DYSFUNKTIONALE ERWARTUNGEN BEI PERSONEN MIT DEPRESSIVER SYMPTOMATIK -

RELEVANZ, AUFRECHTERHALTUNG UND MECHANISMEN DER VERÄNDERUNG

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Tobias Kube

aus Berlin

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Erstgutachter:	Prof. Dr. Winfried Rief
Zweitgutachterin:	Prof. Dr. Julia Anna Glombiewski
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Das Rumpelstilzchen

von L. F.

[…]

Dann packt es aus sein Handwerkszeug:
„Vergleich“ und „Relativität“.
Darin ist es wahrer Meister,
wenn es in mir Zweifel sät.

„Das war auch wirklich nicht so schwer“,
sagt es mir mit bösen Zungen,
„Kein Grund, um stolz darauf zu sein“,
ist mir einmal was gelungen.

„Dass die anderen es nicht schaffen,
ist wirklich ihre Dummheit nur.
Kein Grund, um stolz darauf zu sein.“
Es grinst, verschränkt die Arme stur.

Und wenn ich mich mal freuen kann,
mich lächelnd auch zur Ruhe setze,
dann treibt es mich zur Eile an,
dass ich ja mein Glück nicht schätze.

Und hab‘ ich persönlich mich entwickelt
und sehe langsam schon das Ziel,
zuckt es mit den Schultern nur:
„Du erreichst nicht wirklich viel“.

„Für andere wär‘ das selbstverständlich,
wer bist du, dass du es nicht kannst?“
Und es freut sich diebisch,
weil es in mir Trübsal pflanzt.

[…]

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[1] Im Rahmen der vorliegenden Arbeit wurde versucht, eine geschlechtsneutrale Sprache zu verwenden, indem beispielsweise von „Patient*innen“ gesprochen wird. An Stellen, an denen dies nicht möglich war, wurde aus Gründen der besseren Lesbarkeit in der Regel die weibliche Form verwendet. Es sei jedoch ausdrücklich darauf hingewiesen, dass immer alle Geschlechter eingeschlossen sind.

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1 Zusammenfassung und Abstract

1.1 Zusammenfassung

Eine Vielzahl von Studien belegt die Bedeutung von dysfunktionalen Kognitionen für die Entstehung und Aufrechterhaltung von depressiven Störungen. Jüngste Arbeiten legen jedoch nahe, dass dysfunktionale Erwartungen eine besonders relevante Untergruppe von Kognitionen im Kontext depressiver Störungen darstellen könnten, da Erwartungen als zukunftsgerichtete Kognitionen individuelle Vorhersagen für die Zukunft darstellen und damit das zukünftige Wohlbefinden entscheidend beeinflussen könnten. Das Ziel der vorliegenden Dissertation war es daher, die Rolle von dysfunktionalen Erwartungen bei Personen mit depressiver Symptomatik genauer zu untersuchen.

Dafür wurde zunächst ein Fragebogen entwickelt, der depressions-spezifische Erwartungen mit einem hohen Maß an situativer Spezifität erfasst (Studie 1). In einer gemischten Stichprobe (N=175) zeigte dieser Fragebogen dabei gute bis sehr gute psychometrische Gütekriterien. In einer weiteren Studie mit einer klinischen Stichprobe (N=95) zeigte sich im Querschnitt, dass situations-spezifische dysfunktionale Erwartungen (SDE) ein wichtiges Bindeglied zwischen globalen Kognitionen und depressiven Symptomen darstellen, da SDE den Einfluss von globalen Kognitionen auf depressive Symptome mediierten (Studie 2). Bei Betrachtung der Längsschnittdaten einer klinischen (N=52) und einer gesunden Stichprobe (N=47) zeigte sich, dass SDE depressive Symptome zu einem späteren Zeitpunkt besser vorhersagten als globale Kognitionen (Studie 3).

Nachdem in Studien 1-3 gezeigt wurde, dass dysfunktionale Erwartungen einen wichtigen Einfluss auf depressive Symptome haben, wurde in Studien 4-6 untersucht, inwiefern sich dysfunktionale Erwartungen durch erwartungsverletzende Erfahrungen verändern lassen. Dabei wurde zunächst in einem theoretischen Modell die Hypothese formuliert, dass Personen mit depressiver Symptomatik häufig trotz korrigierender Erfahrungen an dysfunktionalen Erwartungen festhalten, indem sie erwartungsverletzende Erfahrungen im Nachhinein uminterpretieren und abwerten (sog. kognitive Immunisierung, Studie 4). Nachfolgend wurde mit Hilfe einer studentischen Stichprobe (N=102) ein experimentelles Paradigma entwickelt, mit dem die Veränderung von Erwartungen bei Personen mit depressiven Symptomen untersucht werden kann (Studie 5). In Studie 6 zeigte sich schließlich, dass Personen mit depressiver Symptomatik (N=58) tatsächlich trotz erwartungsverletzender Erfahrungen an ihren ursprünglichen Erwartungen festhielten,

während gesunde Personen (*N*=59) ihre Erwartungen in der gleichen Situation veränderten. Zusätzlich konnte in einem weiteren Teilexperiment (*N*=59) bestätigt werden, dass kognitive Immunisierung einen wichtigen Mechanismus darstellt, der der Aufrechterhaltung von Erwartungen zu Grunde liegt.

1.2 Abstract

Numerous studies have provided evidence for the crucial role of dysfunctional cognitions in major depression. However, recent research has suggested that dysfunctional expectations might be a particularly important subgroup of cognitions, because expectations refer to future events more specifically than other cognitions, and therefore expectations might be powerful predictors of future well-being. Thus, the purpose of this dissertation was to investigate the relevance of dysfunctional expectations in major depression.

First, a novel questionnaire assessing depression-specific expectations with a high level of situational specificity was developed (Study 1). Using a convenience sample (*N*=175), the questionnaire has shown good psychometric properties. Subsequently, cross-sectional data analysis using a clinical sample (*N*=95) indicated that situation-specific dysfunctional expectations (SDEs) represent an important link between global cognitions and depressive symptoms as SDEs mediated the effects of global cognitions on depressive symptoms (Study 2). Further, using longitudinal data from both a clinical (*N*=52) and a healthy sample (*N*=47) provided indications that SDEs rather than global cognitions predict later depressive symptoms (Study 3).

Since Studies 1-3 have shown that dysfunctional expectations impact depressive symptoms, Studies 4-6 examined to what degree expectations are changed through expectation-disconfirming experiences. In Study 4, a theoretical model was developed, arguing that dysfunctional expectations in major depression often persist despite disconfirming evidence, because disconfirming evidence is devaluated using cognitive immunization strategies. Subsequently, an experimental paradigm was developed in Study 5 to investigate expectation change using a student sample (*N*=102). Finally, Study 6 provided evidence for the hypothesis that people suffering from major depression (*N*=58), contrary to healthy individuals (*N*=59), tend to maintain their expectations despite expectation-disconfirming experiences. Moreover, another experiment (*N*=59) indicated

that cognitive immunization is indeed a mechanism underlying expectation persistence in depression.

2 Hintergrund

2.1 Relevanz depressiver Störungen

2.1.1. Klinisches Erscheinungsbild und Epidemiologie

Zu den Kernsymptomen depressiver Störungen zählen laut ICD-10 (Dilling, Mombour, & Schmidt, 2015) eine gedrückte, wenig auslenkbare Stimmung, Interessens- bzw. Freudverlust, sowie eine Verminderung des Antriebs. Daneben treten oft Symptome wie Gewichts- und Appetitveränderungen, Schlafstörungen, psychomotorische Agitiertheit oder Verlangsamung, Erschöpfung, Gefühle von Schuld und Wertlosigkeit, Denk- und Konzentrationsschwierigkeiten auf. Allerdings kann die spezifische Ausprägung der verschiedenen Symptome interindividuell stark variieren, sodass das klinische Erscheinungsbild insgesamt sehr heterogen ist (Hautzinger, 2013).

Unterschieden wird laut ICD-10 u.a. zwischen einer einzelnen depressiven Episode und rezidivierenden depressiven Störungen (Dilling et al., 2015). Auch im *Diagnostischen und Statistischen Manual Psychischer Störungen* (5. Aufl.; *DSM-5;* APA, 2013) wird zwischen einer einzelnen und wiederkehrenden Episode unterschieden. Daneben können auch persistierende depressive Störungen auftreten, bei denen eine gedrückte Stimmung über mehrere Jahre anhält, ohne dass die Kriterien einer depressiven Episode voll erfüllt sind (sog. Dysthymie, Dilling et al., 2015). Von unipolaren depressiven Störungen werden Bipolare Affektive Störungen unterschieden, bei denen neben depressiven Episoden auch manische bzw. hypomane Episoden erlebt werden (Dilling et al., 2015). In der vorliegenden Arbeit wird i.d.R. der Begriff *depressive Störung* verwendet, womit die Diagnosen *Depressive Episode* und *Rezidivierende Depressive Störung* eingeschlossen sind.

Die Lebenszeitprävalenz von depressiven Störungen in Europa beträgt laut einer großen bevölkerungsrepräsentativen Studie 12.8%, die 12-Monatsprävalenz depressiver Störungen wird in der Studie mit 3.9% angegeben (Alonso et al., 2004). In Deutschland wurde die 12-Monats-Prävalenz depressiver Störungen in einer großen bevölkerungsrepräsentativen Studie mit 6.0% angegeben (Jacobi et al., 2014). Damit stellen depressive Störungen nach Substanzmissbrauch und -abhängigkeit und Angststörungen die dritthäufigste psychische Störung in Deutschland dar (Jacobi et al.,

2014). Dabei zeigt sich konsistent, dass Frauen etwas häufiger betroffen sind als Männer (Alonso et al., 2004; Jacobi et al., 2014).

2.1.2. Individuelle und gesellschaftliche Folgen

Depressive Störungen sind mit erheblichen Beeinträchtigungen und Belastungen für die Betroffenen verbunden. So weisen depressive Störungen z.B. hohe Komorbiditäten mit anderen psychischen Störungen, insbesondere Angststörungen, auf (Jacobi et al., 2014; Kessler et al., 2003; Kessler et al., 2010) und verschiedene Studien legen nahe, dass psychische Komorbiditäten mit schlechteren Prognosen und einer reduzierten Lebensqualität zusammenhängen (Bair, Robinson, Katon, & Kroenke, 2003; Davis, Uezato, Newell, & Frazier, 2008; Kessler et al., 1998; Roy-Byrne et al., 2000). Daneben werden auch erhöhte Komorbiditäten mit körperlichen Erkrankungen berichtet (Kessler et al., 2010; Maske et al., 2016). Das Funktionsniveau ist bei Personen, die an depressiven Störungen leiden, oft deutlich eingeschränkt (Kessler et al., 2003; Maske et al., 2016; Wittchen & Pittrow, 2002) und die Mortalität ist erhöht (Cuijpers & Smit, 2002). Zudem sind depressive Störungen mit einem deutlich erhöhten Suizidrisiko assoziiert (Ferrari et al., 2013). Die gravierenden individuellen Folgen depressiver Störungen werden zudem verdeutlicht durch den von der Weltgesundheitsorganisation erhobenen Index *Disability Adjusted Life Years* (DALYs): Demnach sind depressive Störungen weltweit an 15. Stelle bzgl. der wichtigsten Gründe für verlorene Lebensjahre (Weltgesundheitsorganisation, 2014).

Neben diesen individuellen Belastungen und Beeinträchtigungen sind depressive Störungen auch mit erheblichen gesellschaftlichen Folgen verbunden: Beispielsweise sind depressive Störungen mit eingeschränkter Arbeitsfähigkeit und vermehrten krankheitsbedingten Fehltagen assoziiert (Kessler et al., 2003; Wittchen, Muller, Pfister, Winter, & Schmidtkunz, 1999). Ein Bericht der Bundespsychotherapeutenkammer legt zudem nahe, dass depressive Störungen im Jahr 2012 - noch vor allen körperlichen Erkrankungen - der wichtigste Grund für Frühverrentungen in Deutschland waren (Bundespsychotherapeutenkammer, 2013). Darüber hinaus führen depressive Störungen zu erhöhten Gesundheitskosten (Gustavsson et al., 2011; Salize et al., 2004).

2.2 Erklärungsmodelle depressiver Störungen

Zur Erklärung der Entstehung und Aufrechterhaltung depressiver Störungen wurden eine Vielzahl von Theorien und Modelle entwickelt und untersucht. So nehmen

beispielsweise genetische Modelle an, dass eine erblich bedingte Vulnerabilität für depressive Störungen besteht (Zalsman et al., 2006). Neurobiologische Modelle betonen die Bedeutung von dysregulierten Neurotransmittersystemen (Siever & Davis, 1985) oder dysregulierten neuronalen Netzwerken (Meyberg, 1997). Lerntheoretische Modelle diskutieren hingegen z.B. eine zu geringe Rate positiver Verstärkung (Lewinsohn, 1974) oder eine erlernte Hilflosigkeit (Miller & Seligman, 1975) als mögliche Ursachen für die Entstehung und Aufrechterhaltung depressiver Störungen. Kognitive Modelle nehmen dysfunktionale Kognitionen (A. T. Beck, 1963, 1964; A. T. Beck, Rush, Shaw, & Emery, 1979) oder ungünstige Attributionsstile (Seligman, Abramson, Semmel, & von Baeyer, 1979) als depressionsauslösende und -aufrechterhaltende Faktoren an. Inzwischen wird davon ausgegangen, dass depressive Störungen multifaktoriell bedingt sind (Hautzinger, 2010). Da jedoch das kognitive Modell der Depression nach A. T. Beck (1963, 1964) für die vorliegende Arbeit besonders wichtig ist, soll dieses Modell nachfolgend etwas genauer beschrieben werden.

2.2.1. Das kognitive Modell der Depression

Das kognitive Modell der Depression nach A. T. Beck (1963, 1964) war sehr einflussreich für die Depressionsforschung und hat die Entwicklung der kognitiven Verhaltenstherapie für depressive und andere psychische Störungen maßgeblich inspiriert (A. T. Beck & Haigh, 2014; A. T. Beck et al., 1979). Nach diesem Modell bestimmt die subjektive Wahrnehmung einer Situation - eher als die Situation selbst -, wie eine Person sich in Bezug auf diese Situation fühlt, verhält und welche körperlichen Symptome sie erlebt (A. T. Beck et al., 1979). Im Hinblick auf die Entstehung depressiver Störungen ist das zentrale Postulat dieses Modells, dass Personen mit depressiven Symptomen charakterisiert sind durch eine (negativ) verzerrte Informationsverarbeitung in Folge von dysfunktionalen Kognitionen (A. T. Beck, 1963).

Im kognitiven Modell der Depression unterscheiden A. T. Beck et al. (1979) dabei verschiedene Typen von Kognitionen. Demnach leiden Personen mit depressiver Symptomatik oft unter dysfunktionalen Grundannahmen, die zentrale Einstellungen eines Individuums über sich selbst darstellen und durch frühe Lernerfahrungen geprägt werden, z.B. „Ich bin unfähig“ (J. S. Beck, 2011). Diese Grundannahmen prägen bedingte Annahmen, die feste Leitsätze für die Lebensführung und -gestaltung eines Individuums ausmachen, z.B.: „Wenn man etwas nicht richtig und perfekt tun kann, dann hat es

überhaupt keinen Sinn, die Sache anzufangen“ (Hautzinger, Joormann, & Keller, 2005). Aus dysfunktionalen Grundannahmen und bedingten Annahmen resultieren laut A. T. Beck et al. (1979) automatische negative Gedanken, die - im Gegensatz zu den erstgenannten Konstrukten - den Betroffenen oft unmittelbar bewusst zugänglich sind und in einer konkreten Situation auftreten können, z.B.: „Das schaffe ich nicht“. Nach dem kognitiven Modell lösen diese unterschiedlichen Typen von dysfunktionalen Kognitionen die depressive Symptomatik aus, die wiederum im Sinne eines negativen Feedbackprozesses auf die Kognitionen zurückwirkt und diese weiter negativ färbt (A. T. Beck et al., 1979). Die Zusammenhänge zwischen Grundannahmen, bedingten Annahmen, automatischen Gedanken und depressiven Symptomen sind in Abbildung 1 zusammengefasst dargestellt.

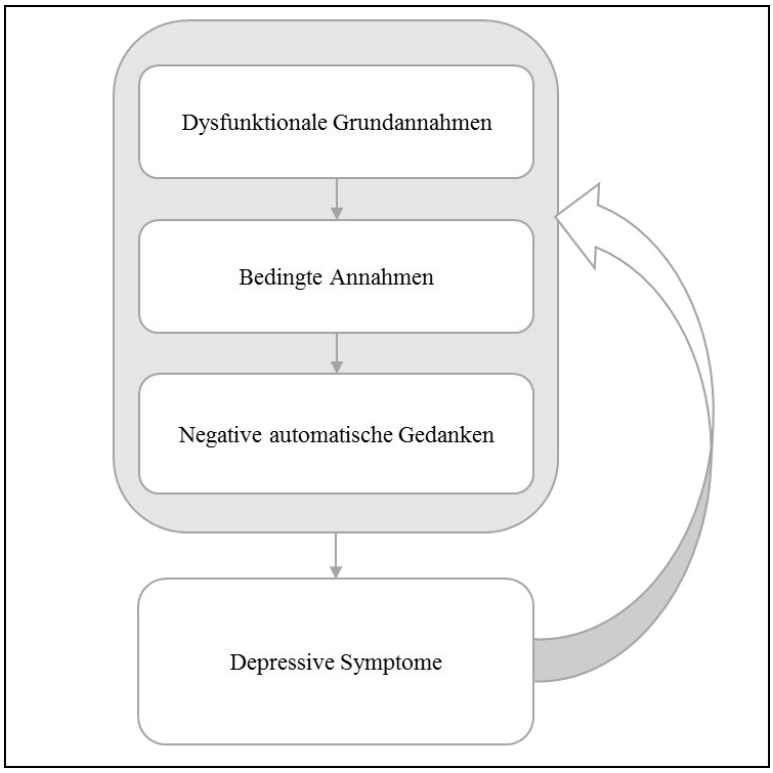

Abbildung 1: Kognitives Modell der Depression nach Beck et al. (1979)

2.3 Behandlung depressiver Störungen

Aus den oben dargestellten Überlegungen von Beck zur Rolle dysfunktionaler Kognitionen bei depressiven Störungen entwickelte sich die kognitive Verhaltenstherapie (KVT) als wichtige psychotherapeutische Behandlungsform von depressiven Störungen (A. T. Beck et al., 1979). Ein wesentliches Element der KVT stellt dabei die Modifikation

dysfunktionaler Kognitionen dar, welche laut kognitivem Modell als ursächlich für die depressive Symptomatik angesehen werden (A. T. Beck, 1964). Dabei wird versucht, die dysfunktionalen Kognitionen zu hinterfragen und alternative, hilfreiche Gedanken und Sichtweisen zu etablieren bzw. zu stärken (J. S. Beck, 2011). Ein weiteres wichtiges Element der KVT bei depressiven Störungen ist die Verhaltensaktivierung. Dabei wird versucht, dem Rückzugsverhalten der Betroffenen entgegenzuwirken und sie zu mehr Aktivität zu ermutigen, um vermehrt positive Erlebnisse und Erfahrungen zu machen, die die Stimmung aufhellen sollen (Hautzinger, 2013).

Die Wirksamkeit von KVT bei depressiven Störungen wurde in den letzten Jahrzehnten wiederholt nachgewiesen. Im Vergleich zur Pharmakotherapie zeigen kognitiv-verhaltenstherapeutische Behandlungsansätze eine geringere Wahrscheinlichkeit für ein erneutes Auftreten depressiver Symptome (Dobson et al., 2008; Hollon, Stewart, & Strunk, 2006; Vittengl, Clark, Dunn, & Jarrett, 2007). Daneben fand eine andere Studie, dass eine Kombination aus Psychotherapie und Pharmakotherapie der reinen Pharmakotherapie überlegen war (Cuijpers, Dekker, Hollon, & Andersson, 2009). Allerdings legen andere Meta-Analysen nahe, dass die Wirksamkeit psychotherapeutischer Behandlungsansätze bei depressiven Störungen in vorherigen Arbeiten möglicherweise überschätzt wurde, z.B. durch mangelhafte Qualität der berichteten Studien oder den sogenannten „Publikationsbias“ (d.h. die Tendenz, dass v.a. Studien, die signifikante Effekte nachweisen können, publiziert werden) (Cuijpers, Smit, Bohlmeijer, Hollon, & Andersson, 2010; Cuijpers, van Straten, Bohlmeijer, Hollon, & Andersson, 2010). Daneben ist zu berücksichtigen, dass die langfristige Wirksamkeit von KVT noch nicht hinreichend belegt ist und depressive Störungen durch hohe Rückfallraten gekennzeichnet sind (Judd et al., 1998; Lin et al., 1998; Pintor, Gasto, Navarro, Torres, & Fananas, 2003; Solomon et al., 2000).

Insgesamt zeigt sich also, dass die Behandlung depressiver Störungen möglicherweise noch optimiert werden kann. Im Rahmen der vorliegenden Arbeit soll untersucht werden, inwiefern störungsspezifische Erwartungen von Personen mit depressiver Symptomatik hierfür einen vielversprechenden Ansatzpunkt darstellen könnten. Daher soll die Rolle von Erwartungen bei psychischen Störungen und deren Behandlung im Folgenden einführend dargestellt werden.

2.4 Die Rolle von Erwartungen bei psychischen Störungen und deren Behandlung

2.4.1. Definitionen und Konzepte von Erwartungen

Erwartungen stellen in vielen psychologischen Subdisziplinen ein wichtiges Konstrukt dar. Laut Laferton, Kube, Salzmann, Auer, and Shedden Mora (2017) gibt es jedoch sehr unterschiedliche Definitionen und Konzepte von Erwartungen. Eine für den Gegenstand der vorliegenden Arbeit wichtige Theorie zu Erwartungen stammt von Irving Kirsch (1985, 1997). Kirsch zufolge kann unterschieden werden zwischen Erwartungen, die sich auf das Eintreten eines äußeren Ereignisses beziehen („stimulus expectancy“) und Erwartungen, die sich auf eine nicht willentlich steuerbare Reaktion des Individuums auf bestimmte Situationen beziehen („response expectancy“). Laferton et al. (2017) griffen diesen Ansatz, sowie verschiedene andere Konzeptualisierungen und Theorien, auf und schlugen eine Arbeitsdefinition von Erwartungen für den medizinisch-psychologischen Anwendungsbereich vor. Demnach werden Erwartungen als zukunftsgerichtete Kognitionen aufgefasst, die sich auf das Eintreten oder Nichteintreten von bestimmten Ereignissen oder Erfahrungen beziehen (Laferton et al., 2017). Die Autor*innen führen weiter aus, dass Erwartungen bewusst oder unbewusst vorhanden sein können. Die unterschiedlichen Konzepte und Theorien zu Erwartungen fassen Laferton et al. (2017) in einem integrativen Modell zusammen, das in Abbildung 2 schematisch dargestellt ist. Demnach können Erwartungen von Patient*innen hinsichtlich verschiedener Aspekte unterschieden werden, u.a. bzgl. des Ausmaßes an Generalisierung vs. Spezifität sowie hinsichtlich des Fokus auf eigenes Verhalten oder auf das Erhalten von Behandlungsangeboten.

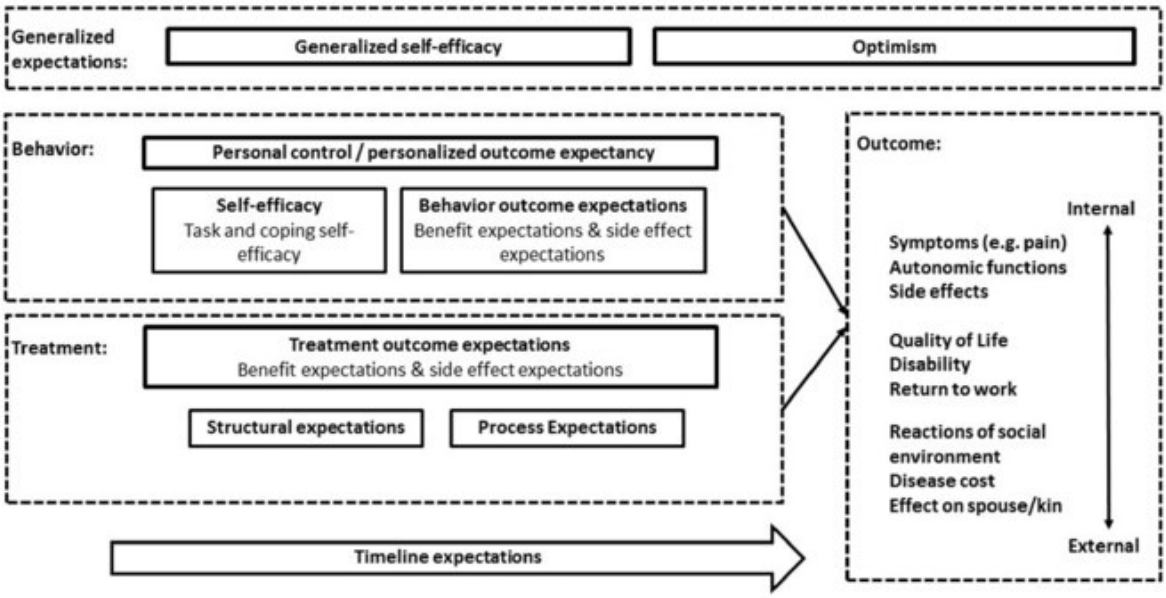

Abbildung 2: Das integrative Erwartungsmodell von Laferton et al. (2017)

2.4.2. Erwartungseffekte in der Placebo-Forschung und der Verhaltensmedizin

Die Rolle von Erwartungen bei psychischen Störungen und deren Behandlung ist in den letzten Jahren Gegenstand intensiver Forschungsbemühungen geworden (Rief & Glombiewski, 2017). Inspiriert wurde die stärkere Fokussierung auf Erwartungen in der Psychotherapieforschung durch beeindruckende Befunde aus der Placebo-Forschung: Eine Vielzahl klinischer Studien konnte substantielle Placebo-Effekte (d.h. positive Effekte eines Scheinmedikaments) bei verschiedenen pharmakologischen und medizinischen Interventionen feststellen (Benedetti, 2008) und Forschungsergebnisse legen nahe, dass Erwartungen hierbei einen zentralen Wirkmechanismus darstellen (Rief, Bingel, Schedlowski, & Enck, 2011; Rutherford et al., 2016; Schwarz, Pfister, & Buchel, 2016). Beispielsweise konnte gezeigt werden, dass die Erwartung, ein wirksames Medikament zu erhalten, zu positiven Effekten sowohl bzgl. subjektiver (d.h. von Patient*innen berichteten) Kriterien (Bingel et al., 2011; de la Cruz, Hui, Parsons, & Bruera, 2010) als auch bzgl. objektiver Maße (z.B. Immunparameter) führt (Benedetti et al., 2003; Goebel et al., 2002). Umgekehrt kann die Erwartung, unerwünschte Nebenwirkungen eines Medikaments zu erleben, dazu führen, dass tatsächlich Nebenwirkungen berichtet werden, obwohl kein Medikament, sondern ein Placebo verabreicht wurde („Nocebo-Effekt“) (Colloca & Miller, 2011).

Die besondere Rolle von Erwartungen wird zudem unterstrichen durch Studienergebnisse aus der Verhaltensmedizin. Forschungsbefunde aus diesem Bereich

zeigen, dass Erwartungen von Patient*innen mit körperlichen Erkrankungen, z.B. koronarer Herzkrankheit (Auer et al., 2016; Barefoot et al., 2011; Petrie, Weinman, Sharpe, & Buckley, 1996), Brustkrebs (Nestoriuc et al., 2016) oder Diabetes (Broadbent, Donkin, & Stroh, 2011), den Krankheitsverlauf entscheidend beeinflussen.

Besonders im Forschungsinteresse standen in den letzten Jahren Bemühungen, diese „Macht der Erwartungen“ (Rief, Hofmann, & Nestoriuc, 2008) bestmöglich zu nutzen, um den Erfolg von Behandlungsmaßnahmen zu optimieren. Dabei wird angestrebt, die Erwartungen der Patient*innen derart zu modifizieren, dass adaptive Erwartungen gefördert und maladaptive Erwartungen reduziert werden. Bzgl. der Verabreichung von Medikamenten konnte beispielsweise gezeigt werden, dass das Fördern von positiven Erwartungen an die Medikamenteneinnahme die gewünschten Effekte durch das Medikament verstärkt (Bingel et al., 2011; Schenk, Sprenger, Geuter, & Buchel, 2014). Darüber hinaus wurde in einer eigenen Arbeit dargestellt, dass die Erwartungen von Patient*innen und pharmakologische Effekte von Medikamenten nicht voneinander unabhängig sind, sondern sich wechselseitig beeinflussen und Erwartungen somit das Potential haben, die Wirkung von Medikamenten zu verstärken oder abzuschwächen (Kube & Rief, 2017). Des Weiteren konnte kürzlich nachgewiesen werden, dass die Optimierung von Erwartungseffekten auch den Behandlungserfolg von sehr schwerwiegenden medizinischen Interventionen, wie beispielsweise einer aortokoronaren Bypass-Operation, verbessern kann, indem die Patient*innen vor einer Herzoperation erwartungsoptimierende psychologische Gespräche erhalten (Rief et al., 2017). In solchen erwartungsoptimierenden Interventionen wird u.a. versucht, positive und realistische Erwartungen der Patient*innen (z.B. bzgl. des Operationsverlaufs) zu fördern und negative und unrealistische Erwartungen (z.B. bzgl. befürchteter Nebenwirkungen) zu reduzieren. In einer eigenen systematischen Übersichtsarbeit wurde das große Potential von erwartungsfokussierten psychologischen Interventionen für Patient*innen mit verschiedenen medizinischen Krankheitsbildern genauer dargestellt (Kube, Glombiewski, & Rief, in revision).

2.4.3. Erwartungen als Prädiktor für den Erfolg von Psychotherapie

Da Erwartungen einen wesentlichen Prädiktor für den Erfolg von medizinischen Behandlungen darstellen, ist es naheliegend, dass Erwartungen an eine psychotherapeutische Behandlung ähnlich bedeutsam für deren Erfolg sind. Den Einfluss

von Erwartungen auf den Erfolg von Psychotherapie hat der Psychotherapieforscher Bruce Wampold (2015) in seinem „Contextual Model“ genauer beschrieben. Demnach gebe es drei zentrale Pfade, über die Psychotherapie eine positive Wirkung entfalten könne: die „echte“ therapeutische Beziehung, Erwartungen und spezifische Elemente. Die Grundvoraussetzung für die Wirkung dieser drei Pfade sei laut Wampold (2015) eine positive initiale therapeutische Beziehung. Erwartungen der Patient*innen können laut Wampold (2015) einen positiven Wirkmechanismus darstellen, wenn es gelingt, den Patient*innen ein gutes Verständnis davon zu vermitteln, wie die Psychotherapie ihnen bei ihren Problemen helfen kann und wie sie selbst zur Überwindung ihrer Probleme beitragen können.

Tatsächlich konnten mehrere Arbeiten nachweisen, dass die Erwartungen von Patient*innen an eine Psychotherapie einen starken Einfluss auf den Behandlungserfolg haben (Constantino, Arnkoff, Glass, Ametrano, & Smith, 2011; Glass, Arnkoff, & Shapiro, 2001; Greenberg, Constantino, & Bruce, 2006; Price, Anderson, Henrich, & Rothbaum, 2008). Demnach stellen Erwartungen der Patient*innen an eine Psychotherapie einen wichtigen Prädiktor für deren Erfolg dar, sodass angestrebt werden sollte, günstige Erwartungen an die Psychotherapie zu fördern und Erwartungen, die den Therapieerfolg gefährden könnten, abzubauen.

2.4.4. Fokussierung auf Erwartungen bei psychischen Störungen

Für den Bereich der klinischen Psychologie und Psychotherapie sind jedoch nicht nur Erwartungen an eine psychotherapeutische Behandlung relevant, sondern auch Erwartungen, die aus der störungsspezifischen Symptomatik heraus resultieren. Einer aktuellen Arbeit zufolge können Erwartungen als Kernmerkmal psychischer Störungen konzeptualisiert werden und sind somit ein effektiver Ansatzpunkt psychotherapeutischer Interventionen (Rief et al., 2015). Es wurde vorgeschlagen, dass hierfür verschiedene Arten von Erwartungen der Patient*innen relevant sein könnten (Rief & Glombiewski, 2016):

- Erwartungen in Bezug auf sich selbst (z.B.: „Egal, was ich tue, ich werde versagen“)
- Erwartungen in Bezug auf andere Menschen (z.B.: „Andere Menschen werden mich verlassen, wenn sie merken, wie verletzlich und unsicher ich bin“)

- Erwartungen in Bezug auf störungsspezifische Merkmale (z.B.: „Wenn mein Herz weiter so stark schlägt, werde ich sterben“)
- Erwartungen an die Psychotherapie (z.B.: „Die Therapie wird mir helfen“).

Dem Modell von Rief und Kollegen (2015) zufolge werden Erwartungen geprägt durch vorherige Erfahrungen, soziale Einflüsse sowie interindividuelle Unterschiede. Das Modell nimmt weiterhin an, dass sich aus generalisierten Erwartungen (z.B.: „In Leistungssituationen werde ich immer versagen“) situations-spezifische Erwartungen (z.B.: „In der morgigen Mathe-Klausur werde ich versagen“) ableiten, die mit charakteristischen antizipatorischen Reaktionen einhergehen (z.B. erhöhter Herzschlag). Des Weiteren wird angenommen, dass Erwartungen nach situativen Überprüfungen verändert oder beibehalten werden können (Rief et al., 2015): Demnach verfestigen sich die Erwartungen einer Person, falls das erwartete Ereignis eintritt, während Erwartungen im Fall von erwartungsverletzenden Erfahrungen (engl.: violation of expectations = ViolEx) verändert oder aufrechterhalten werden können. Das „ViolEx“-Modell von Rief und Kollegen (2015) zur Veränderung vs. Aufrechterhaltung von Erwartungen ist in Abbildung 3 schematisch dargestellt.

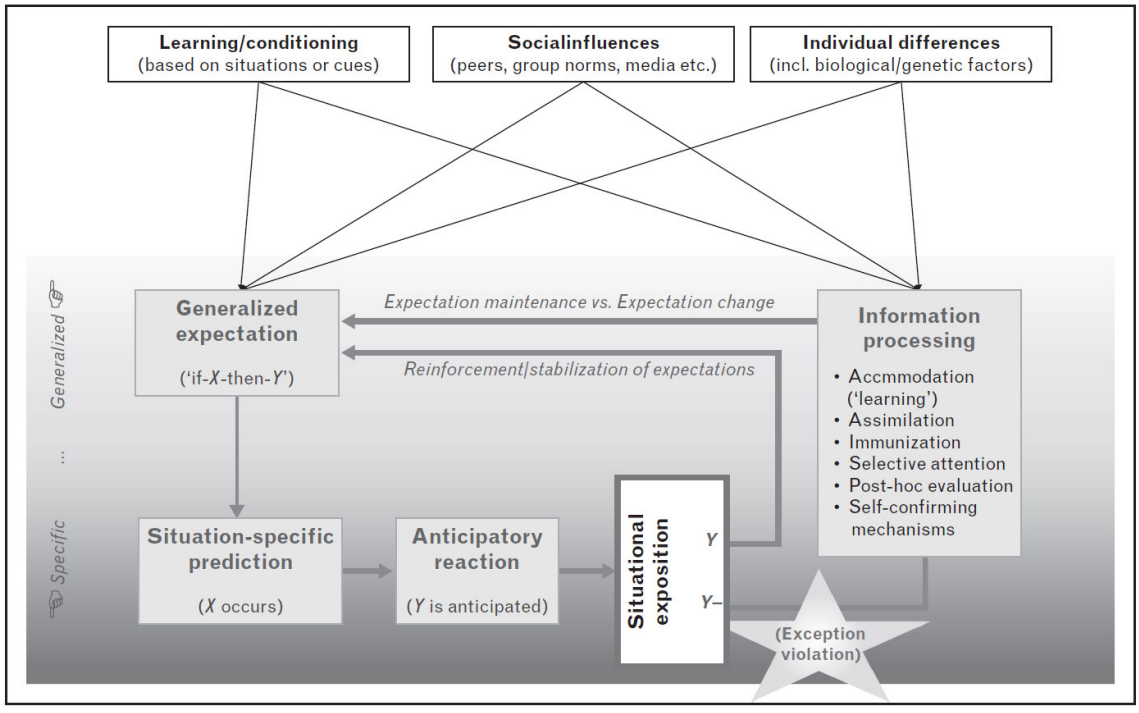

Abbildung 3: Das ViolEx-Modell von Rief und Kollegen (2015)

Das im ViolEx-Modell dargestellte Prinzip der Erwartungsverletzung ist bereits fester Bestandteil der Behandlung von Patient*innen mit Angststörungen und führte in den letzten Jahren zu einer Neukonzeption der Expositionstherapie. Laut Craske, Treanor,

Conway, Zbozinek, and Vervliet (2014) kann der langfristige Therapieerfolg von Patient*innen mit Angststörungen maximiert werden, wenn sie Erfahrungen ausgesetzt werden, die ihren Erwartungen widersprechen. Dabei wird angenommen, dass die Modifikation von Erwartungen umso stärker ausfällt, je größer die Diskrepanz zwischen erwartetem und tatsächlichem Ereignis ist. Die Autor*innen gehen davon aus, dass diese Modifikation von Erwartungen einen wichtigen Beitrag zur langfristigen Reduktion der Symptomatik leistet (Craske et al., 2014). Beispielsweise könnte eine Patientin mit Panikstörung, die die Erwartung hat: „Wenn mein Herz weiter so stark schlägt, werde ich sterben“, dazu angeleitet werden, erhöhten Herzschlag zu provozieren (z.B. durch Treppen auf und ab laufen, Luft anhalten, Hyperventilieren etc.) und ihre Erwartung so zu überprüfen. Die Erfahrung, dass sie - entgegen ihrer Erwartung - trotz erhöhten Herzschlags nicht stirbt, sollte laut Craske et al. (2014) dazu führen, dass die Paniksymptomatik der Patientin bedeutsam reduziert werden kann.

