werden, wodurch ein Gesamt-Score errechnet wird (0 – 10; je höher desto größere Medikamentenadhärenz).

Zusätzlich zur retrospektiven Erfassung des Einnahmeverhaltens, wie es in der MARS erfragt wird, wurden Teilnehmende mittels zweier ad-hoc-Items auf einer 11-stufigen Likert-Skala von 0 („sehr unwahrscheinlich“) bis 10 („sehr wahrscheinlich“) nach der Einschätzung ihres zukünftigen Einnahmeverhaltens gefragt: „Wie wahrscheinlich ist es, dass Sie in Zukunft Ihre Neuroleptika reduzieren / ganz absetzen?“.

Einstellung gegenüber Medikamenten. Diese wurden mittels des *Beliefs about Medicines Questionnaire* (BMQ; Horne et al., 1999) ermittelt, der die kognitiven Repräsentationen von Medikamenten erfasst. Das 18-Items-Instrument umfasst zwei Bereiche: Der spezifische Bereich (*BMQ-Specific*) erfasst mit 10 Items Annahmen von Patient_innen über Medikamente, welche sie persönlich verschrieben bekommen haben, und enthält zwei Subskalen zur wahrgenommenen Notwendigkeit der Medikation (*Specific-Necessity*) sowie Befürchtungen hinsichtlich Nebenwirkungen, Langzeitfolgen und Abhängigkeit (*Specific-Concerns*). Der generelle Bereich (*BMQ-General*) misst mit acht Items die allgemeine Einstellung gegenüber Medikamenten und ist unterteilt in zwei Subskalen, Schädlichkeit (*General-Harm*) und Übermäßiger Gebrauch (*General-Overuse*). Items werden auf einer 5-stufigen Likert-Skala beantwortet, für jede Subskala wird ein Summenscore berechnet. Wir verwenden die deutsche Übersetzung von Mahler et al. (2010), welche eine gute Reliabilität (α = .79 – .83) und Validität berichten.

Symptombelastung. Zum Screening der allgemeinen psychischen Symptombelastung wurde die deutsche Kurzform der *Symptom- Checkliste* SCL-K9 (Klaghofer & Brähler, 2001) eingesetzt. Die SCL-K9 stellt ein häufig verwendetes Instrument zur validen und reliablen Erfassung der Symptomschwere dar (Petrowski et al., 2019). Der Fragebogen umfasst neun Items, welche auf einer 5-stufigen Likert-Skala von 0 („überhaupt nicht“) bis 4 („sehr stark“) verschiedene Symptombereiche abfragen, um einen Gesamtwert der psychischen Belastung zu ermitteln.

Problematischer Medikamentenkonsum. Problematischer Medikamentenkonsum in den letzten 12 Monaten wurde mit dem *Kurzfragebogen zum Medikamentenmissbrauch* (KMM; Watzl et al., 1991) erfasst. Bestehend aus 12 Items, umfasst der KMM Aussagen zu Gewohnheiten und Schwierigkeiten bezogen auf die Medikamenteneinnahme und dient als valides und reliables Screening für möglichen Medikamentenmissbrauch (Watzl et al., 1991).

Allgemeine Risikobereitschaft. Allgemeine Risikobereitschaft wurde anhand der Frage „Sind Sie im Allgemeinen ein risikobereiter Mensch oder versuchen Sie, Risiken zu vermeiden?“ aus dem deutschen Sozio-ökonomischen Panel (SOEP; Dohmen et al., 2011) gemessen, das sich als verlässlicher Prädiktor für die generelle Tendenz zu riskantem Verhalten erwiesen hatte (Frey et al., 2017). Teilnehmende bewerteten das Item auf einer Skala von 0 („gar nicht risikobereit“) bis 10 („sehr risikobereit“).

Statistische Analyse

Stichprobe 1: Item- und Faktorenanalyse. In einem ersten Schritt wurde der Itempool an Stichprobe 1 einer itemanalytischen Eignungsüberprüfung unterzogen. Die Itemselektion wurde anhand der Empfehlungen von Moosbrugger und Kelava (2020) durchgeführt und umfasste die Schwierigkeitsindizes P_i der Itemvarianzen (Ausschluss: $20 > P_i > 80$) und die Trennschärfeindizes r_{it} bezüglich der Skalen Einnahme und Absetzen (Ausschluss: $r_{it} \leq .50$). Items mit $.40 \leq r_{it} \leq .50$ wurden dann beibehalten, wenn der Risikobereich in der Skala nicht anders repräsentiert wurde und wenn dadurch eine Balance der Skalenlängen unterstützt werden konnte. Durch gleiche Skalenlängen sollte die Suggestion vermieden werden, es könnten mehr Risiken für die Einnahme als das Absetzen der Medikation bestehen. Zur Berechnung der internen Konsistenz wurde Cronbachs α verwendet.

Die Faktorenstruktur und die Anzahl der zu extrahierenden Faktoren wurde nach Ausschluss von als ungeeignet identifizierten Items explorativ mit einer Hauptachsenanalyse (Principal Factor Analysis, PFA) mit direkter obliquer Rotation (Oblimin Rotation) und unter

Verwendung des Kaiser-Guttman-Kriteriums und des Screeplots ermittelt (Field, 2018). Mittels Kaiser-Meyer-Olkin- und Bartlett-Tests wurde vorab überprüft, ob sich die Daten für eine Faktorenanalyse eignen. Die explorative Faktorenanalyse wurde der konfirmatorischen Faktorenanalyse vorgezogen, da zwar a priori theoretische Annahmen über zwei Skalen zur Risikowahrnehmung vorlagen, diese jedoch vorläufig und bislang nicht bestätigt waren.

Stichprobe 2: Konvergente und diskriminante Validierung. Anhand Stichprobe 2 wurde die konvergente und diskriminante Validität untersucht. Aufgrund inhaltlicher Ähnlichkeit der Konstrukte wurde eine hohe positive Korrelation der FRA Skala *Absetzen* mit *BMQ-Notwendigkeit*, MARS und der Einschätzung des zukünftigen Einnahmeverhaltens erwartet sowie der FRA Skala *Einnahme* mit *BMQ-Befürchtungen* und *BMQ-Schädlichkeit* und eine negative Korrelation von *Einnahme* mit MARS. Eine hohe positive Korrelation wurde ebenso zwischen der FRA Differenz und der *BMQ-Notwendigkeit*, der MARS und dem zukünftigen Einnahmeverhalten erwartet. Für die diskriminante Validität wurden theoretisch nicht verwandte Konstrukte wie der KMM und SOEP verwendet; es wurde nicht erwartet, dass die FRA Werte mit ihnen korrelieren. Zusätzlich wurden Korrelationen des FRA mit demographischen Kennwerten und der Symptombelastung explorativ untersucht.

Die Teilnehmenden erhielten alle 40 Items. Es wurden aber nur die 24 Items in die Analysen einbezogen, die anhand von Stichrobe 1 selektiert wurden. Nach der Itemreduktion fehlten insgesamt 0.94% aller Messwerte von Stichprobe 2. Pro FRA Item fehlten maximal 7.7%. Über die gesamten FRA Items hinweg fehlten 1.68% der Werte. Bezüglich der weiteren Fragebögen fehlten pro Item max. 2.6%. Die fehlenden Werte waren zufällig verteilt (MCAR-Test; Little, 1988: $\chi^2 = 131.78$ (140), $p = .678$) und wurden mit Multipler Imputation ersetzt. Berichtet werden die kombinierten Ergebnisse aus den fünf Imputationsschritten.

Aufgrund der Non-Linearität der Variablen wurde Spearman’s rho zur Abschätzung der konvergenten und diskriminanten Validität berechnet. Zusammenhänge zwischen der

Risikowahrnehmung, demographischen Angaben und Symptombelastung wurden je nach Linearität und Normalverteilung der abhängigen Variablen mittels Spearman oder Pearson bestimmt.

Alle Analysen wurden mit SPSS Version 28 durchgeführt.

Resultate

Itemanalysen

Die Itemschwierigkeiten der 40 Items (20 pro Skala) lagen im niedrigen bis hohen Bereich (P_i = 21.15 – 64.08). Darauf basierend wurden keine Items ausgeschlossen.

Bei Betrachtung der Trennschärfen zu den theoretisch konstruierten Skalen fielen 8 Items der Skala *Absetzen* und 13 Items der Skala *Einnahme* in den niedrigen Bereich ($r_{it} < .50$). Unter Berücksichtigung von Items mit $.40 \leq r_{it} \leq .50$ und inhaltlicher Abdeckung der jeweiligen Risikobereiche wurden final jeweils 8 Items der Skala *Absetzen* und der Skala *Einnahme* ausgeschlossen. Die Trennschärfen der finalen 24 Items lagen zwischen zwischen $.53 \leq r_{it} \leq .71$ (*Absetzen*) beziehungsweise zwischen $.40 \leq r_{it} \leq .66$ (*Einnahme*).

Die interne Konsistenz der Skalen *Absetzen* und *Einnahme* mit je 12 Items lag bei α = .92 respektive α = .85 und konnte durch die beschriebene Itemreduktion leicht verbessert werden (initiale 40 Items: α = .88, *Absetzen*, α = .84, *Einnahme*). Die Itemvarianz der resultierenden 24 Items lag zwischen 1.02 und 2.13.

Exploratorische Faktorenanalyse

Die Stichprobeneignung für eine Faktorenanalyse mit den verbliebenen 24 Items wurde sowohl mittels des Kaiser- Meyer-Olkin Kriteriums (KMO = .80; für alle individuelle Variablen: KMO ≥ .64) als auch durch den Bartlett- Test (χ^2 (276) = 1389.75, $p < .001$) bestätigt. Obwohl die Prüfung des Kaiser-Guttmann-Kriteriums auf das Vorliegen von sechs Faktoren mit Eigenwerten größer als 1.0 hinwies, wurde aufgrund einer möglichen Überschätzung durch

die geringe Stichprobengröße eine visuelle Inspektion des Screeplots (Elbow-Kriterium) als akkurateres Maß zur Bestimmung der Faktorenanzahl bevorzugt (Field, 2018). Dieses legte die Extraktion von zwei Faktoren nahe. Dabei zeigte sich für die Items in der PFA eine klare Struktur: Alle Items, welche theoretisch der Skala *Absetzen* zugeordnet waren, luden höher (Faktorladungen > .4) auf den ersten als auf den zweiten Faktor und alle Items der theoretisch zugeordneten Skala *Einnahme* luden höher (Faktorladungen > .4) auf den zweiten als auf den ersten Faktor. Der erste Faktor, verbunden mit der Skala *Absetzen*, erklärte 24.82% der Varianz. Der zweite Faktor, welcher die Skala *Einnahme* repräsentierte, erklärte 16.86% der Varianz. Zusammen erklärten beide Faktoren 41.67% der gesamten Varianz.

Konvergente und diskriminante Validität

Zur Überprüfung der konvergenten Validität in Stichprobe 2 wurden Korrelationen der Skalen- und Differenzwerte des FRA mit den Subskalen des BMQ sowie der MARS berechnet (siehe Tabelle 5). Wie erwartet, zeigten sich signifikante positive Korrelationen von FRA-*Einnahme* mit *BMQ-Befürchtungen* und *BMQ-Schädlichkeit* und zwischen FRA-*Absetzen* und *BMQ-Notwendigkeit*. Wir fanden keine signifikanten Zusammenhänge zwischen der MARS und den FRA Skalen. Die Einschätzung, Medikamente zukünftig zu reduzieren oder abzusetzen, korreliert signifikant negativ mit der FRA Skala *Absetzen* und dem Differenzwert. Es zeigten sich signifikant positive Korrelationen zwischen dem FRA Differenzwert mit *BMQ-Notwendigkeit* und der MARS sowie eine signifikant negative Korrelation zwischen Differenzwert und *BMQ-Schädlichkeit*.

Um die diskriminante Validität zu beurteilen, wurden Korrelationen zwischen den FRA Skalen mit dem KMM und dem SOEP-Risikoitemberechnet. Es zeigten sich keine signifikanten Assoziationen der FRA Skalen und dem Differenzwert mit dem KMM und dem SOEP-Item.

Tabelle 5

Korrelationen (Pearson oder Spearman) zwischen FRA Skalen und Differenzwert, demographischen Variablen, Psychopathologie und Messwerten zur Validität

	FRA-Einnahme			**FRA-Absetzen**			**FRA-Differenz**		
	N	***r***	***p***	**N**	***r***	***p***	**N**	***r***	***p***
FRA-Einnahme	39	1	-	39	.319	.058	39	-.432**	.006
FRA-Absetzen	39	.319	.058	39	1	-	39	.717***	<.001
Alter	39	-.362*	.027	39	.119	.479	39	.379*	.017
Geschlecht	39	.151	.371	39	.140	.399	39	.023	.894
Bildungsniveau	38	-.094	.579	38	-.096	.570	39	-.029	.866
	N	**ρ**	***p***	**N**	**ρ**	***p***	**N**	**ρ**	***p***
SCL-K9	39	.504**	.001	39	.207	.209	39	-.125	.453
BMQ-S-N	39	.161	.332	39	.591***	<.001	39	.471**	.002
BMQ-S-C	39	.408**	.010	39	.074	.664	39	-.229	.162
BMQ-G-H	39	.406**	.010	39	-.059	.726	39	-.354*	.028
BMQ-G-O	39	.083	.624	39	-.111	.511	39	-.205	.217
MARS	39	-.301	.065	39	.178	.288	39	.394*	.013
Zukünftige Reduktion	39	-.031	.853	39	-.412*	.010	39	-.396*	.012
Zukünftiges Absetzen	39	.135	.416	39	-.494**	.002	39	-.562***	<.001
KMM	38	.118	.484	38	.286	.083	38	.284	.084
SOEP	39	-.016	.929	39	.155	.357	39	.220	.185

Anmerkungen: * $p < .05$, ** $p < .01$, *** $p < .001$, N = 38-39, Zukünftige Reduktion: Einschätzung Medikamente zukünftig zu reduzieren, Zukünftiges Absetzen: Einschätzung Medikamente zukünftig abzusetzen, BMQ-S-N: Notwendigkeit, BMQ-S-C: Befürchtungen, BMQ-G-H: Schädlichkeit, BMQ-G-O: Übermäßiger Gebrauch.

Korrelation des FRA zu demographischen Variablen und Symptombelastung

Die Auswertungen der FRA Skalen in Stichprobe 2 ergaben einen Mittelwert von 2.66 (SE = 0.12) für die Skala *Einnahme* und einen Mittelwert von 3.13 (SE = 0.16) für die Skala *Absetzen*. Die Korrelation zwischen den Skalen *Einnahme* und *Absetzen* war marginal signifikant. Die Höhe der Symptombelastung (SCL-K9) korreliert signifikant positiv mit der FRA Skala *Einnahme*. Für weitere Korrelationen der FRA Skalen *Einnahme/ Absetzen* und dem Differenzwert mit den Variablen Alter, Geschlecht und Bildungsniveau sowie der Symptombelastung siehe Tabelle 5.

Diskussion

In der vorliegenden Studie wurde anhand zweier SZP Stichproben der *Fragebogen zur Risikowahrnehmung von Antipsychotika* (FRA) zur Erfassung der wahrgenommenen Risiken bei Einnahme und Absetzen von Antipsychotika entwickelt und evaluiert.

Durch eine Itemanalyse konnte der initiale Itempool des FRA von 40 auf 24 Items reduziert werden. Die Items zeigten gute Schwierigkeitskoeffizienten und Trennschärfeindizes. Item E14 der Skala *Einnahme* („…Sie psychotische Symptome weniger gut unter Kontrolle haben?“) zeigte die geringste Trennschärfe. Item A3 mit der gleichen Formulierung des Satzendes bezogen auf das Absetzen der Antipsychotika zeigte hingegen eine sehr hohe Trennschärfe. Dies könnte darauf zurückzuführen sein, dass die psychotische Symptomatik für einen kleineren Teil der SZP als positiv oder gewinnbringend erlebt wird (Moritz et al., 2009) oder die Einnahme als Auslöser der Symptome angesehen wird. Trotz geringer Trennschärfe wurde das Item E14 für die Erfassung der Wahrnehmung der psychotischen Symptomatik als relevanter Risikobereich eingeschlossen und sollte anhand einer größeren Stichprobe erneut evaluiert werden. Beide Skalen wiesen sehr gute interne Konsistenzen auf und die Varianz bestätigte eine gute Differenzierungsfähigkeit der Items.

Die explorative Faktorenanalyse unterstützt die theoretisch postulierte zweifaktorielle Struktur mit den Faktoren *Einnahme* und *Absetzen*. Die Faktorladungen der verbliebenen Items waren den jeweiligen Skalen eindeutig zuordenbar. Dies spiegelt wider, dass SZP welchen Antipsychotika verordnet wurden, in ihrer Risikowahrnehmung zwischen Einnahme und Absetzen der Medikation differenzieren und unterschiedliche Risiken erleben. Item A2 („…Sie einen Rückfall erleiden?“) und Item A3 („…Sie psychotische Symptome weniger gut unter Kontrolle haben?) wiesen die höchsten Ladungen für den Faktor Absetzen auf, wohingegen Item A11 („…Sie körperlich krank werden oder sich bestehende Krankheiten verschlimmern?“) die geringste Ladung aufwies. Demnach lässt sich die Risikowahrnehmung von SZP hinsichtlich des Absetzens der Medikation hauptsächlich von dem wahrgenommenen Risiko eines Rückfalls sowie einer erhöhten psychotischen Symptomatik ableiten und weniger von der Exazerbation körperlicher Erkrankungen. Stattdessen lud Item E19 („…Sie körperlich krank werden oder sich bestehende Krankheiten verschlimmern?“) am höchsten auf den Faktor *Einnahme*, was durch die hohe Besorgtheit hinsichtlich körperlicher Auswirkungen durch Antipsychotika (Moritz et al., 2009), welche in dieser allgemeinen Formulierung vielfältig einzuschließen sind, erklärbar scheint und auch weitere spezifischer formulierte Nebenwirkungen zeigten hohe Ladungen für diesen Faktor. Am geringsten lud Item E14 („…Sie psychotische Symptome weniger gut unter Kontrolle haben?“) auf den Faktor *Einnahme*. Dennoch scheint hierbei interessant, dass eine Verstärkung von psychotischen Symptomen auch hinsichtlich der Einnahme der Antipsychotika in die Risikowahrnehmung miteinfließt, was die subjektive Sicht der SZP sowie die Komplexität und die individuellen Differenzierungen der medikamentenbezogenen Risikowahrnehmung verdeutlicht.