Allerdings postulieren Rief und Kollegen (2015), dass Patient*innen häufig trotz erwartungsverletzender Erfahrungen an ihren Erwartungen festhalten. Sie nehmen an, dass hierfür sogenannte Immunisierungsstrategien verantwortlich sein könnten. Als kognitive Immunisierung definieren die Autor*innen die nachträgliche Neubewertung bzw. Umdeutung einer erwartungsverletzenden Erfahrung, sodass die Diskrepanz zwischen Erwartung und Erfahrung aufgelöst und die ursprüngliche Erwartung aufrechterhalten wird. Beispielsweise könnte die oben beschriebene Patientin an ihrer Befürchtung zu sterben trotz der korrigierenden Erfahrung in der Expositionsübung weiter festhalten, indem sie denkt: „Ich bin zwar eben nicht gestorben, aber die vielen Panikattacken aus der Vergangenheit haben mein Herz nachhaltig geschädigt, sodass ich bei der nächsten Panikattacke wirklich sterben werde“. Das Konzept der kognitiven Immunisierung ist ursprünglich in der Entwicklungspsychologie eingeführt worden und wird im Kontext von Alterungsprozessen als Mechanismus verstanden, der erklärt, warum Individuen im höheren Erwachsenenalter trotz zunehmender Veränderungen und Verlusterfahrungen (z.B. Zunahme körperlicher Einschränkungen, Todesfälle im Bekanntenkreis) weiterhin ihr ursprüngliches Selbstkonzept (z.B.: „Ich bin fit und selbstbestimmt“) aufrechterhalten (Brandtstadter & Greve, 1994). Im Bereich der klinischen Psychologie wurde das Phänomen der kognitiven Immunisierung hingegen noch nicht systematisch untersucht.

3 Darstellung des Dissertationsvorhabens

3.1 Relevanz und Herleitung der Fragestellungen

Die Bedeutung von dysfunktionalen Kognitionen für depressive Störungen ist seit den Arbeiten von Beck zum kognitiven Modell der Depression (A. T. Beck et al., 1979) bekannt und vielfach untersucht worden. Inspiriert durch die Bedeutung von Erwartungen in der Placebo- und verhaltensmedizinischen Forschung wurde zuletzt jedoch diskutiert, dass Erwartungen als zukunftsgerichtete Kognitionen im Vergleich zu anderen (z.B. gegenwartsbezogenen) Kognitionen möglicherweise eine besondere Relevanz für psychische Störungen, und damit auch für depressive Störungen, haben könnten (Rief et al., 2015). Viel spezifischer als andere Kognitionen beziehen sich Erwartungen auf zukünftige Ereignisse oder Erlebnisse (Kirsch, 1985) und stellen damit auch einen wichtigen Prädiktor für das aktuelle, wie zukünftige Wohlbefinden dar. Um dieses Argument zu veranschaulichen, mag folgendes Beispiel hilfreich sein: Alle Menschen haben hin und wieder negative automatische Gedanken, wie: „Heute bin ich traurig“. Solange bei den betroffenen Personen jedoch eine Erwartung wie: „Morgen wird es mir wieder besser gehen“ vorhanden ist, dürfte das klinische Leid durch den negativen automatischen Gedanken begrenzt sein. Liegt hingegen eine zukunftsgerichtete Erwartung wie: „In Zukunft werde ich immer traurig sein“ vor, dürfte der Leidensdruck erheblich größer sein. Tritt diese negative Zukunftserwartung in Kombination mit einer hilflosigkeitsbezogenen Erwartung wie: „Wenn ich traurig bin, werde ich nichts tun können, um mich besser zu fühlen“ auf, dürfte der Leidensdruck zusätzlich steigen. Die zentrale Hypothese des Dissertationsprojekts war demnach, dass negative Zukunftserwartungen charakteristisch sind für Personen mit depressiver Symptomatik und durch Immunisierungsstrategien trotz widersprüchlicher Erfahrung aufrechterhalten werden.

Um diese Fragestellung zu untersuchen, wurde zunächst ein Fragebogen entwickelt, der situations-spezifische dysfunktionale Erwartungen (SDE) erfasst, die typisch für depressive Störungen sind (Studie 1). Nachfolgend sollte untersucht werden, wie sich SDE in das kognitive Modell der Depression (A. T. Beck et al., 1979) einordnen lassen (Studie 2) und inwiefern sie im Vergleich zu anderen Kognitionen die depressive Symptomatik zu einem späteren Zeitpunkt vorhersagen (Studie 3). Studien 4 bis 6 beschäftigten sich mit der Frage, ob dysfunktionale Erwartungen bei Personen mit depressiver Symptomatik trotz

erwartungsverletzender Erfahrungen aufrechterhalten werden und welche Mechanismen hierfür verantwortlich sein könnten. Dabei wurde in Studie 4 zunächst ein theoretisches Modell zur Veränderung von Erwartungen bei Personen mit depressiver Symptomatik entwickelt. Nachfolgend wurde mit Hilfe einer gesunden Stichprobe ein experimentelles Paradigma entwickelt, mit dem die Veränderung von Erwartungen bei depressiven Störungen untersucht werden kann (Studie 5). In Studie 6 wurde anhand zweier experimenteller Arbeiten zunächst untersucht, ob Personen, die an depressiven Störungen leiden, im Vergleich zu gesunden Kontrollprobanden trotz erwartungsverletzender Erfahrungen an ihren ursprünglichen Erwartungen festhalten (Experiment 1). In Experiment 2 wurde schließlich untersucht, ob kognitive Immunisierung einen Mechanismus darstellt, durch den Erwartungen bei Personen mit depressiver Symptomatik aufrechterhalten werden.

Nachdem im Bereich der Angststörungen bereits gezeigt werden konnte, dass durch eine stärkere Fokussierung auf die Erwartungen der Patient*innen die Behandlung optimiert werden kann (Craske et al., 2014; Salkovskis, Hackmann, Wells, Gelder, & Clark, 2007), verfolgte das Dissertationsprojekt das Ziel, ein besseres Verständnis für die Rolle von Erwartungen bei depressiven Störungen zu entwickeln und dadurch die Behandlungsangebote für Personen mit depressiver Symptomatik zu verbessern.

3.2 Fragestellungen des Dissertationsvorhabens

Basierend auf der bisherigen Forschungslage wurden dem Dissertationsvorhaben folgende Fragestellungen zu Grunde gelegt:

Studie 1: Lassen sich SDE bei depressiver Symptomatik reliabel und valide mit einem neu entwickelten Fragebogen, der Depressive Expectations Scale (DES), erfassen? Wie hängen SDE mit depressiven und mit Angstsymptomen zusammen? Welche Faktorenstruktur liegt der DES zu Grunde?

Studie 2: Wie lassen sich SDE in das kognitive Modell der Depression einordnen? Wird der Einfluss von globalen Kognitionen wie bedingten Annahmen und dispositionellem Optimismus auf depressive Symptome über SDE mediiert?

Studie 3: Was ist der langfristige Einfluss von SDE auf die depressive Symptomatik? Sagen SDE die depressive Symptomatik besser vorher als globalere Kognitionen?

Studie 4: Wie lässt sich die Veränderung von dysfunktionalen Erwartungen bei Personen mit depressiver Symptomatik theoretisch beschreiben und begründen? Über welche Mechanismen könnten Erwartungen trotz erwartungsverletzender Erfahrungen aufrechterhalten werden?

Studie 5: Lässt sich mit einem neu entwickelten experimentellen Paradigma eine Veränderung von Leistungserwartungen bei gesunden Probanden herbeiführen, wenn die Probanden erwartungsverletzende positive Leistungsrückmeldungen erhalten? Bleiben die Erwartungen hingegen bei erwartungsbestätigendem Leistungsfeedback stabil?

Studie 6: Halten Personen, die an depressiven Störungen leiden, im Vergleich zu gesunden Probanden auch nach erwartungsverletzendem positivem Feedback an ungünstigen Leistungserwartungen fest? Ist kognitive Immunisierung ein Mechanismus, der die Erwartungspersistenz bei Personen mit depressiver Symptomatik erklärt?

4 Zusammenfassung der Studien

4.1 Studie 1: Entwicklung eines Fragebogens zur Erfassung von depressions-spezifischen Erwartungen

Zitation: Kube, T., D'Astolfo, L., Glombiewski, J. A., Doering, B. K., & Rief, W. (2017). Focusing on situation-specific expectations in major depression as basis for behavioural experiments–Development of the Depressive Expectations Scale. *Psychology and Psychotherapy: Theory, Research and Practice, 90*(3), 336-352. doi: 10.1111/papt.12114

Hintergrund: Es wird angenommen, dass dysfunktionale Erwartungen Kernmerkmale psychischer Störungen darstellen. Bei Angststörungen wurden dysfunktionale Erwartungen bereits gut untersucht und als Ansatzpunkt für die Optimierung der Behandlung identifiziert. Bei depressiven Störungen wurden dysfunktionale Erwartungen bisher dagegen weniger systematisch untersucht. Das Ziel der Studie bestand daher darin, einen neuen Fragebogen zu entwickeln, der SDE bei depressiver Symptomatik untersucht, die Depressive Expectations Scale (DES). Dabei wurde angestrebt, solche Items zu formulieren, die eindeutig überprüfbare und durch Verhaltensexperimente widerlegbare Erwartungen erfassen. Es wurde angenommen, dass der Summenwert der DES stark mit dem Ausmaß depressiver Symptome und weniger stark mit dem Vorhandensein von Angstsymptomen korreliert.

Methode: Für die Entwicklung der DES wurde zunächst ein großer Itempool mit 75 Items generiert. Diese 75-Item Version der DES wurde zusammen mit den Modulen des Patient Health Questionnaire für Depression (PHQ-9) und Angst (GAD-7) von 175 Personen in einer Onlinebefragung bearbeitet. Um Personen mit depressiver Symptomatik für die Studienteilnahme zu gewinnen, wurde die Umfrage u.a. durch Selbsthilfegruppen für Personen mit depressiver Symptomatik beworben. Anhand von Itemanalysen wurden aus der ursprünglichen Version der DES die 25 besten Items ausgewählt. Nachfolgend wurden die psychometrischen Gütekriterien der 25-Item Version der DES bestimmt und es wurde eine exploratorische Faktorenanalyse zu Untersuchung der Faktorenstruktur durchgeführt.

Ergebnisse: Reliabilitätsanalysen wiesen eine exzellente Reliabilität der DES mit α=.93 aus. Der Summenwert der DES korrelierte stark mit der Schwere depressiver

Symptome (r=.754; p<.001). Der Summenwert der DES korrelierte ebenfalls stark mit dem Ausmaß von Angstsymptomen (r=.647; p<.001). Die exploratorische Faktorenanalyse ergab vier Faktoren, die der DES zu Grunde lagen: Erwartungen in Bezug auf soziale Zurückweisung, soziale Unterstützung, den Umgang mit negativen Gefühlen sowie den Umgang mit Leistungssituationen.

Diskussion: Die DES wies insgesamt gute bis sehr gute psychometrische Gütekriterien auf und scheint daher geeignet zu sein, um SDE bei depressiver Symptomatik zu erfassen. Die Items wurden so formuliert, dass sie leicht überprüfbar und falsifizierbar sind. Daher könnte sich eine strukturierte Erfassung von SDE bei Personen mit depressiver Symptomatik eignen, um eine Basis für die Planung von Verhaltensexperimenten im Therapieverlauf zu schaffen. Erwartungen, denen die betroffene Person besonders stark zustimmt, könnten so durch praktische Erfahrungen überprüft werden und damit die kognitive Umstrukturierung erleichtern.

4.2 Studie 2: Einordnung von Erwartungen in das kognitive Modell der Depression

Zitation: Kube, T., Siebers, V. H. A., Herzog, P., Glombiewski, J. A., Doering, B. K., & Rief, W. (in revision). Integrating situation-specific dysfunctional expectations and dispositional optimism into the cognitive model of depression - A path-analytic approach. *Journal of Affective Disorders*.

Hintergrund: Dysfunktionale Erwartungen spielen eine wichtige Rolle bei verschiedenen psychischen Störungen. Für depressive Störungen nimmt das kognitive Modell der Depression an, dass negative Zukunftserwartungen als ein Aspekt der sogenannten kognitiven Triade (negative Sicht auf sich selbst, die Umwelt und die Zukunft) ein wichtiger Faktor für die Entstehung und Aufrechterhaltung von depressiven Symptomen sind. Bisher wurde jedoch kein spezifisches Modell entwickelt und empirisch getestet, das den Zusammenhang zwischen Erwartungen, anderen kognitiven Variablen und depressiven Symptomen beschreibt. Das Ziel der Studie war es daher, zwei wichtige Formen von Erwartungen, SDE und dispositionellen Optimismus, in das kognitive Modell der Depression zu integrieren. Dabei wurde die Hypothese getestet, dass der Einfluss von bedingten Annahmen und dispositionellem Optimismus als globale Kognitionen auf depressive Symptome über SDE mediiert wird.

Methode: Es wurden 95 Personen untersucht, die an einer diagnostizierten depressiven Störung litten. Zum Zeitpunkt der Studienteilnahme hatten die Patient*innen gerade eine Behandlung in einer Psychotherapie-Ambulanz (N=24), einer psychosomatischen Akutklinik (N=53) oder einer psychiatrischen Akutklinik (N=18) begonnen. Die Proband*innen füllten im Rahmen der Studie u.a. die DES zur Erfassung von SDE, die Skala dysfunktionaler Einstellungen zur Erfassung von bedingten Annahmen, den Life Orientation Test Revised (LOT-R) zur Erfassung von dispositionellem Optimismus sowie das Becks Depressionsinventar (BDI) zur Erfassung von depressiven Symptomen aus. Die Zusammenhänge der verschiedenen Variablen wurden im Querschnitt mit Hilfe von Pfadanalysen und bias-korrigierten Bootstrapping-Konfidenzintervallen untersucht.

Ergebnisse: Der Einfluss von bedingten Annahmen auf depressive Symptome wurde vollständig über SDE mediiert (β=.172, *BCa* 95% CI [.051, .355]). Der Einfluss von dispositionellem Optimismus auf depressive Symptome wurde teilweise über SDE vermittelt (β=-.124, *BCa* 95% CI [-.248, -.043]). Das Pfadmodell klärte insgesamt 42.3% der Varianz bzgl. SDE und 38.2% der Varianz bzgl. depressiver Symptome auf.

Diskussion: Die Studie unterstreicht die Bedeutung von SDE für depressive Störungen. Es konnte gezeigt werden, dass der Einfluss von bedingten Annahmen und dispositionellem Optimismus auf depressive Symptome über SDE mediiert wird. Damit stellen SDE ein wichtiges Bindeglied zwischen eher globalen Kognitionen und depressiven Symptomen dar. Durch das hohe Maß an situativer Spezifität stellen SDE einen wichtigen Ansatzpunkt für psychotherapeutische Interventionen wie Verhaltensexperimente dar.

4.3 Studie 3: Der prädiktive Einfluss von Erwartungen auf depressive Symptome

Zitation: Kube, T., Herzog, P., Michalak, C. M., Glombiewski, J. A., Doering, B. K., & Rief, W. (submitted). Do situational expectations rather than global beliefs predict depressive symptoms? A longitudinal study. *Cognitive Therapy and Research*.

Hintergrund: Eine Vielzahl von Studien konnte zeigen, dass dysfunktionale Kognitionen eine wichtige Ursache für die Entstehung und Aufrechterhaltung von depressiven Störungen darstellen. Jüngste Forschungsergebnisse legen allerdings nahe, dass dysfunktionale Erwartungen - als Teilbereich der Kognitionen, der sich auf das Antizipieren zukünftiger Ereignisse oder Erfahrungen bezieht - besonders entscheidend sein könnten im Kontext depressiver Störungen. Daher sollte in dieser Studie untersucht werden, inwiefern SDE im Vergleich zu anderen Kognitionen depressive Symptome in einem längsschnittlichen Design vorhersagen. Es wurde die Hypothese getestet, dass SDE durch ihr hohes Maß an situativer Spezifität depressive Symptome stärker als globalere Kognitionen (d.h. bedingte Annahmen, dispositioneller Optimismus, generalisierte Erwartungen bzgl. der Regulation negativer Stimmung) in einer klinischen und einer gesunden Stichprobe vorhersagen.

Methode: An der Studie nahmen zum ersten Untersuchungszeitpunkt 95 Personen mit einer diagnostizierten depressiven Störung sowie 80 gesunde Personen teil. Am zweiten Untersuchungszeitpunkt fünf Monate später nahmen 52 Personen mit depressiver Symptomatik und 47 gesunde Personen teil. Die Fragebögen, die in dieser Studie eingesetzt wurden, waren u.a. die DES zur Erfassung von SDE, die Skala dysfunktionaler Einstellungen (DAS) zur Erfassung von bedingten Annahmen, der LOT-R zur Erfassung von dispositionellem Optimismus, die Skala zur Erfassung generalisierter Erwartungen bzgl. der Regulation negativer Stimmung (NMR) sowie das BDI zur Erfassung von depressiven Symptomen. Der Einfluss von SDE sowie den anderen kognitiven Variablen auf depressive Symptome wurde mit Hilfe multipler hierarchischer linearer Regressionen in beiden Stichproben separat untersucht. Dabei wurden jeweils die Depressionswerte vom ersten Messzeitpunkt als Prädiktor im ersten Block aufgenommen. Im zweiten Block wurden die Summenwerte der DAS, des LOT-R sowie der NMR Skala als Prädiktoren aufgenommen. Im dritten Block wurde der Summenwert der DES als Prädiktor

aufgenommen. Das Kriterium waren die Depressionswerte zum zweiten Messzeitpunkt. Für die klinische Stichprobe wurde zusätzlich eine Regressionsanalyse durchgeführt, bei der die Depressionswerte vom ersten Untersuchungszeitpunkt nicht als Prädiktor aufgenommen wurden, um den Einfluss von SDE auf depressive Symptome zum zweiten Messzeitpunkt spezifischer erfassen zu können.

Ergebnisse: Die Regressionsanalyse ergab für die gesunde Stichprobe, dass die kognitiven Variablen, die als Prädiktoren im zweiten Block aufgenommen wurden, keine zusätzliche Varianz gegenüber den Depressionswerten vom ersten Messzeitpunkt aufklären konnten (ΔR^2=.117; ΔF=2.116; p=.113). Die Hinzunahme der DES Summenwerte im dritten Block führte hingegen zur einer signifikanten zusätzlichen Varianzaufklärung (ΔR^2=.084; ΔF=4.993; p=.031). In der klinischen Stichprobe führte die Aufnahme der Prädiktoren des zweiten Blocks wie in der gesunden Stichprobe nicht zu einer bedeutsamen zusätzlichen Varianzaufklärung (ΔR^2=.072; ΔF=1.450; p=.240). Die durch die DES Summenwerte im dritten Block zusätzlich erklärte Varianz erreichte ebenfalls nicht statistische Signifikanz (ΔR^2=.060; ΔF=3.804; p=.057). Wenn in der klinischen Stichprobe die Ausgangswerte bzgl. der Depressionssymptome nicht als Prädiktor aufgenommen wurden, klärten die kognitiven Variablen im ersten Block (DAS, LOT-R, NMR) signifikant Varianz auf (ΔR^2=.185; ΔF=3.629; p=.019). Nach Hinzunahme der DES Summenwerte im zweiten Block klärten diese signifikant zusätzlich Varianz auf und stellten den einzigen signifikanten Prädiktor dar (β=.473; p=.028).

Diskussion: Die Studie hebt die Relevanz von SDE im Vergleich zu globaleren Kognitionen für den Verlauf depressiver Symptome hervor. In der gesunden Stichprobe zeigte sich, dass SDE den einzigen signifikanten Prädiktor unter allen kognitiven Variablen darstellten. Ein ähnlicher Trend zeigte sich zwar auch in der klinischen Stichprobe, jedoch wurde das Signifikanzniveau nicht erreicht, wenn die Ausgangswerte bzgl. der Depressionsschwere berücksichtigt wurden. Insgesamt liefert die Studie weitere Hinweise für die Bedeutung von dysfunktionalen Erwartungen bei depressiver Symptomatik, sodass es sinnvoll erscheint, in weiteren Untersuchungen zu beleuchten, inwiefern sich dysfunktionale Erwartungen bei Personen mit depressiver Symptomatik verändern lassen.

4.4 Studie 4: Theoretisches Modell zur Veränderung von Erwartungen bei depressiven Störungen

Zitation: Kube, T., Rief, W., & Glombiewski, J. A. (2017). On the Maintenance of Expectations in Major Depression – Investigating a Neglected Phenomenon. *Frontiers in Psychology, 8*(9). doi: 10.3389/fpsyg.2017.00009

In dieser theoretischen Arbeit wurde ein Modell entwickelt, durch das sich die Veränderung von dysfunktionalen Erwartungen bei depressiven Störungen beschreiben und erklären lässt. Dieser Arbeit gingen klinische Beobachtungen voraus, wonach Personen mit depressiver Symptomatik oft auch dann an negativen Erwartungen festhalten, wenn sie Erfahrungen machen, die ihren Erwartungen widersprechen. In dieser Studie wurde kognitive Immunisierung als möglicher Mechanismus diskutiert, der dieser Erwartungspersistenz zu Grunde liegen könnte. Dabei wurde angenommen, dass Personen mit depressiver Symptomatik erwartungsverletzende Erfahrungen im Nachhinein abwerten, indem sie die widersprüchliche Erfahrung beispielsweise als Ausnahme betrachten oder die Glaubwürdigkeit der Erfahrung in Frage stellen. Diese nachträgliche Neubewertung der erwartungsverletzenden Erfahrungen führt dazu, dass die Diskrepanz zwischen Erwartung und Erfahrung aufgehoben wird und die ursprünglichen Erwartungen aufrechterhalten werden. Weiterhin wurde angenommen, dass eine solche Erwartungspersistenz umso wahrscheinlicher ist, je stärker die entsprechende Erwartung (z.B. „Ich werde bei der folgenden Aufgabe versagen“) mit dem Selbstkonzept der Person (z.B. „Ich bin unfähig, irgendetwas hinzubekommen“) übereinstimmt.

Da das Phänomen der Erwartungspersistenz durch kognitive Immunisierung bei depressiven Störungen bisher noch nicht systematisch untersucht worden ist, wurde vorgeschlagen, einen schrittweisen experimentellen Ansatz zu verfolgen. Es wurde diskutiert, dass dies bedeutsame Implikationen für die klinische Praxis haben könnte: Indem kognitive Immunisierung als störungsaufrechterhaltender Faktor aktiv adressiert wird, könnte der langfristige Therapieerfolg erheblich verbessert werden. Dabei wurden konkrete Vorschläge diskutiert, wie Therapeut*innen Immunisierungstendenzen entgegenwirken könnten.

4.5 Studie 5: Entwicklung eines experimentellen Paradigmas zur Untersuchung von Erwartungsveränderung

Zitation: Kube, T., Rief, W., Gollwitzer, M., & Glombiewski, J. A. (2018). Introducing an EXperimental Paradigm to investigate Expectation Change (EXPEC). *Journal of Behavior Therapy and Experimental Psychiatry, 59,* 92-99. doi: 10.1016/j.jbtep.2017.12.002.

Hintergrund: Dysfunktionale Erwartungen haben eine hohe Relevanz für verschiedene psychische Störungen. Klinische Beobachtungen legen nahe, dass Personen mit psychischen Störungen (z.B. depressiven Störungen) häufig auch dann an dysfunktionalen Erwartungen festhalten, wenn sie Erfahrungen machen, die ihren Erwartungen widersprechen. Da dieses Phänomen bisher noch nicht empirisch untersucht worden ist, wurde in dieser Studie ein experimentelles Paradigma dafür entwickelt. Anknüpfend an die vorherigen Studien aus dem Dissertationsprojekt, die eine große Bedeutung von Erwartungen für depressive Störungen belegen konnten, wurde das experimentelle Paradigma v.a. für die Untersuchung von Personen mit depressiver Symptomatik entwickelt. In dieser Studie sollte zunächst an einer gesunden Stichprobe die Validität des Paradigmas untersucht werden, um es in einem nächsten Schritt in einer klinischen Stichprobe anzuwenden.

Methode: Nach zwei vorausgegangenen Pilotstudien (N=28 und N=37) wurde in dieser Studie (N=102) untersucht, ob gesunde Personen ihre aufgabenspezifischen und generalisierten Leistungserwartungen verändern, wenn sie erwartungsverletzend positive Leistungsrückmeldungen erhalten. Gleichzeitig wurde untersucht, ob die Leistungserwartungen der Versuchspersonen unverändert bleiben, wenn sie erwartungsbestätigende Leistungsrückmeldungen erhalten. Der Fokus auf Leistungserwartungen wurde gewählt, weil negative Leistungserwartungen einerseits eine wichtige Rolle bei Personen mit depressiven Störungen spielen und sie andererseits einer standardisierten Untersuchung im experimentellen Rahmen gut zugänglich sind. In dem entwickelten Paradigma wurden zunächst neutrale bis negative Leistungserwartungen bei allen Versuchspersonen hervorgerufen, indem ihnen mitgeteilt wurde, sie müssten im Rahmen der Untersuchung einen sehr schweren Test bearbeiten, den kaum jemand richtig lösen könne. Nachfolgend wurden die aufgabenspezifischen und generalisierten Leistungserwartungen das erste Mal erfasst. Anschließend bearbeiteten die

Versuchspersonen, den Test zur Messung Emotionaler Intelligenz (TEMINT), der sich in einer Pilotstudie als für das geplante Paradigma geeignet erwies. Die Proband*innen erhielten dabei standardisierte Leistungsrückmeldungen, die entweder eine unerwartet gute Leistung (erwartungsverletzende Bedingung) oder eine durchschnittliche Leistung (erwartungsbestätigende Bedingung) nahelegten. Nach Beendigung des Tests wurden die Leistungserwartungen der Versuchspersonen erneut abgefragt. Abschließend gab es eine ausführliche Nachbefragung, bevor die Proband*innen über den tatsächlichen Untersuchungsgegenstand aufgeklärt wurden.

Ergebnisse: Die Versuchspersonen veränderten nach Erhalt der erwartungsverletzenden Leistungsrückmeldung sowohl ihre aufgabenspezifischen ($F(1,100)=34.580$; $p<.001$; $\eta^2_p=0.257$) als auch ihre generalisierten Leistungserwartungen ($F(1,100)=8.950$; $p=.003$; $\eta^2_p=0.082$), wohingegen es keine Veränderung der Erwartungen nach erwartungsbestätigendem Feedback gab.

Diskussion: Die Studie liefert erste Hinweise für die Validität des entwickelten experimentellen Paradigmas, indem gezeigt werden konnte, dass gesunde Personen ihre Leistungserwartungen nach erwartungsverletzender Leistungsrückmeldung bedeutsam veränderten. Damit erscheint das Paradigma gut geeignet, um es in einem nächsten Schritt in einer klinischen Stichprobe anzuwenden und zu untersuchen, ob Personen mit depressiver Symptomatik trotz erwartungsverletzender Leistungsrückmeldungen an ihren ursprünglichen Erwartungen festhalten. Obwohl das Paradigma primär für die Untersuchung von Personen mit depressiven Störungen entwickelt wurde, ist es möglicherweise auch geeignet für die Untersuchung anderer psychischer Störungen, bei denen negative Leistungserwartungen ebenfalls eine wesentliche Rolle spielen (z.B. soziale Phobie oder Prüfungsangst).

4.6 Studie 6: Die Rolle von kognitiver Immunisierung bei der Veränderung dysfunktionaler Erwartungen

Zitation: Kube, T., Rief, W., Gollwitzer, M., Gärtner, T., & Glombiewski, J. A. (submitted). Why dysfunctional expectations in depression persist - Results from two experimental studies investigating cognitive immunization. *Journal of Abnormal Psychology*.

Hintergrund: Klinische Beobachtungen legen nahe, dass Personen mit depressiver Symptomatik häufig trotz erwartungsverletzender Erfahrungen an dysfunktionalen Erwartungen festhalten. Nachdem mit Hilfe einer gesunden Stichprobe ein experimentelles Paradigma zur Untersuchung der Veränderung von Erwartungen entwickelt wurde, wurde das Paradigma in dieser Studie in zwei weiteren experimentellen Untersuchungen angewendet. Dabei sollte in Experiment 1 untersucht werden, ob Personen mit depressiver Symptomatik im Vergleich zu gesunden Personen tatsächlich stärker an ihren Leistungserwartungen festhalten, wenn sie erwartungsverletzendes Feedback erhalten. In Experiment 2 sollte anschließend untersucht werden, ob kognitive Immunisierung einen Mechanismus darstellt, der der Persistenz von Erwartungen bei Personen mit depressiver Symptomatik zu Grunde liegt.

Experiment 1: ***Methode*****.** An Experiment 1 nahmen 63 Personen mit diagnostizierter depressiver Störung sowie 72 gesunde Personen teil. Der Ablauf war derselbe wie in Studie 5 beschrieben: Nach Induktion neutraler bis negativer Leistungserwartungen bearbeiteten die Proband*innen den TEMINT und erhielten entweder erwartungsverletzende oder -bestätigende Leistungsrückmeldungen. Anschließend wurden die Leistungserwartungen erneut abgefragt.

Ergebnisse. Während die Proband*innen aus der klinischen wie der gesunden Stichprobe ihre generalisierten Leistungserwartungen nach erwartungsbestätigendem Leistungsfeedback nicht veränderten, gab es nach es nach erwartungsverletzender Leistungsrückmeldung differentielle Effekte ($F(1,113)=5.414$; $p=.022$; $\eta^2_p=0.046$): Gesunde Personen veränderten ihre Erwartungen bedeutsam, wohingegen die Personen mit depressiver Symptomatik weiter an ihren ursprünglichen Erwartungen festhielten.

Experiment 2: ***Methode.*** Bei diesem Experiment wurden Personen mit erhöhten Depressionswerten untersucht. Dabei konnten nach einer kurzen Voruntersuchung Personen an der Studie teilnehmen, die im Becks Depressionsinventar einen Gesamtwert von ≥10 erzielten. Das Studiendesign von Experiment 2 entsprach im Wesentlichen dem von Experiment 1, wobei in diesem Experiment alle Versuchspersonen erwartungsverletzend positive Leistungsrückmeldungen erhielten. Um kognitive Immunisierung als zu Grunde liegenden Mechanismus der Aufrechterhaltung von Erwartungen untersuchen zu können, wurden Immunisierungsprozesse experimentell variiert. Dafür wurde in einer Experimentalgruppe nach Erhalt des unerwartet positiven Leistungsfeedbacks eine „immunisierungsfördernde" Manipulation (N=17) eingefügt, die nahelegen sollte, dass das positive Testergebnis nicht besonders aussagekräftig ist. Damit sollte die Veränderung der generalisierten Leistungserwartungen erschwert werden. In einer zweiten Experimentalgruppe wurde hingegen eine „immunisierungshemmende" Manipulation (N=21) eingefügt, die die Relevanz des positiven Testergebnisses besonders betonte, wodurch die Veränderung der generalisierten Leistungserwartung erleichtert werden sollte. Eine Kontrollgruppe (N=21) erhielt nach der Leistungsrückmeldung keine weiteren Informationen.

Ergebnisse: Die experimentelle Variation hatte einen signifikanten Effekt auf die Veränderung der generalisierten Leistungserwartungen ($F(2,56)=4.977$; $p=.010$; $\eta^2_p=0.151$): Während die Proband*innen der immunisierungshemmenden Gruppe sowie der Kontrollgruppe ihre Erwartungen bedeutsam veränderten, gab es in der immunisierungsfördernden Bedingung keine signifikante Veränderung der Erwartungen.

Diskussion: Die beiden experimentellen Untersuchungen zeigen einerseits, dass Personen mit depressiver Symptomatik im Gegensatz zu gesunden Personen tatsächlich trotz positiver Leistungsrückmeldungen an ihren Erwartungen weiter festhielten (Experiment 1). Andererseits konnte bestätigt werden, dass kognitive Immunisierung einen wichtigen Mechanismus für die Aufrechterhaltung von Erwartungen darstellt, da eine Variation von Immunisierungsprozessen zu signifikanten Unterschieden in der Veränderung der Erwartungen führte (Experiment 2). Damit liefern die beiden Arbeiten wichtige Implikationen für die therapeutische Praxis: Die Ergebnisse unterstreichen die Notwendigkeit, die Gründe für die Persistenz von Erwartungen aktiv zu explorieren und Strategien zu entwickeln, um Immunisierungstendenzen der Patient*innen entgegen zu wirken.

5 Zusammenfassende Diskussion und Ausblick

Das Ziel der vorliegenden Dissertation war es, die Rolle von dysfunktionalen Erwartungen bei Personen mit depressiver Symptomatik genauer zu untersuchen. Im Rahmen der Dissertation ist es gelungen, einen Fragebogen mit guten psychometrischen Eigenschaften zur Erfassung von situations-spezifischen Erwartungen bei depressiver Symptomatik zu entwickeln (Studie 1). In weiteren Studien konnte gezeigt werden, dass SDE den Einfluss von bedingten Annahmen und dispositionellem Optimismus als globale Kognitionen auf depressive Symptome mediieren (Studie 2) und dass SDE depressive Symptome in einem längsschnittlichen Design besser vorhersagen als globale Kognitionen (Studie 3). Damit unterstreichen Studien 1-3 insgesamt die Relevanz von dysfunktionalen Erwartungen bei depressiven Störungen und machen deutlich, dass SDE durch ihr hohes Maß an situativer Spezifität und Falsifizierbarkeit einen interessanten Ansatzpunkt für die Therapieplanung darstellen könnten. Beispielsweise könnte versucht werden, die dysfunktionalen Erwartungen durch Verhaltensexperimente zu modifizieren, indem die Patient*innen Erfahrungen machen, die ihren Erwartungen widersprechen.

In Studien 4-6 wurde jedoch dargestellt, dass die Veränderung von dysfunktionalen Erwartungen bei Personen mit depressiver Symptomatik durch ungünstige Informationsverarbeitungsprozesse schwer fallen könnte. In Studie 4 wurde dabei in einem theoretischen Modell ausgeführt, dass Personen mit depressiver Symptomatik die Tendenz haben, positive erwartungsverletzende Erfahrungen im Nachhinein umzudeuten und abzuwerten, indem die korrigierende Erfahrung beispielsweise als Ausnahme oder wenig glaubhaft zurückgewiesen wird. Diese kognitiven Immunisierungsstrategien könnten einen Mechanismus dafür darstellen, warum nach klinischen Beobachtungen dysfunktionale Erwartungen bei Personen mit depressiver Symptomatik trotz erwartungsverletzender Erfahrungen aufrechterhalten werden.

Um das Phänomen der Persistenz dysfunktionaler Erwartungen genauer zu untersuchen, wurde in Studie 5 ein experimentelles Paradigma entwickelt. Mit diesem Paradigma gelang es, positive erwartungsverletzende Erfahrungen im Bereich der Leistungserwartungen herbeizuführen. Es konnte gezeigt werden, dass gesunde Personen ihre aufgabenspezifischen und generalisierten Leistungserwartungen nach den erwartungsverletzenden Erfahrungen in positiver Richtung veränderten.