Hohe Korrelationen der FRA Skala *Einnahme* mit den BMQ-Subskalen *Schädlichkeit* und *Befürchtungen* als auch der FRA Skala *Absetzen* mit *Notwendigkeit* bestätigen unsere Annahmen und weisen auf eine zufriedenstellende konvergente Validität des Instruments hin. Je höher Risiken des Absetzens wahrgenommen wurden, desto notwendiger schätzten SZP die

Medikamenteneinnahme ein. Die erwarteten Korrelationen zwischen den FRA Skalen und der MARS konnten nicht gefunden werden. Nur die Risikowahrnehmung allein bzgl. der Einnahme respektive des Absetzens der Antipsychotika gab demnach keinen Aufschluss über die Adhärenz. Interessanterweise fanden wir stattdessen eine mittlere Korrelation des FRA Differenzwertes und der MARS: Je höher die Risiken des Absetzens verglichen zu den Risiken der Einnahme eingeschätzt wurden, desto adhärenter zeigten sich die SZP. Dies deutet darauf hin, dass ein komplexerer Zusammenhang zwischen antipsychotikabezogener Risikowahrnehmung und Medikamenten-Adhärenz existieren könnte. So stellt sich die Frage, ob weniger die isolierte Betrachtung der jeweiligen Risiken (Einnahme/ Absetzen) als vielmehr das wahrgenommene Verhältnis der Risiken zueinander die mit der MARS operationalisierte Adhärenz beeinflusst. Hierzu liefern auch die Korrelationen der Angaben der SZP zu zukünftiger Antipsychotika-Einnahme interessante Aspekte: Je stärker die Risiken des Absetzens die der Einnahme überwogen (ergo positiver Differenzwert), desto unwahrscheinlicher wurde zukünftiges Absetzen/ Reduzieren von Antipsychotika eingeschätzt. Ein ähnlicher Zusammenhang wurde mit der Skala *Absetzen* gefunden, jedoch nicht mit der Skala *Einnahme*. Diese querschnittlichen Zusammenhänge zwischen höherer Risikowahrnehmung (bezogen auf das Absetzen verglichen zur Einnahme) und einem geringeren Risikoverhalten (operationalisiert mit Non-Adhärenz im Fragebogen) entsprechen der „accuracy“ Hypothese (Brewer et al., 2004); inwiefern diese auch im Sinne der „behavior motivation“ Hypothese motivierend für risikopräventives Verhalten wirken, wäre in gezielten Längsschnittstudien mit Verhaltensdaten zu überprüfen. Um besser zu verstehen, inwiefern sich das wahrgenommene Verhältnis – wie SZP die Risken bzgl. Absetzen und Einnahme miteinander „verrechnen“ – auf die Adhärenz auswirkt, sollte als nächster Schritt auch die Ermittlung des Differenzwertes optimiert werden, beispielsweise über spezifische Item-Gewichtung.

Einen unerwarteten Befund stellt die marginale positive Korrelation beider FRA Skalen dar: Eine stärkere Wahrnehmung der Einnahmerisiken ging mit einer stärkeren Wahrnehmung der Risiken bei Absetzen einher. Dies könnte dadurch erklärt werden, dass SZP sich häufig in innerer Ambivalenz gegenüber Antipsychotika befinden (Samalin et al., 2016) und Antipsychotika ebenso risikoreich wie auch risikoverringernd wahrgenommen werden. Eine andere Erklärung für dieses paradoxe Phänomen könnte sein, dass adhärente SZP mehr Antipsychotika einnehmen und dadurch mehr Nebenwirkungen erleben, wie von Linden et al. (2001) nachgewiesen. Um dieses komplexe Zusammenspiel der Risikowahrnehmung und dessen Zusammenhang mit Adhärenz genauer zu untersuchen, benötigt es weitere Studien mit größeren Fallzahlen.

Die geringen Korrelationen der FRA Skalen mit dem problematischen Medikamentenkonsum (KMM) und der allgemeinen Risikobereitschaft (SOEP) bestätigen die diskriminante Validität des FRA. Risikobereitschaft wurde hierbei mittels einer Einzelfrage erfasst, sollte aber in Nachfolgestudien als multifaktorielles Konstrukt erhoben werden. Im Einklang mit vorherigen Studienergebnissen zu Medikamentenadhärenz und soziodemographischen Variablen fanden wir keine Zusammenhänge zwischen antipsychotikabezogener Risikowahrnehmung und Geschlecht sowie Bildung (Lacro et al., 2002), dafür einen negativen Zusammenhang zwischen Alter und wahrgenommenen Risiken bei Medikamenteneinnahme (El Abdellati et al., 2020). Weiter beobachteten wir einen positiven Zusammenhang zwischen wahrgenommenen Risiken bei Medikamenteneinnahme und der aktuellen Symptombelastung. Eine Erklärung könnte die Überschneidung von Symptomen und Nebenwirkungen (z.B. Müdigkeit, Konzentrationsschwierigkeiten) darstellen, welche von SZP subjektiv schwer zu unterscheiden sind und teils fehlattribuiert werden (Kane et al., 2013). Ebenso könnte die höhere Symptombelastung der SZP mit einer stärkeren psychotischen Symptomatik, genereller Ängstlichkeit oder geringerer Krankheitseinsicht zusammenhängen.

Dieser Einfluss könnte über Zusammenhänge zwischen FRA, Positiv- und Negativsymptomatik und Krankheitseinsicht geprüft werden.

Folgende Limitationen begrenzen klare Folgerungen dieser Studie: Zum einen basierte die Messung der Adhärenz ausschließlich auf anonymen Selbstberichten. In weiterführenden Validierungsstudien muss die Adhärenz jedoch auch durch objektive biologische Parameter und klinische Fremdeinschätzung erfasst werden; dabei wären nähere Informationen zur Medikation (z. B. Dosierung, Depot) mit erhebbar. Zum anderen können aufgrund des querschnittlichen Designs keine Aussagen über dynamische Veränderungen der Risikowahrnehmung sowie kausale Zusammenhänge zu Risikoverhalten und Adhärenz getroffen werden. Daher sollten Längsschnittstudien durchgeführt werden, die auch die Bedeutung weiterer konfundierender Variablen wie Chronifizierung oder die Motivation für die Risikowahrnehmung untersuchen. Methodenkritisch ist neben der geringen Stichprobengröße anzumerken, dass die Vergleichbarkeit beider Stichproben durch die unterschiedliche Datenerhebung (Online vs. Paper-Pencil) eingeschränkt ist. Ebenso kritisch anzumerken ist, dass Stichprobe 2 der initiale Itempool anstatt den faktorenanalytisch extrahierten Items vorgelegt wurde, da die Befragung von Stichprobe 2 noch vor der Auswertung der ersten Daten begonnen hatte. Zur Bestätigung der faktoriellen Struktur und der Validität des FRA bedarf es weiterer Studien mit der finalen itemreduzierten FRA-Version, größeren und unabhängigen Stichproben. Bei der Bewertung der Ergebnisse zur konvergenten und diskriminanten Validität ist kritisch zu berücksichtigen, dass hierbei keine Korrektur des Signifikanzniveaus vorgenommen wurde.

Zusammenfassend zeigte der spezifisch für SZP entwickelte FRA in ersten Überprüfungen faktorielle, konvergente und diskriminante Validität und liefert Hinweise dafür, wie die individuelle Risikowahrnehmung in Zusammenhang mit Medikamenten-Adhärenz stehen könnte. Der FRA könnte für die Klinik die Möglichkeit bieten, basierend auf einer

standardisierten Erfassung von subjektiven Risiken bezogen auf Einnahme und Absetzen, das therapeutische Bündnis zu stärken und speziell angepasste Interventionen zum Umgang mit Risiken in die Behandlung zu integrieren.

V. General Discussion

The three research papers reported in this thesis aim to contribute to an improved comprehension of risk perception and behavior, covering three kinds of risk behaviors from samples with various characteristics. By integrating present risk theories into MAP, this thesis offers a novel approach, which may be advantageous for future interventions to reduce risk behavior and related harms. In the following, a summary of the results of the three research papers will be presented, and their implications for the interplay of MAP with risk perception and risk behavior will be discussed. The final part will conclude with future directions for risk research.

Research Paper I. The first study explored the effects of a mindset induction on the ASSIST-linked Brief Intervention focusing on risky alcohol use among university students in Germany. Contrary to our expectations, participants in the implemental condition reduced their alcohol use by an average of almost six standard drinks after the intervention, whereas participants in the deliberative mindset condition even increased their alcohol use by an average of more than seven standard drinks. These results suggest mindset induction as a strong moderator concerning the effectiveness of the ASSIST-linked Brief Intervention. Interestingly, no changes in risk perception were revealed, neither for the deliberative nor the implemental condition.

Research Paper II. In the second article, the effectiveness of the ASSIST-linked Brief Intervention adapted for khat use among Ethiopian university students was investigated. We found a decrease in the frequency of khat consumption favoring the intervention group compared to the control group. Also, we observed a general reduction in the amount of consumed khat bundles in both groups after the intervention, which was stronger for the intervention group than the control group. Further, we detected psychopathological symptom load and change motivation as significant predictors of khat consumption. Concerning the effects of the mindset induction, we could not replicate the results of Research Paper I, as we

found no considerable effects of the induction of a deliberative versus an implemental mindset on the brief intervention.

Research Paper III. The last presented article evaluated the developed questionnaire to measure risk perception of antipsychotics (FRA) among schizophrenic patients. The exploratory factor analysis revealed the theoretically expected two-factor structure with factor loadings clearly assigned either to the scale risk perception of the intake of antipsychotics or to the scale risk perception of the discontinuation of antipsychotics. Correlations with adherence measurements and medication-related questionnaires supported convergent and discriminant validity. While the two subscale scores of risk perception of intake or discontinuation respectively showed no significant correlations with medication adherence, the difference of the two scores was significantly associated with adherence, implicating that patients with higher risk perception of discontinuation compared to intake were associated with higher adherence (supporting the accuracy hypothesis (Brewer et al., 2004)) and reduced intentions of future risk behavior.

Implications

In the first place, the findings reported in the current thesis again illustrate the high rates of risk behavior among several groups and the corresponding high demand for effective help and interventions to change it. Research Papers I and II support the effectiveness of brief interventions like the ASSIST-linked Brief Intervention to change alcohol use and khat consumption. Beyond this observation, the thesis broadens prior research on risk by scrutinizing and incorporating the pre- and postdecisional mindsets into the interventional processes of changing risk perception and behavior. Given that many of the implications of the present research have already been discussed in the research papers, the focus of the following section lies on the implications for the advancement of risk dynamics in the context of MAP.

In doing so, the results of Research Paper I indicate that the induced mindset affects the interventional impact on the concerned risk behavior, here alcohol use, yielding decreased alcohol intake for participants in the implemental mindset and even increased intake for those in the deliberative mindset. The work by Nenkov and Gollwitzer (2012) might reconcile these intriguing findings: Nenkov and Gollwitzer (2012) found that the explicitly instructed deliberation of pros and cons (similar to the decisional balance part of the ASSIST-linked Brief Intervention) of a chosen goal (i.e., postdecisional phase) bolstered the goal commitment, as the deliberation fostered a focus on the pros of the selected goal and moreover led to justify the initial decision, termed *postdecisional defensiveness*. Whereas participants who had not yet made a decision concerning a specific goal (i.e., predecisional phase) were more undetermined and hesitant to commit after the assigned deliberation. In addition, the strengthened commitment following the postdecisional defensiveness can lead to an increase in planning and searching for helpful information to achieve the goal (Nenkov & Gollwitzer, 2012). It thus would have been interesting to observe whether participants in the implemental condition in Research Paper I took the offered self-help booklet with them more often after the intervention, but unfortunately, we did not capture the respective data. Another area seemingly relevant to our results is research by W. R. Miller and Rose (2015) on the effects of two clinical approaches: Motivational Interviewing and decisional balance. The authors pointed out that paying equal attention to both pros and cons of the status quo and of the potential change in a decisional balance intervention, which is often related to "exploring ambivalence" in Motivational Interviewing, appears to be contraindicated in ambivalent or rather predecisional clients. Instead of decreasing ambivalence, research shows that the decisional balance reduces commitment and behavior change, supporting the results of Nenkov & Gollwitzer (2012). Particularly addressing alcohol use disorder, Magill and colleagues (2013) compared a focus on ambivalence (which included exploring it) with a focus on commitment (which included planning steps) as two core principles of Motivational Interviewing. Contrary to their

expectations, focusing on commitment was associated with less alcohol use among all patient groups, but focusing on ambivalence was again associated with worse drinking patterns among all outpatients and predecisional patients in aftercare (precontemplation or contemplation stage). This path of explanation for the results of Research Paper I assumes that participants in the deliberative mindset condition might have either stayed ambivalent or, after openly reflecting on their alcohol use, decided to keep their status quo of alcohol use. The subsequent deliberation, as done in the brief intervention, might have prolonged the ambivalence or led to postdecisional defensiveness in the latter, which would align with the found increased resistance of participants in the deliberative condition. By contrast, participants in the implemental mindset condition might have been eager to "jump to a decision" to reduce their alcohol use, and the renewed deliberation increased their commitment to goal pursuit. Otherwise, the hypothesis could be derived that not only the cognitive features but also the decision status related to an activated mindset can translate to the subsequent task, which is unrelated to the initially evoking task. Further systematic research on this hypothesis would be beneficial.

Taken together, these findings highlight the decision status of the participants in the context of risk-related interventions: Whether the participants are pre- or postdecisional related to the addressed risk behavior just before receiving the brief intervention appears to play a crucial role in determining opposite effects of the deliberating part of the intervention on the outcomes of risk behavior. This yields some possible implications for practical applications, which need to be discussed. The common opinion suggests that the open reflection and exploration of both sides of risk behavior, the negative as well as the positive aspects, seems undesirable once the decision to change the risk behavior is made (Nenkov & Gollwitzer, 2012). Although coping functions of risk behaviors and the associated ambivalence are well-known, practitioners are often hesitant to touch on the pros of risk behavior due to the concern of unintentionally reminding clients of the benefits of the risk behavior and thus strengthening it

or even fostering resistance (W. R. Miller & Rose, 2015). For instance, asking a schizophrenic patient what bothers them about their antipsychotics or a student why they like to consume alcoholic drinks in high amounts might be viewed as second-guessing or doubting their decision to alter their behavior. However, findings from the described research and Research Paper I suggest that the counterbalanced deliberation of pros and cons of a risk behavior for individuals, who have already decided to change, could actually be used as an effective tool to reinforce the commitment to change and thus increase the probability of successful goal attainment. On the other hand, deliberating could deter commitment to change or even strengthen the risk behavior in individuals who are still indecisive respectively ambivalent about changing it. Hence, this would imply that an adaption of interventions such as the here-used ASSIST-linked Brief Intervention or the established Motivational Interviewing, which both incorporate deliberational elements, to the decision state of the client would be vital. Otherwise, the intended effects of the intervention might backfire.

Yet, the question remains: Why could the results of Research Paper I not be replicated in Research Paper II, as no significant influences from the mindset induction were found? In this regard, several differences between the two studies conducted come into consideration: Firstly, the discrepancy could rely on the apparent different investigated risk behaviors or rather substances. Although alcohol and khat share several determinants and are interrelated (Alemu et al., 2020; Kassa et al., 2016), quite a few differences exist, and khat is embedded in another culture. Amongst other cultural variations, khat is much more polarizing in Ethiopian society than alcohol in Germany (Odenwald et al., 2010). For instance, whereas khat is usually integrated into traditional rituals in the Muslim community (e.g., to increase concentration during prayer time), it is even prohibited or stigmatized in other religious communities (Haile & Lakew, 2015). Thus, the mindset-induced characteristics like open-mindedness for the deliberative mindset or partial processing of desirability-related information for the implemental mindset probably faced more extremely developed pros and cons referring to khat

compared to alcohol. Additionally, we must consider that we observed high rates of mental health problems among the khat chewing sample (Hassen et al., 2021). Moreover, based on the findings from Duresso et al. (2018a), we suspect that participants experienced serious withdrawal and craving symptoms compared to the alcohol user sample from Research Paper I. These factors might impede changing khat use and thus diminish differences between experimental conditions. Furthermore, as eligibility was limited to students with current motivation to change their khat use, participants might have begun to strive for their goal to reduce khat right after their study application. Assuming they already experienced withdrawal and craving symptoms before receiving the ASSIST-linked brief intervention, the assigned deliberation could also be part of an *action crisis*. Herrmann and Brandstätter (2015) reported that if a set goal turned out more stressful or frustrating to achieve than expected, an inner conflict triggers the redeliberation over continuing or fully disengaging from the goal. However, first, we did not control for the trigger of the deliberation; second, this would have implied worse results for the interventional condition. Therefore, another explanation points toward the decision status of the participants. Unlike the study design in Research Paper I, we determined the motivation to reduce khat use as an eligibility criterium and thus assume that the participants in Research Paper II already made the decision to change their khat consumption prior to enrollment. Hence, the assigned deliberation might activate *postdecisional defensiveness* and enhance their commitment.