In Studie 6 konnte hypothesenkonform im ersten Teilexperiment gezeigt werden, dass Personen mit depressiver Symptomatik trotz erwartungsverletzender Leistungsrückmeldungen an ihren ursprünglichen Leistungserwartungen festhielten, während gesunde Probanden ihre Erwartungen nach dem positiven Feedback veränderten. In einem zweiten Teilexperiment wurde nachgewiesen, dass kognitive Immunisierung einen Mechanismus darstellt, der für die Aufrechterhaltung von Erwartungen entscheidend ist, da eine experimentelle Variation von Immunisierungsprozessen zu bedeutsamen Unterschieden hinsichtlich der Erwartungsveränderung führte.

Damit konnten die vorliegenden Studien das kognitive Modell der Depression (A. T. Beck et al., 1979) weiter spezifizieren, indem gezeigt werden konnte, dass insbesondere negative Zukunftserwartungen als Teilbereich der dysfunktionalen Kognitionen entscheidende Bedeutung im Kontext depressiver Störungen haben. Darüber hinaus bestätigen die vorliegenden Studien insgesamt die Annahmen des ViolEx-Modells, wonach dysfunktionale Erwartungen Kernmerkmale psychischer Störungen darstellen und durch Immunisierungsprozesse schwer modifizierbar sind (Rief et al., 2015). Die Ergebnisse stehen ebenso im Einklang mit Studien, die nahelegen, dass depressive Störungen durch eine starke kognitive Rigidität gekennzeichnet und dysfunktionale Kognitionen schwer veränderbar sind (Bridges & Harnish, 2010; Brose, Schmiedek, Koval, & Kuppens, 2015; Lefebvre, 1981; Watkins, 2008). Die Befunde aus Studie 6, wonach Personen mit depressiver Symptomatik im Vergleich zu gesunden Personen nach unerwartet positiven Erfahrungen ihre Erwartungen nicht verändern, stimmen überein mit einer anderen Studie (Korn, Sharot, Walter, Heekeren, & Dolan, 2014). In dieser Studie wurde gezeigt, dass gesunde Personen ihre Vorstellungen von der Zukunft durch einen starken Einfluss von Optimismus leiten lassen, während dieser „Optimismus-Bias“ bei Personen mit depressiver Symptomatik nicht vorlag.

5.1 Einschränkungen

Die durchgeführten Studien weisen einige Stärken auf. U.a. konnte mit einer vielfältigen Methodik und Datenstruktur (querschnittliche Daten, längsschnittliche Daten, experimentell gewonnene Daten) die Rolle von dysfunktionalen Erwartungen bei Personen mit depressiver Symptomatik genauer untersucht werden. Gleichzeitig gelang es, sowohl gesunde Personen als auch Personen mit depressiver Symptomatik zu untersuchen, sodass differentielle Effekte untersucht werden konnten. V.a. durch den Vergleich von gesunden

Personen und Personen mit depressiver Symptomatik hinsichtlich des Umgangs mit erwartungsverletzenden Erfahrungen in Studie 6 konnten neue Erkenntnisse über die Psychopathologie von depressiven Störungen gewonnen werden. Bzgl. der Interpretation der Ergebnisse der dargestellten Studien müssen jedoch auch einige Limitationen kritisch berücksichtigt werden.

Eine allgemeine Einschränkung der Studien 1-3 ist, dass die Depressionsschwere jeweils nur durch Selbstauskunft der Proband*innen erfasst wurde und damit möglicherweise anfällig für leichte Verzerrungen (z.B. durch selektive Erinnerung) ist. Daher sollten zukünftige Studien anstreben, Depressionssymptome zusätzlich auch durch Fremdbeurteilung hinsichtlich ihrer Schwere einzuschätzen. Eine weitere Einschränkung bzgl. Studien 1-3 liegt dadurch vor, dass es bisher unzureichende Daten dazu gibt, inwiefern die mit der DES erfassten SDE tatsächlich ein depressions-spezifisches Merkmal darstellen. Zukünftige Studien sollten daher die DES auch bei anderen klinischen Populationen (z.B. Patient*innen mit Angststörungen) einsetzen und z.B. vergleichen, ob die SDE bei diesen Gruppen im Vergleich zu Personen mit depressiver Symptomatik schwächer ausgeprägt sind. Studie 1 weist darüber hinaus durch die Methode einer Online-Befragung mit einer gemischten Stichprobe einige weitere spezielle Limitationen auf (z.B. möglicher Selbstselektionsbias bei den Teilnehmenden, wenige Teilnehmende mit schweren depressiven Symptomen). Studie 2 und 3 haben zusätzlich die Einschränkung, dass die Stichprobengrößen für die durchgeführten Analysen grenzwertig klein waren, weshalb weitere Untersuchungen mit größeren Stichproben notwendig sind, um die Ergebnisse dieser Studien abzusichern und zu bestätigen. Bzgl. Studie 3 muss zudem bedacht werden, dass die Patient*innen der klinischen Stichprobe zwischen dem ersten und dem zweiten Messzeitpunkt psychotherapeutische Behandlungen erhielten, sodass die Vorhersage der Depressionssymptome zum zweiten Messzeitpunkt möglicherweise beeinflusst war durch Effekte der Behandlung.

Eine allgemeine Einschränkung bzgl. Studien 5 und 6 ist, dass der Fokus speziell auf Leistungserwartungen gelegt wurde. Zwar sind Leistungserwartungen im Kontext depressiver Störungen wichtig, wie u.a. auch Studien 1-3 zeigen, doch sie decken nicht das gesamte Spektrum der für depressive Störungen relevanten Erwartungen ab. Daher wäre es hilfreich, die in Studien 5 und 6 gewonnen Erkenntnisse bzgl. der Veränderung von Erwartungen zukünftig auch im Hinblick auf andere Erwartungen zu untersuchen, z.B. Erwartungen in Bezug auf soziale Ablehnung. Eine weitere allgemeine Limitation von

Studien 5 und 6 ist, dass nur Reaktionen auf positive Erwartungsverletzungen untersucht wurden. Dies steht zwar im Einklang mit gängigen Depressionsmodellen, wonach Personen mit depressiver Symptomatik v.a. Probleme damit haben, positive Erfahrungen zu machen oder anzunehmen (A. T. Beck et al., 1979; Lewinsohn, 1974; Seligman et al., 1979), dennoch wäre es wichtig zu überprüfen, ob es bei gesunden Personen und Personen mit depressiver Symptomatik auch Unterschiede im Umgang mit unerwartet negativen Erfahrungen gibt. Darüber hinaus ist zu beachten, dass in den experimentellen Studien 5 und 6 nur explizite Erwartungen untersucht wurden und die Einflüsse möglicherweise vorhandener impliziter Erwartungen nicht kontrolliert werden konnten.

Eine wesentliche Einschränkung von Studie 5 ist, dass die klinische und die gesunde Stichprobe wegen deutlicher Unterschiede hinsichtlich der soziodemografischen Merkmale schwer vergleichbar sind. Daher sollte in künftigen Studien angestrebt werden, dass die untersuchten Stichproben durch Parallelisierung relevanter Merkmale besser verglichen werden können. Eine weitere Einschränkung bzgl. Studie 6 ist, dass in dieser Studie durch einen Vortest zwar sichergestellt werden konnte, dass nur Personen mit erhöhten Depressionswerten untersucht wurden, doch nur knapp ein Drittel der Teilnehmer*innen im Strukturierten Klinischen Interview (Wittchen, Wunderlich, Gruschwitz, & Zaudig, 1997) erfüllte die Kriterien für eine depressive Störung. Folglich sollte in zukünftigen Studien die Rolle von kognitiver Immunisierung weiter spezifiziert werden, indem auch Stichproben mit schwereren depressiven Symptomen untersucht werden.

5.2 Perspektiven für zukünftige Forschung

Ausgehend von den Ergebnissen der vorliegenden Arbeit lassen sich einige Perspektiven für die weitere Forschung ableiten. Die Befunde bzgl. der gesunden Stichprobe aus Studie 3, wonach SDE der wichtigste Prädiktor für spätere depressive Symptome waren, legen beispielsweise nahe, in künftigen Studien zu untersuchen, ob erhöhte Werte in der DES einen Risikofaktor für das spätere Entwickeln einer klinisch bedeutsamen depressiven Störung darstellen. Dies könnte zu einem noch genaueren Verständnis der Relevanz von SDE für die Entstehung und Aufrechterhaltung von depressiven Störungen führen.

Nachdem in der vorliegenden Dissertation das Phänomen der Persistenz von Erwartungen bei depressiver Symptomatik im Kontext von Leistungssituationen untersucht wurde, könnten zukünftige Arbeiten die Veränderung von Erwartungen in anderen

Situationen untersuchen. Beispielsweise könnten komplexere Stimuli verwendet werden, um den Umgang mit sozialen Interaktionen zu untersuchen. Ausgehend von den Ergebnissen aus Studie 6 könnte die Hypothese untersucht werden, dass Personen mit depressiver Symptomatik trotz positiver Erfahrungen im Umgang mit anderen Menschen an negativen Erwartungen bzgl. der Reaktion anderer Menschen festhalten.

Darüber hinaus könnte in künftigen Arbeiten untersucht werden, inwiefern sich durch den Einsatz von Verhaltensexperimenten die Erwartungen von Patient*innen mit depressiver Symptomatik modifizieren lassen. Angesichts der Bedeutung von situations-spezifischen Erwartungen (Studien 2 und 3) sollte dabei der Fokus darauf gelegt werden, die Erwartungen der Patient*innen möglichst konkret zu erfassen, um sie durch erwartungsverletzende Erfahrungen falsifizieren zu können. Gleichzeitig sollte angesichts der Ergebnisse aus Studie 6 darauf geachtet werden, dass Immunisierungsprozessen entgegengewirkt wird, um die Veränderung von Erwartungen zu erleichtern. Zukünftige Forschungsarbeiten könnten dabei untersuchen, welche Strategien zur Verhinderung bzw. Reduktion von Immunisierungsstrategien besonders wirksam sind. Einige Ideen für die klinische Praxis werden hierfür in einem nachfolgenden Abschnitt genauer diskutiert.

Perspektivisch kann durch die besondere Relevanz von dysfunktionalen Erwartungen für depressive Störungen daran gearbeitet werden, einen erwartungsfokussierten Behandlungsansatz für Personen mit depressiven Störungen zu entwickeln. Dabei kann auf die Konzepte und Ideen einer vorangegangenen Arbeit (Rief & Glombiewski, 2016) zurückgegriffen werden, die für den Kontext depressiver Störungen angepasst werden könnten.

In den Studien 4-6 der vorliegenden Dissertation wurde die Persistenz dysfunktionaler Erwartungen am Beispiel depressiver Störungen untersucht. Es ist jedoch anzunehmen, dass dieses Phänomen auch bei anderen Störungsbereichen auftritt und durch kognitive Immunisierung erklärt werden kann (Rief & Glombiewski, 2016; Rief et al., 2015). Daher wäre es eine interessante Perspektive für zukünftige Forschung, die Aufrechterhaltung dysfunktionaler Erwartungen durch kognitive Immunisierung auch auf andere Störungsbereiche auszuweiten. Beispielsweise könnte das in Studie 5 entwickelte Paradigma auch bei anderen psychischen Störungen (z.B. Sozialer Phobie oder Prüfungsangst) eingesetzt werden, bei denen negative Leistungserwartungen ebenfalls eine wichtige Rolle spielen. Darüber hinaus könnten weitere Paradigmen entwickelt werden, die kognitive Immunisierung im Kontext von anderen psychischen Störungen untersuchen.

5.3 Implikationen für theoretische Modelle depressiver Störungen

Die vorliegende Dissertation liefert einige Implikationen für die theoretische Konzeption der Entstehung und Aufrechterhaltung depressiver Störungen. Die Ergebnisse von Studien 2 und 3 konnten das kognitive Modell der Depression weiter spezifizieren, indem gezeigt wurde, wie bedingte Annahmen einen Einfluss auf depressive Symptome ausüben: Gemäß den Ergebnissen aus Studie 2 wird der Einfluss von bedingten Annahmen auf depressive Symptome vollständig über SDE mediiert. Darüber hinaus legt Studie 3 nahe, dass SDE eine besondere Bedeutung für die Entstehung depressiver Störungen haben könnten im Vergleich zu anderen, globaleren Kognitionen, da SDE depressive Symptome zu einem späteren Zeitpunkt besser vorhersagten als globale Kognitionen.

Diese große Bedeutung von SDE für die Entstehung depressiver Störungen wird zudem gestützt durch Befunde der kognitiven Neurowissenschaft: Dabei wird davon ausgegangen, dass die Funktion des menschlichen Gehirns durch permanente Vorhersagen zukünftiger Ereignisse und Erlebnisse gekennzeichnet ist (de-Wit, Machilsen, & Putzeys, 2010; Huang & Rao, 2011). Beispielsweise wird beim Wandern antizipiert, wie sicher der Untergrund ist und wohin man ohne Gefahr treten kann bzw. wo Vorsicht geboten ist. An diese Vorhersagen werden dann die Bewegungsabläufe unseres Köpers angepasst. Laut neuesten Befunden der kognitiven Neurowissenschaft sind dabei Diskrepanzen zwischen dem, was antizipiert wurde, und dem, was tatsächlich eingetreten ist (sogenannte Vorhersagefehler), besonders entscheidend für menschliches Lernen (Garrison, Erdeniz, & Done, 2013; Niv & Schoenbaum, 2008). In dieser Terminologie könnten depressive Störungen dadurch gekennzeichnet sein, dass Personen mit depressiver Symptomatik vermehrt negative Ereignisse antizipieren und subjektiv bestätigt sehen, während (positive) Vorhersagefehler durch selektive Aufmerksamkeit (Eizenman et al., 2003; Joormann & Gotlib, 2007) oder kognitive Immunisierung nicht wahrgenommen werden.

Kongruent dazu belegte Studie 6, dass Personen mit depressiver Symptomatik unerwartet positive Leistungsrückmeldungen nicht dafür nutzen konnten, die Vorhersage ihrer eigenen Leistung zu verändern. Weiterhin wurde in Studie 6 spezifiziert, dass kognitive Immunisierung einen wichtigen Mechanismus darstellt, der dieser Aufrechterhaltung von Erwartungen zu Grunde liegt. Demnach könnte kognitive Immunisierung ein Mechanismus sein, der die depressive Symptomatik aufrechterhält.

Folglich könnten die Befunde der vorliegenden Dissertation dazu genutzt werden, in künftigen Studien eine Reformulierung des kognitiven Modells der Depression genauer zu untersuchen: Möglicherweise entstehen depressive Störungen durch negative Zukunftserwartungen, die zunehmend immun gegen korrigierende Erfahrungen werden und die Symptomatik so aufrechterhalten.

5.4 Implikationen für die klinische Praxis

Während in der Behandlung von Angststörungen seit der einflussreichen Arbeit von Craske et al. (2014) der Fokus bereits auf die Überprüfung und Modifikation von störungsspezifischen Erwartungen gelegt wird, erhielten Erwartungen in der Behandlung depressiver Störungen bislang weniger Aufmerksamkeit. Die Ergebnisse der vorliegenden Dissertation legen jedoch nahe, dass dysfunktionale Erwartungen von Patient*innen mit depressiver Symptomatik in der psychotherapeutischen Behandlung aktiv thematisiert werden sollten.

Ein erster Schritt bzgl. der Fokussierung auf Erwartungen in der Psychotherapie könnte sein, die Patient*innen im Rahmen von psychoedukativen Einheiten über die Rolle von Erwartungen bei ihrer individuellen Problematik gemäß den Vorschlägen von Rief und Glombiewski (2016) aufzuklären. Anschließend könnte versucht werden, mit einer strukturierten Erfassung von Erwartungen durch die DES diejenigen dysfunktionalen Erwartungen auszuwählen, denen die betroffene Person besonders stark zustimmt. Nachfolgend kann mit den Patient*innen gemeinsam geplant werden, wie die ausgewählten Erwartungen in einem Verhaltensexperiment überprüft werden könnten, um die Diskrepanz zwischen Erwartung und tatsächlicher Erfahrung zu maximieren (Craske et al., 2014). Wenn eine Patientin beispielsweise der Erwartung „Wenn ich eine Person um Hilfe bitte, wird sie mich abweisen“ stark zustimmt, könnte gemeinsam überlegt werden, eine Person aus dem Familien- oder Bekanntenkreis anzusprechen und sie bei einer Angelegenheit um Hilfe zu bitten. Bestenfalls macht die Patientin dann die Erfahrung, wider Erwarten Hilfe zu bekommen und laut Craske et al. (2014) müsste diese erwartungsverletzende Erfahrung dazu führen, dass die Erwartung modifiziert wird und sich die Symptomatik reduziert.

Die Befunde aus Studie 6 der vorliegenden Dissertation legen allerdings nahe, dass die Erwartungen durch kognitive Immunisierungsprozesse nicht so leicht modifiziert werden, sodass in der Therapie Strategien entwickelt werden sollten, um den

Immunisierungstendenzen entgegenzuwirken. Beispielsweise könnte ein Verhaltensexperiment wiederholt oder unter anderen Umständen erneut durchgeführt werden, um einer Bewertung der erwartungsverletzenden Erfahrung als Ausnahme entgegenzuwirken. Mit Blick auf die immunisierungshemmende Manipulation aus Teilexperiment 2 von Studie 6 könnte zudem versucht werden, die Bedeutung der korrigierenden Erfahrung besonders zu betonen, indem die Anwendbarkeit der korrigierenden Erfahrung für weitere Situationen beleuchtet wird oder indem herausgearbeitet wird, dass das erfolgreiche Bewältigen der Situation für die Patientin individuell einen großen Erfolg darstellt. Darüber hinaus kann auch mit den Patient*innen schon vor Durchführung des Verhaltensexperiments überlegt werden, ob die Gefahr besteht, dass sie einen möglichen Erfolg im Nachhinein durch Immunisierungsstrategien abwerten würden. In diesem Fall könnte gemeinsam besprochen werden, woran genau die Patient*innen merken würden, dass ihre Erwartung verletzt werden und unter welchen Umständen oder Bedingungen sie die erwartungsverletzende Erfahrung als valide ansehen und die Erwartung verändern würden.

5.5 Fazit

Insgesamt unterstreicht die vorliegende Dissertation die Bedeutung von dysfunktionalen Erwartungen bei depressiven Störungen. Es konnte gezeigt werden, dass situations-spezifische Erwartungen im Kontext depressiver Störungen durch die DES gut erfassbar sind und dass SDE als Bindeglied zwischen globalen Kognitionen und depressiven Symptomen eine zentrale Rolle im kognitiven Modell der Depression spielen. Auch die prädiktive Bedeutung von SDE für den Verlauf depressiver Symptome wurde nachgewiesen. Darüber hinaus konnte in experimentellen Studien gezeigt werden, dass die Erwartungen von Personen mit depressiver Symptomatik im Vergleich zu gesunden Proband*innen schwer modifizierbar durch erwartungsverletzende Erfahrungen sind. Einen zentralen Mechanismus stellt hierbei kognitive Immunisierung dar, wodurch erwartungsverletzende Erfahrungen im Nachhinein so uminterpretiert werden, dass die ursprünglichen Erwartungen weiter aufrechterhalten werden. Damit konnte die vorliegende Arbeit neue Erkenntnisse bzgl. der psychopathologischen Mechanismen bei depressiven Störungen liefern und deutlich machen, dass es lohnenswert ist, dysfunktionale Erwartungen stärker als bisher in den Fokus der psychotherapeutischen Arbeit zu rücken. In zukünftigen Forschungsarbeiten sollte weiter untersucht werden, wie sich

dysfunktionale Erwartungen bei Personen mit depressiver Symptomatik am effektivsten verändern lassen.

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Anhang A: Studie 1

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Focusing on situation-specific expectations in major depression as basis for behavioural experiments – Development of the Depressive Expectations Scale

Tobias Kube*, Lisa D'Astolfo, Julia A. Glombiewski, Bettina K. Doering and Winfried Rief

Department of Clinical Psychology and Psychotherapy, Philipps-University of Marburg, Germany

Objectives. Dysfunctional expectations are considered to be core features of various mental disorders. The aim of the study was to develop the Depressive Expectations Scale (DES) as a depression-specific measure for the assessment of dysfunctional expectations. Whereas previous research primarily focused on general cognitions and attitudes, the DES assesses 25 future-directed expectations (originally 75 items) which are situation-specific and falsifiable.

Design and methods. To evaluate the psychometric properties of the DES, the scale was completed by 175 participants with and without severe depressive symptoms in an online survey. Participants additionally completed the Patient Health Questionnaire modules for depression (PHQ-9) and anxiety (GAD-7). People experiencing depressive symptoms were informed about the study with the help of self-help organizations.

Results. Reliability analyses indicated excellent internal consistency of the scale. An exploratory factor analyses revealed four factors: social rejection, social support, mood regulation, and ability to perform. The DES sum score strongly correlated with the severity of depressive symptoms. The DES sum score also significantly correlated with symptoms of generalized anxiety.

Conclusion. The DES was shown to have excellent reliability; validity analyses were promising. As the DES items are situation-specific and falsifiable, they can be tested by the individual using behavioural experiments and may therefore facilitate cognitive restructuring. Thus, a structured assessment of patients' expectation with help of the DES can provide a basis for interventions within cognitive–behavioural treatment of depression.

Practitioner points

- Assessing situation-specific expectations in patients experiencing depressive symptoms can provide a basis for the conduction of behavioural experiments to test patients' expectations.
- For the use of behavioural experiments, therapists should choose those dysfunctional expectations which a patient strongly agrees on.

*Correspondence should be addressed to Tobias Kube, Department of Clinical Psychology and Psychotherapy, Philipps-University of Marburg, Gutenbergstraße 18, D-35032 Marburg, Germany (email: tobias.kube@uni-marburg.de).

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- To modify patients' expectations, they should be exposed to situations where the discrepancy between patients' expectations and actual situational outcomes can be maximized.
- The Depressive Expectations Scale can be completed repeatedly to monitor a patient's progress within cognitive–behavioural treatment.

Expectations[1] concerning future events are assumed to be core features of mental disorders (Rief *et al.*, 2015). Disorder-specific expectations, such as expectations about a lethal heart attack in patients suffering from panic disorder, may contribute to the development and maintenance of various mental disorders (Rief & Glombiewski, 2016). Hence, in patients with anxiety disorders, maximizing the discrepancy between patients' expectations and actual situational outcomes ('expectation violation') is discussed as a promising approach in exposure therapy (Craske, Treanor, Conway, Zbozinek, & Vervliet, 2014). However, in patients suffering from a major depressive disorder (MDD), dysfunctional expectations are not addressed as systematically by therapists so far as they might be. Instead, research to date has primarily focused on general cognitions and attitudes (e.g., Beck & Haigh, 2014; Weissman & Beck, 1978; Zauszniewski & Bekhet, 2012). Different kinds of expectations have been found to predict the course of depressive symptoms, such as (treatment) outcome expectations (Greenberg, Constantino, & Bruce, 2006; Price, Anderson, Henrich, & Rothbaum, 2008), self-efficacy expectations (Gopinath, Katon, Russo, & Ludman, 2007; Gordon, Tonge, & Melvin, 2011; Ludman *et al.*, 2003), and global expectations about future events (Strunk, Lopez, & DeRubeis, 2006; Vilhauer *et al.*, 2012). Disorder-specific expectations resulting from depressive core beliefs, however, have received limited attention in the literature. We argue that disorder-specific dysfunctional expectations are crucial to the development and maintenance of MDD and may therefore be a promising target of approaches designed to address such expectations in expectation violation situations.

The cognitive model of depression (Beck, Rush, Shaw, & Emery, 1979; Beck, 2011) theorizes that people suffering from MDD often hold dysfunctional core beliefs that can cover different areas of personal and interpersonal life. According to Beck (2011), the core beliefs 'I am worthless', 'I am helpless', and 'I am not likable' are most common among individuals with MDD. It is assumed that these core beliefs elicit dysfunctional intermediate beliefs and negative automatic thoughts (Beck *et al.*, 1979). These dysfunctional cognitions and beliefs are considered to be a major risk factor for the development and maintenance of a MDD (Beck *et al.*, 1979). In addition to this well-established model, we suggest that dysfunctional core beliefs do not only elicit negative intermediate beliefs and automatic thoughts, but also situation-specific expectations. For instance, the core belief 'I am not likable' might elicit the future-directed expectation 'Nobody will be there for me when I ask someone for help'. In terms of the cognitive model of MDD, we conceptualize expectations as cognitions that are future-directed and focused on the incidence or non-incidence of a specific event or experience. Thereby, several meta-cognitions (such as 'My thoughts will automatically stray') can also be considered as expectations. As expectations can often be viewed in terms of 'if-then' assumptions, they are amenable to falsification by the individual. Thus, situation-specific expectations can be distinguished from global expectations about the future resulting from dispositional optimism or pessimism (see Scheier & Carver, 1985, 1992) in so far as

[1] *The terms 'expectation' and 'expectancy' are often used in an interchangeable way. However, 'expectation' is more frequently used as a specific, verbalized construct, whereas 'expectancies' may be present without full awareness (i.e., implicit expectancies). In this manuscript, we only use the term 'expectation'.*

global expectations are much harder to be tested. Other researchers have differentiated between self-efficacy expectancies and response expectancies. Self-efficacy expectancies are related to one's expected ability to execute voluntary behaviour and actions, whereas response expectancies refer to an involuntary reaction as a consequence of a certain event or experience (Backenstrass *et al.*, 2010; Kirsch, 1985; Maddux, 1999).

Rief *et al.* (2015) suggested that disorder-specific expectations are shaped by learning and conditioning processes, as well as by social influences and individual differences. In turn, these expectations influence individuals' experiences and determine how they perceive themselves, their environment, and the world in general (Kirsch, 1999). Thus, dysfunctional expectations might contribute to the development and maintenance of MDD and therefore might further specify the cognitive model of depression. Moreover, a structured assessment of expectations may provide the basis for therapeutic change using these expectations to design behavioural experiments that facilitate cognitive restructuring (see also Beck, 2011; Dobson & Hamilton, 2003).

To assess situation-specific dysfunctional expectations in patients with depressive symptoms, we developed the Depressive Expectations Scale (DES). The major goal of scale development was to collect MDD-specific expectations representing specific predictions for future events which could be tested using a behavioural experiment. The purpose of this study was to report on scale development and to evaluate the psychometric properties of a large item pool in order to compose a preliminary version of the DES. Given the maladaptive information processing in patients with MDD (Beck & Haigh, 2014; Beck *et al.*, 1979; Haaga & Beck, 1995), it is supposed that patients experiencing depressive symptoms have more negative and fewer positive expectations about specific future events compared to non-depressed subjects (see also Korn, Sharot, Walter, Heekeren, & Dolan, 2014; Strunk *et al.*, 2006). Therefore, we hypothesize that the DES sum score correlates with the symptom severity of depression indicating concurrent validity. However, the scale should correlate less with symptoms of generalized anxiety disorder (GAD) indicating discriminant validity. While previous research has shown a considerable overlap between the negative future expectations in MDD and GAD (Andersen & Limpert, 2001; Dugas *et al.*, 1998; Roemer, Molina, & Borkovec, 1997), MDD rather than GAD is characterized by a lack of positive future expectations (Miranda, Fontes, & Marroquin, 2008; Miranda & Mennin, 2007).

Methods

Scale development and procedure

After an extensive literature review on depressive cognitions and meta-cognitions, we asked four experts and therapists who frequently work with MDD and conducted domain sampling (see Nunnally, 1978; for a detailed description of this method) for item development. Hereby, we focused on the depressive core beliefs 'being worthless', 'being helpless', and 'not being likable' and deduced specific expectations about future events from them with the aim of finding specific expectations resulting from a core belief that might be disconfirmed in a particular situation. The core beliefs 'being worthless', 'being helpless', and 'not being likable' were used for item development, since on the one hand, they have been shown to be very common in MDD (Beck, 2011). On the other hand, these core beliefs might be useful to deduce situation-specific expectations that can be disconfirmed with a behavioural experiment. In particular, from a clinical perspective, 'helplessness' appears to be an especially interesting aspect to focus on, as

cognitive–behavioural therapy (CBT) might help individuals to acquire useful strategies to cope with a specific situation. As we gained the impression that helplessness might relate to a broad range of situations, we decided to focus on two particular aspects of it: helpless in coping with negative mood and helplessness in performance-related situations. These domains were chosen, because both subjective deficits in mood regulation (Berking, Ebert, Cuijpers, & Hofmann, 2013; Berking & Wupperman, 2012; Ehring, Tuschen-Caffier, Schnülle, Fischer, & Gross, 2010) and performance-related situations (Beck, 2011; Kovacs & Beck, 1978; Metalsky, Joiner, Hardin, & Abramson, 1993) have been shown to be very common in MDD. In order to develop items assessing an individual's expectation to cope with negative mood, we considered the conceptually similar 'Generalized Expectancies for Negative Mood Regulation (NMR) Scale' (Catanzaro & Mearns, 1990). In contrast to the NMR scale, we did not only focus on feeling sad, but also on feeling guilty. We used a similar beginning of the items as the NMR scale ('When I am feeling. . .'), but developed new completions for it with the aim of collecting items that are straight forward, easy to understand, and falsifiable through a behavioural experiment. The items assessing the subjective 'ability to perform' measure one's ability to adequately behave in evaluation or performance-related situations (e.g., 'When I have to get an important task done I will fail at it').

In terms of self-efficacy expectancies versus response expectancies, the DES includes both self-efficacy expectancies (e.g., 'When I am feeling sad or dejected I will not be able to get anything done') and response expectancies (e.g., 'When I talk to someone about my problems I will feel better afterwards'). The DES includes only explicit expectations, as we aimed to develop a scale that might help to organize the assessment of dysfunctional expectations in MDD which might be used to design behavioural experiments in order to disconfirm these expectations.

Previous research revealed that depressed patients are not only characterized by a stronger negative bias when thinking about the future but also by a weaker positive bias compared to healthy subjects (Korn *et al.*, 2014). Moreover, it has been suggested that questionnaires including too many negatively worded items are 'more challenging for participants because of aversion to negative emotional content' (Hankins, 2008; Zauszniewski & Bekhet, 2012). Therefore, we balanced negative expectations with positive expectations in the scale development. The collected expectations were used to construct a self-rating scale including 75 items. Originally, the scale was composed with German items; for this article, we translated the scale into English according to the procedure proposed by Bracken and Barona (1991). The translation process was supported by a bilingual native English/German speaker with a master degree in clinical psychology. Re-translation into German was examined with regard to potential discrepancies to the original German version of the scale. The items are rated on a 5-point Likert Scale: 'I disagree – I partially disagree – neutral – I partially agree – I agree' which is scored from 1 to 5. Lower scores indicate fewer dysfunctional expectations, while higher scores indicate more dysfunctional expectations. As we aimed to balance negative expectations with positive expectations, about half of the items need to be rated inversely. In a pilot study, we tested the scale in a sample of 17 community volunteers (mean age in years = 32.92 (SD = 14.93); 47% female). Internal consistency was very good in this sample with Cronbach's α = .87. Furthermore, interitem correlations were at or above the mean (Nunnally, 1978). Participants of the pilot study were asked to give feedback concerning item clarity and comprehension. Subsequently, several modifications were made to improve the scale. The resulting 75-item self-report questionnaire was examined in an online survey that this article reports on. The questionnaire was administered in German. As the major aim of this study was to evaluate the preliminary

version of the scale in a large sample, we decided not to conduct a retest measure in order to ensure a high participation rate.

Participants

Individuals experiencing depressive symptoms were informed about the study with the promotion of several self-help organizations for MDD in Germany. Healthy controls were identified through social networks and E-mail invitations. We aimed to balance the distributions of age, sex, and education among depressed and non-depressed participants. Data were collected between December 2015 and January 2016. No financial benefit was offered, and participation was voluntary. In this study, 194 participants followed the link for the questionnaire and began to participate in the survey. Informed consent was obtained from all individual participants included in the study. Of these participants, 175 completed the questionnaire. Individuals who failed to complete the study did not significantly differ from participants who completed the whole questionnaire regarding any of the assessed variables. After data screening, 17 participants were excluded because they did not endorse the statement 'I will complete this questionnaire honestly and conscientiously'. Thus, analyses are based on data from 158 participants. Participants were invited to e-mail the investigators in case of any questions or difficulties with the survey. No participant made use of this.

Other measurements

Patient Health Questionnaire

For the assessment of depressive and general anxiety symptoms, the Patient Health Questionnaire (PHQ) modules for depression (PHQ-9; Kroenke & Spitzer, 2002) and generalized anxiety disorder (GAD-7; Spitzer, Kroenke, Williams, & Löwe, 2006) were used. These self-report questionnaires can easily be completed by participants and allow a pre-classification of the corresponding diagnoses. They have demonstrated good reliability and validity (Kroenke & Spitzer, 2002; Löwe *et al.*, 2008; Martin, Rief, Klaiberg, & Braehler, 2006; Spitzer *et al.*, 2006). In our sample, internal consistency for the PHQ-9 (Cronbach's $\alpha = .90$) and the GAD-7 (Cronbach's $\alpha = .87$) was very good.

Socio-demographics

Socio-demographic variables were assessed in a self-report questionnaire including age, sex, and education.

Ethics

The study was approved by local ethics committee (reference number 2015-34k) and has been conducted in accordance with the ethical standards as laid down in the Declaration of Helsinki (1964) and its later amendments.

Statistical analyses

We examined item-total correlations to detect items with low item selectivity. Reliability was assessed by computing Cronbach's α. An exploratory factor analysis was conducted

to determine the factorial structure of the DES. The Kaiser-Meyer-Olkin criterion of sampling adequacy was computed to ensure that the correlation of the variables met criteria for the factor analysis. As the assumption of normal distribution of the dataset as determined by the Kolmogorov–Smirnoff test could not be ensured for each item, the extraction method was set to minimum residuals. An oblique rotation method was chosen to allow a more realistic interpretation of the factor structure. According to Gorsuch (1983), items with factor loadings >.30 can be interpreted as loading on a single factor. To ensure an unambiguous interpretation of the factor structure, we conservatively decided to consider an item as loading on a single factor in case of loading on the respective factor with .50 or greater while not loading on another factor >.30. Concurrent and discriminant validity were tested by computing the correlation of the DES sum score with the PHQ-9 and the GAD-7 sum scores, respectively. To control for the effect of anxiety on the relationship between depressive symptoms and depressive expectations, we computed the partial correlation of the DES sum score and the PHQ-9 sum score with the GAD-7 sum score as control variable. Moreover, to put more focus on the participants with depression, we conducted a subgroup analysis with only those participants who reported at least moderate symptoms of depression while controlling for anxiety levels. Alpha error level was set at 5%. There were no missing values as participants could only continue with the next page of the survey after completing all items.

Results

Sample characteristics

We analysed data of 158 participants. The mean age in the sample was 37.08 years (SD = 13.82), 64.5% of the participants were female, and most of the participants had higher education (53.9%). The mean participant sum score on the PHQ-9 was 9.74 (SD = 6.30). Furthermore, 41.1% of the participants had a sum score greater than nine on this measure, indicating moderate to severe depressive symptoms (Kroenke & Spitzer, 2002). More specifically, 23.4% had a sum score than 14 indicating moderately severe or severe depressive symptoms, while 9.5% of all participants had a sum score >19 which indicates severe symptoms of depression (Kroenke & Spitzer, 2002). The mean age (40.63; SD = 14.19) of participants with moderate to severe depressive symptoms (PHQ-9 sum score >9) was significantly higher than the mean age (34.67; SD = 13.01) of participants with no or mild depressive symptoms (t = 2.70; p = .008). Distribution of sex (χ^2 = 1.32; p = .252) and education (χ^2 = 12.66; p = .081) did not significantly differ among participants with moderate to high symptom severity versus no or mild symptoms. The mean of the GAD-7 sum score was 7.54 (SD = 4.91). With respect to the classification proposed by Spitzer *et al.* (2006), GAD-7 results indicate that 30.4% of the participants reported moderate to severe anxiety symptoms. 9.5% of all participants had a GAD 7 sum score >14 indicating severe symptoms of anxiety. Worthy of note, 66.7% of the individuals who reported severe symptoms of depression reported severe symptoms of anxiety at the same time. Table 1 shows all socio-demographic and clinical characteristics of the sample.

Item analyses of the DES

In a first step of item reduction, we excluded those items with low item-total correlations. According to Bühner (2011), there is no fixed minimum level for item-total correlations for the exclusion of single items. Instead, it is recommended to conceptually decide how

Table 1. Sample characteristics

Variable	Data
Age mean in years (*SD*)	37.08 (13.82)
Sex (%)	
Male	35.5
Female	64.5
Education level (%)	
Primary education or no educational degree	15.8
Secondary education	30.3
Higher education	53.9
DES sum score	
75 items (*SD*)	177.76 (49.86)
25 items (*SD*)	58.54 (16.47)
PHQ-9	
Mean sum score (*SD*)[a]	9.74 (6.30)
% sum score >9	41.1
% sum score >14	23.4
% sum score >20	9.5
GAD-7	
Mean sum score (*SD*)[b]	7.54 (4.91)
% sum score >9	30.4
% sum score >14	9.5

Notes. *SD* = Standard deviation; No = number; DES = Depressive Expectations Scale; PHQ-9 = Patient Health Questionnaire 9; GAD-7 = Generalized Anxiety Disorder 7.