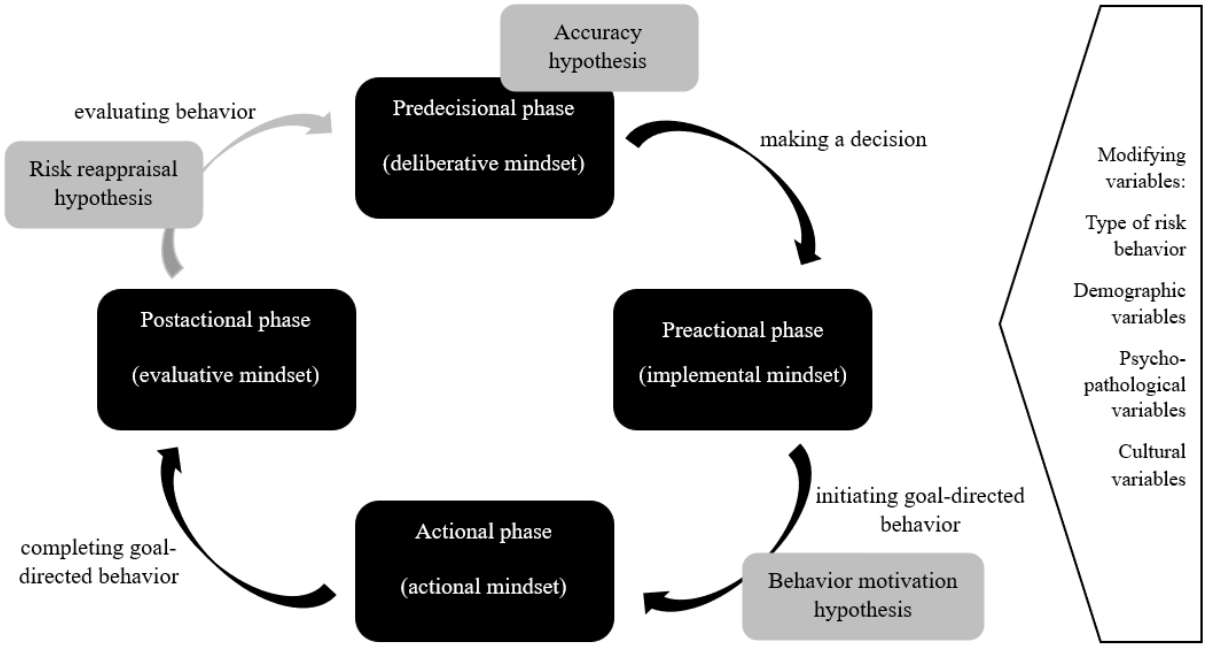
Continuing this line of thought regarding the role of the decision status for risk behavior, Research Paper III also painted a rather complex picture of the link between risk perception and risk behavior. After the development and validation of the questionnaire to assess risk perception of the intake and the discontinuation of antipsychotics (FRA), further explorational analysis revealed that the ratio of the perceived risks of these two sides of risk behavior might be more determining for the displayed risk behavior non-adherence than the isolated risk perception of only one side of the risk behavior, meaning only risk perception of intake or of

discontinuation respectively. Nevertheless, among 208 reviewed studies on risk appraisal, Sheeran and colleagues (2014) found only two studies which measured next to the perceived costs of a risk behavior also the perceived rewards of it. The authors suspected that response costs might be considered an adequate measurement of the loss of rewards for the risk behavior. Testing the described correlation between risk perception and behavior as stated in the accuracy theory, Brewer and colleagues (2004) similarly assessed the perceived risks by the cons of the risk behavior (risk behavior was, in this case, not getting the Lyme vaccine), but did not assess the perceived positive aspects of continuing the risk behavior. However, individuals cognitively differentiate between the disadvantages and advantages of a behavior when making a decision (Duran & Trafimow, 2000), which matches the findings of the factorial analysis of Research Paper III. In Motivational Interviewing, working with ambivalence and thereby with the positive and negative motivations for change is one of its long-standing key principles for enhancing intrinsic motivation (W. R. Miller & Rollnick, 2013). In sum, gaining a broader perspective by investigating both sides of risk perception could detect further essential factors for decisions regarding risk behavior. Additionally, these findings point to potential improvements of present risk theories by integrating them into MAP, as MAP deals with the pros and cons of a decision concerning the expressed behavior.

An Integrative Framework. The present thesis places risk behavior in the context of two strands of theories – MAP by Gollwitzer (1990, 2012) and the risk hypotheses by Brewer and colleagues (2004) – and discusses possible intersections. Continuing the thoughts from Research Papers I-III and referred literature, the following proposed framework, showcased in Figure 5, serves as a hypothetical approach to determine how the risk hypotheses by Brewer and colleagues (2004) could be integrated into MAP in order to advance the understanding of processes around changing risk behavior.

Figure 5

An integrated framework in the context of risk based on MAP by Gollwitzer (1990, 2012) as seen in L. Keller and colleagues (2019) on black background and the risk hypotheses by Brewer and colleagues (2004) on grey background.



As this framework should be explicitly seen in the context of risk, the goal to set and strive for consists of reducing or ceasing a perceived risk. Starting with the predecisional phase, the cognitive features of the deliberative mindset seem to facilitate the accuracy hypothesis because they are associated with a more realistic view of the behavior. In comparison, risk perception of individuals in an implemented mindset is related to unrealistic optimism (L. Keller & Gollwitzer, 2017). Not only considering one side of the coin but also incorporating the indecisive phase of deliberating the pros and cons of the respective risk behavior constitutes a feature of MAP, which the risk hypotheses are missing. More research from the perspective of MAP could clarify why the accuracy hypothesis is not always supported, or only partially, as in the results of Research Paper III.

Further research may also contribute explanations to the ambiguity of why changes in risk perception do not always translate into changes in risk behavior (Sheeran et al., 2014) against the behavior motivation hypothesis. From an integrational view, this framework states that only if a person believes the cons of a risk behavior outweigh its pros, implying the postdecisional phase of MAP, they might be motivated to change. Hence (as discussed in Research Paper I and II), the decision state is another construct of MAP advancing the risk hypotheses and could moderate the association between risk perception and risk behavior in the behavior motivation hypothesis. An example of the type of thought captured by this framework is that the perceived risk of becoming addicted to alcohol alone does not suffice to motivate a person to change their drinking behavior (behavior motivation hypothesis). A person will only be motivated to reduce their drinking if the perceived risks associated with less drinking (e.g., feeling more anxious) weigh less than the perceived pros of changing their drinking behavior (e.g., not becoming addicted).

The last phase of MAP, during which individuals evaluate whether the goal has been attained, provides a parallel to the risk reappraisal hypothesis, in which an action aimed to reduce risk is also evaluated, followed by an adaption of the respective risk perception. Reevaluations are continuously part of changing risk behavior, so it is less about looking at reducing risk behavior as a temporally limited goal than more about the maintenance or engaging in adapted intentions to reduce risk. For example, if a student decided not to consume alcohol for an evening and achieved abstinence, the successful preventive behavior would lower risk perception according to the risk reappraisal hypothesis. If someone offers this student a beer the following day, a new decision will be required. How will the student decide? Mapping the risk reappraisal hypothesis into MAP could contribute a possible answer to this scenario. For instance, a study on exercising behavior found that self-evaluation (about success or failure) in the post-actional phase of MAP constitutes a critical link to subsequent intentions (Kwan et al., 2018): Positive evaluations predicted higher exercising intentions and subsequent expressed

exercising behavior. Additionally, the evaluative mindset is associated with a switch back to rather open-minded desirability (L. Keller et al., 2019). Besides, Sheeran et al. (2014) reported that self-efficacy and response-efficacy augmented the impact of risk perception on intentions and actions. Summing up, the possibility arises that, although increased preventive behavior led to decreased risk perception (risk reappraisal hypothesis), positive self-evaluation of the effectively reduced risk behavior could augment further engagement in risk-reducing behavior, which would imply, that the student could again decide to limit alcohol intake. Considering the switch back to the predecisional phase and adding the risk reappraisal hypothesis, an adapted structure of the integrated framework for the context of risk is proposed. The action phases are initially understood as a temporal horizontal path, ending with the evaluation of an achieved goal (Gollwitzer, 1990; Heckhausen & Gollwitzer, 1987). With the purpose of integrating the risk hypotheses into MAP, the action phases are placed into a circular framework, with the feedback of the post-behavioral evaluations to the predecisional phase closing the loop.

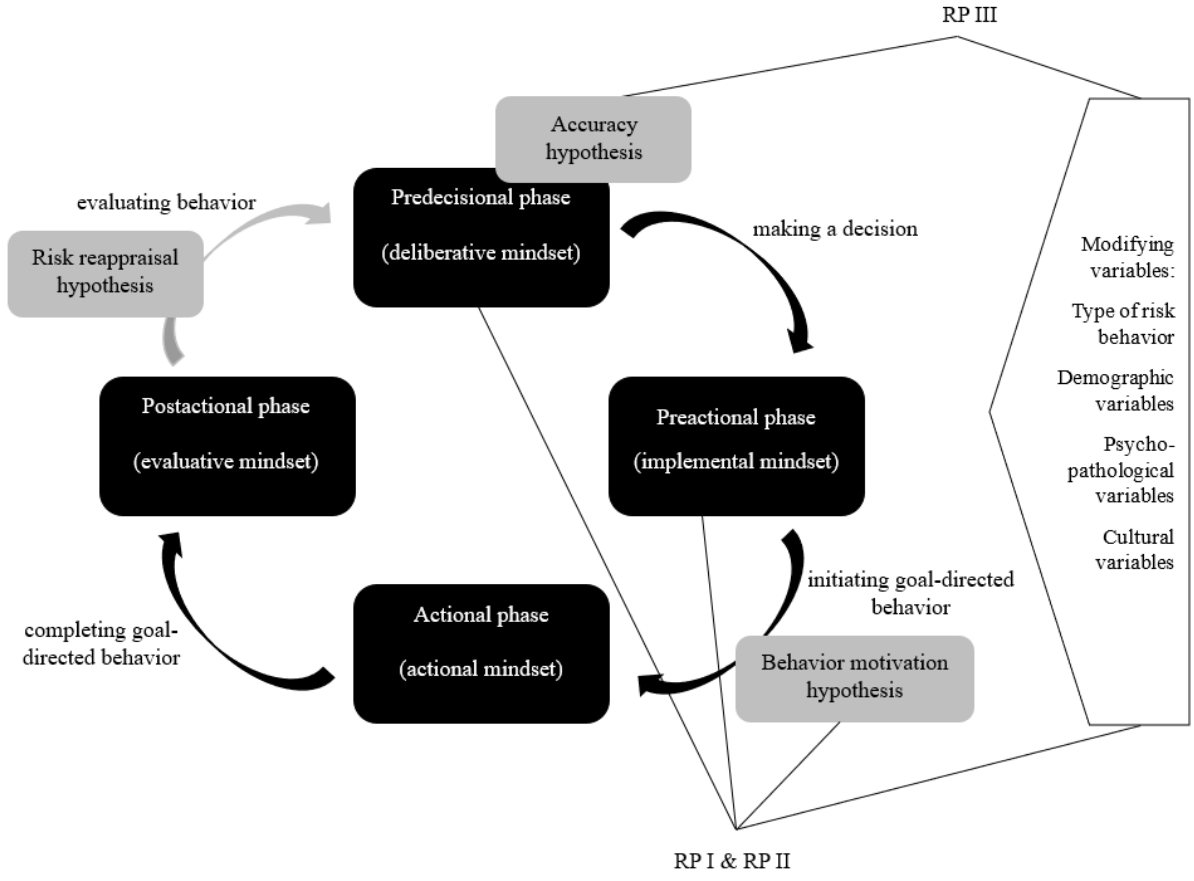
Finally, variables such as demographic, cultural, or psychopathological differences as well as the type of risk behavior are included in the framework. Some of these variables match other factors, which were detected to determine the effectiveness of brief interventions or the effects of Motivational Interviewing (DiClemente et al., 2017; Saitz, 2014). Regarding the type of risk behavior as one exemplary factor, Saitz (2014) described that risk perception differs between legal alcohol use and socially proscribed illegal drug use and thereby affects the outcome of the brief intervention. Deducted from the distinct results from Research Papers I and II, the influencing roles of these variables as well as the exploration of more factors should be further investigated.

Figure 6 is an extended version of Figure 5 by placing the Research Papers I-III into the proposed framework and showing which parts of the framework are addressed by the respective Research Paper. As a matter of course, the proposed integrational framework will require

further investigations of the suggested associations and predictions as it is hypothetically deduced from the discussions of Research Papers I-III. Nevertheless, mapping the risk hypotheses into MAP could contribute to a broader perspective of the dynamics of risk behavior and thereby advance the applications of interventions to change risk behavior, which will be discussed in the following section.

Figure 6

Overview of the proposed integrated framework showing which parts are addressed by Research Papers I-III (RP I-III)



Future Directions and Limitations

The present thesis offers a first approach to combine present risk hypotheses and related interventions with MAP. Given that the research papers provide somehow surprising findings,

several possible future directions for research on this topic could be drawn from them, and I will therefore outline the four of them which I find the most fruitful.

First, the deductions, particularly from Research Paper I, shed light on the relevance of the decision status for the effectiveness of the intervention in reducing risk behavior and thus suggest the development of adapted brief interventions, acknowledging the client's action phase. The triggering of postdecisional defensiveness could be used as an efficient tool to enhance commitment in persons who have already decided to reduce their risk behavior. Thus, regarding the application of a decisional balance part, the critical question is when to ask for the pros and cons of certain risk behavior. The findings rather advise against assigned deliberation, as instructed in the decisional balance part of the ASSIST-linked Brief Intervention, with persons who are indecisive or have decided not to reduce their risk behavior, as it could backfire. Moreover, further studies are needed to disentangle the specific effects of the separate tasks of brief interventions with regard to individual dispositions, for instance, by conducting a 3 (deliberative mindset vs. implemental mindset vs. control group) x 2 (brief intervention with vs. without decisional balance part) design. A study with such a design is currently in process.

Second, and of relevance to the first implication, the question is raised whether the inertia of the mindsets can also be used to alter the individual's decision status regarding a domain entirely unrelated to the decision problems that initially evoked them. After the first stage of mindset research, which focused on identifying the cognitive characteristics of the distinct mindsets, the second stage furthermore revealed evidence for the interventional effects of induced mindsets (e.g., Dennehy et al., 2014; L. Keller & Gollwitzer, 2017). However, the question of whether not only a cognitive feature (like open-mindedness or illusory optimism) but also the pre- or postdecisional status of the respectively induced mindset can carry over to an unrelated task is yet to be answered and merits more research. If this were the case, the

adaption of brief interventions to the decision status and, thereby, the correct identification of the decision status would be less necessary. Instead, the induction of an implemental mindset might be interventionally applied to alter the decision status and provide the precondition to the intended postdecisional defensiveness.

Third, the present thesis, especially Research Paper III, suggests taking a broader perspective on risk perception. With relevance to the results of the developed questionnaire FRA, a risk behavior can be perceived from two points of view: the perceived risks of continuing the risk behavior and the perceived risks of changing the risk behavior. For example, the decision for a COVID-19-vaccine does not only depend on the risk perception of being unvaccinated (e.g., higher risk of severe course of disease), but also on the risk perception of being vaccinated (e.g., risk of adverse effects). Further research could pay more attention to distinguishing and investigating both sides of risk perception. Nevertheless, inconclusive results regarding the variable risk perception were found in the first two Research Papers and were discussed considering multiple factors that partially differ depending on the type of risk behavior and could moreover rely on different operationalizations. At least three different risk behaviors were investigated in this thesis, yet each behavior separately. Apart from future research on risk perception factors, the behavior-specific or general applicability of models and interventions needs to be considered. Thus, investigating different risk behaviors within the same study setting could further the understanding of underlying processes and the future adaption of interventions.

Fourth and finally, the validity of the proposed integrational framework is currently limited as it requires subsequent tests for the suggested commonalities and the circular adaption. Further analyses regarding the proposed framework would also imply more attention to the actional and evaluative mindsets, which were not included in the Research Papers compared to the deliberative and the implemental mindsets. The lack of studies on the last two action phases

associated with these mindsets, respectively, emphasizes the need for more future research on the actional and evaluative mindsets. Despite these limitations, the proposed framework aims to draw attention to the potential benefits of integrating different theories and models. Many risk-related models have been explored relatively independently (Aven, 2016; Noar & Zimmerman, 2005). Instead, bringing together different views and investigating the parallels and differences represents an important direction for future research. By integrating existing models and investigating different factors in relation to each other, the understanding of the psychological processes related to risk perception might be advanced. In addition, interventional approaches could be adapted to an integrated theory in order to optimize their effectiveness.

On a side note: Integrational thinking could also bring something of value to the table that would not have occurred without it. The integration of further motivational processes could, for instance, also contribute to more insights into the paradox of why people engage in risk behavior despite the known consequences, which paves the way for a less stigmatized discussion around risk behavior. Given the amount of shame, criticism, and paternalism around the topic risk behavior (Townsend et al., 2022; van Boekel et al., 2013), a broader perspective would be preferable.

Summary and Conclusion

The present research spans three types of risk behaviors and investigates different factors in the process of changing risk behaviors from the perspective of MAP by Gollwitzer (1990, 2012) combined with the risk hypotheses by Brewer and colleagues (2004). In Research Paper I, we saw an induced implemental mindset enhancing the effectiveness of the ASSIST-linked Brief Intervention, whereas an induced deliberative mindset led to increased alcohol use after the intervention. In Research Paper II, in a sample with distinct contextual variables, we observed no differences regarding the mindset induction but found that the adapted ASSIST-

linked Brief Intervention reduced subsequent khat chewing. In Research Paper III, we developed and evaluated a valid questionnaire to measure risk perception of antipsychotics and discussed relations to non-adherence. Taken together, these results suggest that the activated cognitive characteristics of a pre- or postdecisional mindset right before a brief intervention can have meaningful consequences for the addressed risk behavior. Underlining these results, an integrative framework is proposed, combining MAP by Gollwitzer (1990, 2012) with the risk hypotheses by Brewer et al. (2004). This integrative framework serves as an approach to develop a better understanding of the relation between risk perception and changing risk behavior and sheds light on the role of the decision status regarding the effects of (deliberating) interventional techniques. Furthermore, it highlights a broader perspective on risk perception by taking the pros and cons of continuing and discontinuing a risk behavior into account. This thesis represents a point of departure for further research on the interventional effects of mindset inductions on risk behavior within the clinical practice and contributes to the idea that integrating different theories advances our understanding of changing risk behavior.

VI. References

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VII. Record of Achievement

The research papers of the present thesis were the product of the cooperation with other researchers inside and outside of the University of Konstanz. I am very thankful for the effort and knowledge of my co-authors. In the following, I will specify my contribution to each research paper.

Research Paper I (published)

Büchele, N., Keller, L., Zeller, A. C., Schrietter, F., Treiber, J., Gollwitzer, P. M., & Odenwald, M. (2020). The effects of pre-intervention mindset induction on a brief intervention to increase risk perception and reduce alcohol use among university students: A pilot randomized controlled trial. *PloS One*, *15*(9), 1-16. https://doi.org/10.1371/journal.pone.0238833

I contributed to the following:

- Study conceptualization
- Assisting in training and supervision
- Data curation and analysis
- Interpretation and theoretical refinement
- Writing original draft and revision

Research Paper II (in preparation for submission to Scientific Reports)

Büchele, N., Keller, L., Hassen, M. T., Soboka, M., Widmann, M., Rukundo-Zeller, A. C., Barnewitz, E., Yitayih, Y., Schiller, S., Senger, J., Adorjan, K., Kabengele, M. C., Odenwald, M. (in preparation). Brief intervention and mindset induction to reduce khat use among Ethiopian students – a randomized controlled trial.