[a]The sum score of the PHQ-9 can range from 0 to 27. According to Kroenke and Spitzer (2002), depression severity is classified with regard to the sum score as follows: 0–4 none; 5–9 mild; 10–14 moderate; 15–19 moderately severe; 20–27 severe.

[b]The sum score of the GAD-7 can range from 0 to 21. According to Spitzer *et al.* (2006), level of anxiety severity is classified with regard to the sum score as follows: 0–4 minimal; 5–9 mild; 10–14 moderate; 15–21 severe.

homogenous the scale should be (Bühner, 2011); we decided to exclude items with item-total correlations below .40 in order to ensure considerable homogeneity of the scale. Accordingly, five items were excluded from subsequent analyses. Next, we excluded 22 items which correlated higher with the sum score of the GAD-7 than with the sum score of the PHQ-9 as we aimed to develop a scale which assesses depressive rather than anxious expectations. Following this consideration, we next excluded another 13 items because they were correlated with the GAD-7 sum score $r = .50$ or greater. Finally, we took a closer look at items assessing similar expectations. In the case of redundant items, two independent raters excluded those expectations which were assumed to be harder to test in a behavioural experiment, whereby the two raters agreed in their ratings. This led to the exclusion of another ten items. Thus, the final version of the DES consists of 25 items (see Appendix). Figure 1 illustrates the item reduction process.

Factor analysis

A factor analysis including the 25-item version of the DES was performed to reveal the factor structure of the DES. The Kaiser-Meyer-Olkin measure revealed an overall measure

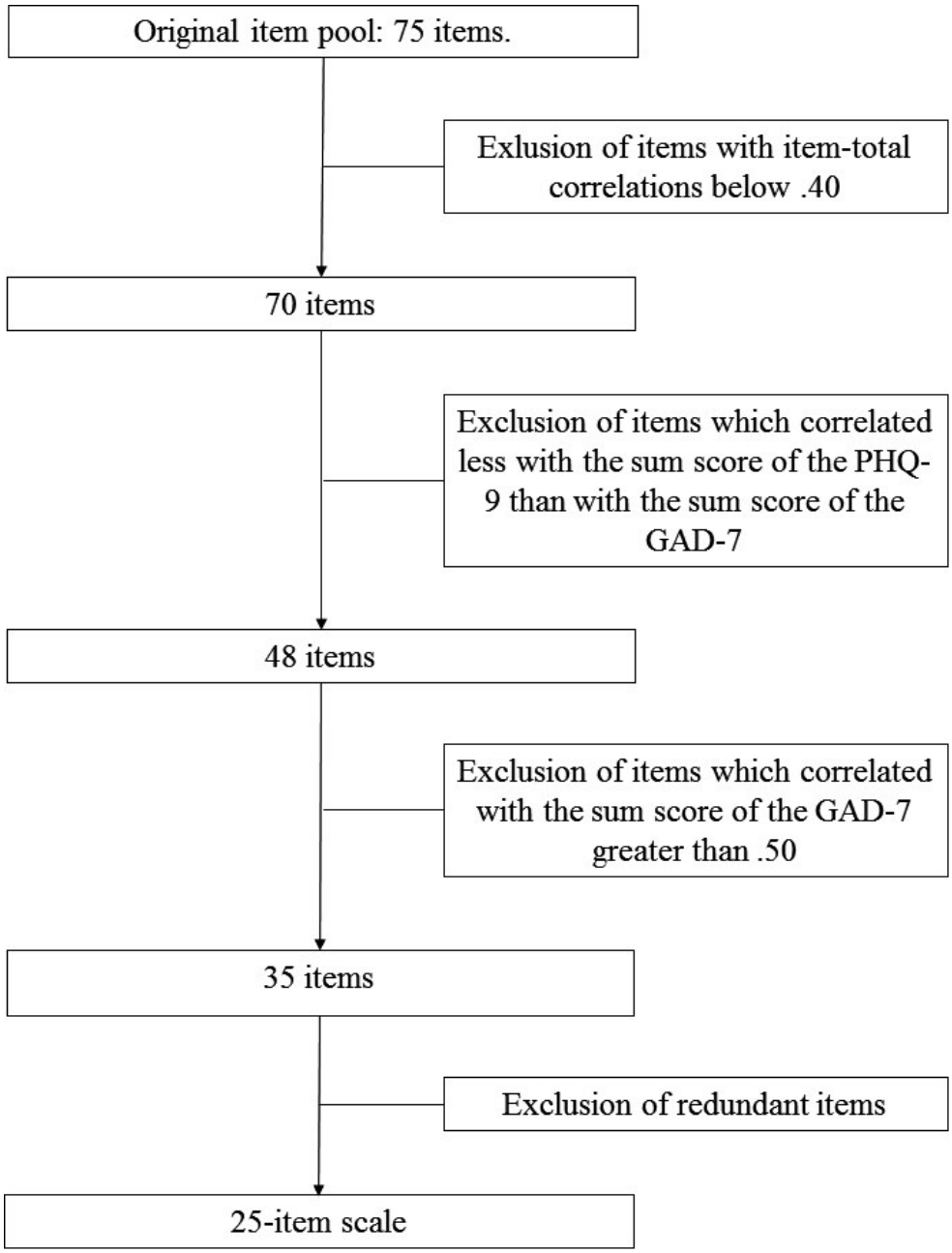

Figure 1. Process of item reduction.

of sampling adequacy of .71, which is above the suggested minimal level of .05 (Kaiser, 1959). Table 2 shows the factor loadings and communality measures of the 25 DES items for the four-factor solution suggested by the Scree test. The four-factor model explained an overall variance of 45%. The first factor named 'social rejection' was predominantly loaded by items associated with expectations concerning a negative social reaction towards

Table 2. Factor scores of the items: rotated factor matrix. (Factor loadings and communalities for the items: rotated factor matrix.)

	Factor				
Item no.	Social rejection	Social support	Mood regulation	Ability to perform	Communality
1			.64		.48
2	.26		.55		.50
3			.66		.51
4			.44		.19
5		.64			.50
6			.51		.34
7	.59				.30
8		.63			.48
9		.76			.69
10	.43				.20
11	.59				.40
12	.41	.36			.43
13	.31	.43			.34
14	.46	.38			.46
15			.60		.31
16			.60		.47
17	.44			.39	.49
18				.94	.89
19				.82	.73
20	.72				.67
21	.60				.43
22	.56				.43
23	.31		.37		.39
24					.12
25	.56				.44

Note. Extraction methods: minimum residual factor analysis with oblimin rotation. Only factor scores of ≥.25 are reported.

failure or personal weaknesses (items no. 7, 11, 20, 21, 22, 25). The second factor labelled 'social support' was associated with items which depict a benefit from seeking social support (items no. 5, 8, 9). The third factor labelled 'mood regulation' was associated with expectations concerning the ability to affect one's own mood (items no. 1, 2, 3, 6, 15, 16). Performance-related expectations were associated with the fourth factor labelled 'ability to perform' (items no. 18, 19).

Reliability and validity analyses

Cronbach's α for the complete scale of 75 items was .98. After item reduction, Cronbach's α for the 25-item version of the scale was .93 indicating excellent internal consistency. The correlation of the sum score of the DES (25-item version) with the sum score of the PHQ-9 was $r(156) = .754$ ($p < .001$). The total score of the 25-item DES significantly correlated with the GAD-7 sum score, $r(156) = .647$; $p < .001$. The sum scores of the PHQ-9 and the GAD-7 were strongly correlated, $r(156) = .812$; $p < .001$. The correlation between the total score of the 75-item DES and the PHQ-9 did not significantly differ from the

correlation between the 75-item DES total score and the GAD-7, $z(157) = 1.455$; $p = .073$. The correlation between the total score of the 25-item DES and the PHQ-9 was significantly different from the correlation between the 25-item DES total score and the GAD-7, $z(157) = 3.222$; $p < .001$. The partial correlation of the 25-item DES total score and the PHQ-9 sum score with the GAD-7 sum score as control variable was statistically significant, $r(155) = .515$; $p < .001$. This partial correlation remained significant, $r(63) = .494$; $p < .001$, when including only those participants into the analysis who reported at least moderate symptoms of depression (PHQ-9 sum score >9). Table 3 shows the reliability and correlational analyses for both the 75-item and the 25-item version of the DES. Furthermore, Table 3 shows reliability and factor analyses for the four factors suggested by the exploratory factor analysis.

Discussion

In an iterative process, we developed and preliminarily evaluated the DES as a new self-rating scale for the assessment of dysfunctional expectations in patients with depressive symptoms. This study examined the psychometric properties of a preliminary 75-item version and a reduced 25-item version of the scale in an online sample including people with and without severe symptoms of depression. The DES-25 is considered to be the final version. Results indicate excellent internal consistency of the scale. More specifically than other existing instruments assessing depressive cognitions and meta-cognitions, the DES focusses on various situation-specific expectations which can be tested in behavioural experiments during therapy. In contrast to the NMR scale (Catanzaro & Mearns, 1990), the DES does not only assess expectations regarding feelings of sadness but also expectations regarding feelings of guilt as well as interpersonal expectations and expectations regarding personal achievement. Factor analyses revealed that the DES items can be described by four factors: social rejection, social support, being helpless in coping with negative mood ('mood regulation'), and being helpless in coping with performance-related situations ('ability to perform'). This is consistent with our construction principles as we aimed to use the depressive core beliefs 'being worthless', 'being helpless', and 'not being likable' (Beck, 2011) to deduce specific expectations. The factors 'mood regulation' and 'ability to perform' can clearly be linked to the core belief 'being helpless' as suggested above. The factors 'social support' and 'social rejection' do not directly reflect the core beliefs 'not being likable' and 'being worthless'. However, it is plausible that both social support and social rejection are strongly related to these core beliefs. For instance, a

Table 3. Reliability and correlational analyses

	Cronbach's α	r_{PHQ-9}	r_{GAD-7}
75-item DES	.98	.755 ($p < .001$)	.709 ($p < .001$)
25-item DES	.93	.754 ($p < .001$)	.647 ($p < .001$)
Factor 1: social rejection	.86	.648 ($p < .001$)	.602 ($p < .001$)
Factor 2: social support	.82	.464 ($p < .001$)	.329 ($p < .001$)
Factor 3: mood regulation	.80	.636 ($p < .001$)	.573 ($p < .001$)
Factor 4: ability to perform	.85	.624 ($p < .001$)	.456 ($p < .001$)

Note. DES = Depressive Expectations Scale; PHQ-9 = Patient Health Questionnaire 9; GAD-7 = Generalized Anxiety Disorder 7.

person who disagrees with the statement 'When I talk to someone about my problems, they will understand me' might have the core belief 'I am not likable'. Similarly, a person who agrees with the expectation 'If I do something imperfectly nobody will like me anymore' might have the core belief 'I am worthless', as this would indicate that being valued by other people is connected with accomplishing something.

Consistent with studies using the NMR scale (Backenstrass *et al.*, 2010; Catanzaro & Mearns, 1990), the sum score of the DES items strongly correlates with the sum score of the PHQ-9 assessing the severity of depressive symptoms. Thus, the results indicate good concurrent validity. Regarding discriminant validity, the study yielded less straightforward results as the sum score of the DES significantly correlated with the sum score of the GAD-7, a brief measure for assessing symptoms of generalized anxiety disorder. The correlation of the DES with both the PHQ-9 and the GAD-7 is presumably due to the strong correlation between the PHQ-9 and the GAD-7 sum scores and the great overlap of both depressive and anxiety symptoms in our sample. This is in line with results of previous studies revealing a strong correlation between symptoms of depression and anxiety (Carter, Wittchen, Pfister, & Kessler, 2001; Spitzer *et al.*, 2006; Wittchen, Zhao, Kessler, & Eaton, 1994). More specifically, previous research has revealed similarities of MDD and GAD regarding the anticipation of negative events and pessimistic predictions about the future (Andersen & Limpert, 2001; Dugas *et al.*, 1998; Miranda & Mennin, 2007; Roemer *et al.*, 1997). Hence, the correlation of the DES with both the PHQ-9 and the GAD-7 is plausible when taking into account the overlap of depressive and anxious symptoms. Although we aimed to develop the DES as a depression-specific measure, we cannot safely conclude at this point of investigation that the DES indeed assesses depressive rather than anxious expectations as the correlation of the 75-item DES with the PHQ-9 was only slightly stronger than the correlation with the GAD-7. However, as the process of item selection aimed at excluding items strongly correlating with symptoms of generalized anxiety, the correlation of the 25-item DES with the PHQ-9 was significantly greater than the correlation with the GAD-7. Moreover, partial correlation analysis suggests that depressive expectations and depressive symptoms are strongly correlated even when controlling for the effect of anxiety on this relationship.

Clinical implications

Focusing on expectations in depressive patients has several advantages for practitioners as knowledge about behaviour-related expectations can be used to design behavioural experiments within CBT. This could be facilitated by the DES. For example, if a patient strongly agrees with the statement 'When I ask someone for help I will be rejected' the item could provide the basis for a behavioural experiment given that therapist and patient can agree on situation-specific conditions mentioned by the respective item. Thus, with help of the DES, treatment of individuals with depressive disorders could incorporate expectation violation as suggested by Craske *et al.* (2014). To maximize expectation violation, therapists should choose those expectations that the patient endorses most strongly and put effort into creating behavioural experiments that lead to maximal change in these expectations. This process might facilitate cognitive restructuring within CBT for MDD as the experience gained in a behavioural experiment can be used to modify a person's beliefs (see also Beck, 2011; Dobson & Hamilton, 2003). Taking into account that dysfunctional expectations are often maintained, even in case of experiences which are contradictory to patients' expectations (Rief *et al.*, 2015), the DES can be used repeatedly during the treatment to monitor a patient's progress. Hereby, therapists should also

repeatedly measure depressive symptoms to ensure that psychological interventions aiming at modifying patients' expectations change both depressive expectations and symptoms. A structured assessment of patients' expectations can provide first indications for therapy planning which can be complimented by an idiographic approach in the following therapy process. We hope that the DES will inspire therapists to deliver an expectation-focused treatment of MDD based on the newest findings on mechanisms of change (Craske *et al.*, 2014).

Limitations and directions for future research

As this study was designed as a first step of evaluating the new scale, it has several limitations. First of all, the sample examined in this study was used to develop the DES; other samples with more sophisticated classification approaches should be examined to validate and replicate our results. In particular, although more than 40% of the participants included in the present study reported at least moderate symptoms of depression, future studies should examine a clinical sample with a more thorough diagnostic procedure to ensure that the results yielded in this study are applicable for people formally diagnosed with MDD. For this purpose, future studies should aim at including more individuals reporting severe symptoms of depression as the representation of this group in the current sample is limited. Moreover, the use of a convenience sample in an online survey may have led to a self-selection bias as the study was promoted via web sites and email lists of self-help organizations. To reduce a possible self-selection bias, we decided not to offer a financial benefit; participation was voluntarily and completely anonymous. Further, the use of an online sample may pose a limitation in general. However, several studies have revealed that online surveys usually yield equivalent results when compared with traditional paper–pencil surveys; the representativeness of participants is usually not compromised (Denissen, Neumann, & van Zalk, 2010; Gosling, Vazire, Srivastava, & John, 2004; Lewis, Watson, & White, 2009; Weigold, Weigold, & Russell, 2013). Other studies pointed out that online surveys often enhance self-disclosure and reduce social desirability (Joinson, 1999; Kays, Gathercoal, & Buhrow, 2012; Weisband & Kiesler, 1996). The dropout rate of the present study with 9.8% is very low compared with 34% as average of online surveys (Reips, 2000). Thus, as the study was conducted in accordance with typical recommendations regarding Internet research (Buchanan, 2003; Hewson, Vogel, & Laurent, 2015), the use of an online sample in this study should not be problematic *per se*.

Beyond limitations with regard to the sample, this study could not examine incremental validity of the DES over other existing measures. Thus, the additional use of instruments assessing closely related constructs such as generalized expectancies for negative mood regulation (Catanzaro & Mearns, 1990), dispositional optimism (Scheier & Carver, 1985), or dysfunctional attitudes (Hautzinger, Joormann, & Keller, 2005; Weissman & Beck, 1978) is advisable. The additional use of these measures would also allow to examine the specificity of the DES items as depressive expectations rather than general pessimism, dysfunctional attitudes, or other related constructs. In general, it should be noted that the specificity of the DES items is limited in the way that it was attempted to find a balance between situational specificity on the one hand and general validity for the heterogeneous group of people suffering from MDD on the other hand. Furthermore, the significant difference of the correlation of the 25-item DES with the PHQ-9 and with the GAD-7 was guaranteed by the used strategy of item selection. Thus, the findings regarding the correlation of the DES with measures for depression and anxiety should be replicated with the 25-item version of the DES. Moreover, testing discriminant

validity by examining the correlation between the DES and the GAD-7 might not have been the ideal approach due to the great overlap of depressive and anxious symptoms in our sample. In order to test discriminant validity with regard to anxiety, future studies should more specifically examine anxiety beyond the use of the GAD-7, which was developed as a brief but not sophisticated measure of anxiety. For example, the additional assessment of social phobia might be useful to more specifically examine whether the DES measures depressive expectations rather than anxious expectations. Also, it would be advantageous to test the DES in a longitudinal study in order to examine causal relations between dysfunctional expectations and depressive symptoms. Additionally, this would provide the opportunity to determine the test–retest reliability of the DES. Moreover, it is important to note that the English version of the scale that this article reports on was not tested in the study. Thus, the study should be replicated with an English speaking sample.

Conclusions

The DES was developed as a self-rating scale for the assessment of dysfunctional expectations in patients with depressive symptoms. In an examination of the psychometric properties of the DES in an online sample, the scale was shown to have excellent internal consistency. Validity analyses are promising. The final version of the DES includes 25 items. For cognitive–behavioural treatment of MDD, the DES may facilitate cognitive restructuring given that the identification of a patient's dysfunctional expectations can be used to design behavioural experiments.

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Appendix: Items[a] of the Depressive Expectations Scale (DES)

When I am feeling sad or dejected
1. I will be helpless in coping with my feelings
2. It will help me to do something I usually have fun with
3. I will be able to influence my mood
4. It will help me not to exert myself
5. I will feel better when I talk to someone about my problems
6. I will not be able to get anything done

When I ask someone for help
7. I will be rejected

When I talk to someone about my problems
8. I will feel better afterwards
9. They will understand me
10. They will take advantage of me
11. They will refuse to deal with me any longer

When I take time for myself
12. Others will be understanding of that

When I try to make new acquaintances
13. I will manage that
14. I will get to know kind people

When I am feeling feel guilty
15. I will feel better when I lie down on my bed
16. I will not be able to do anything to feel better

When I have to get an important task done
17. I will fail at it
18. I will hardly be able to concentrate on it
19. My thoughts will automatically stray

When I do something imperfectly
20. Nobody will like me anymore
21. Others will be disappointed in me

General Expectancies
22. Most people will like me just the way I am
23. Nothing will be able to catch my interest
24. If someone did not treat me well in the past that will also be the case in the future
25. Nobody will be there for me when I ask for help

[a]Items of the German version can be requested by mailing the author.

Anhang B: Studie 2

Integrating situation-specific dysfunctional expectations and dispositional optimism into the cognitive model of depression - A path-analytic approach

Tobias Kube*,

Philipps-University of Marburg, Department of Clinical Psychology and Psychotherapy, Gutenbergstraße 18, D-35032 Marburg, Germany

Verena Helena Anna Siebers*,

Philipps-University of Marburg, Department of Clinical Psychology and Psychotherapy, Gutenbergstraße 18, D-35032 Marburg, Germany

Philipp Herzog,

Philipps-University of Marburg, Department of Clinical Psychology and Psychotherapy, Gutenbergstraße 18, D-35032 Marburg, Germany

Julia Anna Glombiewski,

Philipps-University of Marburg, Department of Clinical Psychology and Psychotherapy, Gutenbergstraße 18, D-35032 Marburg, Germany

Bettina Katharina Doering,

Philipps-University of Marburg, Department of Clinical Psychology and Psychotherapy, Gutenbergstraße 18, D-35032 Marburg, Germany

and Winfried Rief

Philipps-University of Marburg, Department of Clinical Psychology and Psychotherapy, Gutenbergstraße 18, D-35032 Marburg, Germany

*Both authors contributed equally to the manuscript.

Correspondence can be addressed to: Tobias Kube, Philipps-University of Marburg, Department of Clinical Psychology and Psychotherapy, Gutenbergstraße 18, D-35032 Marburg, Germany, Email: tobias.kube@uni-marburg.de, Telephone: +49 6421 2823341, Fax: +49 6421 2828904

Abstract

Background: Dysfunctional expectations are considered to be core features of mental disorders and, in particular, major depression. The aim of the present study was to integrate two important types of expectations into the cognitive model of depression: situation-specific dysfunctional expectations (SDE) and dispositional optimism (DO). It was hypothesized that the influence of both DO and intermediate beliefs (IB) on depressive symptoms would be mediated via SDE.

Methods: We examined 95 individuals (age *M*=40.7, 68.1% female) with a diagnosed major depressive disorder from two inpatient clinics and one outpatient clinic. Measurements used in the study included the Depressive Expectations Scale, Dysfunctional Attitudes Scale, Life Orientation Test Revised, and Beck's Depression Inventory-II. Relationships between the constructs were analyzed using path-analytic models with bias-corrected bootstrapping confidence intervals.

Results: Results indicate that the effect of IB on depressive symptoms was fully mediated via SDE, while the effect of DO on depressive symptoms was partly mediated via SDE. IB and DO moderately correlated with each other.

Limitations: Due to the cross-sectional design of the study, it is not possible to draw unambiguous conclusions regarding the causality of the suggested relationships.

Conclusions: The present study stresses the crucial role of dysfunctional expectations for major depression. Moreover, it reveals that SDEs as expectations with a high level of situational specificity may pose an important link between global cognitions and depressive symptoms. Given this situational specificity, SDEs are amenable to disconfirmation through behavioral experiments and may therefore be a promising target for cognitive-behavioral interventions.

Keywords: Major depression, expectation, dispositional optimism, cognitive-behavioral therapy, behavioral experiment

Introduction

Since its first formulation, Beck's cognitive model of depression (Beck, 1963, 1964) has greatly impacted research on depression, and it has inspired the development of cognitive-behavioral therapy (CBT) for Major Depressive Disorder (MDD) and other mental disorders (Beck and Haigh, 2014; Beck et al., 1979). According to this model, a person's emotions, behavior and somatic reactions in a given situation are influenced by the subjective perception of the situation rather than by its objective features (Beck, 1963, 1964; Beck et al., 1979). Thus, the fundamental assumption of this cognitive model is that people suffering from MDD tend to interpret environmental experiences in a negative fashion. It has been hypothesized that this maladaptive information processing is caused by dysfunctional cognitions.

In particular, it has been theorized that dysfunctional core beliefs elicit rigid intermediate beliefs which in turn elicit negative automatic thoughts, hence causing depressive symptoms, as illustrated in Figure 1 (Beck et al., 1979; Beck, 2011). Moreover, Beck et al. (1979) assume that the content of these dysfunctional cognitions reflects a negative view on oneself, the environment and the future ('cognitive triad'). Thus, negative future expectations[2] have been considered to be core features of MDD since Beck's early studies. This crucial role of dysfunctional expectations in MDD has recently been emphasized and further specified (Backenstrass et al., 2006; Kube et al., 2017a; Kube et al., 2017b). Therefore, the present article aims at integrating two important types of expectations - situation-specific dysfunctional expectations (SDE) and dispositional optimism (DO) - into the cognitive model of depression. This may help to better understand cognitive processes in MDD and to identify effective targets for possible interventions through CBT.

Insert Figure 1 here.

In a clinical psychology framework, expectations have been defined as future-directed cognitions that focus on the incidence or non-incidence of a specific event or experience (Kirsch, 1999; Kube et al., 2017a). More specifically than other cognitions, expectations refer to future events or experiences, and therefore they are powerful predictors of future well-being (Laferton et al., 2017). While everyone may have present-

[2] The terms 'expectation' and 'expectancy' are often used in an interchangeable way. However, 'expectation' is more frequently used as a specific, verbalized construct whereas 'expectancies' may be present without full awareness (i.e., implicit expectancies). In this manuscript, we only use the term 'expectation'.

related negative automatic thoughts like "Today I'm feeling sad" in certain situations, the future-directed expectation "In the future, I will constantly feel sad" might lead to significantly more suffering. If this expectation coincidently occurs with the helplessness-related expectation "When I'm feeling sad, I will not be able to do anything to feel better", suffering may further increase.

Accordingly, recent research has acknowledged this clinical relevance of expectations for various mental disorders (Rief and Glombiewski, 2017). With regards to major depressive disorder (MDD), different kinds of expectations have been found to predict the course of depressive symptoms, such as (treatment) outcome expectancies (Greenberg et al., 2006; Price et al., 2008), self-efficacy expectancies (Gopinath et al., 2007; Gordon et al., 2011; Ludman et al., 2003) and global expectancies about future events (Strunk et al., 2006; Vilhauer et al., 2012). Recently, it has been indicated that people suffering from MDD also hold SDEs that might be elicited by depressive core beliefs (Kube et al., 2017a). SDEs can cover different areas of personal and interpersonal life, e.g. expectations concerning social rejection (e.g., “When I ask someone for help, I will be rejected”), mood regulation (e.g., “When I am feeling sad or dejected, I will be helpless in coping with my feelings”), and personal achievement (e.g., “When I have to get an important task done, I will fail at it”) (Kube et al., 2017a).

DO has been defined as personality trait, characterized by the tendency to believe that one will generally experience good vs. bad outcomes in life (Scheier and Carver, 1985). Though DO has originally been conceptualized as unidimensional construct with the poles optimism and pessimism, more recent research has consistently provided evidence for its bidimensionality with the independent constructs of optimism and pessimism (Chang et al., 1994; Chang et al., 1997; Glaesmer et al., 2011; Herzberg et al., 2006; Marshall et al., 1992; Robinson-Whelen et al., 1997). The sum score of both dimensions correlates positively with optimism and negatively with pessimism (Glaesmer et al., 2011). In this manuscript, we therefore use the term *DO* for the sum score of both constructs, while the terms *optimism* and *pessimism* refer to the two distinct constructs.

Research has suggested that both SDEs and DO are strongly correlated with depressive symptoms. In particular, it has been shown that depressive symptoms are associated with SDEs (Kube et al., 2017a) and specific expectations regarding negative mood regulation (Backenstrass et al., 2006; Catanzaro and Mearns, 1990). Likewise, DO has been shown to be associated with depressive symptoms (Strunk and Adler, 2009;

Strunk et al., 2006; Thimm et al., 2013). More specifically, a recent study has revealed that MDD is characterized by the absence of optimistically biased belief updating about future life events (Korn et al., 2014). Though the cognitive model of depression with its cognitive triad implicitly considers SDEs and DO as negative future expectations, so far to our knowledge no model has been developed and empirically tested that explicitly integrates these two important types of expectations. Therefore, the aim of the present study is to examine the relationships of SDEs and DO with depressive symptoms and intermediate beliefs (IB) in a path-analytic model, and thus to explicitly integrate these components into the cognitive model.

Hypotheses

While IB reflect global attitudes and assumptions regarding oneself and life in general (e.g., "It is difficult to be happy unless one is good looking, intelligent, rich and creative"), SDEs are characterized by a higher level of situational specificity (e.g., "When I talk to someone about my problems, I will feel better afterwards"). Moreover, due to their rigorous future-directed wording, it might be easier to disconfirm SDEs through behavioral experiments compared to IB (Kube et al., 2017a). However, both SDEs and IB cover similar areas of personal and interpersonal life, and we therefore assume that SDEs and IB do not differ with regards to their contents, but with regards to their level of situational specificity. Given this difference between SDEs and IB regarding situational specificity and the associations of both SDEs and IB with depressive symptoms, we hypothesize that the effect of IB on depressive symptoms is mediated via SDEs (Hypothesis 1). The level of situational specificity also represents a difference between SDEs and DO: while SDEs are focused on specific situations, DO reflects generalized expectations that are held in various contexts. In line with that, Rief et al. (2015) have suggested that situation-specific expectation may result from generalized expectations. However, both SDEs and DO reflect expectations about future events, and both concepts have been found to be associated with depressive symptoms. Therefore, we hypothesize that the effect of DO on depressive symptoms is mediated via SDEs (Hypothesis 2). In contrast to SDEs, both DO and IB are global and stable assumptions being relevant in various situations, hence making it hard to disconfirm them. With regards to contents, both low DO and IB reflect a negative view of the individual on oneself and life in general. However, while DO per definition (Scheier and Carver, 1985) reflects future-directed outcome expectations, this time-related aspect is not crucial for IB. Thus, we expect a moderate correlation between DO and IB (Hypothesis

3). The hypothesized relationships between SDE, DO, IB and depressive symptoms are illustrated in Figure 2.

Insert Figure 2 here.

Methods

Participants

Participants were recruited at two inpatient clinics and an outpatient clinic in Germany via flyers and personal contact. Inclusion criteria were: current diagnosis of MDD, age of at least 18 years, and sufficient knowledge of German language. A total of 95 volunteers participated in the study. As an incentive for participation, participants had the chance to win gift vouchers for a popular bookshop. The study was approved by local ethics committee (reference number 2016-04k) and has been conducted in accordance with the ethical standards as laid down in the 1964 Declaration of Helsinki and its later amendments. All participants gave written informed consent and were treated in accordance with the ethical guidelines of the German Psychological Association. The whole research project also included the examination of a healthy sample, but as the current study focused on examining the cognitive model of depression in a clinical sample, these data are not reported in this manuscript.

Procedure

In the two inpatient clinics (n=53 and n=18), patients were informed about the study by the study coordinator. In order to control for effects of later treatment (e.g. psychotherapy), patients could only participate during the first two weeks after their intake at the clinic. After receiving detailed study information, participants gave written informed consent. Subsequently, they received the questionnaire and completed it on their own. Completed questionnaires were collected by clinic staff. In the outpatient clinic (n=24), patients were informed about the study by their therapists or the study coordinator. After receiving the study information and giving informed consent, participants completed the questionnaire and gave it back to their therapists or the study coordinator. Similar to the procedure in the inpatient clinics, patients from the outpatient clinic completed the questionnaire during the diagnostic phase before the beginning of the therapy in order to control for therapy effects. Data collection lasted from May 2016 to December 2016. Though the whole research project included an additional second measurement with a five-

month follow-up, these data will be reported elsewhere for two reasons. First, the anticipated drop-out rate at the follow-up would impede the computation of path-analytic models, as aimed in this article. Second, using the follow-up data would hinder our aim to examine the hypothesized relationships in absence of therapy effects.

Measures

Situation-specific dysfunctional expectations (SDE). SDEs were assessed using the Depressive Expectations Scale (DES) developed by Kube et al. (2017a). This scale was developed to measure MDD-specific expectations representing specific predictions of future events which could be tested using a behavioral experiment. For this purpose, the most common depressive core beliefs 'being worthless', 'being helpless', and 'not being likable' (Beck, 2011) were used to deduce situation-specific expectations. For instance, the core belief 'I am not likeable' was used to deduce the situation-specific expectation 'Nobody will be there for me when I ask someone for help'. A previous validation study revealed four underlying factors of the DES: expectations concerning social rejection, social support, negative mood regulation and performance-related situations (Kube et al., 2017a). The DES comprises 25 items, which are rated on a five-point Likert scale. High sum scores of the DES reflect a greater amount of dysfunctional expectations. In a previous study, the DES has shown excellent internal consistency and promising validity (Kube et al., 2017a). In the current study, Cronbach's alpha for internal consistency was α=.87.

Dispositional optimism (DO). DO was assessed with the German version of the Life Orientation Test Revised (LOT-R, Scheier, Carver, & Bridges, 1994) by Glaesmer et al. (2011). The LOT-R is a 10-item self-report scale, of which four items are distractor items that have to be excluded when computing the sum scores. Thus, each subscale (optimism and pessimism) comprises three items. The items are rated on a five-point Likert scale. The sum score of the LOT-R reflects the entire construct of DO (with high values indicating positive outcome expectations), and it has been shown to have good reliability and validity (Glaesmer et al., 2011; Reilley et al., 2005; Scheier et al., 1994). To examine the relationship of DO and depressive symptoms, we decided to use only the sum score of the LOT-R for three reasons. First, this approach is quite common in research investigating the association of DO with depressive symptoms (Andersson, 1996; Chang, 1998; Scheier and Carver, 1985; Scheier et al., 1994). Second, recent research has revealed that depression is characterized by a lack of optimism rather than by excessive pessimism (Korn et al., 2014;

Sharot, 2011). Third, using the sum score of the LOT-R ensured better reliability for the measure of the construct of interest compared to the two subscales optimism (α=.76) and pessimism (α=.69). Internal consistency of the LOT-R was α=.79.

Intermediate beliefs (IB). IB were assessed using a shortened version of the Dysfunctional Attitudes Scale (DAS), originally developed by Weissman and Beck (1978) and translated into German by Hautzinger et al. (2005). The 26-item version of this scale is based on those items which have consistently been shown to belong to the dimensions "performance evaluation" and "approval by others" (Cane et al., 1986; Hautzinger et al., 2005; Joormann, 2004; Prenoveau et al., 2009). Participants rated the items of the DAS on a five-point Likert scale. Previous studies have revealed good reliability and validity of the DAS (Joormann, 2004; Nelson et al., 1992). In the present study, internal consistency was α=.91.

Depressive symptoms. Depressive symptoms were assessed with the Beck Depression Inventory-II (Beck et al., 1996). This well-established 21-item scale assesses somatic, cognitive and affective symptoms of depression with higher scores (ranging from 0 to 63) reflecting severe symptoms of depression. The BDI-II has been shown to have good psychometric properties (Beck et al., 1996). Regarding one inpatient clinic, we used the BDI-II scores that had already been assessed by the clinic within the last two weeks in order to reduce strains for the participants.

Other measures. Socio-demographic variables were assessed in a self-report questionnaire including age, sex, and education. Further, participants completed the anxiety subscales of the Symptom Checklist (SCL) 90-R (Derogatis, 1977) and the Generalized Expectancies for Negative Mood Regulation (NMR) Scale (Backenstrass et al., 2006; Catanzaro and Mearns, 1990). However, as both the SCL-90-R and the NMR scale are not crucial for the research question of this article, we do not report these measures in further detail.

Statistical Analyses

First, we conducted data screening according to the suggestions of Tabachnick and Fidell (2014) and tested the assumptions of path analyses (Kline, 2005). Data screening revealed that for two participants, more than 40% of all data were missing. According to the suggestions of Tabachnick and Fidell (2014), these participants were excluded. Univariate outliers were inspected using the z-scores of the respective scales and their

histograms (Kline, 2005). According to the suggestions of Cohen et al. (2003) and Stevens (2002), multivariate outliers were identified through the Mahalanobis distance and Cook's distance (with $\alpha = 0.5$-quantile of the F distribution according to Cohen et al., 2003). Two participants were identified as outliers regarding several variables and were therefore excluded. Thus, all subsequent analyses are based on data from 91 participants. Further inspection of missing values revealed that only 0.69% of all values were missing, and the MCAR test (Little, 1988) yielded non-significant results, indicating that the values were missing completely at random. Missing values were estimated using the expectation maximization procedure according to Tabachnick and Fidell (2014). We tested the assumptions of the path analysis by examining linearity, homoscedasticity, multicollinearity, independence of residuals, and normal distribution. To examine the relationships between the constructs of interest, we first computed Pearson correlations between SDE, DO, IB, and depressive symptoms using the sum scores of DES, LOT-R, DAS, and BDI-II. These correlational analyses in addition to data screening and descriptive analyses were conducted using IBM SPSS Statistics Version 21.

Path analyses were conducted using IB and DO as exogenous variables, SDE as mediator variable, and depressive symptoms as endogenous variable. For testing statistical significance, we used the maximum likelihood estimation and accelerated bias-corrected bootstrapping confidence intervals (CI) with 10,000 bootstrapping samples. This bias-corrected bootstrapping procedure has been recommended by several authors for testing mediation effects (Cheung and Lau, 2008; Hayes, 2009; MacKinnon et al., 2004). Path analyses were conducted using Mplus version 7.4.