I contributed to the following:

- Assisting in training
- Creating experimental materials

- Data curation and analysis
- Interpretation and theoretical refinement
- Writing original draft and revision

Research Paper III (published)

Büchele, N., Mier, D., Rockstroh, B., Viehl, K., Schiller, S., Haupt, M., Weitbrecht, M., Gegenfurtner, C., Volkland, K., & Odenwald, M. (2023). Bei Risiken und Nebenwirkungen fragen Sie Ihre… Patientinnen und Patienten. *Zeitschrift Für Klinische Psychologie Und Psychotherapie*, 1-11. https://doi.org/10.1026/1616-3443/a000697

I contributed to the following:

- Conceptualization and creation of the FRA questionnaire
- Recruitment and data collection
- Data analysis
- Interpretation and theoretical refinement
- Writing original draft and revision

VIII. Appendix

Supporting Information (Research Paper I)

Table 6

Inter-correlation of variables at baseline

	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1) AUDIT	.32**	.19*	.59**	.35**	.06	.40**	.62**	.59**	.36**	-.25**
(2) Alcohol Standard Units[1]	-	.35**	.10	-.08	-.17	-.17	.06	.24	-.07	.01
(3) DOSPERT		-	.19*	.17	-.03	.20*	.05	.29**	-.04	-.03
(4) FAR-PPV[1]			-	.62**	.29**	.54**	.65**	.69**	.44**	-.29**
(5) FAR-PV[2]				-	.31**	.38**	.34**	.46**	.26**	-.20*
(6) FAR-ARP[3]					-	.28**	.22*	.23*	.25**	-.03
(7) FAR-PE[4]						-	.48**	.47**	.27**	-.18
(8) SOC-Recognition							-	.81**	.70**	-.31**
(9) SOC-Ambivalence								-	.59**	-.31**
(10) SOC-Taking Steps									-	-.38**
(11) URICA Precontemplation										-

* $p \leq .05$. ** $p \leq .01$.
[1] Alcohol Standard Units consumed in the 28 days before intervention
[2] FAR subscale perceived personal vulnerability
[3] FAR subscale peer vulnerability
[4] FAR subscale affective risk perception
[5] FAR subscale precaution effectiveness

Further Analyses (Research Paper II)

Testing Mindset Intervention Effects. For the analysis of the probability of consuming khat on a specific day, we fitted generalized linear mixed-effects models regressing the probability to have consumed khat on whether participants were in the intervention or control group, whether they were in the implemental or deliberative mindset condition, and a time factor that encompasses whether consumption data was from before or after t1 with allowing for random variation in slopes for the latter as well as random intercepts for each participant. Moreover, we controlled for symptom load and change motivation by using the SRQ score and the score of the TS subscale of the SOCRATES, respectively. This analysis revealed main effects for symptom load, $b = 0.06$, $z = 2.41$, $p = .016$, and change motivation, $b = -0.05$, $z = -2.64$, $p = .008$, meaning that the likelihood to have consumed on a day was significantly increased for participants with higher symptom load but reduced for participants with higher change motivation. No other main effect was significant, and neither was the 3-way interaction between our experimental factors. However, the 2-way interaction between intervention and time was approaching significance in the full model, $b = -0.82$, $z = -1.70$, $p = .089$. Consistently, neither adding all three 2-way interactions nor the 3-way interaction (i.e., analyzing the full model) significantly increase explanatory power, $\chi s \leq 3.17$, $ps \geq .367$.

To keep it similar to the analyses reported in the manuscript, we moved on to analyze the control and intervention groups separately. In the control group, no significant effects emerged, all $ps \geq .194$. In the intervention group, there was a strong negative effect of time, $b = -1.15$, $z = -3.30$, $p < .001$, but no significant effect of the mindset manipulation, $b = 0.13$, $z = 0.32$, $p = .748$, or an increase in explanatory power when adding the interaction between the two, $\chi(1) = 1.28$, $p = .258$. Again, symptom load was positively related, $b = 0.06$, $z = 1.93$, $p = .053$, and change motivation negatively related, $b = -0.07$, $z = -2.89$, $p = .004$, to the likelihood of consuming khat on a given day.

For the analysis of bundles before and after the intervention, we fitted similar linear mixed-effects models regressing the number of consumed bundles on a given day on the same predictors (i.e., whether participants were in the intervention or control group, whether they were in the implemental or deliberative mindset condition, and a time factor that encompasses whether consumption data was from before or after t1 with allowing for random variation in slopes and intercepts for each participant. Again, we controlled for symptom load and change motivation. This first analysis only revealed a main effect of change motivation, $b = -0.02$, $t(268.3) = -2.50$, $p = .013$. Furthermore, symptom load, $b = 0.02$, $t(268.4) = 1.70$, $p = .090$, and time, meaning that participants consumed fewer bundles after t1 than before, $b = -0.26$, $t(267.9) = -1.89$, $p = .059$, were near the conventional levels of significance. All other main effects were not significant, $|b|$s ≤ 0.26, ps $\geq .290$, as were the comparisons between the model with only main effects and these with two-way and three-way interactions between the three factors, χs ≤ 2.09, ps $\geq .352$.

Next, we looked at the control and intervention groups separately. In the control group, we find a negative trend of time, $b = -0.26$, $t(142.7) = -1.88$, $p = .063$, but no significant effect of the mindset manipulation, $b = 0.22$, $t(141.8) = 0.98$, $p = .331$, or an increase in explanatory power when adding the interaction between the two, $\chi(1) = 0.02$, $p = .898$. Only symptom load was a significant predictor in the control group, $b = 0.03$, $t(142.0) = 2.08$, $p = .039$. In the intervention group, a stronger effect of time, $b = -0.42$, $t(124.5) = -2.58$, $p = .011$, was again accompanied by no significant effect of the mindset manipulation, $b = -0.26$, $t(126.9) = -1.06$, $p = .294$, and no significant increase in explanatory power when adding the interaction between the two, $\chi(1) = 1.96$, $p = .162$. Consistently, the interaction between the two in the full model was not significant, $b = 0.30$, $t(125.1) = 1.40$, $p = .163$. Change motivation was also a significant predictor in the full model, $b = -0.03$, $t(126.6) = -2.55$, $p = .012$. Taken together, while we find some decrease in the number of consumed khat bundles from before t1 to after t1, this effect is not specific to the intervention group but also emerges in the control group; meaning that

participants are consuming fewer bundles of khat after t1 compared to before. However, it seems that the decrease in the number of bundles is stronger in the intervention group than the control group.

Form to Assess Risk Perception of Antipsychotics (Research Paper III)

The German *Fragebogen zur Risikowahrnehmung von Antipsychotika* (FRA) and additional items (paper-pencil version):

Liebe Teilnehmerin, lieber Teilnehmer,

lesen Sie sich die Fragen in Ruhe durch und kreuzen Sie diejenige Antwort an, der Sie am ehesten zustimmen. Es gibt keine „richtigen“ oder „falschen“ Antworten, da es nur um Ihre persönliche Einschätzung geht. Lassen Sie bitte keine Fragen aus.

---

1. Angaben zur Person

1.1 Geschlecht

weiblich ☐ männlich ☐ divers ☐

1.2 Nationalität

deutsch ☐ andere ☐

1.3 Alter

_____ Jahre

1.4 Familienstand

Ledig ☐ Verheiratet ☐ Verheiratet aber getrennt lebend ☐

Verwitwet ☐ Geschieden ☐

1.5 Aktuelle Wohnsituation

Betreut ☐ Haus am Briel ☐ ZfP ☐

Nicht betreut ☐ Hilfsverein ☐ Andere ☐

1.6 Wie viele Jahre sind Sie zur Schule gegangen?
(ohne Berufsschuljahre und ohne Klassenwiederholung/en) _____ Jahre

1.7 Was ist Ihr bisher höchster erreichter Abschluss?

Haupt-/Realschule ☐ Abitur ☐ Bachelor ☐

Master ☐ Diplom ☐ Andere ☐

1.8 Krankheitsgeschichte

In welchem Jahr sind bei Ihnen zum ersten Mal psychotische Symptome aufgetreten?	In welchem Jahr haben Sie zum ersten Mal Medikamente gegen psychotische Symptome bekommen?	In welchem Jahr war Ihr erster Aufenthalt in einem psychiatrischen Krankenhaus?
_____	_____	_____

2. Aktuelle Medikation und typische Einnahme

Neuroleptika bzw. Antipsychotika sind Substanzen, die psychotische Symptome reduzieren sollen. Dabei konzentriert man sich vor allem auf motorische, kognitive und emotionale Erregung. Stimmenhören oder Halluzinationen sollen also seltener bis gar nicht auftreten. Neuroleptika können von dämpfend bis hin zu antipsychotisch wirken.

Bitte geben Sie nun an, welche Medikamente Sie aktuell einnehmen, sowie in welcher Form (Oral, Depot) und welcher Dosierung (mg/Tag) die Einnahme erfolgt.