Results

Sample Characteristics

In our sample, 68.1% of the participants were female, mean age was *M*=40.7 years (*SD*=13.3), and most of the participants had primary education (46.5%). Most of the participants were married or in a partner relationship (50.6%). The mean participant sum score in the BDI-II was 28.9 (*SD*=8.76) indicating severe levels of depression (Beck et al., 1996). With regards to the patients' specific diagnoses, 36.7% of the participants were diagnosed with a major depressive episode, 55.7% with a recurrent depressive disorder, 3.8% with a bipolar disorder, and 3.8 % suffered from chronic depression. 24.7% had at least one comorbid other mental disorder with anxiety disorders as most frequent

comorbidities (13.5%). Participants of the three different samples did not differ with regards to BDI sum scores, $F(2, 88)=0.986$, $p=.387$ or any other clinical variable. However, participants from the outpatient clinic ($M=32.10$; $SD=11.91$) were significantly younger than the patients from the two inpatient clinics ($M=43.46$, $SD=12.65$ and $M=42.93$, $SD=13.16$), $F(2, 85)=6.413$, $p=.003$. There were no differences between the three groups regarding other sociodemographic variables. All sample characteristics can be found in Table 1.

Insert Table 1 here.

Correlational Patterns

Correlational analyses revealed significant correlations of the BDI-II sum scores with the DES sum scores ($r=.572$; $p<.001$), the DAS sum scores ($r=.436$; $p<.001$), and the LOT-R sum scores ($r=-.487$; $p<.001$). There were also significant correlations among the DES and the DAS ($r=.586$; $p<.001$), the DES and the LOT-R ($r=-.520$; $p<.001$), and the DAS and the LOT-R ($r=-.462$; $p<.001$). All intercorrelations of the scales used in this study can be found in Table 2.

Insert Table 2 here.

Path Analyses

Examining the assumptions of the path analyses revealed that all preconditions mentioned above were fulfilled. Results of the path analyses indicated a significant direct effect of SDE on depressive symptoms ($\beta=.391$, BCa 95% CI [.138, .642]). IB had no significant direct effect on depressive symptoms ($\beta=.096$, BCa 95% CI [-.168, .364]), but a significant indirect effect via SDE ($\beta= .172$, BCa 95% CI [.051, .355]). DO had both a significant direct effect on depressive symptoms ($\beta=-.239$, BCa 95% CI [-.449, -.038]) and significant indirect effect via SDE ($\beta=-.124$, BCa 95% CI [-.248, -.043]). Overall, the path model explained 42.3% variance in SDE and 38.2% variance in depressive symptoms. Results of the path analyses are illustrated in Figure 3.

Insert Figure 3 here.

Discussion

The aim of the present study was to integrate SDE and DO into the cognitive model of depression by examining their relationships with depressive symptoms and IB. Results

of the study indicated that the effect of both DO and IB on depressive symptoms was mediated by SDE.

With reference to Beck's traditional cognitive model (Beck et al., 1979), it was hypothesized that both IB and DO would impact depressive symptoms. Moreover, we hypothesized that these relationships would be mediated by SDEs as expectations with a higher level of situational specificity. Results of the present study confirmed these hypotheses: both DO and IB were related to depressive symptoms, and these correlations were significantly reduced when simultaneously considering SDEs in the path-analytic models. The effect of IB on depressive symptoms was fully mediated via SDEs, while the effect of DO on depressive symptoms was partly mediated via SDEs. Thus, in line with our mediation hypotheses (Hypotheses 1 and 2), both DO and IB had indirect effects on depressive symptoms. Furthermore, we found a moderate negative correlation between DO and IB, hence confirming our third hypothesis.

Theoretical Implications

The results of the study emphasize the crucial role of expectations for MDD. While expectations have so far only implicitly been considered in the cognitive model of depression, we were able to explicitly integrate SDEs and DO as two important types of expectations into the cognitive model.

The present study replicated previous findings regarding the strong correlation between SDEs and depressive symptoms (Kube et al., 2017a). In addition, the relevance of SDEs for MDD was further specified by revealing that SDEs represent an essential link between both IB and DO and depressive symptoms. Particularly the mediation of the relationship of IB and depressive symptoms via SDEs appears remarkable in view of traditional cognitive theory and therapy: it has been theorized (Beck, 2011) that CBT reduces symptoms of depression by modifying dysfunctional IB. However, previous research has revealed inconsistent findings concerning this cognitive mediational model: while some studies did provide evidence for the mediating role of IB (Moldovan et al., 2013; Quilty et al., 2008; Vittengl et al., 2014), other studies did not find substantial changes of IB through CBT (Koehler et al., 2013; Kohler et al., 2015). Perhaps these inconsistent findings are due to the lack of consideration for more specific cognitions such as SDEs, as the present study suggests that the cognitive model should be extended by considering SDEs. In particular, it is conceivable that the studies mentioned above varied

in the degree of situational specificity of the dysfunctional cognitions that were modified through CBT, hence resulting in differential patterns with regard to changes of dysfunctional cognitions and depressive symptoms.

The current study also emphasized the relevance of DO for MDD, thus replicating results of previous studies (Karlsson et al., 2011; Kleiman et al., 2017; Reilley et al., 2005). Moreover, by providing evidence for the mediation via SDEs, we could specify how DO has an effect on depressive symptoms. That is, individuals with low DO hold more pronounced SDEs which in turn lead to more severe depressive symptoms. Further, results indicated that people with low DO also hold more pronounced IB. This adds to a previous finding by Day and Maltby (2003) who have revealed a negative correlation of DO and IB in a student sample. Given this association between DO and depression, it appears important to integrate DO into the cognitive model of depression.

While the present study was able to integrate SDE and DO into the cognitive model of depression by examining their relationships with IB and depressive symptoms, it could not consider all components of Beck's traditional cognitive model (Beck et al., 1979). In particular, we were not able to consider depressive core beliefs and negative automatic thoughts as additional dysfunctional cognitions. Therefore, future studies may aim at additionally considering these two constructs to further specify cognitive processes in MDD.

Of note, the crucial role of expectations revealed in this study is in line with recent research from cognitive neuroscience. According to modern reformulations of operating principles of the brain, learning is mainly driven by making predictions and experiencing possible differences between predicted and actual outcomes (so-called prediction error) (Garrison et al., 2013; Niv and Schoenbaum, 2008). Thus, as expectations are the only cognitions that represent clear predictions for an individual's future, CBT may more rigorously focus on patients' expectations with the aim of gaining expectation-disconfirming experiences (that is, prediction errors), hence facilitating learning processes such as cognitive and behavioral changes (D'Astolfo and Rief, 2017).

Clinical Implications

The present study stressed that SDEs represent an important link between the more global constructs DO and IB and depressive symptoms. Thus, as SDEs assessed with the DES represent future-directed cognitions with a high degree of situational specificity, they

may provide a good basis for the planning of behavioral experiments and exposure therapy with the aim of disconfirming these expectations (Craske et al., 2014; Kube et al., 2017a; Rief and Glombiewski, 2016). For instance, if a patient holds a SDE like "When I ask someone for help, I will be rejected", the patient could be guided by the therapist to examine the validity of this expectation by conducting a behavioral experiment. This may help to facilitate cognitive restructuring of dysfunctional cognitions (Dobson and Hamilton, 2003). Importantly, given the close relationship between SDEs and IB as revealed in the current study, the modification of SDEs may also help weaken IB if therapists put effort into emphasizing the general relevance of an expectation-violating experience. For this purpose, it might be important to prevent cognitive immunization, a cognitive reappraisal of an expectation-disconfirming experience resulting in expectation persistence despite disconfirming evidence (Kube et al., 2017b).

As the results of the present study also stressed the relevance of DO for MDD, it may inspire therapists to put effort into enhancing patients' optimism. Suggestions for enhancing optimism have been made by Pretzer and Walsh (2001) and Riskind et al. (1996). In particular, it has been suggested that positive imaginations of the future (Blackwell et al., 2013) and the self (Meevissen et al., 2011) may enhance optimism. Indeed, first studies have shown that optimism-enhancing interventions can reduce depressive symptoms and depressive thinking (Miranda et al., 2017; Sergeant and Mongrain, 2014). However, evidence for the effectiveness of such optimism enhancing interventions in clinical samples is limited. Therefore, as the present study emphasized the effect of DO on depressive symptoms in a clinical sample, future research may aim to further examine optimism enhancing interventions among people with MDD.

Limitations

To our knowledge, the present study is the first one that integrated two important types of expectations into the cognitive model of depression by examining a clinical sample. However, the study also has some limitations that need to be addressed.

First, the cross-sectional design does not allow drawing unambiguous conclusions regarding the causality of the suggested relationships. In theory, it is e.g. also possible that people are less optimistic because of their depressive symptoms. Thus, future research should further specify the relationships examined in this study by using experimental or longitudinal designs. Second, as some of the participants did not complete the BDI-II and

the other questionnaires at the same time, it is possible that the relationships of the respective measures and depressive symptoms have not been assessed as precisely as they might have been. Third, as the BDI-II is a self-report questionnaire for the measurement of depressive symptom severity, it might be useful in future studies to additionally use e.g. the Hamilton Depression Rating Scale (Hamilton, 1960) as an external assessment. Fourth, though it would have been desirable to examine also depressive core beliefs and automatic thoughts in our cognitive model, the current study was not able to do so for the following reason: with regards to depressive core beliefs, there is to our knowledge no validated measure for this construct, and we therefore could not consider it in the cognitive model of the present study. Though the Automatic Thoughts Questionnaire (ATQ) has in fact been developed as a measure for negative automatic thoughts, it focuses on the frequency of automatic thoughts rather than on their contents. Therefore, we did not use the ATQ in the current study. Thus, future studies may aim at developing and using measures for depressive core beliefs and automatic thought contents enabling an empirical test of the in this regard extended cognitive model. Finally, it should be noted that the present study put special emphasis on situation-specific expectations as a subtype of depressive cognitions. However, depressive cognitions are also often tied to attributions of past events, and therefore future studies may aim at additionally including these cognitions to further specify the cognitive model of depression.

Concluding remarks

The present study was designed to examine the relationships of SDEs and DO with IB and depressive symptoms and thus to integrate SDEs and DO as important types of expectations into the cognitive model of depression. Results of the study indicated that the effect of both DO and IB as rather stable global constructs on depressive symptoms was mediated via SDEs. Hence, the current study emphasized the crucial role of expectations for MDD. As SDEs represent expectations with a high level of situational specificity, they may provide a promising basis for the planning of behavioral experiments through CBT with the aim of disconfirming patients' expectations. This may facilitate cognitive restructuring and thus lead to optimized treatment outcomes.

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Table 1

Sample characteristics (n=91)

Variable	M (SD)
Age in years[1]	40.7 (13.3)
BDI-II sum core	28.9 (8.76)
Variable	**N (%)**
Education level[2]	
No educational degree	1 (1.2)
Primary education	40 (46.5)
Secondary education	16 (18.6)
Higher education	29 (33.8)
Marital status[3]	
Married/couples relationship	44 (50.6)
Single	30 (34.5)
Divorced	11 (12.6)
In separation	1 (1.1)
Widowed	1 (1.1)
Diagnosis of Major Depression[4]	
Major depressive Episode	29 (36.7)
Recurrent major depressive disorder	44 (55.7)
Chronic depression	3 (3.8)
Bipolar disorder	3 (3.8)
Comorbid diagnoses[5]	
No comorbid mental disorder	67 (75.3)
Anxiety disorder	12 (13.5)
Eating disorder	4 (4.5)
Somatoform disorder	1 (1.1)
Personality disorder	2 (2.2)
Dissociative amnesia	2 (2.2)
Sexual dysfunction	1 (1.1)

Note. M=mean, SD=Standard deviation, n=number, BDI-II=Beck's Depression Inventory II

[1] missing values: 3; [2] missing values: 5; [3] missing values: 4; [4] missing values: 12; [5] missing values: 2

Table 2

Correlational analyses

	BDI-II	DES	DAS	LOT-R
BDI-II	-	.572**	.436**	-.487**
DES	-	-	.586**	-.520**
DAS	-	-	-	-.462**
LOT-R	-	-	-	-

Note. BDI-II = Beck's Depression Inventory II, DES = Depressive Expectations Scale, DAS = Dysfunctional Attitudes Scale, LOT-R = Life Orientation Test Revised

*=p<.05; **=p<.001

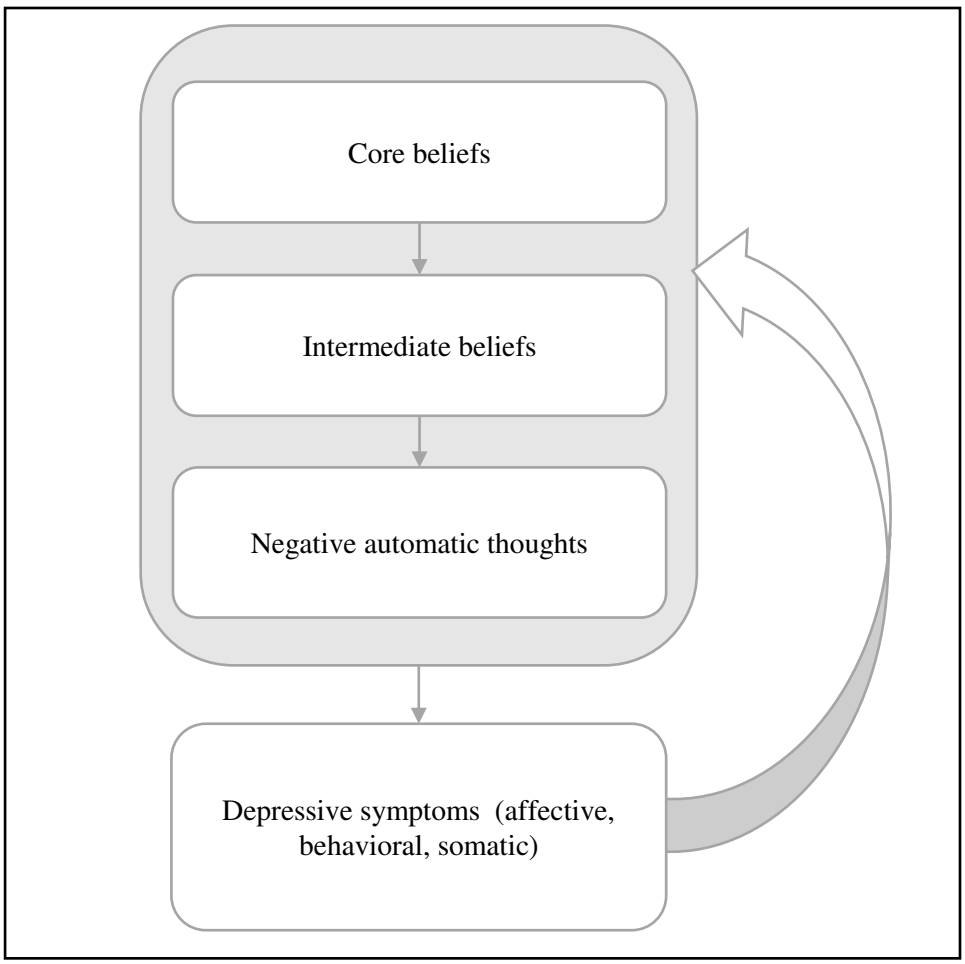

Figure 1. The traditional cognitive model of depression. According to (Beck et al., 1979), depressive symptoms are caused by dysfunctional cognitions. It is assumed that dysfunctional core beliefs elicit intermediate beliefs and negative automatic thoughts which evoke symptoms of depression. Depressive symptoms can in turn influence dysfunctional cognitions.

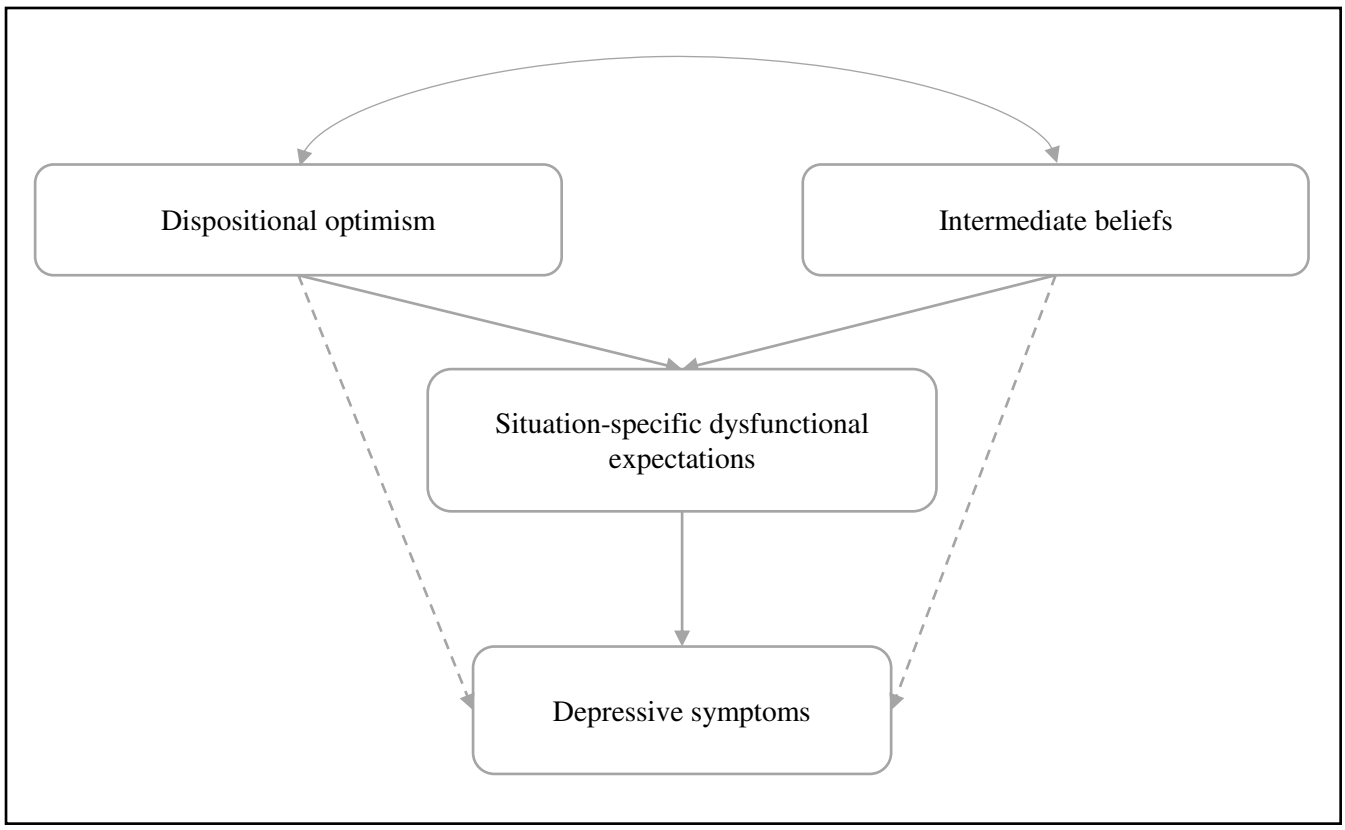

Figure 2. The hypothesized extended cognitive model in the present study considering intermediate beliefs, dispositional optimism, situation-specific dysfunctional expectations and depressive symptoms. We assume that the effect of both intermediate beliefs and dispositional optimism on depressive symptoms is mediated via situation-specific dysfunctional expectations.

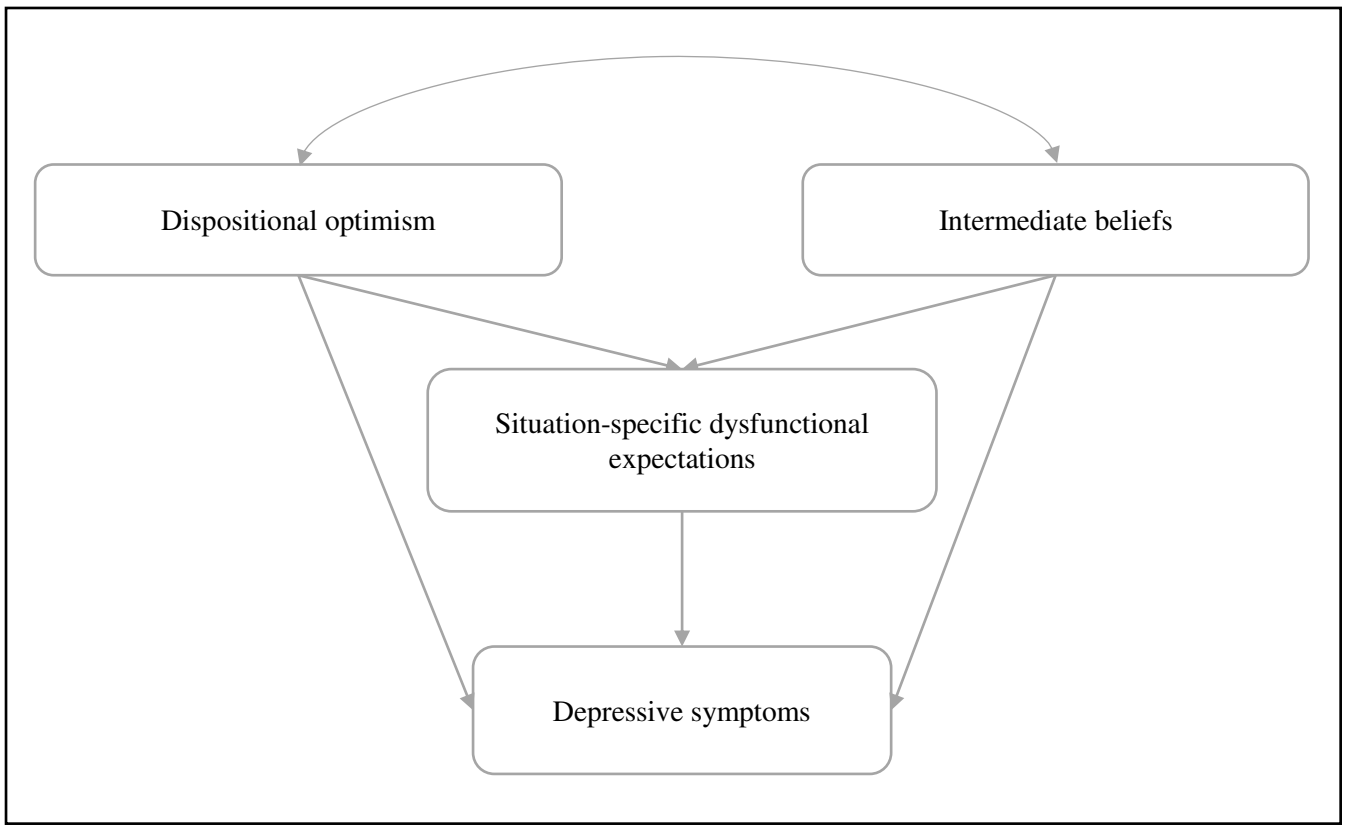

Figure 3. Main results from the path analyses (maximum likelihood estimation) conducted in the present study (n=91). There are presented the standardized path coefficients. Statistical significance was examined using bias-corrected bootstrapping confidence intervals with 10,000 bootstrapping samples. *The 95% bootstrapping confidence interval does not include 0. ** The 99% bootstrapping confidence interval does not include 0.

Anhang C: Studie 3

Do situational expectations rather than global cognitions predict depressive symptoms? A longitudinal study

Tobias Kube[1], Philipp Herzog[1], Charlotte Marie Michalak[1], Julia Anna Glombiewski[1], Bettina Katharina Doering[1], and Winfried Rief[1]

[1]Philipps-University of Marburg, Department of Clinical Psychology and Psychotherapy, Gutenbergstraße 18, D-35032 Marburg, Germany

Correspondence can be addressed to: Tobias Kube, Philipps-University of Marburg, Department of Clinical Psychology and Psychotherapy, Gutenbergstraße 18, D-35032 Marburg, Germany, Email: tobias.kube@uni-marburg.de, Telephone: +49 6421 2823341, Fax: +49 6421 2828904

Abstract

Numerous studies have revealed evidence for the importance of dysfunctional cognitions in major depression. However, recent research has suggested that expectations might be a particularly important subtype of cognitions due to their clear predictions of future events. In the present study, we therefore investigated whether situation-specific dysfunctional expectations (SDEs) rather than more global cognitions (such as intermediate beliefs, dispositional optimism, and generalized expectancies for negative mood regulation) predict symptoms of depression five months later. For this purpose, we examined a clinical (N = 52) and a healthy sample (N = 47). Results indicate that in both the clinical and the healthy sample SDEs had the greatest predictive value for depressive symptoms among all cognitive variables. Thus, the present study highlights the importance of SDEs for the course of depressive symptoms. Due to their high level of situational specificity, SDEs might be an effective target for cognitive-behavioral interventions such as behavioral experiments.

Keywords: expectations, expectancies, major depression, behavioral experiment, dysfunctional cognitions

Introduction

Since Beck's early studies from the 1960s (Beck, 1963, 1964), numerous studies have provided evidence for negative thinking among people suffering from major depressive disorder (MDD). In particular, individuals suffering from MDD have negative cognitions such as negative automatic thoughts, intermediate beliefs and core beliefs. These cognitions are supposed to influence the development and maintenance of depressive symptoms (Beck, Rush, Shaw, & Emery, 1979). However, recent research has suggested that expectations[3] as one specific subgroup of cognitions could be even more important for the development and maintenance of MDD than thoughts and beliefs that focus on present or past events (Kube, D'Astolfo, Glombiewski, Doering, & Rief, 2017). Expectations are the only cognitions with clear relevance for the future, and therefore we argue that negative future expectations may cause increased suffering among people with MDD.

The following example should illustrate this argument: While everyone may have present-related negative automatic thoughts like "I'm feeling guilty" in certain situations, the future-directed expectation "I'm feeling guilty and this is not going to change in the future" might lead to significantly more suffering. If this expectation coincides with the helplessness-related expectation "When I'm feeling guilty, I will not be able to do anything to feel better", this may further increase suffering. Indeed, research has shown that individuals suffering from MDD hold different kinds of negative expectations, such as low self-efficacy expectations (Gopinath, Katon, Russo, & Ludman, 2007; Gordon, Tonge, & Melvin, 2011; Ludman et al., 2003), negative global expectations about future events (Strunk, Lopez, & DeRubeis, 2006; Vilhauer et al., 2012), or situation-specific dysfunctional expectations (Backenstrass et al., 2006; Kube, D'Astolfo, et al., 2017). Because of the future-directed wording of expectations and their "if-then" structure, the validity of expectations can be tested using cognitive-behavioral interventions such as behavioral experiments (Kube, D'Astolfo, et al., 2017). It has been hypothesized that disconfirming patients' disorder-specific expectations can lead to substantial symptom reduction and improved therapy outcome (Craske, Treanor, Conway, Zbozinek, & Vervliet, 2014). Given this clinical utility of patients' expectations, we recently developed

[3] The terms 'expectation' and 'expectancy' are often used in an interchangeable way. However, 'expectation' is more frequently used as a specific, verbalized construct whereas 'expectancies' may be present without full awareness (i.e., implicit expectancies). In this manuscript, we only use the term 'expectation', and we conceptualize expectations as future-directed cognitions that focus on the incidence or non-incidence of a specific event or experience (see also Kube, D'Astolfo et al., 2017; Laferton et al., 2017).

a novel measure for assessing situation-specific dysfunctional expectations (SDE) in MDD, the Depressive Expectations Scale (DES).

The DES assesses SDEs regarding different areas of personal and interpersonal life, such as expectations concerning social rejection (e.g., "When I ask someone for help, I will be rejected), social support (e.g., "When I talk to someone about my problems, I will feel better afterwards", inverted) mood regulation (e.g., "When I am feeling sad or dejected, I will be helpless in coping with my feelings"), and personal achievement (e.g., "When I have to get an important task done, I will fail at it") (Kube, D'Astolfo, et al., 2017). With reference to the cognitive model of depression (Beck et al., 1979), we hypothesized that SDEs may pose an important link between global beliefs, such as intermediate beliefs (IB) and dispositional optimism (DO), and depressive symptoms. This hypothesis could recently be confirmed: the effects of both IB and DO on depressive symptoms were mediated via SDE (Kube et al., in revision). In another previous study, we provided preliminary evidence for the reliability and validity of the DES using a convenience sample (Kube, D'Astolfo, et al., 2017).

Aims of the Present Study

The present study aims at further validating the DES by examining its predictive and incremental validity using a longitudinal design. According to Laferton, Kube, Salzmann, Auer, and Shedden Mora (2017), expectations can vary in their degree of specificity vs. generalization. SDEs represent expectations with a high level of situational specificity. At the opposite end of this continuum, the most prominent concept of generalized expectations is dispositional optimism, defined as the tendency to believe that one will generally experience good vs. bad outcomes in life (Scheier & Carver, 1985). Previous research has revealed that DO is associated with depressive symptoms (Strunk & Adler, 2009; Strunk et al., 2006; Thimm, Holte, Brennen, & Wang, 2013). Another construct reflecting rather generalized expectations has been introduced by Catanzaro and Mearns (1990): they focused on generalized expectancies for negative mood regulation (NMR), and defined this construct as the generalized expectancy that some behavior or cognition will alleviate a negative mood state. Similar to DO, these expectancies have been found to be associated with depressive symptoms (Backenstrass et al., 2006). Likewise, previous research has revealed that IB, reflecting global attitudes and assumptions regarding oneself and life in general, predict the development of depressive symptoms (Alloy, Abramson, Whitehouse, & Hogan, 2006; Jarrett et al., 2012). In addition, dysfunctional IB have been

found to be associated with the severity of depressive symptoms in both healthy and clinical samples (Burns & Spangler, 2001).

The aforementioned constructs - IB, DO, and NMR expectancies - represent dysfunctional cognitions and have therefore conceptual similarities to SDEs. However, IB, DO and NMR expectancies represent more global cognitions while SDEs are characterized by a higher level of situational specificity. We argue that due to this clear situational focus, SDEs may predict depressive symptoms better than global cognitions, because SDEs may be closely related to an individual's perception of his/her environment, while a person may not always be aware of global cognitions. Thus, as SDEs rather than more global cognitions reflect specific predictions of everyday events, the occurrence of anticipated negative events or the non-occurrence of anticipated positive events may result in symptoms of depression. Moreover, given the higher level of situational specificity of SDEs compared to more global cognitions, it might be easier to disconfirm SDEs using behavioral experiments, thus facilitating cognitive restructuring (Dobson & Hamilton, 2003).

In particular, it was hypothesized that SDEs at baseline predict the later severity of depressive symptoms at the follow-up more strongly than the aforementioned more global cognitions in a longitudinal design. In addition to testing this hypothesis in a sample of depressed patients, the present research aimed to examine the prediction of depressive symptoms by SDEs in a healthy sample, because SDEs may pose a risk factor for the development of MDD.

Methods

This study has been part of a larger research project, and cross-sectional data from this project have recently been published (Kube et al., in revision). This study additionally reports the longitudinal data and results from a healthy sample.

Participants

Clinical sample. Participants were recruited at two inpatient clinics and one outpatient clinic in Germany via flyers and personal contact. Inclusion criteria were: current diagnosis of MDD, age of at least 18 years, and sufficient knowledge of the German language. A total of 95 volunteers participated in the study. Among these participants, 52 persons participated in the follow-up examination (54.7%).

Healthy sample. We examined 80 healthy individuals at baseline. Inclusion criteria for the healthy sample were: absence of a currently diagnosed mental disorder, age of at least 18 years, and sufficient knowledge of the German language. In the healthy sample, 47 participants completed the follow-up questionnaires (58.8%).

As an incentive for participation, participants had the chance to win gift vouchers for a popular bookshop. The study was approved by local ethics committee (reference number 2016-04k) and has been conducted in accordance with ethical standards as laid down in the 1964 Declaration of Helsinki and its later amendments. All participants gave written informed consent and all procedures were in accordance with the ethical guidelines of the German Psychological Society.

Procedure

Clinical sample. In the two inpatient clinics (n = 53 and n = 18), patients were informed about the study by the study coordinator. In order to control for effects of later treatment (e.g. psychotherapy), patients could only participate during the first two weeks after their intake at the clinic. After receiving detailed study information, participants gave written informed consent. Subsequently, they received the questionnaire and completed it on their own. Completed questionnaires were collected by clinic staff. In the outpatient clinic (n = 24), patients were informed about the study by their therapists or the study coordinator. After receiving the study information and giving informed consent, participants completed the questionnaire and gave it back to their therapists or the study coordinator. Similar to the procedure in the inpatient hospitals, patients from the outpatient clinic completed the questionnaire during the diagnostic phase before the beginning of the therapy in order to control for therapy effects.

Five months after completing the first questionnaire, patients from the inpatient clinics were sent the second questionnaire via postal service and completed it at home. Participants from the outpatient clinic received the questionnaire by their therapists or the study coordinator. The questionnaire used at the follow-up was shorter than the one used at the first measurement, and included only the measure of SDEs and depressive symptoms. Completed follow-up questionnaires were sent back to the study coordinator. Data collection lasted from May 2016 to November 2017. For 14 participants, there were difficulties in contacting the participants since their contact data had changed or were incorrect. Therefore, the period of five months for the follow-up measure could not be

ensured for these participants, resulting in a follow-up measure six to fourteen months after the first measurement.

Healthy sample. Healthy individuals were recruited via mailing lists and postings at public spaces. Participants from this sample were informed about the study and completed the questionnaires online via the commercial survey platform Unipark®. Five months after the first measurement, they were contacted by the study coordinator via Email, and they were asked to complete the questionnaires from the follow-up measure.

Measures

Situation-specific dysfunctional expectations (SDEs). SDEs were assessed using the Depressive Expectations Scale (DES) developed by Kube, D'Astolfo, et al. (2017). This 25-item scale assesses depression-specific expectations concerning social rejection, social support, negative mood regulation and performance-related situations using a five-point Likert scale. High sum scores of the DES reflect a greater endorsement of dysfunctional expectations. In a previous study, the DES has been shown to have excellent internal consistency and promising validity (Kube, D'Astolfo, et al., 2017). In the current study, internal consistency for the clinical sample was $\alpha = .89$ at the first measurement (for the healthy sample: $\alpha = .89$) and $\alpha = .92$ at the follow-up (for the healthy sample: $\alpha = .94$). Retest reliability was $r = .509$ (for the healthy sample: $r = .693$). After a previous study examined the factorial structure of the DES using a convenience sample (Kube, D'Astolfo, et al., 2017), we performed an exploratory factor analysis to analyze the factor structure using the clinical sample from the present study. The results of this factor analysis can be found in the supplementary materials.

Dispositional optimism (DO). DO was assessed with the German version of the Life Orientation Test Revised (LOT-R, Scheier, Carver, & Bridges, 1994) by Glaesmer et al. (2011). The LOT-R is a 10-item self-report scale, of which four items are distractor items are excluded when computing the sum scores. Thus, each subscale (optimism and pessimism) comprises three items. The items are rated on a five-point Likert scale. The sum score of the LOT-R reflects the entire construct of DO (with high values indicating positive outcome expectations), and it has been shown to have good reliability and validity (Glaesmer et al., 2011; Reilley, Geers, Lindsay, Deronde, & Dember, 2005; Scheier et al., 1994). For the clinical sample from the present study, internal consistency of the LOT-R was $\alpha = .80$, while for the healthy sample internal consistency was low ($\alpha = .25$).

Generalized expectancies for negative mood regulation. We used the Generalized Expectancies for Negative Mood Regulation (NMR) Scale (Backenstrass et al., 2006; Catanzaro & Mearns, 1990) to examine incremental validity of the DES over this existing measure. The NMR scale includes 30 items, and is rated using a five-point Likert scale. High values reflect positive expectations. The NMR scale has been shown to be associated with depressive symptoms, and there is evidence for good reliability of this scale (Backenstrass et al., 2006). In the current study, internal consistency for the clinical sample was $\alpha = .90$ (for the healthy sample: $\alpha = .89$).

Intermediate beliefs (IB). IB were assessed using a shortened version of the Dysfunctional Attitudes Scale (DAS), originally developed by Weissman and Beck (1978) and translated into German by Hautzinger, Joorman, and Keller (2005). The 26-item version of this scale is based on those items which have consistently been shown to belong to the dimensions "performance evaluation" and "approval by others" (Cane, Olinger, Gotlib, & Kuiper, 1986; Joormann, 2004; Prenoveau et al., 2009). Previous studies have revealed good reliability and validity of the DAS (Joormann, 2004; Nelson, Stern, & Cicchetti, 1992). Participants from the clinical sample rated the items of the DAS using a five-point Likert scale. Due to an annoying organizational mistake, healthy participants rated the DAS using a seven-point Likert scale. Internal consistency for the clinical sample was $\alpha = .92$ (for the healthy sample: $\alpha = .88$).

Depressive symptoms. Depressive symptoms were assessed with the Beck Depression Inventory-II (Beck, Steer, Ball, & Ranieri, 1996). This well-established 21-item scale assesses somatic, cognitive and affective symptoms of depression (ranging from 0 to 63) with higher scores reflecting more severe symptoms of depression. The BDI-II has shown good psychometric properties (Beck et al., 1996).

Sociodemographic variables. Socio-demographic variables were assessed in a self-report questionnaire including age, sex, education, and employment status.

Statistical Analyses

Data screening was conducted according to the recommendations by Tabachnick and Fidell (2014). For four participants from the clinical sample, more than 40% of all data were missing. According to Tabachnick and Fidell (2014), these participants were excluded. Univariate outliers were inspected via standardized values of measured variables and their histograms (Kline, 2005). According to Cohen, Cohen, West, and Aiken (2003)

and Stevens (2002), multivariate outliers were identified via Mahalanobis distance and Cook's distance (with α = 0.5-quantile of the *F* distribution). Data from the participants who completed the follow-up questionnaire (52 participants from the clinical sample and 47 participants from the healthy sample) were used to perform a multiple linear hierarchical regression for the two samples, separately, according to the suggestions made by Tabachnick and Fidell (2014). The MCAR test (Little, 1988) yielded non-significant results in the respective samples, indicating that the values were missing completely at random. Missing values were estimated using the expectation maximization procedure according to Tabachnick and Fidell (2014). Differences between the three clinical samples were examined using multivariate analysis of variance (MANOVA). Another MANOVA examined differences between the healthy and the clinical sample.

Assumptions of multiple hierarchical linear regression analysis were carefully examined. Regression analysis was performed with the BDI-II sum scores at the follow-up as dependent variables. Baseline BDI-II sum scores were included as predictors in the first block. LOT-R sum scores, NMR sum scores, and IB sum scores from the first measurement were entered as predictors in the second block. Baseline DES sum scores were entered in the third block. With reference to our previous study (Kube et al., in revision), we expected that SDEs and depressive symptoms have a large proportion of common variance. Therefore, we additionally performed a regression analysis without baseline levels of depression as a predictor, in order to more precisely examine the specific influence of SDEs on depressive symptoms at the follow-up. Importantly, though the aforementioned constructs - DES, LOT-R, NMR expectancies and IB - represent dysfunctional cognitions, there was no multicollinearity between the predictors, indicated by the variance inflation factor (all values < 10). In the results of this regression analysis, the standardized beta coefficients (β) are reported. Type-1 error levels were set at 5%. All analyses were conducted with IBM SPSS Statistics Version 21.

Results

Sample Characteristics

Clinical Sample. Participants of the three different clinical samples did not differ with regards to BDI sum scores, $F(2, 88) = 1.759$, $p = .178$ or any other clinical variable. However, participants from the outpatient clinic ($M = 32.10$; $SD = 11.91$) were significantly younger than the patients from the two inpatient hospitals ($M = 43.46$, $SD =$

12.65 and M = 42.93, SD = 13.16), $F(2, 88) = 7.497$, $p = .001$. There were no differences between the three groups regarding other sociodemographic variables. The mean participant sum score in the BDI-II was 28.7 (SD = 9.18) indicating severe levels of depression (Beck et al., 1996). With regards to the patients' specific diagnoses, 36.7% of the participants were diagnosed with a major depressive episode, 55.7% with a recurrent depressive disorder, 3.8% with a bipolar disorder, and 3.8 % suffered from chronic depression. About a quarter of all participants (24.7%) had at least one comorbid mental disorder with anxiety disorders being most frequent (13.5%). All sample characteristics regarding sociodemographic variables can be found in Table 1.

Insert Table 1 here.

Healthy sample. The mean participant sum score in the BDI-II was 10.1 (SD = 9.07) indicating minimum levels of depression (Beck et al., 1996). Sample characteristics regarding socio-demographic variables are presented in Table 1.

Differences between samples. A MANOVA examined the differences between the two samples (clinical vs. healthy) at baseline. Participants from the healthy sample had significantly fewer depressive symptoms, $F(1, 169) = 175.818$, $p < .001$, $\eta^2_p = .510$, less pronounced situation-specific dysfunctional expectations, $F(1, 169) = 68.775$, $p < .001$, $\eta^2_p = .289$, and less pronounced NMR expectancies, $F(1, 169) = 51.518$, $p < .001$, $\eta^2_p = .234$. They were also more optimistic, $F(1, 169) = 16.521$, $p < .001$, $\eta^2_p = .089$, and significantly younger than those from the clinical sample, $F(1, 113) = 124.846$, $p < .001$; $\eta^2_p = .425$. Frequency analyses revealed that participants from the two samples did not differ on sex distribution, $\chi^2 = .865$, $p = .352$. However, healthy participants had significantly higher educational degrees, $\chi^2 = 59.371$, $p < .001$, and had, contrary to the clinical sample, predominantly a student status, $\chi^2 = 69.446$, $p < .001$.

Main Analysis: Prediction of Depressive Symptoms

Using data from the clinical sample, correlational analyses revealed significant intercorrelations of the scales used in this study, which can be found in Table 2.

Insert Table 2 here.

Clinical Sample. For the BDI-II sum scores from the follow-up measure as dependent variables, the baseline BDI-II sum scores as predictors in the first step explained 14.9% of the variance, $p = .005$; $\beta = .387$. The second set of predictors added another 7.2%

of the variance (p = .240). In this step, none of the predictors had significant effects. When including the DES sum scores in the third block, another 6.0% of the variance could be explained (p = .057). Though there was a trend indicating the importance of DES sum scores (β = .387; p = .057), none of the predictors in this step had significant effects. Results of the multiple hierarchical linear regression analysis are presented in Table 3.

Insert Table 3 here.

For the regression analysis without baseline depression as predictor, the first set of predictors (DAS, NMR, LOT) explained 18.5% of the variance ($R^2_{adj.}$ = .134; F(3, 48) = 3.629; p = .019). In this step, none of the predictors had significant effects. The inclusion of the DES sum scores as predictors in the second block added another 8.0% of the variance ($R^2_{adj.}$ = .203; F(1, 47) = 5.135; p = .028). In this step, only DES sum scores had significant effects (β = .473; p = .028). The results of this regression analysis are illustrated in Figure 1.

Insert Figure 1 here.

Healthy sample. For the BDI-II sum scores from the follow-up as dependent variable, the baseline levels of depression explained 10.9% of the variance, and had significant effects (β = .331; p = .023). The second set of predictors added another 11.7% of the explained variance which did not reach significance (p = .113), and none of the predictors had significant effects. Including the DES sum scores as predictors in the third block added another 8.4% of the variance, which was significant (p = .031). In this step, only the DES sum scores had significant effects (β = .497; p = .031). The results of the regression analysis for the healthy sample can be found in Table 3.

Discussion

The aim of the present study was to examine to what degree SDEs predict depressive symptoms relative to more global cognitions such as IB, DO, and NMR expectancies. For this purpose, a multiple hierarchical regression analysis was performed using a clinical and a healthy sample, with depressive symptoms from the follow-up as dependent variable and baseline depressive symptoms (first step), IB, DO, NMR expectancies (second step), and DES sum scores (third step) as predictors. Results indicate that for the healthy sample, SDEs were the only predictor that had significant effects on depressive symptoms five months later when considering all constructs reflecting dysfunctional cognitions

simultaneously. In the clinical sample, however, the effects of all cognitive variables on depressive symptoms did not reach significance, even though there was a trend similar to the healthy sample indicating the greatest predictive value of SDEs. Because we expected that SDEs and depressive symptoms would have a large proportion of common variance in the clinical sample, we additionally performed a regression analysis without baseline levels of depression as predictors to more precisely examine the specific effects of SDEs on depressive symptoms five months later. In doing so, SDEs were the only significant predictor among all cognitive variables, and the amount of additionally explained variance was significant. Thus, results confirmed the primary hypothesis of the study that SDEs, assessed with the DES, rather than more global cognitions predict depressive symptoms. This is in line with our previous study showing that the effects of IB and DO on depressive symptoms were mediated via SDEs (Kube et al., in revision). However, though the study provided indications for the relevance of SDEs relative to other constructs reflecting dysfunctional cognitions, these results need to be interpreted with caution due to drop-outs at the follow-up resulting in a loss of power.

Nevertheless, the indications provided by the present study suggesting that SDEs rather than global cognitions predict depressive symptoms appear important for both clinical research and practice. The cognitive model of depression (Beck et al., 1979) has pointed out the importance of dysfunctional cognitions for the development and maintenance of MDD, and has argued that modifying dysfunctional cognitions might be an effective way to reduce depressive symptoms. However, several studies have revealed that it might be quite difficult to modify dysfunctional cognitions in MDD (Koehler et al., 2013; Kohler et al., 2015; Kube, Rief, & Glombiewski, 2017). Therefore, the findings of the present study suggest that it could be important to more thoroughly focus on patients' situational expectations instead of more global cognitions for two reasons.

First, the high level of situational specificity of SDEs might be the reason why SDEs had more impact on depressive symptoms than global cognitions because situational expectations are closer to the way an individual perceives his/her environment. Research from cognitive neuroscience has revealed that the brain permanently creates predictions of future events or experiences, and that these predictions are crucial for human learning, since learning is mainly driven by making predictions and experiencing possible differences between predicted and actual outcomes (so-called prediction error) (Garrison, Erdeniz, & Done, 2013; Niv & Schoenbaum, 2008). Therefore, as SDEs represent

cognitions reflecting clear predictions for an individual's future, they might impact depressive symptoms if the individual anticipates predominantly negative events or experiences. Second, given the high level of situational specificity of SDEs, they might be an effective target for cognitive-behavioral treatment of depression. In particular, therapists may consider using behavioral experiments with the aim of providing experiences that disconfirm patients' expectations (in terms of cognitive neuroscience: create prediction errors), hence facilitating learning processes such as cognitive and behavioral changes (Craske et al., 2014; D'Astolfo & Rief, 2017).

Further, the present study revealed that among healthy individuals, SDEs were the only cognitive variable that significantly predicted depressive symptoms. Given these findings, future studies using a longer follow-up interval may examine to what degree SDEs represent a risk factor for the development of full-blown major depression.

Moreover, the current results provide further evidence for the reliability and validity of the DES. In particular, the DES shows incremental validity, as SDEs rather than other cognitive variables predicted depressive symptoms.

Limitations

To our knowledge, the present study is the first empirical investigation to examine the predictive value of situational expectations compared to more global cognitions for depressive symptoms. However, there are several limitations that need to be addressed.

First and foremost, the results of the regression analyses have to be interpreted with caution due to the rather small sample sizes at the follow-up. Hence, future research using larger samples are warranted to confirm our findings. Second, it was not possible to directly compare the predictive value of SDEs between MDD-patients and healthy individuals, because the two samples of the present study considerably differed on both clinical and sociodemographic variables. Further, the clinical sample rated the questionnaires using the paper-pencil method, whereas healthy individuals completed the questionnaires in an online survey. However, several studies have revealed that online surveys usually yield equivalent results compared to traditional paper–pencil surveys, and the representativeness of participants is not compromised (Denissen, Neumann, & van Zalk, 2010; Gosling, Vazire, Srivastava, & John, 2004; Lewis, Watson, & White, 2009; Weigold, Weigold, & Russell, 2013), thus it is unlikely that this aspect had an effect on the results. Nevertheless, future studies may aim at examining parallelized samples in order to

enhance the comparability of the samples. Third, as the BDI-II is a self-report questionnaire for the measurement of depressive symptom severity, it might be useful in future studies to additionally use e.g. the Hamilton Depression Rating Scale (Hamilton, 1960) as an external assessment. Fourth, for some participants from the clinical sample, the follow-up interval was longer than five months, possibly resulting in additional variability among all participants regarding the prediction of depressive symptoms. Finally, since all participants from the clinical sample received psychotherapeutic treatment between the two measurements, the prediction of depressive symptoms was possibly influenced by effects of later treatment.

Concluding Remarks

The purpose of the present study was to use longitudinal data to examine the influence of SDEs and more global cognitions on depressive symptoms in a clinical and a healthy sample. Results of the multiple hierarchical linear regression analysis indicate that in both samples SDEs had the greatest predictive value for depressive symptoms five months later among all cognitive variables assessed at baseline. However, while the amount of explained variance was significant in the healthy sample, it was not significant in the clinical sample when considering baseline levels of depression as a predictor. In sum, the current study highlights the potential of considering SDEs in research on depression, and it provides further indications for thoroughly focusing on SDEs in cognitive-behavioral treatment.

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Table 1

Sociodemographic sample characteristics

Variable	Clinical sample (N = 91)	Healthy sample (N = 80)
Age in years, *M* (*SD*)	40.8 (13.2)	23.05 (5.32)
Sex, *n* (%)[1]		
male	28 (31.5)	20 (25.0)
female	61 (68.5)	60 (75.0)
Educational level, *n* (%)[2]		
No educational degree	1 (1.2)	0
Primary education	41 (47.7)	3 (3.8)
Secondary education	16 (18.6)	57 (71.3)
Higher education	28 (32.6)	20 (25.0)
Employment status, *n* (%)[3]		
Full-time working	15 (17.2)	16 (20.0)
Part-time working	6 (6.9)	10 (12.5)
In training	12 (13.8)	49 (61.3)
Unemployed	9 (10.3)	5 (6.3)
Disabled	14 (16.1)	0
Be off sick	24 (27.6)	0
Pensioners	5 (5.7)	0
Homemaker	2 (2.3)	0

Note. M = mean, SD = standard deviation, n = number

Missing values in the clinical sample: [1] = 2; [2] = 5; [3] = 4

Table 2

Correlational analyses using the baseline data from the clinical sample (N=91)

	BDI	DES	NMR	LOT-R	DAS
BDI	-	.641**	-.520**	-.522**	.534**
DES	-	-	-.672**	-.561**	.634**
NMR	-	-	-	.497**	-.468**
LOT-R	-	-	-	-	-.535**
DAS					-

Note. BDI = Beck's Depression Inventory II, DES = Depressive Expectations Scale, NMR = Generalized Expectancies for Negative Mood Regulation Scale, LOT-R = Life Orientation Test Revised, DAS = Dysfunctional Attitudes Scale

**=p < .001

Table 3

Prediction of depressive symptoms in the clinical sample (N = 52) and the healthy sample (N = 47)

Model		Criterion: BDI-II T2				
Clinical Sample	Predictors	*β*	R^2	R^2 *adj.*	ΔR^2	ΔF
Block 1			.149	.132	.145*	8.784*
	BDI-II T1	.387*				
Block 2			.221	.155	.072	1.450
	BDI-II T1	.256				
	DAS T1	.182				
	NMR T1	.162				
	LOT-R T1	-.217				
Block 3			.281	.203	.060	3.804
	BDI-II T1	.173				
	DAS T1	.019				
	NMR T1	.332				
	LOT-R T1	-.232				
	DES T1	.420				
Healthy Sample						
Block 1			.109	.090	109*	5.523
	BDI-II T1	.331*				
Block 2			.226	.153	.117	2.116
	BDI-II T1	.115				
	DAS T1	.019				
	NMR T1	-.403				
	LOT-R T1	.095				
Block 3			.310	.226	.084*	4.993*
	BDI-II T1	.028				
	DAS T1	.016				
	NMR T1	-.046				
	LOT-R T1	.024				
	DES T1	.497*				

Note. T1= Baseline assessment; T2= Follow-up assessment; BDI-II = Beck Depression Inventory II; DES = Depressive Expectations Scale; DAS = Dysfunctional Attitudes Scale; NMR = Generalized Expectancies for Negative Mood Regulation Scale; LOT-R = Life Orientation Test Revised;

*p < .05

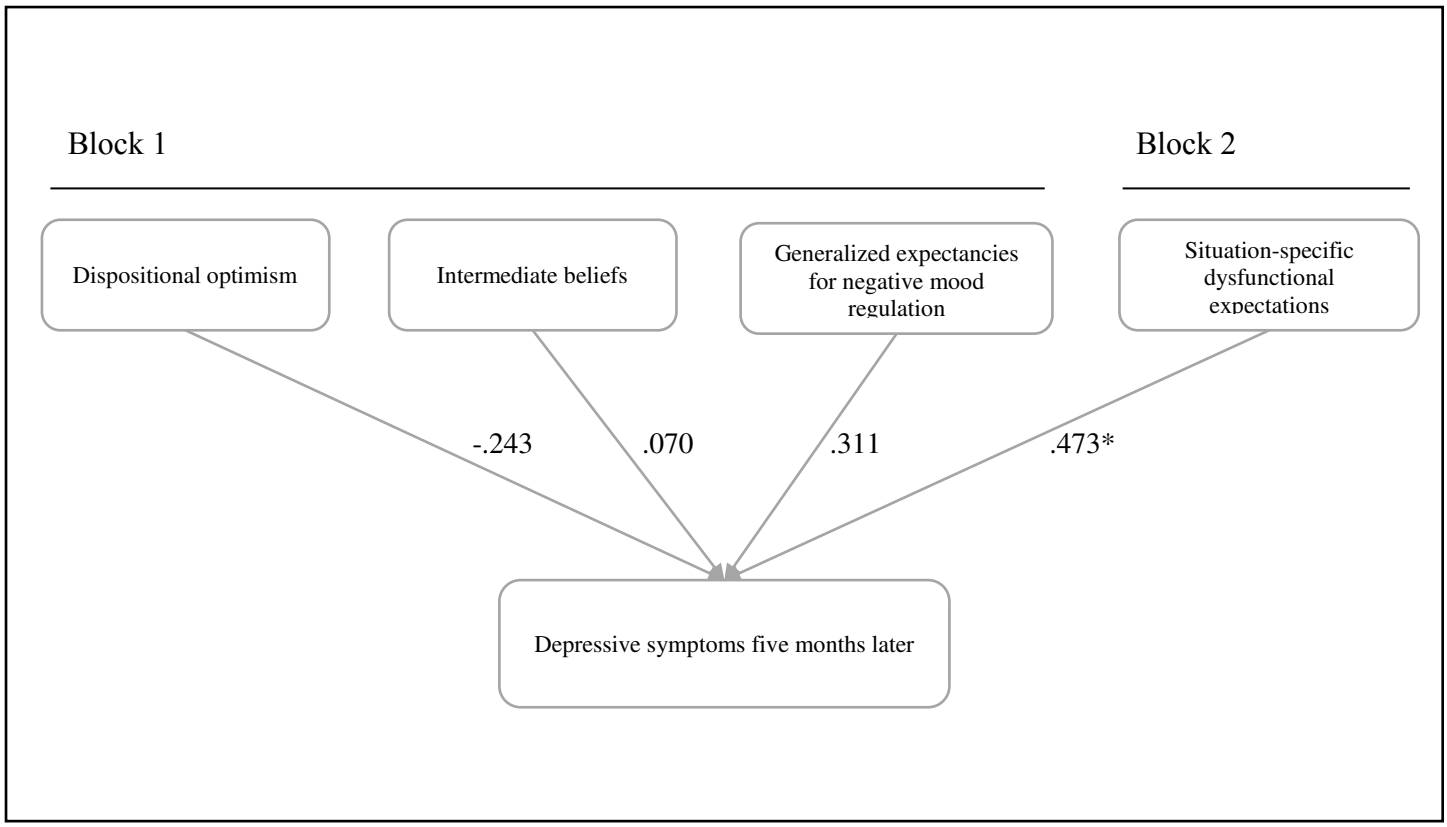

Figure 1. Results of the regression analysis for the clinical sample (N = 52). The effects of different cognitive variables on depressive symptoms were examined without considering baseline levels of depression as predictors. The standardized beta coefficients are presented. The first set of predictors explained 18.5% of the variance (p = .019), including situation-specific dysfunctional expectations as predictors in the second step added 8.0% explained variance (p = .028). In the second step, situation-specific dysfunctional expectations were the only significant predictor among all constructs reflecting dysfunctional cognitions. *p < .05

Supplementary Material

Article Title: Do situation-specific dysfunctional expectations rather than more global cognitions predict depressive symptoms? - A longitudinal study

Journal name: Cognitive Therapy and Research

Author names: Tobias Kube, Philipp Herzog, Charlotte Michalak, Julia Anna Glombiewski, Bettina Katharina Doering, and Winfried Rief

Corresponding author: Tobias Kube, Philipps-University of Marburg, Department of Clinical Psychology and Psychotherapy, Gutenbergstraße 18, D-35032 Marburg, Germany, Phone: +0049 6421 2823341, Email: tobias.kube@staff.uni-marburg.de

Factor analysis: Method

After a previous study revealed four underlying factors of the DES using a convenience sample (Kube, D'Astolfo, et al., 2017), we used baseline data from the clinical sample (n=91) to determine the factor structure of the DES among individuals suffering from MDD. A maximum likelihood factor analysis was computed (Lawley & Maxwell, 1962). Though this technique is a subtype of an exploratory factor analysis, it can be useful for a cross-validation using confirmatory factor analyses in future analyses (Tabachnick & Fidell, 2014). Preconditions of factor analysis were carefully examined, and sample adequacy was examined by inspecting the following coefficients: Kaiser-Meyer-Olkin coefficient, measure of sample adequacy (MSA) coefficients and Bartlett's test of sphericity. According to the recommendations by Bühner (2011), the minimum average partial correlation (MAP) test (Velicer, 1976) was chosen to determine the number of factors. An oblique rotation technique, i.e. the Promax rotation, was chosen because of the intercorrelations of the factors as revealed in our previous study (Kube et al., under revision). According to Gorsuch (1983), items with factor loadings >.30 can be interpreted as loading on a single factor, while Comrey and Lee (1992) have recommended to use factor loadings of ≥.32 as a cut-off for the interpretation. We followed the more conservative suggestions made by Comrey and Lee (1992) to ensure an unambiguous interpretation of the factor structure. Additionally, the factors were interpreted in the light of replicability, utility, and complexity (Tabachnick & Fidell, 2014).

Factor analysis: Results

The Kaiser-Meyer-Olkin coefficient of sampling adequacy yielded a score of .73, MSA coefficients were all clearly above the lower limit of .50 and the Bartletts' test of sphericity was significant indicating an overall moderate adequacy of the sample. All preconditions of factor analysis were fulfilled. The MAP-test revealed five underlying factors of the 25-item DES. Table 4 shows the factor loadings and communality measures of the 25 items for the five-factor solution. Four factors were in line with the factors revealed by a previous study (Kube, D'Astolfo, et al., 2017), namely "social rejection" (item no. 7, 10, 13, 14, 22, 24, 25), "social support" (item no. 5, 8, 9, 11), "mood regulation" (item no. 1, 2, 3, 4, 6, 15, 16) and "ability to perform" (item no. 17, 18, 19). In this sample, an additional fifth factor was found, and it was labelled "approval by others" (item no. 12, 20, 21). This factor was associated with items expressing anticipated negative

reactions by others if, for instance, one does something imperfectly or takes time for one self. The overall variance explained by the five-factor model before rotation was 46.72%.

Table 4

Factor loadings and communalities for the clinical sample (N=91): pattern matrix.

	Factor					Communality
Item no.	Social rejection	Social support	Mood regulation	Ability to perform	Approval by others	
1			.64			.48
2			.49			.40
3			.86			.66
4			.32			.15
5		.58				.35
6			.51			.47
7	.43					.39
8		.92				.84
9		.54				.36
10	.41					.30
11		.35				.39
12					.56	.33
13	.93				-.35	.77
14	.70					.50
15			.39			.27
16			.63			.53
17				.46		.41
18				.77		.63
19				.95		.88
20					.74	.61
21					.80	.63
22	.40					.40
23	.34			.43		.38
24	.38					.19
25	.55					.36

Note. Extraction method: maximum likelihood factor analysis with Promax rotation. Only factor loadings of ≥ .30 are reported.

Factor analysis: Discussion

Results of the factor analysis using the data from the clinical sample stressed the factorial validity of the DES. In comparison to our previous study (Kube, D'Astolfo, et al., 2017), the present study revealed five underlying factors of the DES, of which four factors are equivalent to the factors revealed by the previous study (social rejection, social support, mood regulation, ability to perform), and one additional factor, labelled “approval by others”. It is conceivable that this additional factor could not be found in the previous study, because the convenience sample used in the previous study was more heterogeneous compared to the clinical sample from the present study, resulting in a less unambiguous factor structure with less substantial factor loadings on a single factor and more cross-loadings compared to the present study.

Anhang D: Studie 4

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On the Maintenance of Expectations in Major Depression – Investigating a Neglected Phenomenon

Tobias Kube, Winfried Rief and Julia A. Glombiewski*

Department of Clinical Psychology and Psychotherapy, Philipps-University of Marburg, Marburg, Germany

In this perspective paper, we suggest that among patients suffering from major depressive disorder (MDD), dysfunctional expectations are maintained despite experiences that are contrary to these expectations. Surprisingly, this persistence of expectations in MDD has not yet been addressed by empirical studies. We argue that it is worthwhile to investigate this phenomenon with the aim of improving the treatment of MDD, and we provide a theoretical framework for understanding it. It is hypothesized that the persistence of expectations is primarily due to a process called immunization. That is, people experiencing depressive symptoms may cognitively reappraise the contradictory experience such that expectations do not need to be changed. There may be two mechanisms underlying this immunization: (1) the experience in the expectation-violating situation is considered to be an exception; or (2) the credibility of the information gained from the experience is called into question. Moreover, the maintenance of expectations may be particularly persistent if a person's expectations reflect his or her self-concept, as self-concept has been shown to be associated with future expectations. To empirically examine the hypothesized maintenance of expectations in MDD, we propose an experimental approach which could provide important implications for the treatment of MDD within cognitive behavioral therapy. We suggest that psychological interventions such as behavioral experiments should more rigorously focus on patients' appraisal of expectation-violating experiences in order to prevent immunization processes. Therapists should continuously examine whether patients' expectations were modified and should address the reasons for the maintenance of expectations.

Keywords: major depression, expectation violation, expectancy, immunization, self-concept, expectation persistence, cognitive-behavioral therapy, behavioral experiment

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****Correspondence:***
Tobias Kube
tobias.kube@uni-marburg.de

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THE RELEVANCE OF EXPECTATIONS IN MAJOR DEPRESSION

In a clinical psychology framework, expectations[1] have been defined as future-directed cognitions that focus on the incidence or non-incidence of a specific event or experience (Kube et al., 2016). Based on the Rescorla–Wagner model (Rescorla, 1967), expectations are developed through learning processes (Cleeremans and McClelland, 1991; Colloca and Benedetti, 2009;

[1]The terms 'expectation' and 'expectancy' are often used in an interchangeable way. However, 'expectation' is more frequently used as a specific, verbalized construct whereas 'expectancies' may be present without full awareness (i.e., implicit expectancies). In this manuscript, we only use the term 'expectation.'

Colloca and Miller, 2011). Expectations have been identified to contribute substantially to clinical outcome in various medical conditions (Auer et al., 2016; Nestoriuc et al., 2016). Moreover, expectations have been shown to be one of the major components contributing to placebo and nocebo responses in clinical trials (Rief et al., 2008, 2011; Schwarz et al., 2016), and expectations can substantially enhance the effects of drug-specific components (see Kube and Rief, 2016 for a review). With regard to antidepressant clinical trials, large placebo effects have been reported (Kirsch and Sapirstein, 1998; Kirsch et al., 2002, 2008, Rief et al., 2009), and they are assumed to be mainly based on expectation mechanisms (Shedden Mora et al., 2011; Rutherford et al., 2016). Given the great impact of expectancies in clinical research, Rief et al. (2015) have discussed expectancies as core features of mental disorders (Rief et al., 2015). For major depressive disorder (MDD), there is evidence that people suffering from MDD hold situation-specific dysfunctional expectations which may be elicited by depressive core beliefs (Kube et al., 2016). Clinical observations suggest that these expectations are maintained despite experiences that are contrary to patients' expectations ("expectation violation") (Rief and Glombiewski, 2016). Surprisingly, this observed persistence of expectations in MDD has not yet been investigated in empirical studies. In this perspective article, we argue that it is worthwhile to investigate the maintenance of expectations in MDD, and we provide a theoretical framework for it with the aim of inspiring empirical research into this neglected phenomenon. This could help to develop psychological interventions aiming at enhancing expectation change and could thus substantially improve current cognitive behavioral treatment (CBT) of MDD.

Exposure therapy for the treatment of anxiety disorders has recently focused on disconfirming disorder-specific expectations by maximizing the discrepancy between patients' expectations and actual situational outcomes in expectation-violating situations, which is discussed as promising approach to modify patients' expectations and thereby reduce anxiety symptoms (Craske et al., 2014; Craske, 2015). In MDD, however, disorder-specific expectations are less obvious: people suffering from MDD often report somatic symptoms (such as sleep disturbance, loss of appetite etc.) and negative mood, but may be less aware of cognitions such as expectations (Beck, 2011). Prior research has indicated that (treatment) outcome expectations (Greenberg et al., 2006; Price et al., 2008), self-efficacy expectancies (Ludman et al., 2003; Gopinath et al., 2007; Gordon et al., 2011), and global expectations about future events (Strunk et al., 2006; Vilhauer et al., 2012) predict the course of depressive symptoms. However, situation-specific expectations resulting from depressive core beliefs have received limited attention in psychotherapy research. Similarly, CBT of MDD has primarily focused on present-focused cognitions and automatic thoughts by using cognitive and behavioral interventions (such as cognitive restructuring and behavioral experiments), while rigorously disconfirming future-directed expectations has so far received less attention. A more focused examination of patients' expectations may be advantageous for optimizing psychological interventions (Rief and Glombiewski, 2016).

This is especially important because MDD has been shown to have a high relapse rate (Judd et al., 1998; Lin et al., 1998; Solomon et al., 2000; Pintor et al., 2003; Eaton et al., 2008; Moffitt et al., 2010). According to Risch et al. (2012), relapse may be due to the reactivation of dysfunctional thoughts when confronted with new stressful events. Moreover, a substantial group of patients does not respond to usual CBT (Hofmann et al., 2012; Button et al., 2015; Beard et al., 2016). We hypothesize that the long-term efficacy of CBT could be increased by more rigorously addressing the mechanisms underlying the persistence of dysfunctional expectations. Before discussing these clinical implications, we first address in more detail the phenomenon of expectation persistence.

FRAMEWORKS FOR THE MAINTENANCE OF EXPECTATIONS IN EXPECTATION-VIOLATING SITUATIONS

Rief et al. (2015) proposed a theoretical model to explain the development and maintenance of expectations. According to this model, expectations are shaped by learning processes, as well as by social influences and individual differences. After being confronted with experiences that are contrary to one's expectations, expectations can either be changed or maintained (Rief et al., 2015). We suggest that healthy individuals are able to change their expectations after expectation-violating experiences. For instance, though many people may initially expect to fail when attempting a novel difficult task, healthy individuals may modify their expectations about future performance after receiving feedback indicating that they performed well. However, we suggest that among individuals suffering from MDD expectations are often maintained despite experiences that are contrary to their expectations. We argue that this persistence of expectations despite contradictory experiences is a core feature of MDD, and that the maintenance of expectations in MDD is due to maladaptive information processing involving a process called "immunization."

Immunization as Important Mechanism for the Persistence of Expectations

The term "immunization" was originally introduced by Brandstädter and Greve (1994) in a developmental psychology framework and needs to be distinguished from its use in a medical context. According to Brandstädter and Greve (1994), immunization serves as self-protective mechanism by reappraising experiences of loss in a self-worth stabilizing manner. In clinical psychology, however, immunization has not yet been empirically investigated, and little is known about this phenomenon. According to Rief et al. (2015), in a clinical psychology framework, immunization means that an expectation-violating experience is cognitively reappraised so that one's prior expectation is confirmed by a *post hoc* evaluation, while the contradictory experience is discounted. We suggest that there are two possible mechanisms underlying this immunization process. First, the experience gained in the expectation-violating situation may be considered to be an exception rather than the rule. For instance, a person might maintain expectations

of failure after successful experiences by thinking, "Well, I managed that, but it was an easy task." and thus reappraising the contradictory experience. Second, a person may question the credibility of the information gained in an expectation-violating situation. For instance, the expectation "Nobody will be there for me when I ask for help" may be maintained despite another person's offer of help by a reappraisal such as, "He only helped me because he wanted to get rid of me afterward. In fact, he does not like me and is not interested in how I am feeling." Both mechanisms may lead to a persistence or possibly even reinforcement of expectations via cognitive reappraisal of the contradictory experience in a way that confirms prior expectations. In addition to this immunization process, other forms of maladaptive information processing in MDD, such as cognitive distortion, selective attention or selective memory (Beck, 1963; Hammen and Krantz, 1976; Hammen, 1978; Beck et al., 1979; Krantz and Hammen, 1979; Haaga and Beck, 1995; Beck and Haigh, 2014), may contribute to the maintenance of expectations.

A Social Psychology Perspective

The idea that individuals reappraise contrary information to experience cognitive consistency is supported by research from social and cognitive psychology (Lord et al., 1979; Ross and Lepper, 1980; Frey and Rosch, 1984; Oaksford and Chater, 2007). Cognitive consistency theories and especially the theory of cognitive dissonance (Festinger, 1962) have impacted research on how individuals change cognitions and attitudes. According to Festinger (1962), cognitive dissonance is an aversive state that is generated when a person has two or more contrary cognitions. As a result, people aim to reduce this dissonance by changing one or more of the inconsistent cognitions.

Moreover, research from social and personality psychology has provided extensive evidence that a person's self-concept remains quite stable over time, as individuals selectively search for information that confirms the self-concept while denying self-concept incongruent information (Markus, 1977; Swann and Read, 1981a,b; Swann and Hill, 1982; Markus and Wurf, 1987). Hence, people seem to be prone to a "confirmation bias," and they are supposed to use "positive test strategies," meaning that one prefers to use strategies that are considered to confirm the prior hypothesis (Klayman and Ha, 1987). More specifically, McFarlin and Blascovich (1981) demonstrated in an experimental study that an individual's level of self-esteem predicts expectations about future performance, irrespective of feedback on performance. Given that MDD is associated with low self-esteem (Lewinsohn et al., 1988; Roberts and Monroe, 1992, 1994; Joiner et al., 1999; Orth et al., 2008), we suggest that self-esteem or other aspects of an individual's self-concept may be moderator variables within the immunization process. That is, the maintenance of expectations via immunization is more likely if the expectations involved are closely related to one's self-concept. For instance, the expectation "When I have to get an important task done, I will fail at it" may be particularly persistent if an individual's self-concept includes the assumption "I am not able to adequately cope with performance-related situations." This may be the case in individuals suffering from MDD, since people experiencing depressive symptoms are thought to hold dysfunctional core beliefs such as, "I am not able to get anything done" (Beck et al., 1979; Beck, 2011). **Figure 1** illustrates the suggested immunization process while taking into account the self-concept relevance of expectations.

Also, we suggest that the maintenance of self-concept related expectations is facilitated by the fact that actively modifying one's expectations is perceived as more effortful than reappraising the experience, since one thereby does not need to change one's self-concept (see also Swann and Hill, 1982). For instance, if an individual were to change the expectation, "When I have to get an important task done, I will fail at it" into "When I have to get an important task done, I will manage it," it would follow that the individual is abandoning an excuse for not exposing oneself to performance-related situations. Our clinical experiences, however, suggest that people experiencing depressive symptoms tend to use their pessimistic expectations as justification for withdrawal and avoidance (e.g., "I do not need to try that because I will fail at it anyway"). For instance, modifying one's expectation to "I will be able to manage that" may imply that one has the responsibility to overcome existing challenges and is no longer able to use expectations about failure as excuse for withdrawal and avoidance. This may threaten the self-concept against the background of past behavior, hence facilitating expectation maintenance rather than expectation change.

A Neurobiological Perspective

Expectations have been suggested to shape experiences and to affect how an individual experiences its environment (Kirsch, 1999). This idea has recently been examined by cognitive neuroscience researchers. For instance, it has been shown that prior expectations bias stimulus processing in the visual cortex (Kok et al., 2013). Additionally, research from cognitive neuroscience has indicated that expectation-violating effects (e.g., by using invalid cues) can lead to a "surprise-attention link," resulting in a shift of attention, which may hinder or facilitate learning processes (Horstmann, 2015). Given the maladaptive information processing in MDD, this bias in experiencing one's environment by prior expectations could be especially pronounced in people suffering from MDD, which could further contribute to expectation maintenance.