Name der Medikamente	Oral	Depot	Menge

3. Hauptteil

Wenn Sie Ihre Neuroleptika **absetzen,** wie hoch ist Ihr persönliches Risiko, dass...

	sehr niedrig	niedrig	mittel	hoch	sehr hoch
… psychotische Symptome (z.B. Halluzinationen, Wahnvorstellungen, Stimmenhören) stärker werden?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
… Sie einen Rückfall erleiden?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
… Sie psychotische Symptome weniger gut unter Kontrolle haben?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
… Sie sich schlechter konzentrieren können?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

Wenn Sie ihre Neuroleptika **weiter einnehmen,** wie hoch ist Ihr persönliches Risiko, dass …

	sehr niedrig	niedrig	mittel	hoch	sehr hoch
… Sie Schulden machen, Rechnungen nicht bezahlen können, oder kein Geld mehr haben?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
... Sie Ihre Tagesstruktur verlieren (morgens nicht aufstehen, Termine nicht selbstständig wahrnehmen, Verpflichtungen nicht erfüllen, zu spät ins Bett gehen)?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
… Sie nicht mehr arbeiten können (z.B. in Ihrem Job, in der Reha- Werkstatt oder andere)?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
… Sie in Ihrer Freiheit eingeschränkt werden (z.B. Sie auf eine geschlossene Station verlegt werden, Zwangsmaßnahmen angewandt werden, Sie enger betreut oder überwacht werden)?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

Wenn Sie Ihre Neuroleptika **absetzen**, wie hoch ist Ihr persönliches Risiko, dass...

	sehr niedrig	niedrig	mittel	hoch	sehr hoch
… Sie wegen der Nichteinnahme von Neuroleptika in Konflikt mit Familie, Freunden oder Betreuungspersonal geraten?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
… Ihre sozialen Beziehungen leiden (z.B. sich Freunde oder Familie abwenden)?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
… Sie stigmatisiert werden (z.B. weil Sie als krank oder unkooperativ gelten)?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

Wenn Sie ihre Neuroleptika **weiter einnehmen,** wie hoch ist Ihr persönliches Risiko, dass …

	sehr niedrig	niedrig	mittel	hoch	sehr hoch
… Sie Übelkeit, Schwindel etc. erleben, wenn Sie zusammen mit Neuroleptika Drogen oder Alkohol konsumieren?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
… Sie sich gedämpft oder wie in Watte eingepackt fühlen?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
… psychotische Symptome (z.B. Stimmenhören oder Wahnvorstellungen) weniger werden?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
… positive Aspekte der Psychose wegfallen (z.B. Sie sich weniger beachtet oder gut vernetzt fühlen, Sie sich weniger besonders fühlen, Sie Langeweile oder Einsamkeit erleben, Sie Stimmen oder Witz vermissen)?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

Wenn Sie Ihre Neuroleptika **absetzen,** wie hoch ist Ihr persönliches Risiko, dass…

	sehr niedrig	niedrig	mittel	hoch	sehr hoch
… Sie unter Sedierung, Heißhunger oder Speichelfluss leiden?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
… Sie sich allgemein träge oder müde fühlen?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
… Sie an Gewicht zunehmen?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
... Sie körperlich krank werden oder sich bestehende Krankheiten verschlimmern?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
… Sie unter z.B. Muskelschmerzen, Zittern der Hände, Bewegungsunruhe oder Steifigkeit leiden?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

Wenn Sie Ihre Neuroleptika **absetzen**, wie hoch ist Ihr persönliches Risiko, dass...

	sehr niedrig	niedrig	mittel	hoch	sehr hoch
… psychotische Symptome (z.B. Stimmenhören oder Wahnvorstellungen) weniger werden?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
… Sie sich gedämpft oder wie in Watte eingepackt fühlen?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
… Sie Übelkeit, Schwindel etc. erleben, wenn Sie ohne Neuroleptika Drogen oder Alkohol konsumieren?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
…. positive Aspekte der Psychose stärker in den Vordergrund rücken (z.B. Sie sich weniger einsam fühlen, sich besser vernetzt, besonders oder mehr beachtet fühlen, Sie mehr positive Stimmen oder witzige Kommentare hören)?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

Wenn Sie ihre Neuroleptika **weiter einnehmen,** wie hoch ist Ihr persönliches Risiko, dass …

	sehr niedrig	niedrig	mittel	hoch	sehr hoch
… Sie stigmatisiert werden (z.B. weil Sie als krank oder unkooperativ gelten)?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
… Ihre sozialen Beziehungen leiden (z.B. sich Freunde oder Familie abwenden)?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
… Sie wegen der Einnahme von Neuroleptika in Konflikt mit Familie, Freunden oder Betreuungspersonal geraten?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

Wenn Sie ihre Neuroleptika **weiter einnehmen**, wie hoch ist Ihr persönliches Risiko, dass …

	sehr niedrig	niedrig	mittel	hoch	sehr hoch
… Sie einen Rückfall erleiden?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
… psychotische Symptome (z.B. Halluzinationen, Wahnvorstellungen, Stimmenhören) stärker werden?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
… Sie psychotische Symptome weniger gut unter Kontrolle haben?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
… Sie sich schlechter konzentrieren können?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

Wenn Sie Ihre Neuroleptika **absetzen,** wie hoch ist Ihr persönliches Risiko, dass...

	sehr niedrig	niedrig	mittel	hoch	sehr hoch
… Sie Schulden machen, Rechnungen nicht bezahlen können, oder kein Geld mehr haben?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
… Sie nicht mehr arbeiten können (z.B. in Ihrem Job, in der Reha-Werkstatt oder andere)?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
… Sie in Ihrer Freiheit eingeschränkt werden (z.B. Sie auf eine geschlossene Station verlegt werden, Zwangsmaßnahmen angewandt werden, Sie enger betreut oder überwacht werden)?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
... Sie Ihre Tagesstruktur verlieren (morgens nicht aufstehen, Termine nicht selbstständig wahrnehmen, Verpflichtungen nicht erfüllen, zu spät ins Bett gehen)?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

Wenn Sie ihre Neuroleptika **weiter einnehmen,** wie hoch ist Ihr persönliches Risiko, dass …

	sehr niedrig	niedrig	mittel	hoch	sehr hoch
… Sie sich allgemein träge oder müde fühlen?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
… Sie an Gewicht zunehmen?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
… Sie unter z.B. Muskelschmerzen, Zittern der Hände, Bewegungsunruhe oder Steifigkeit leiden?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
... Sie körperlich krank werden oder sich bestehende Krankheiten verschlimmern?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
… Sie unter Sedierung, Heißhunger oder Speichelfluss leiden?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

4. Typischer Umgang mit Neuroleptika

	Ja	**Nein**
Vergessen Sie manchmal Ihre Medikamente zu nehmen?	☐	☐
Gehen Sie manchmal achtlos bei der Einnahme von Medikamenten vor?	☐	☐
Hören Sie manchmal auf Medikamente zu nehmen, wenn Sie sich besser fühlen?	☐	☐
Hören Sie manchmal auf Medikamente zu nehmen, weil Sie sich nach der Einnahme schlechter fühlen?	☐	☐

5. Unterstützungsbedarf

	sehr wenig	wenig	mittel	viel	sehr viel
Wie stark benötigen Sie bezüglich Ihrer Neuroleptika normalerweise Unterstützung (z.B. durch Sozialstation, Pflegepersonal etc.)?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

6. Einnahme von Neuroleptika in der Vergangenheit

Haben Sie Ihre Neuroleptika schon einmal ...	**Nein**	**Ja, absichtlich**	**Ja, unabsichtlich**
… ohne ärztliche Absprache abgesetzt (mind. eine Woche lang nicht genommen)?	☐	☐	☐
… ohne ärztliche Absprache reduziert (mind. eine Woche lang weniger genommen als verschrieben)?	☐	☐	☐
… ohne ärztliche Absprache unregelmäßig eingenommen (mind. eine Woche fielen Zeiten oder Menge der Einnahme unregelmäßig aus)?	☐	☐	☐

7. Sozialer Druck

7.1 Haben Sie schon einmal sozialen Druck empfunden, Ihre Neuroleptika ...	**Ja**	**Nein**	**7.2** Wenn ja, durch wen wurde dieser Druck ausgeübt?	
… abzusetzen?	☐	☐	MitarbeiterInnen	☐
… zu reduzieren?	☐	☐	Freunde oder Familie	☐
… weiter einzunehmen?	☐	☐	Andere PatientInnen	☐

8. Zukünftige Einnahme von Neuroleptika

Nachdem Sie den Fragebogen durchgearbeitet haben….

… wie wahrscheinlich ist es, dass Sie in Zukunft Ihre Neuroleptika reduzieren?

Sehr unwahrscheinlich Sehr wahrscheinlich

1	2	3	4	5	6	7	8	9	10

… wie wahrscheinlich ist es, dass Sie in Zukunft Ihre Neuroleptika ganz absetzen?

Sehr unwahrscheinlich Sehr wahrscheinlich

1	2	3	4	5	6	7	8	9	10

… wie wahrscheinlich ist es, dass Sie in Zukunft Ihre Neuroleptika weiter einnehmen wie bisher?

Sehr unwahrscheinlich Sehr wahrscheinlich

1	2	3	4	5	6	7	8	9	10

… wie wahrscheinlich ist es, dass Sie in Zukunft eine Änderung der aktuell verschriebenen Neuroleptika wünschen?

Sehr unwahrscheinlich Sehr wahrscheinlich

1	2	3	4	5	6	7	8	9	10

Vielen Dank für Ihre Teilnahme!