INVESTIGATING THE PERSISTENCE OF EXPECTATIONS

To empirically examine the hypothesized phenomenon of expectation maintenance in MDD, we propose a stepwise experimental approach (see **Table 1**). First, researchers should attempt to empirically examine the clinical observation that people suffering from MDD tend to maintain their expectations despite expectation-violating experiences. For this purpose, researchers could focus on explicit expectation regarding personal achievement (e.g., "I will be successful in working on an unknown test"), and they could ask participants to complete an unknown test which is said to be very difficult. Then,

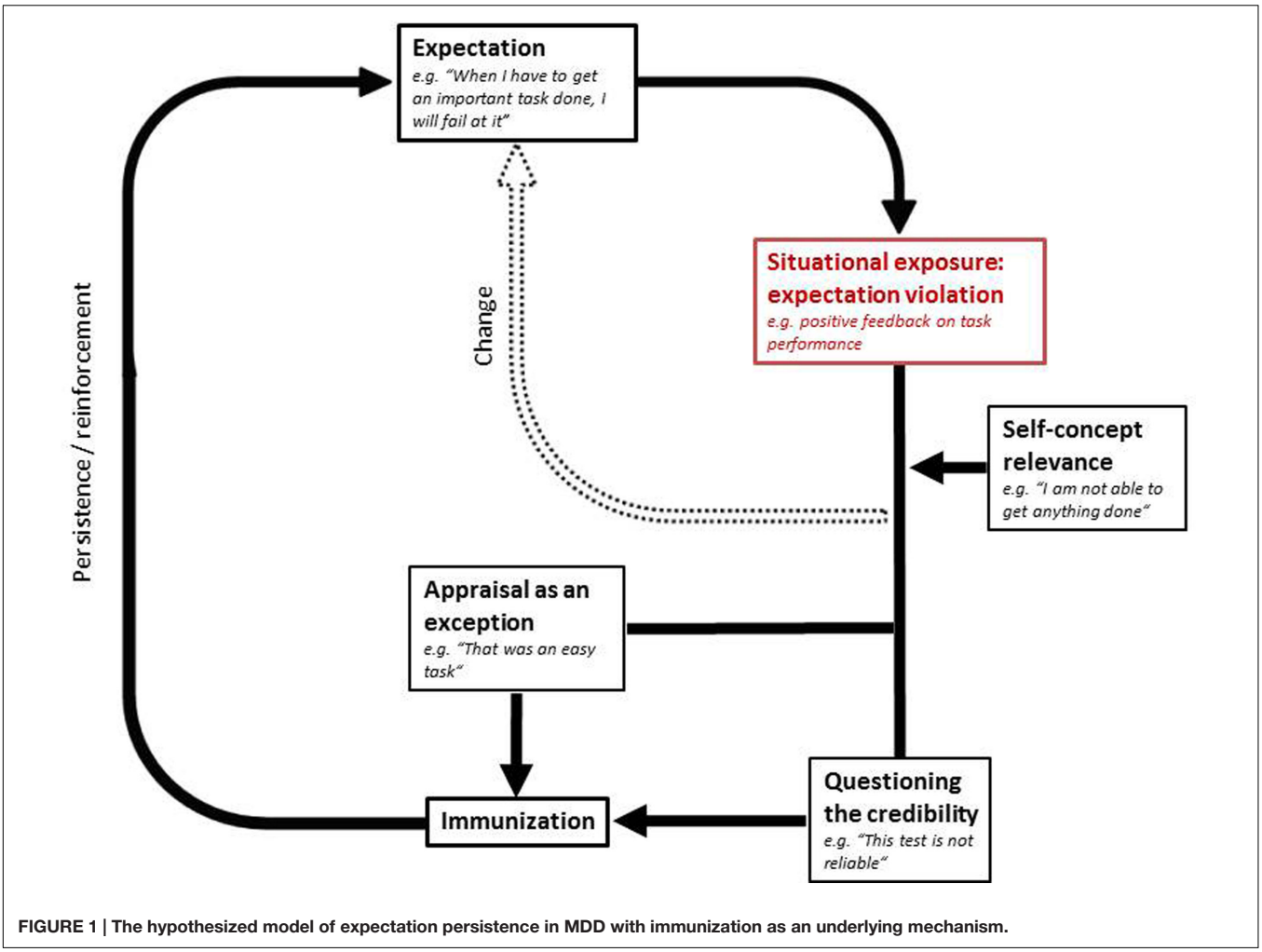

FIGURE 1 | The hypothesized model of expectation persistence in MDD with immunization as an underlying mechanism.

TABLE 1 | Proposed stepwise procedure for the investigation of expectation persistence.

	Aim of the investigation step
Step 1	Systematically observing that people suffering from MDD relative to healthy controls tend to more frequently maintain their expectations despite experiences contrary to expectations. Developing an experimental paradigm for the investigation of expectation violation in MDD. Developing a questionnaire assessing situation-specific expectations in MDD.
Step 2	Experimentally manipulating the appraisal of an expectation-violating situation and thus experimentally manipulating immunization.
Step 3	Examining the self-concept relevance of expectations as a possible moderator of immunization in correlational analyses. Subsequently, experimentally manipulating the self-concept relevance of expectations.
Step 4	Conducting a clinical study with cognitive behavior therapy enhanced with expectation focused psychological interventions vs. treatment as usual.

participants could be given standardized performance feedback that is surprisingly positive. Thereby, it could be examined whether subjects changed their initial expectations after receiving expectation-violating feedback; that is, the possible change of expectations from pre to post would be the dependent variable. At the same time, the hypothesized immunization process as an underlying mechanism could be examined by exploring the reasons for expectation change vs. expectation maintenance.

After this exploratory approach, it may be useful to experimentally manipulate the appraisal of the expectation-violating situation to impede or enhance immunization. For this purpose, experimenters could vary whether or not participants are guided to consider the expectation-violating experience as exceptional. For instance, one could provide standardized information to participants suggesting that the test completed either is or is not useful for predicting achievement in other situations. Thus, it can be examined to what degree the manipulation of the perceived relevance of the expectation-violating experience influences expectation change. Another approach for experimentally manipulating immunization could be the induction of self-focused rumination vs. distraction after an expectation-violating situation. Based on Lyubomirsky et al.'s (2003) paradigm, it is hypothesized that self-focused rumination in individuals with MDD triggers negative thoughts about perceived past failures, which may facilitate

immunization and may therefore additionally contribute to expectation maintenance. To investigate self-concept relevance as a possible moderating variable, correlational analyses could examine whether expectation maintenance is more likely if the expectations are closely related to the individual's self-concept. If correlational analyses yield promising results, researchers could experimentally vary whether or not the expectations examined in the study are associated with self-concept. Finally, clinical studies might examine whether enhancing CBT with expectation focused interventions (see also Rief and Glombiewski, 2016) increases therapy success relative to treatment as usual.

CLINICAL IMPLICATIONS

A better understanding of the persistence of expectations in MDD would have several implications for CBT for MDD. Within CBT for MDD, behavioral experiments are an effective method of testing automatic thoughts in order to facilitate cognitive restructuring (Dobson and Hamilton, 2003; Beck, 2011; Dobson, 2016). Given the relevance of disorder-specific expectations in MDD, we encourage therapists to more specifically focus on patients' expectations when designing behavioral experiments, as the "if-then" structure of expectations (as opposed to other automatic thoughts) makes them susceptible to falsification (Kube et al., 2016). That is, behavioral experiments can serve as expectation-violating situations insofar as patients can gain experiences that are contrary to their expectations (Craske et al., 2014). However, clinical experiences suggest that experiences contrary to patients' expectations do not always result in successful change of expectations (Rief and Glombiewski, 2016). In such cases, it may be worthwhile to actively explore the reasons for the maintenance of expectations in order to impede immunization processes, which could improve therapy success in multiple ways.

First, if a patient considers the experience in a behavioral experiment to be an exception, the therapist should discuss whether this appraisal is accurate or useful. If necessary, behavioral experiments may subsequently be repeated under different circumstances to call the patient's appraisal into question. Thus, the generalizability of the experience gained in a behavioral experiment should be emphasized to prevent immunization processes. Second, if a patient fundamentally questions the credibility of the experience, the therapist might help the patient to re-examine the validity of the experience. Third, therapists should carefully consider whether the expectations tested in a behavioral experiment are closely related to the patient's self-concept, and should be aware that if so, change in expectations may be less likely. Such awareness may prevent disappointment for both patient and therapist, and the therapist can motivate the patient to change his or her behavior, e.g., by discussing the consequences of the behavior. Fourth, in addition to exploring the reasons for maintenance of expectations *after* a behavioral experiment, it may be useful to discuss with the patient the conditions under which he/she would change his/her expectations *before* engaging in the behavioral experiment. This would allow the therapist and patient to agree on the conditions for the behavioral experiment such that the patient would consider a violation of his/her expectations to be a valid experience. This procedure might help to prevent *post hoc* confirmation of expectations via immunization.

Given the high relapse rates in MDD (Judd et al., 1998; Lin et al., 1998; Solomon et al., 2000; Pintor et al., 2003; Eaton et al., 2008; Moffitt et al., 2010), rigorously addressing patients' expectations may be helpful with respect to long-term benefit from therapy, as patients can be encouraged to test future dysfunctional expectations independently after therapy completion. If CBT were to enable patients to prevent dysfunctional immunization processes, this could result in additional positive experiences which in turn could impede the reactivation of dysfunctional thoughts (Risch et al., 2012).

Considering the maintenance of expectations may also be useful for the treatment of other mental disorders. Modifying patients' expectations through exposure to expectation-violating situations has been discussed as a promising approach in the treatment of anxiety disorders (Craske et al., 2014; Craske, 2015), obsessive compulsive disorders (Craske et al., 2014), and chronic pain (Riecke et al., 2013). We believe that impeding immunization processes (as discussed for MDD in this article) might also be an important mechanism of change in these disorders. Thus, we hope that the proposed theoretical model for the persistence of expectations will inspire future research with the aim of optimizing cognitive-behavioral therapy by preventing immunization processes not only in MDD, but also in other mental disorders involving dysfunctional expectations.

CONCLUSION

The maintenance of expectations despite experiences that are contrary to expectations is believed to be a core feature of MDD. We suggest that this persistence of expectations is due to maladaptive information processing in MDD, in particular, immunization processes. Immunization is hypothesized to be especially pronounced if an individual's expectations are closely associated with his or her self-concept. This should be examined in a series of experimental studies and could provide useful information for the treatment of depression. Carefully addressing the reasons for expectation persistence may be useful for optimizing psychological interventions, hence increasing the long-term efficacy of CBT.

AUTHOR CONTRIBUTIONS

TK: Did the major part of the work with regard to conception and design; mainly contributed to the development of the manuscript; approves the manuscript to be published; agrees on being accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

WR: Substantially contributed to the conception of the work; revised the manuscript critically for important intellectual content; approves the manuscript to be published; agrees on being accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. JG: Substantially contributed to the conception of the work; revised the manuscript critically for important intellectual content; approves the manuscript to be published; agrees on being accountable for all aspects of the work in ensuring that.

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Anhang E: Studie 5

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Introducing an EXperimental Paradigm to investigate Expectation Change (EXPEC)

Tobias Kube[a,*], Winfried Rief[a], Mario Gollwitzer[b], Julia A. Glombiewski[a]

[a] Philipps-University of Marburg, Department of Clinical Psychology and Psychotherapy, Gutenbergstraße 18, D-35032 Marburg, Germany
[b] Philipps-University of Marburg, Department of Psychological Methodology and Social Psychology, Gutenbergstraße 18, D-35032 Marburg, Germany

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ABSTRACT

Background and objectives: Dysfunctional expectations are considered to be core features of various mental disorders. Clinical observations suggest that people suffering from mental disorders such as major depression tend to maintain dysfunctional expectations despite expectation-disconfirming evidence. Surprisingly, this clinically relevant phenomenon has not yet sufficiently been investigated in empirical studies. Therefore, we developed an experimental paradigm to investigate expectation change vs. maintenance, and the first step to test its validity is to apply it in healthy individuals.

Methods: After conducting two pilot studies (n = 28; n = 37), the present study systematically examined whether it is possible to change healthy individuals' (n = 102) task-specific and generalized performance expectations through expectation-disconfirming experiences. Using a standardized instruction, we initially induced non-positive expectations regarding participants' ability to successfully work on an unknown test. Then, participants received standardized performance feedback that either confirmed or disconfirmed their expectations before assessing participants' expectations again after completing the Test for the Measure of Emotional Intelligence.

Results: Results indicate that expectation-disconfirming feedback led to a significant change of both task-specific and generalized performance expectations. There was no expectation change in the expectation-confirming condition.

Limitations: As the present study examined expectation change among healthy individuals, the next step is to apply this paradigm in a clinical sample and to examine whether expectation change is less likely among people suffering from depression or other mental disorders characterized by dysfunctional expectations.

Conclusions: Focusing more rigorously on expectation maintenance among people with mental disorders could enable therapists to develop expectation-focused interventions aiming at enhancing expectation change.

1. Introduction

Inspired by findings from placebo research (Beecher, 1955; Benedetti, 2008; Kirsch & Sapirstein, 1998), patients' expectations[1] have become a well-studied construct in the field of physical and mental health problems (Laferton et al., 2017; Rief, Hofmann, & Nestoriuc, 2008). A growing body of research has revealed that patients' expectations have a great impact on the course and treatment success of a variety of medical conditions, such as coronary heart disease (Auer et al., 2016; Barefoot et al., 2011; Juergens et al., 2010; Sears et al., 2004; Stafford, Berk, & Jackson, 2009), chronic pain (Cormier et al., 2016; Vlaeyen et al., 2004), or breast cancer (Nestoriuc et al., 2016). Given this impact of patients' expectations, research has aimed at modifying patients' expectations via brief psychological interventions, and it has been shown that such expectation modifying interventions indeed substantially enhance treatment success (Broadbent et al., 2009; Petrie et al., 2002; Rief et al., 2017).

Over the past years, patients' expectations have also received increasing attention in the context of mental disorders (Rief et al., 2015). In a clinical psychology framework, expectations have been defined as future-directed cognitions that focus on the incidence or non-incidence of a specific event or experience (Kube et al., 2017), and according to Kirsch's response expectancy theory (Kirsch, 1985, 1997), expectations can refer to either external/environmental outcomes (*stimulus*

* Corresponding author.
E-mail address: tobias.kube@uni-marburg.de (T. Kube).

[1] The terms 'expectation' and 'expectancy' are often used in an interchangeable way. However, 'expectation' is more frequently used as a specific, verbalized construct whereas 'expectancies' may be present without full awareness (i.e., implicit expectancies). In this manuscript, we only use the term 'expectation'.

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expectancies) or to non-volitional internal outcomes (*response expectancies*). More specifically than other cognitions, expectations refer to future events or experiences, and therefore we argue that particularly negative future expectations may lead to increased suffering among people with mental disorders. To illustrate this, consider the following example: while everyone may have negative automatic thoughts like "Today I'm feeling sad" in certain situations, the future-directed expectation "In the future, I will constantly feel sad" might be much harder to bear. If this expectation coincidently occurs with the helplessness-related expectation "When I'm feeling sad, I will not be able to do anything to feel better", suffering may further increase. This clinical relevance of expectations additionally increases if dysfunctional expectations are maintained despite continued experiences that are expectation-disconfirming. Indeed, clinical observations suggest that among people suffering from mental disorders dysfunctional expectations are maintained even in case of disconfirming evidence (Rief & Glombiewski, 2016). For instance, unexpectedly positive experiences are considered to be an exception, or the credibility of the disconfirming evidence is called into question (Kube, Rief, & Glombiewski, 2017). Of note, the phenomenon of expectation persistence has conceptual similarities to Jerome Frank's models of demoralization and remoralization (Frank, 1973, 1974; Frank & Frank, 1991). According to this theory, distressed people are characterized by the diminished ability to respond to stressful events resulting in negative consequences for the individual, such as isolation and despair (Connor & Walton, 2011; Frank, 1974). More specifically, demoralization has been conceptualized as a combination of stressful events and subjective incompetence, and it has been argued that demoralization occurs when 'the person's assumptions relevant to self-esteem are disconfirmed by the stressful situation' (de Figueiredo & Frank, 1982).

However, the phenomenon of expectation persistence has not yet sufficiently been investigated in empirical studies. To our knowledge, there is up to now no experimental paradigm that enables to systematically examine differences between healthy individuals and individuals suffering from mental disorders with regards to expectation change vs. maintenance after expectation-disconfirming experiences. Therefore, the primary aim of the present study is to introduce an experimental paradigm that can be used to investigate expectation change after expectation-violating experiences among people with mental disorders (**EX**perimental **P**aradigm to investigate **E**xpectation **C**hange; EXPEC). For this purpose, we primarily focus on people suffering from major depressive disorder (MDD) as clinical example. We do so for three reasons.

First, according to the cognitive model of depression, depressive symptoms are caused by maladaptive information processing and dysfunctional cognitions including dysfunctional expectations about future events (Beck et al., 1979). In particular, research has shown that individuals suffering from MDD hold different kinds of negative expectations, such as low self-efficacy expectations (Gopinath et al., 2007; Gordon, Tonge, & Melvin, 2011; Ludman et al., 2003), negative global expectations about future events (Strunk, Lopez, & DeRubeis, 2006; Vilhauer et al., 2012), or dysfunctional situation-specific expectations (Kube et al., 2017). Second, clinical observations have suggested that dysfunctional expectations in MDD are particularly persistent despite disconfirming evidence (Kube et al., 2017). Thus, it appears that people suffering from MDD are not able to utilize environmental information to update their expectations, hence leading to a disconnection from their environment and a maintenance of depressive symptoms (McCullough, 2003). Third, MDD is a highly prevalent mental disorder (Kessler et al., 2010), and recent meta-analyses have suggested that treatment of MDD should be optimized (Cuijpers et al., 2013, 2014).

However, beyond Beck's cognitive model (Beck et al., 1979), other explanatory models have been developed, stressing the importance of factors different from dysfunctional cognitions for the development and maintenance of MDD, such as learned helplessness (Miller & Seligman, 1976), loss of positive reinforcement (Lewinsohn et al., 1974), or genetic aspects (Zalsman et al., 2006). Recently, it has been revealed that also deficits in emotion regulation predict symptoms of depression (Berking et al., 2014). Since depressive symptoms are associated with negative expectations regarding the ability to regulate emotions (Backenstrass et al., 2006; Kube et al., 2016), the relevance of dysfunctional expectations for MDD further increases.

Only very few studies from the 1970s and '80s have examined to what degree people suffering from MDD relative to healthy individuals can utilize environmental information to update their future expectations. These studies have yielded inconsistent results: while two studies have found that individuals experiencing depressive symptoms could utilize feedback to change their expectations concerning future performance (Loeb, Beck, & Diggory, 1971; Post, Lobitz, & Gasparikova-Krasnec, 1980), another study has revealed the opposite (Hammen & Krantz, 1976). More specifically, Cane and Gotlib (Cane & Gotlib, 1985) have found that negative performance feedback lowered the achievement expectations of both people with MDD and healthy individuals, while positive feedback did not influence future expectations of both groups.

In our view, a major limitation of the studies cited above and a possible reason for their inconsistent findings could be the lack of a differentiation between task-specific and generalized expectations when examining the effect of performance feedback on individuals' future expectations. Generalized achievement expectations can be conceptualized as the degree to which an individual expects to perform successfully across a variety of situations. By contrast, task-specific expectations refer to the expectation to work successfully on a particular task. From a clinical perspective, generalized expectations are more important than task-specific expectations for two reasons. First, task-specific expectations (e.g., "I will not be able to get done with this task") may result from generalized expectations (e.g. "I will not be able to get anything done"). Second, psychotherapeutic interventions with the aim of disconfirming patients' expectations (such as behavioral experiments or exposure therapy (Craske et al., 2014; Rief & Glombiewski, 2016; Vlaeyen et al., 2004)) put effort into emphasizing the general relevance of expectation-violating experiences for various future situations to ensure symptom relief.

We address this issue by developing an experimental approach to investigate the change or maintenance of both task-specific and generalized future expectations. For this purpose, we focus on expectations concerning personal achievement vs. personal failure. We do so for two reasons: first, people experiencing depressive symptoms tend to generally expect themselves to fail in performance-related situations (Kube et al., 2017); second, it is plausible that also healthy individuals report expectations of failure in certain situations, e.g. when confronted with an unknown difficult task. This is important because only when focusing on pessimistic expectations that also healthy individual hold in certain situations, it is possible to investigate whether their maintenance despite contradicting experiences is a core feature of MDD.

1.1. Overview of the present study and hypotheses

The first step in the EXPEC is to systematically induce non-positive expectations among participants in order to minimize possible baseline differences in participants' expectations. For this purpose, we use a standardized instruction suggesting that participants would have to deal with an unknown test which is told to be very difficult. After working on the test, participants receive standardized performance feedback that either confirms or disconfirms their prior expectations. By measuring both the task-specific expectation and the generalized expectations twice – first at baseline before working on the test and second after receiving the feedback – we can examine intra-individual changes in expectation concerning future tasks after receiving either expectation-violating or expectation-confirming performance feedback.

In the present study, we investigated the validity of this novel paradigm. For this purpose, we first focus on healthy individuals in

order to examine whether this paradigm reliably leads to change of healthy individuals' expectations, especially generalized expectations. Only when this paradigm is well-established in a first step among healthy individuals, it can be used to examine possibly different patterns of expectation change in a clinical sample in a second step. Thus, the primary hypothesis of this study is that after receiving expectation-violating feedback, healthy participants change both their task-specific expectation and their generalized expectation concerning personal achievement.

2. Methods

2.1. Participants

The sample size was determined via a-priori power analysis. We estimated the expected effect size based on the existing literature on expectation change cited above (Cane & Gotlib, 1985; Hammen & Krantz, 1976; Loeb et al., 1971; Post et al., 1980), and we expected a small (with regard to the change of the generalized expectation) to medium effect (with regard to the change of the task-specific expectation). Thus, the power analysis (expected $\eta_p^2 = .23$; power = .80) revealed a required sample size of 96 participants. A total of 102 volunteers participated in the study (13 men; 89 women; mean age = 22.74). Participants were students at the Philipps-University of Marburg who received course credit for their participation or, alternatively, 5€ as financial compensation. Participants were informed about the study via email lists. Sample characteristics are presented in Table 1.

2.2. Procedure and conceptual issues

By using a cover story, participants were told that the study was about the evaluation of a psychological test with the aim of examining whether the test could be applied to clinical-psychological assessment. Participants did not know which test they would have to work on. The investigation was conducted at the Philipps-University of Marburg, in a laboratory room equipped with a PC. For the conduction of the whole study, the software tool www.unipark.com was used. The study was conducted by two female psychology students.

2.2.1. Instruction

After giving informed consent, an information text concerning the psychological test was given to participants. This instruction aimed at inducing inter-individually similar expectations concerning the following unknown test (the Test for the Measure of Emotional Intelligence, see the next paragraph for a detailed description of the selection process). Because we aimed to subsequently disconfirm participants' baseline expectations via surprisingly positive performance feedback, baseline expectations should be non-positive (that is, neutral to negative). Accordingly, the respective section of the instruction read: “Up to now, you should not be familiar with the tasks from the test. The tasks were designed by the developers to be very difficult and solved correctly by only few people. Therefore, it is completely normal for you to feel insecure with most tasks. Simply try your best to work on the tasks as good as possible.”

Table 1
Sample characteristics.

Variable	Data
Age in years M (SD)	22.74 (3.44)
Sex (%)	
male	13.70
female	87.30
Education level (%)	
Primary education or no educational degree	0.00
Secondary education	82.35
Higher education	17.65
Initial Expectations	
task-specific M (SD)	3.87 (1.11)
generalized M (SD)	4.13 (1.11)
BDI II	
Sum score M (SD)	8.10 (6.33)
TEMINT sum score (SD)	35.04 (8.50)

Note. M = Mean, SD = Standard deviation, BDI II = Beck Depression Inventory, TEMINT = Test for the Measure of Emotional Intelligence.

Table 2
Criteria for the selection of the particular test for the experimental paradigm.

Importance	Particular criterion
crucial	•Performance or competence test •Participants should hardly be able to evaluate their actual performance by themselves so that an external performance feedback is credible •It must be feasible to conduct the test on the PC •It must be feasible that answers can be given in a format that enables immediate performance feedback
considerable	•The actual performance does not significantly differ between individuals experiencing depressive symptoms and healthy individuals •The test should be relevant for an individual's self-concept •Working on the test should not take more than 15–20 min

2.2.2. Selection of a suitable test

Since we aimed at developing an experimental paradigm for the investigation of psychological responses to standardized performance feedback, a crucial point for our study was the selection of the particular test. For this purpose, we first defined criteria that the respective test should meet. One essential criterion was that it should be very difficult for the participants to evaluate their performance by themselves so that the external performance feedback would appear to be credible. All relevant criteria for the test selection are listed in Table 2. Next, we asked experts for psychological diagnostics and clinical psychology which tests could meet these criteria. As a result, three tests were chosen: the Test for the Measure of Emotional Intelligence (TEMINT) (Schmidt-Atzert & Buehner, 2002), the Remote Associates Test (RAT) (Mednick, 1968) and the 2-back task as measure of working memory (Jaeggi et al., 2010).

We empirically examined in which of these three tests expectation-violating performance feedback most clearly leads to a change of especially the generalized expectation concerning personal achievement. The results of this pilot study, which suggested that the TEMINT might be the most appropriate test in this regard, are presented below. The TEMINT contains brief descriptions of situations with one acting person who in fact experienced the given situation (e.g. “I had a dispute with a colleague”). The participants' task is to empathize with the acting person and to evaluate to what degree the acting person experienced different emotions in the particular situation. For each situation, participants are to rate between six and ten emotions of the acting person (e.g. fear, anger, sadness etc.). In total, participants have to rate twelve situations with 85 emotional states. Correct answers can be examined by comparing the participants' answers with the actual ratings of the acting person. The TEMINT sum score reflects the overall deviations from the actual ratings, whereby low sum scores indicate good performance of the participants.

2.2.3. Standardized feedback and experimental conditions

After each of three blocks of the TEMINT, participants received standardized performance feedback that could either confirm or disconfirm the negative expectations that were initially induced. In the expectation-violation condition, participants were told that they solved 25 out 32 tasks correctly in the first block (20 out of 23 in the second block and 24 out of 30 in the third block, respectively), and that they are thus among the best 18% of all participants in that block (among the

best 12% in the second block and among the best 14% in the third block, respectively). After the last block, participants additionally received feedback for the complete test, suggesting that they are among the best 15% of all participants performing on the TEMINT. We decided for a range of the best 12%–18% of all participants which participants were told to belong to for two reasons. First, as the feedback should represent an expectation-violating experience, it has to suggest that the participants' performance was above average. However, the expectation-violating feedback must not appear incredibly positive in order to prevent serious doubts concerning its credibility. Therefore, we refrained from overly positive feedback. Second, we considered it to be important that the numbers being fed back appear authentic in view of a computer based feedback system. Hence, we decided for 12%, 14%, 15%, 18%, and not e.g. for 5% or 10%.

The expectation-confirming condition differed from the expectation-violating condition only with regard to the standardized performance feedback. In that condition, the participants were told that they solved 17 out of 32 tasks correctly in the first block (14 out of 23 in the second block, 17 out of 30 in the third block, and 48 out of 85 in the complete test, respectively). Additionally, each feedback suggested that participants' performance was on average compared with all participants. Participants were randomized to one of the two conditions.

2.2.4. Follow-up measures and debriefing

After completing the TEMINT, several follow-up questionnaires were administered to the participants. Next, to examine the credibility of the cover story, we asked participants after completing the test and the follow-up measures whether they suspected that the study would have another aim than the one mentioned in the study information. Finally, participants were debriefed with regards to the actual aim of the study. All materials and questionnaires were delivered in German language to the participants; for this article, we translated them into English. Fig. 1 illustrates the procedure of the whole study.

2.3. Measures

2.3.1. Expectations

Having read the instruction, participants rated their task-specific expectation and their generalized expectation concerning personal achievement. The task-specific expectation was: “I will be successful in working on the tasks from the test.” The generalized performance expectation read as follows: “I will be successful in working on unknown tasks in general.” Both expectations were rated on a 7-point Likert Scale ranging from (1) “I totally disagree” to (7) “I totally agree”.

After completing the test, participants rated both their task-specific and their generalized expectation again. The task-specific expectation was: “In the future, I will be successful in working on similar tasks as the ones from the test, even if I am not familiar with them.” The generalized future expectation read as follows: “I will be successful in working on unknown tasks in general in the future.” To prevent that rating these two expectations after the test completion would raise doubts concerning the cover story, participants were first to rate four distractor items (e.g. “I liked the test”, “Working on the test was boring” etc.).

2.3.2. Depressive symptoms

Depressive symptoms were assessed with the Beck's Depression Inventory (BDI) II (Beck et al., 1996) which comprises 21 items to assess depressive symptoms on a 4-point scale ranging from 0 to 3. The sum score ranges between 0 and 63, whereby lower values indicate few symptoms of depression. In our sample, the internal consistency of the BDI was $\alpha = .855$.

2.3.3. Socio-demographics

Socio-demographic variables were assessed in a brief self-report questionnaire including age, sex, and education.

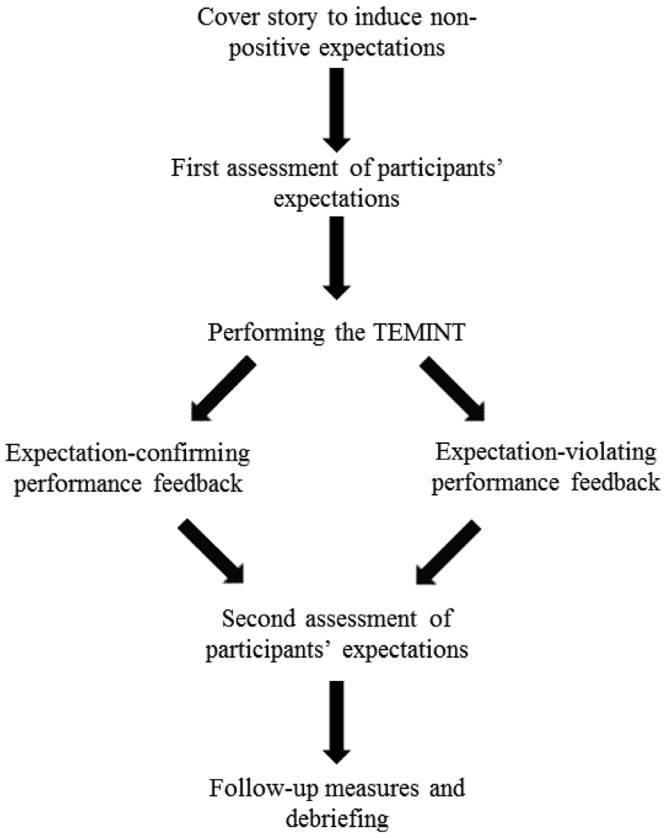

Fig. 1. The basic procedure of the experimental paradigm. After inducing neutral to negative expectations regarding one's ability to work successfully on an unknown test, participants' expectations are assessed for the first time. Then, participants perform the Test for the Measure of Emotional Intelligence (TEMINT), whereby they receive standardized performance feedback that either confirms or disconfirms their initial expectation. Subsequently, participants' expectations are assessed again followed by a follow-up measure and debriefing.

2.4. Ethics

The study was approved by local ethics committee (reference number 2016-03k) and has been conducted in accordance with the ethical standards as laid down in the 1964 Declaration of Helsinki and its later amendments. All participants gave written informed consent and were treated in accordance with the ethical guidelines of the German Psychological Society.

2.5. Statistical analyses

T-tests for independent samples were computed to examine possible baseline differences between the two groups. A Time (before test vs. after feedback) by Group (expectation-violating vs. expectation-confirming feedback) mixed ANOVA with both expectations (task-specific vs. generalized) as dependent variables was conducted. As measure for the effect sizes of the repeated measures ANOVAs, we report η_p^2. According to (Eid, Gollwitzer, & Schmitt, 2010), the categorization of η_p^2 into small/medium/large effects based on the taxonomy by Cohen (Cohen, 1988) depends on the intra-class correlation ρ of the dependent variable. Accordingly, we provide ρ for each ANOVA to allow categorizing the effect sizes. To test whether actual performance in the TEMINT is related to depressive symptoms, we computed the correlation between the TEMINT sum score and the BDI sum score. Type-1 error levels were set at 5%. There were no missing values due to the configuration of the study. All analyses were conducted with IBM SPSS Statistics Version 21.

2.6. Pilot studies

2.6.1. Instruction

In a first pilot study (n = 28), we tested whether the instruction mentioned above, relative to an instruction suggesting that the tasks were very easy and that almost everyone could solve them correctly, actually induced less positive expectations concerning one's ability to work successfully on the unknown test. Participants rated their expectation on a 7-point Likert Scale. Results revealed that the two instructions indeed induced significantly different expectations, $t(26) = 6199$; $p < .001$; $d = 2.358$ with a mean score of 3.50 in the condition aiming at inducing neutral to negative expectations and a mean score of 6.00 in the condition aiming at inducing positive expectations.

2.6.2. Selection of the suitable test

In a second pilot study with a student sample (n = 37), we empirically investigated which of the three selected tests is most appropriate for inducing expectation change after expectation-violating performance feedback. Participants of this pilot study performed one of the three tests under investigation ($n_{TEMINT} = 12$; $n_{RAT} = 12$; $n_{2\text{-}back} = 13$). The procedure was the same as for the main study reported above except for the fact that all participants of this pilot study received expectation-violating performance feedback. A Time (before test vs. after receiving feedback) by Test (TEMINT vs. RAT vs. 2-back) mixed ANOVA with expectations as dependent variables revealed a significant interaction effect for the task-specific expectation, $F(2,34) = 3.878$; $p = .030$; $\eta_p^2 = .186$. With an intra-class correlation of $\rho = .048$, this is a large effect according to Cohen (Cohen, 1988) ($\eta_p^2 = .012$: small effect; $\eta_p^2 = .072$: medium effect; $\eta_p^2 = .167$: large effect). Although the interaction effect for the generalized expectation did not reach significance, $F(2,34) = 3.225$; $p = .052$, the effect size was quite large, $\eta_p^2 = .159$, $\rho = .455$ ($\eta_p^2 = .016$: small effect; $\eta_p^2 = .094$: medium effect; $\eta_p^2 = .211$: large effect). Paired-samples T-tests for expectation change for the three tests under investigation revealed that the change of both task-specific and generalized expectations was significant among those participants who performed the TEMINT ($p_{task\text{-}specific} = .001$; $p_{generalized} = .041$), while expectation change was not significant for the RAT ($p_{task\text{-}specific} = .223$; $p_{generalized} = .723$) and for the 2-back task ($p_{task\text{-}specific} = .175$; $p_{generalized} = 1$). Therefore, we chose the TEMINT as test for our paradigm. Fig. 2 visualizes the results of this pilot study.

Table 3
Comparison of the two experimental conditions.

	Condition		Significant differences
	Expectation confirmation (n = 51)	Expectation violation (n = 51)	
	M (SD)	M (SD)	
Baseline expectations			
task-specific	4.02 (1.07)	3.73 (1.13)	t(100) = -1.349; p = .180
generalized	4.16 (1.12)	4.10 (1.12)	t(100) = -0.265; p = .791
Expectations after test completion			
task-specific	3.86 (1.72)	5.59 (1.24)	F(1,100) = 34.580; p < .001[a]
generalized	3.94 (1.58)	4.73 (1.31)	F(1,100) = 8.950; p = .003[1]
BDI sum score	8.80 (6.93)	7.39 (5.65)	t(100) = -1.127; p = .262
TEMINT sum score	36.24 (9.22)	33.84 (7.63)	t(100) = -1.428; p = .156

Note. M = Mean, SD = Standard deviation, BDI = Beck Depression Inventory II, TEMINT = Test for the Measure of Emotional Intelligence.

[a] Results of a Time (before test vs. after feedback) by Group (expectation-violating vs. expectation-confirming feedback) mixed ANOVA with the task-specific and generalized expectations as dependent variables.

3. Results

3.1. Differences in baseline characteristics, depressive symptoms and test performance

The initial task-specific expectations of the expectation violation condition (M = 3.73; SD = 1.13) and the expectation confirmation condition (M = 4.02; SD = 1.07) did not significantly differ from each other, $t(100) = -1.349$; $p = .180$; $d = 0.263$. The initial generalized expectation was nearly the same in the expectation violation condition (M = 4.10; SD = 1.12) and the expectation confirmation condition (M = 4.16; SD = 1.12), $t(100) = -0.265$; $p = .791$; $d = 0.005$. The two groups did also not significantly differ with regards to depressive symptoms, $t(100) = -1.127$; $p = .262$; $d = 0.223$ and actual performance in the TEMINT, $t(100) = -1.428$; $p = .156$; $d = 0.284$, as indicated in Table 3.

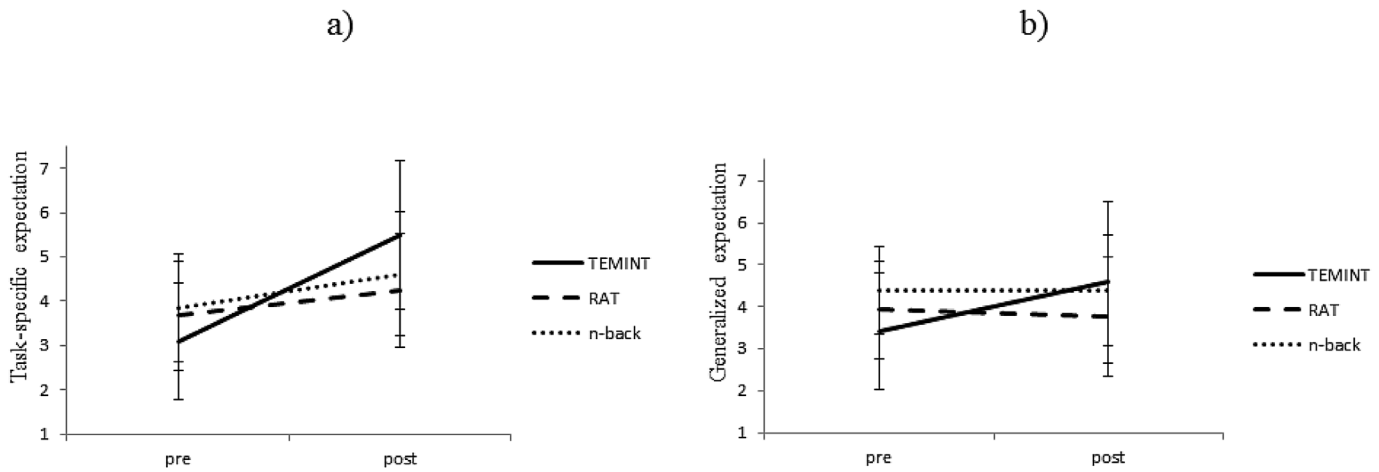

Fig. 2. Results of the pilot study. The pilot study aimed at selecting a psychological test which most clearly leads to expectation change after expectation-violating performance feedback. The TEMINT, the Remote Associates Test (RAT) and a 2-back task (measuring the capacity of working memory) were compared with regards to changes of task-specific (a) and generalized performance expectations (b).

3.2. Change of the task-specific expectations

The Time by Group mixed ANOVA indicated a significant main effect of Time; overall, the task-specific expectation after the test completion was more optimistic (M = 4.73; SD = 1.67) than before working on the test (M = 3.87; SD = 1.11), $F(1,100) = 24.671$; $p < .001$; $\eta_p^2 = .198$. Also, there was a significant main effect of Group, $F(1,100) = 13.387$; $p < .001$; $\eta_p^2 = .118$, whereby the overall task-specific expectation was more positive in the expectation violation condition than in the expectation confirmation condition. There was also a significant Time by Group interaction effect, $F(1,100) = 34.580$; $p < .001$; $\eta_p^2 = .257$, as indicated in Table 3. With $\rho = .049$, the effect size of this interaction effect is large according to Cohen (Cohen, 1988) ($\eta_p^2 = .012$: small effect; $\eta_p^2 = .072$: medium effect; $\eta_p^2 = .167$: large effect). Expectation change occurred in the expectation violation condition ($t(50) = -8.125$; $p < .001$; $d = 1.137$), but not in the expectation confirmation condition ($t(50) = 0.613$; $p = .542$; $d = 0.091$).

3.3. Change of the generalized expectations

The Time by Group mixed ANOVA indicated no significant main effect of Time, $F(1,100) = 2.135$; $p = .147$; $\eta_p^2 = .021$. Also, there was no significant main effect of Group, $F(1,100) = 2.856$; $p = .094$; $\eta_p^2 = .028$. However, there was a significant Time by Group interaction, $F(1,100) = 8.950$; $p = .003$; $\eta_p^2 = .082$, as indicated in Table 3. With $\rho = .390$, the effect size of this interaction effect is medium according to Cohen (Cohen, 1988) ($\eta_p^2 = .016$: small effect; $\eta_p^2 = .094$: medium effect; $\eta_p^2 = .211$: large effect). Like for the task-specific expectation, expectation change occurred in the expectation violation condition ($t(50) = -2.893$; $p = .006$; $d = 0.409$), but not in the expectation confirmation condition ($t(50) = 1.198$; $p = .236$; $d = 0.181$). Fig. 3 visualizes the results regarding change of both task-specific and generalized expectations.

3.4. Credibility of the cover story

Overall, only 19 out of 102 participants suspected that the study would have another aim than the one indicated in the study information, and the following reasons of suspicions were mentioned: “the study aimed to examine the participants' self-evaluation” (nine participants), “the study aimed to examine the influence of the participants' mood on their ability to empathize with other people” (two participants), “the study aimed to encourage participants to think about their own feelings” (one participant), “the study aimed to examine how people cope with failure (one participant). Another six participants suspected another aim although they did not explicitly mention one. Two out of the 19 participants who suspected another aim of the study, explicitly questioned the credibility of the received feedback (these two participants were among the participants who received expectation-confirming feedback). No participant mentioned the suspicion that the study could be about participants' expectations.

4. Discussion

The aim of the present study was to introduce EXPEC, an experimental paradigm that can be used to investigate change vs. maintenance of performance-related expectations after expectation-violating experiences. In line with our hypotheses, it was possible to change both task-specific and generalized expectations concerning personal achievement by giving standardized expectation-violating performance feedback, while expectation confirming feedback did not lead to expectation change.

The present study is the first experimental approach, of which we are aware, that examines whether people can utilize unexpectedly positive feedback to change their generalized performance expectations, while previous studies investigated effects on only task-specific expectations (Cane & Gotlib, 1985; Loeb et al., 1971; Post et al., 1980). In view of research findings from social and personality psychology which have revealed that an individual's self-concept remains intra-individually quite stable over time (Klayman & Ha, 1987; Markus, 1977; Markus & Wurf, 1987) by selectively searching for self-concept confirming information and discounting self-concept incongruent information (Swann & Hill, 1982; Swann & Read, 1981a, 1981b), it appears remarkable that one single expectation-violating situation experienced in our study was able to change the participants' generalized expectations concerning personal achievement. However, it should be noted that the generalized expectations examined in this study only refer to performance-related situations, and it cannot be considered as generalized expectation in terms of generalized self-efficacy or dispositional optimism, as conceptualized by Laferton et al. (Laferton et al., 2017). Regarding change of generalized expectations, recent research has revealed that generalized expectations are susceptible to change by using optimism-enhancing interventions (Meevissen, Peters, & Alberts, 2011). Further, it has been shown that this enhancement of generalized expectations can reduce pain (Hanssen et al., 2013) and pain-induced impairments (Boselie et al., 2014, 2017).

4.1. Strengths and limitations

One limitation is that generalized and task-specific expectations were assessed with only one item in each case. Thus, it is possible that the constructs of interest have not been assessed as precisely as they

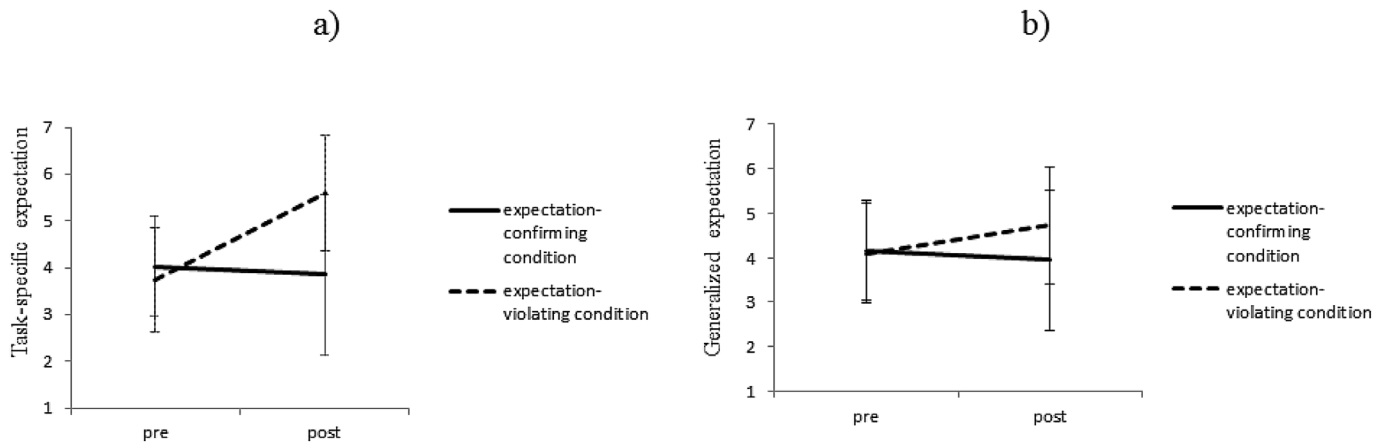

Fig. 3. Illustration of the main results of the present study. Expectation-violating performance feedback leads to changes of both task-specific (a) and generalized expectations (b), while there is no expectation change in case of expectation-confirming feedback.

might have been. However, we decided to measure both expectations with only one item, because we were afraid that a more extensive assessment, though psychometrically superior, could raise serious doubts concerning the cover story, which suggested that the study was about the evaluation of a test, and not about participants' expectations. Another limitation is posed by the fact that we could not assess the temporal stability of expectation change in the expectation violation condition (e.g. over a period of several days). Moreover, we only assessed explicit expectations, and the possibly influencing effects of implicit expectations could not be controlled. In addition, we only focused on performance-related expectations, and this is only one aspect of expectations relevant in MDD. Indeed, research has shown that people suffering from MDD hold various negative expectations regarding personal and interpersonal life (Backenstrass et al., 2006; Gopinath et al., 2007; Kube et al., 2017; Strunk et al., 2006). Therefore, future studies should also aim at examining change of expectations related these aspects. Beyond that, the generalizability of the findings regarding expectation change in healthy individuals is limited due to the fact that we examined a highly educated (predominantly) female student sample.

The study also has several strengths. The paradigm presented in this study enables researchers to examine the influence of an expectation-violating experience on expectation change vs. expectation maintenance in a standardized manner. Hereby, the majority of the participants considered the cover story to be credible. Also, our study is the first one, of which we are aware, that distinguishes between task-specific and generalized performance expectations when examining the effect of performance feedback on future expectations. Furthermore, we carefully selected crucial elements of the paradigm in an iterative process, e.g. the particular test performed by the participants, by defining criteria for its selection and by conducting preliminary empirical investigations. Importantly, the results of the present study revealed no relationship between the performance in the TEMINT and the amount of depressive symptoms. This is in line with our predefined selection criteria for the particular test (see Table 2) and therefore further strengthens the appropriateness of EXPEC.

4.2. Clinical implications and directions for future research

Since it has been hypothesized by previous research that people suffering from major depression tend to maintain pessimistic expectations despite expectation-violating experiences (Kube et al., 2017), the paradigm presented in this study can be used to examine in a next step whether expectation persistence despite disconfirming evidence is indeed a core feature of MDD, after we could show in the present study that it is possible to experimentally induce expectation change in healthy individuals. Thus, future studies should apply our paradigm to a clinical sample, and they should evaluate to what degree expectation change occurs among people suffering from MDD relative to healthy individuals. This could provide new insights into the psychopathology of MDD: we assume that people suffering from MDD cognitively reappraise potentially useful information via cognitive immunization by considering the expectation-violating experience to be an exception rather than the rule or by questioning the credibility of the information gained from the expectation-violating experience (Kube et al., 2017). As a result, individuals cannot utilize this information to change their future expectations so that they appear to be disconnected from their environment, as also theories of cognitive behavioral analysis system of psychotherapy (CBASP) have suggested (McCullough, 2003).

Future research might examine in how far this maladaptive information processing can be influenced such that immunization processes are impeded. For this purpose, it could be useful to experimentally manipulate information processing after an expectation-violating experience, e.g. by providing standardized information that can either emphasize or question the relevance of the information gained from the expectation-violating experience. This could provide useful information for clinical practice, as it might enable therapists to develop expectation-focused psychological interventions (Craske et al., 2014; Rief & Glombiewski, 2016) that aim at enhancing expectation change by more rigorously focusing on the prevention of immunization processes. This would be in line with a recent study which has found that practice in making optimistic predictions decreases depressive predictive certainty (Miranda et al., 2017).

Potentially, the EXPEC may also be applied in research on other mental disorders characterized by dysfunctional performance expectations, such as social phobia (e.g., “If I do not perform well on this test, this will be embarrassing”) or test anxiety (e.g., “I will be so afraid of failing on this test that I will not be able to concentrate”). Additionally, the EXPEC may also be used to examine hasty change of expectations (as observed in Borderline Personality Disorder, Histrionic Personality Disorder or Schizophrenia). Thus, this paradigm may inspire future research to more sufficiently examine when it is adaptive to change one's expectations.

5. Conclusions

The aim of the present study was to introduce an experimental paradigm that can be used to examine expectation change vs. maintenance following expectation-violating experiences. For this purpose, non-positive expectations concerning personal achievement were induced among healthy individuals, before participants received standardized performance feedback that could either confirm or disconfirm their initial expectation. Results of this study indicate that it is possible to change individuals' generalized expectation via expectation-violating performance feedback. The next step is to apply this paradigm to a clinical sample and to examine whether e.g. people suffering from MDD differ from healthy individuals with regard to expectation change. This could provide implications for further improvement of CBT of MDD and other mental disorders characterized by persistent dysfunctional expectations.

Conflicts of interest

The authors declare no conflict of interest.

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Anhang F: Studie 6

Why dysfunctional expectations in depression persist - Results from two experimental studies investigating cognitive immunization

Tobias Kube,

Philipps-University of Marburg, Department of Clinical Psychology and Psychotherapy, Gutenbergstraße 18, D-35032 Marburg, Germany

Winfried Rief,

Philipps-University of Marburg, Department of Clinical Psychology and Psychotherapy, Gutenbergstraße 18, D-35032 Marburg, Germany

Mario Gollwitzer,

Philipps-University of Marburg, Department of Psychological Methodology and Social Psychology, Gutenbergstraße 18, D-35032 Marburg, Germany

Thomas Gärtner,

Schön Klinik Bad Arolsen, Hofgarten 10, D-34454 Bad Arolsen, Germany

and Julia Anna Glombiewski,

Philipps-University of Marburg, Department of Clinical Psychology and Psychotherapy, Gutenbergstraße 18, D-35032 Marburg, Germany

Abstract

Recent research has revealed that expectations are powerful predictors of future well-being. When continuously gaining experiences that disconfirm negative expectations, it appears adaptive to change one's expectations. However, clinical observations suggest that people suffering from major depressive disorder (MDD) tend to maintain dysfunctional expectations despite disconfirming evidence. We conducted two experimental studies to investigate this phenomenon. In Study 1, we compared individuals suffering from MDD (N = 58) to healthy individuals (N = 59). Participants in both groups worked on the same performance test (Test for the Measure of Emotional Intelligence) and received standardized feedback that either confirmed or disconfirmed their initial expectations for their personal performance. Results show that neither healthy individuals nor individuals with MDD changed their expectations after expectation-confirming feedback. In the expectation-disconfirming condition, healthy individuals changed their expectations, whereas individuals with MDD did not. In Study 2, we investigated cognitive immunization (a cognitive reappraisal of the disconfirming evidence) as a possible mechanism underlying expectation persistence among 59 individuals reporting elevated levels of depression. For this purpose, we experimentally varied the appraisal of expectation-disconfirming feedback. Results indicated that varying cognitive immunization by adding an immunization-enhancing or immunization-inhibiting manipulation impacted expectation change, thus suggesting a crucial role of cognitive immunization in expectation change. These two studies indicated that individuals suffering from depression have more difficulties with changing their expectations after disconfirming experiences than do healthy individuals, and cognitive immunization might be a core mechanism underlying expectation persistence. Therefore, psychotherapeutic interventions should aim to inhibit cognitive immunization processes to enhance expectation change.

Keywords: major depression, expectation, immunization, expectation persistence, expectancy violation, behavioral experiment

Why dysfunctional expectations in depression persist - Results from two experimental studies investigating cognitive immunization

Medical research has revealed large placebo effects among a wide range of pharmacological treatments (Benedetti, 2014), and patients' treatment expectations have been shown to be a core mechanism underlying these placebo effects (Rief, Bingel, Schedlowski, & Enck, 2011; Rutherford et al., 2016; Schwarz, Pfister, & Buchel, 2016). These findings have inspired researchers to utilize these expectation effects clinically and to address patients' expectations in psychological interventions. Recent research has shown that enhancing patients' expectations substantially improves treatment outcomes among a wide range of medical conditions (Petrie, Cameron, Ellis, Buick, & Weinman, 2002; Rief et al., 2017; von Blanckenburg et al., 2015; Woods & Asmundson, 2008). Given the relevance of expectations for patients with medical conditions, it may also be worthwhile to more rigorously examine the role of expectations among patients with mental disorders (Rief & Glombiewski, 2017).

Within clinical psychology, expectations have been defined as future-directed cognitions that focus on the incidence or non-incidence of a specific event or experience (Kirsch, 1985, 1997; Kube, D'Astolfo, Glombiewski, Doering, & Rief, 2017). Unlike some other cognitions, expectations specifically refer to future events or experiences, and therefore they are powerful predictors of future well-being (Laferton, Kube, Salzmann, Auer, & Shedden Mora, 2017). Thus, negative future expectations, which characterize various mental disorders, are likely to cause substantial suffering (Rief et al., 2015). In particular, individuals suffering from major depressive disorder (MDD) hold dysfunctional expectations, including low self-efficacy expectations (Gopinath, Katon, Russo, & Ludman, 2007; Gordon, Tonge, & Melvin, 2011; Ludman et al., 2003), negative global expectations concerning future events (Strunk, Lopez, & DeRubeis, 2006; Vilhauer et al.,

2012), and situation-specific dysfunctional expectations (Backenstrass et al., 2006; Kube, D'Astolfo, et al., 2017).

The clinical relevance of expectations in major depression further increases if dysfunctional expectations are maintained despite continued experiences that disconfirm patients' expectations. While it appears to be adaptive to change one's expectations after expectation-disconfirming experiences, clinical observations suggest that people suffering from MDD tend to maintain dysfunctional expectations despite experiences that disconfirm expectations (Kube, Rief, & Glombiewski, 2017). Therefore, theories from the cognitive behavioral analysis system of psychotherapy (CBASP) have argued that people suffering from MDD appear to be disconnected from their environment (McCullough, 2003). Recently, it has been hypothesized that this persistence of expectations is due to maladaptive information processing involving "cognitive immunization" (Kube, Rief, et al., 2017).

The term "immunization" has originally been introduced in developmental psychology (Brandtstadter & Greve, 1994) and needs to be distinguished from its use in a medical context. However, there is little research on this phenomenon in the clinical psychology literature. Recently, cognitive immunization has been defined as a reappraisal of expectation-disconfirming experiences in such a way that the individual's expectations are maintained (Rief et al., 2015). For instance, disconfirming evidence could be considered to be an exception rather than the rule, or its credibility could be called into question resulting in expectation persistence despite disconfirming evidence (Kube, Rief, et al., 2017). The hypothesized persistence of expectations in depression is supported by research indicating that dysfunctional cognitions are quite rigid in major depression (Bridges & Harnish, 2010; Brose, Schmiedek, Koval, & Kuppens, 2015; Lefebvre, 1981; Watkins, 2008).

However, empirical research to date has not yet sufficiently investigated the phenomenon of expectation persistence in MDD and the role of cognitive immunization as a possible mechanism. Previous studies that investigated whether people with MDD can utilize feedback to change future expectations have yielded inconsistent results (Cane & Gotlib, 1985; Hammen & Krantz, 1976; Loeb, Beck, & Diggory, 1971; Post, Lobitz, & Gasparikova-Krasnec, 1980). We argue that this inconsistency is due to a lack of differentiation between task-specific and generalized performance expectations. Generalized performance expectations have been defined as the degree to which an individual expects to perform successfully across a variety of situations, whereas task-specific expectations refer to the expectation of working successfully on a particular task (Kube, Rief, Gollwitzer, & Glombiewski, 2018). From a clinical perspective, generalized expectations are more important than task-specific expectations for two reasons: first, according to Rief et al. (2015), task-specific expectations may stem from generalized expectations; second, psychotherapeutic interventions that aim to disconfirm patients' expectations, such as behavioral experiments or exposure therapy (Craske, Treanor, Conway, Zbozinek, & Vervliet, 2014; Rief & Glombiewski, 2016; Vlaeyen, De Jong, Leeuw, & Crombez, 2004), emphasize the general relevance of expectation-disconfirming experiences for various future situations to optimize long-term treatment outcome. Previous studies have mostly investigated participants' task-specific expectations, but not generalized expectations (Cane & Gotlib, 1985; Hammen & Krantz, 1976; Loeb et al., 1971; Post et al., 1980). Thus, empirical evidence regarding patients' tendency to maintain their generalized expectations after disconfirming feedback is so far lacking.

Therefore, we developed a paradigm for investigating the influence of performance feedback on intra-individual changes in both task-specific and generalized performance expectations, the **EX**perimental **P**aradigm to investigate **E**xpectation **C**hange in **D**epression

(EXPECD). In a previous study investigating the validity of this paradigm, we found that healthy individuals were able to change both their task-specific and their generalized expectations for personal performance after receiving expectation-disconfirming performance feedback (Kube et al., 2018).

Overview of the Present Studies and Hypotheses

We conducted two experimental studies to investigate 1) whether people with MDD, in contrast to healthy individuals, maintain dysfunctional expectations despite expectation-disconfirming experiences; and 2) if so, why this is the case. In Study 1, we used the EXPECD among people suffering from MDD and healthy individuals to examine whether expectation persistence is more pronounced among people with MDD. We expected that individuals with MDD may change task-specific expectations to some degree following expectation-disconfirming performance feedback, but would not change their generalized expectations. Changing task-specific expectations is both easier and more normative than changing generalized expectations – after all, a change in task-specific expectations could simply be regarded as the result of a normative (experimental) demand. Changing generalized expectations, however, requires transferring knowledge from a specific experience to other situations. MDD patients may be less likely to execute this transfer because, according to the cognitive model of depression, they often hold dysfunctional core beliefs about themselves (A. T. Beck, Rush, Shaw, & Emery, 1979). In Study 2, all participants received expectation-disconfirming performance feedback, and we investigated cognitive immunization as a possible mechanism of the persistence of expectations in depression by varying the ease vs. difficulty of engaging in cognitive immunization processes. More specifically, we examined the effect on expectation change vs. maintenance of experimentally manipulating the appraisal of the performance feedback by using an immunization-inhibiting vs. immunization-enhancing manipulation. Given the

greater clinical relevance of generalized expectations, as argued above, we defined change in generalized performance expectations as the primary outcome in both studies. In particular, we tested the following hypotheses:

Neither healthy individuals nor individuals with MDD will change their generalized performance expectations after receiving expectation-confirming performance feedback.

Healthy individuals will change their generalized performance expectations after receiving expectation-disconfirming performance feedback, while individuals with MDD will not change their generalized expectations after receiving expectation-disconfirming performance feedback.

Hypotheses 1 and 2 suggest a three-way interaction effect between group (i.e., MDD vs. healthy controls), condition (expectation-confirming vs. -disconfirming feedback), and time (before feedback, after feedback) on generalized expectations. This interaction effect will be tested in Study 1.

Among individuals reporting elevated levels of depression, varying immunization by using an immunization-enhancing or -inhibiting manipulation after expectation-disconfirming feedback will lead to different levels of intra-individual change in generalized performance expectations. In particular, we hypothesized that expectation change in an immunization-enhancing condition would be smaller than in a control condition and an immunization-inhibiting condition, respectively.

Hypothesis 3 suggests a two-way interaction effect between condition (immunization-enhancing condition vs. immunization-inhibiting condition vs. control condition) and time (before feedback vs. after feedback) on generalized expectations. This interaction effect will be tested in Study 2. If this hypothesis is confirmed, it would suggest that cognitive immunization is indeed a potential mechanism explaining expectation persistence in depression. Further, although beyond the main scope of this manuscript, we

used a novel questionnaire assessing cognitive immunization after performance feedback to examine whether post-hoc immunization tendencies are associated with change in generalized performance expectations.

General Method

Procedure

The two experimental studies are based on a paradigm developed and validated in a previous study (Kube et al., 2018). This previous article describes the paradigm's procedure, conceptual issues, and results of pilot studies in detail. In the present manuscript, we focus on the methodological aspects that are most crucial for understanding the present studies.

Ethics

Both studies were approved by the local ethics committee (reference number 2016-28k) and were conducted in accordance with ethical standards as laid down in the 1964 Declaration of Helsinki and its later amendments. All participants gave written informed consent and were treated in accordance with the ethical guidelines of the German Psychological Society.

Study 1

Methods

Participants

The sample size was determined via a-priori power analysis. We estimated the expected effect size based on the existing literature on expectation change cited above (Cane & Gotlib, 1985; Hammen & Krantz, 1976; Loeb et al., 1971; Post et al., 1980) as well as our previous study (Kube et al., 2018). Accordingly, we expected a small to medium effect size of the hypothesized three-way interaction. Thus, the power analysis

(expected $\eta^2_p = 0.16$; power = .80) indicated a required sample size of at least 112 participants. We therefore planned to recruit $N = 135$ participants; this surplus would allow us to exclude participant data if necessary due to experimental or statistical issues without substantially losing power. The total sample consisted of a clinical population ($N = 63$) and healthy individuals ($N = 72$). The clinical sample was recruited at two German inpatient psychosomatic hospitals and one German psychiatric day-care clinic. Inclusion criteria for the clinical sample were: current diagnosis of MDD, BDI-II sum score ≥ 10, at least 18 years old, and sufficient German language skills. Participants were diagnosed by clinical psychologists working at the three clinics. Healthy individuals were recruited via email lists, newspaper advertisements, and postings in public spaces. Inclusion criteria for the healthy sample were: at least 18 years old, sufficient German language skills, absence of a currently diagnosed mental disorder, and absence of prior major depressive episodes. As an incentive for participation, participants had the chance to win gift vouchers for a popular book shop, or they received financial compensation.

Procedure

The general procedure was the same as for our previous study cited above, and all conceptual issues and pilot studies are described there in detail (Kube et al., 2018). We provide a brief overview of the procedure here, and refer the reader to our prior paper for further details. Experimental sessions for the healthy sample were conducted at the Philipps-University of Marburg, Department of Clinical Psychology, in a laboratory room. Experimental sessions for the clinical sample were conducted in at the respective clinic. All measures were completed online via the commercial survey platform Unipark®.

Instruction. Participants were told that the study aimed to evaluate a test procedure for its applicability for clinical diagnostic use. As part of the cover story, participants were informed that they were about to take a very difficult, unknown test. The goal was to

induce a neutral to negative performance expectation among all participants in order to minimize possible baseline differences in initial expectations. The relevant section of the instructions read: "Up to now, you should not be familiar with the tasks from the test. The tasks were designed by the developers to be very difficult and to be solved correctly by only a few people. Therefore, it is completely normal for you to feel insecure with most tasks. Simply try your best to do the tasks as well as possible."

Performance test. Participants completed the **T**est for the measure of **EM**otional **INT**elligence (TEMINT) (Schmidt-Atzert & Buehner, 2002). This test was chosen based on the results of a pilot study in a student sample (Kube et al., 2018), which showed that both task-specific and generalized performance expectations were highly susceptible to change after positive performance feedback. The TEMINT contains brief descriptions of situations with one acting person who experienced the situation (e.g. "I had a dispute with a colleague"). The participants' task is to empathize with the acting person and to evaluate to what degree the acting person experienced different emotions in the given situation. For each situation, participants rate between six and ten emotions of the acting person (e.g. fear, anger, sadness etc.). Participants are asked to rate a total of twelve situations with 85 emotional states. Answers are scored by comparing the participant's answers with the acting person's actual ratings. The TEMINT sum score reflects the overall deviations from the actual ratings, with low sum scores indicating good performance.

Standardized feedback and experimental conditions. After each of three blocks of the TEMINT, participants received standardized performance feedback that either confirmed or disconfirmed their previous expectations. In the expectation-disconfirmation condition, participants were told that they solved 25 out of 32 tasks correctly in the first block, 20 out of 23 in the second block, and 24 out of 30 in the third block, and that they are thus among the best 18% of all participants in the first block, among the best 12% in

the second block, and among the best 14% in the third block. After the last block, participants received additional feedback for the complete test, indicating that they solved 69 out of 85 tasks correctly and that they are thus among the best 15% of all participants taking the TEMINT.

The expectation-confirmation condition differed from the expectation disconfirmation condition only with regard to the standardized performance feedback. In this condition, participants were told that they solved 17 out of 32 tasks correctly in the first block, 14 out of 23 in the second block, 17 out of 30 in the third block, and 48 out of 85 in the complete test. Additionally, each piece of feedback suggested that participants' performance was average compared with all participants. Participants were randomly assigned to one of the two experimental conditions.

Follow-up measures and debriefing. After completing the TEMINT, several follow-up questionnaires were administered to assess sociodemographic variables and depressive symptoms. Finally, participants were debriefed regarding the true purpose of the study. Figure 1 illustrates the study procedure.

Insert Figure 1 here.

Measures

Change in generalized expectations. After reading the instructions, participants rated their initial expectations for their personal performance. After completing the test, participants rated their expectations again. As mentioned above, we primarily focused on generalized expectations, and therefore the primary outcome in the study was intra-individual difference in generalized performance expectations. The generalized expectation item that participants rated before working on the test read as follows: "I will be successful in working on unknown tasks in general." The generalized future expectation item after

completing the test was, “I will be successful in working on unknown tasks in general in the future.” In addition to these generalized expectations, participants also rated their task-specific expectations, which read, “I will be successful in working on the tasks from the test” (before working on the test) and, “In the future, I will be successful in working on tasks similar to the ones from the test, even if I am not familiar with them” (after feedback). Expectation items were rated on a 7-point Likert Scale ranging from (1) “I totally disagree” to (7) “I totally agree.” This measure of task-specific and generalized performance expectations has been validated in a previous study (Kube et al., 2018).

Depressive symptoms. Depressive symptoms were assessed using the second edition of the Beck Depression Inventory (BDI- II; (A. T. Beck, Steer, Ball, & Ranieri, 1996), which includes 21 items assessing depressive symptoms on a 4-point scale ranging from 0 to 3. The sum score ranges between 0 and 63, and lower values indicate fewer depressive symptoms. In our sample, the internal consistency of the BDI-II was $\alpha = .96$.

Socio-demographics. Socio-demographic variables, including age, sex, education, and employment status, were assessed using a brief self-report questionnaire.

Other measures. To assess for potential confounding variables, we measured participants’ self-concept using the “overall performance” and “general self-esteem” subscales from the Frankfurt Self-Concept Scale (FSKN; (Deusinger, 1986). We also assessed perfectionism using the “personal standards” subscale from the Frost Multidimensional Perfectionism Scale (F-MPS) (Frost, Marten, Lahart, & Rosenblate, 1990). We also aimed to assess depressive core beliefs; however, since to our knowledge there is no validated measure for depressive core beliefs, we developed three simple items (“I am worthless”, “I am not loveable”, “I am incapable”) to assess this construct according to the suggestions of J. S. Beck (2011). In addition, for the clinical sample we assessed duration of treatment at the clinic.

Statistical Analyses

First, we conducted data screening according to the suggestions made by Tabachnick and Fidell (2014) and tested the assumptions of analyses of variance (ANOVAs). There were no missing values due to the study design (participants could only continue if they entered all values). We inspected histograms of each variable's standardized values to check for univariate outliers (Kline, 2005). Multivariate outliers were identified via Mahalanobis distance and Cook's distance (with $\alpha = 0.5$-quantile of the F distribution), as suggested by Cohen, Cohen, West, and Aiken (2003) and Stevens (2002). We conducted a multivariate analysis of variance (MANOVA) to examine possible baseline differences between the two samples (clinical vs. healthy) or the two experimental conditions (expectation confirmation vs. expectation disconfirmation) on initial expectations, TEMINT performance, depressive symptoms, and age. Next, we conducted a 2 (Sample: clinical vs. healthy) × 2 (Condition: expectation confirmation vs. expectation disconfirmation) × 2 (time: before feedback, after feedback) factorial ANOVA. Analyses of covariance (ANCOVAs) were performed to control for self-concept, perfectionism, or depressive core beliefs. Type-1 error levels were set at 5%. We provide 95% confidence intervals (CI) for each effect size, that is η^2_p or Cohen's d, respectively. All analyses were conducted using IBM SPSS Statistics Version 21.

Results

Sample Characteristics

Clinical sample. After data screening, 3 participants were identified as outliers and were therefore excluded. One participant had to be excluded because of serious doubts about the cover story, and another participant was excluded due to a BDI-II sum score < 10, indicating the absence of depressive symptoms (A. T. Beck et al., 1996). Thus, subsequent analyses are based on data from 58 participants in the clinical sample (with n =

30 for the expectation confirmation condition and $n = 28$ for the expectation disconfirmation condition). The mean BDI-II score in the clinical group was 29.44 (SD = 10.93), indicating severe symptoms of depression (A. T. Beck et al., 1996). We were able to obtain diagnostic information for 46 patients (79%); the remaining 12 patients did not give consent for their data to be matched with their clinical treatment records. Of those for whom diagnostic information was available, most (63.0%) were diagnosed with a recurrent depressive disorder, 28.3% with a major depressive episode, and 8.7% with a "double depression" (dysthymia plus current major depressive episode). A majority (63.0%) had at least one comorbid mental disorder, among them anxiety disorders (36.9%), somatoform disorders (21.7%), eating disorders (15.2%), hyperkinetic disorder (8.7%), personality disorders (8.6%), and obsessive compulsive disorder (2.2%). Sociodemographic characteristics of the clinical sample are shown in Table 1.

Healthy sample. After data screening, we excluded 3 participants in the healthy control group who were identified as outliers. An additional 10 participants were excluded because they expressed serious doubts about the cover story. Thus, subsequent analyses are based on data from 59 participants in the health control group (with $n = 30$ for the expectation confirmation condition and $n = 29$ for the expectation disconfirmation condition). The mean BDI-II score in the healthy control group was 6.17 (SD = 4.56), indicating the absence of clinically relevant depressive symptoms (A. T. Beck et al., 1996). Sociodemographic characteristics of the healthy sample are shown in Table 1.

Insert Table 1 here.

Differences between samples. A MANOVA indicated that participants from the healthy sample were significantly younger than those from the clinical sample, $F(1, 113) = 126.729$, $p < .001$; $\eta^2_p = .529$, 95% CI [0.402, 0.620], and had lower levels of depressive symptoms, $F(1, 113) = 223.159$, $p < .001$; $\eta^2_p = .664$, 95% CI [0.563, 0.731]. The two

groups did not differ on initial task-specific expectations, $F(1, 113) = 0.037$, $p = .849$; $\eta^2_p < .001$, 95% CI [0, 0.014], generalized expectations, $F(1, 113) = 3.209$, $p = .076$; $\eta^2_p = .028$, 95% CI [0, 0.110], or TEMINT performance, $F(1, 113) = 0.017$, $p = .897$; $\eta^2_p < .001$, 95% CI [0, 0.006]. The distribution of male and female participants was not significantly different across the two groups, $\chi^2 = 1.528$, $p = .246$. However, healthy participants had significantly higher educational degrees, $\chi^2 = 52.978$, $p < .001$, and were more likely to be students than were participants from the clinical group, $\chi^2 = 57.057$, $p < .001$.

The two experimental conditions (expectation confirmation vs. expectation disconfirmation) did not significantly differ on initial task-specific expectations, $F(1, 113) = 0.880$, $p = .350$; $\eta^2_p = .008$, 95% CI [0, 0.068], generalized expectations, $F(1, 113) = 0.723$, $p = .397$; $\eta^2_p = .006$, 95% CI [0, 0.064], age, $F(1, 113) = 0.908$, $p = .343$; $\eta^2_p = .008$, 95% CI [0, 0.069], depressive symptoms, $F(1, 113) < 0.001$, $p = .993$; $\eta^2_p < .001$, 95% CI [0, 0.001], or TEMINT performance, $F(1, 113) = 1.029$, $p = .313$; $\eta^2_p = .009$, 95% CI [0, 0.072].

Main analyses

Change in generalized expectations. The Time by Sample by Condition three-factorial ANOVA with generalized expectations as the dependent variable indicated no significant main effect of Time, $F(1,113) = 3.395$; $p = .068$; $\eta^2_p = .029$, 95% CI [0, 0.112]. The main effect of Condition was also non-significant, $F(1,113) = 2.898$; $p = .091$; $\eta^2_p = .025$, 95% CI [0, 0.105]. However, there was a significant main effect of Sample $F(1,113) = 4.938$; $p = .028$; $\eta^2_p = .042$, 95% CI [0.001, 0.133], with more optimistic expectations among the healthy sample ($M = 4.520$, $SD = 1.318$) compared to the clinical sample ($M = 4.015$, $SD = 1.500$). The Time by Sample interaction was not significant, $F(1,113) = 0.361$; $p = .549$; $\eta^2_p = .003$, 95% CI [0, 0.053], nor was the Time by Condition interaction, $F(1,113) = 1.821$; $p = .180$; $\eta^2_p = .016$, 95% CI [0, 0.087], or the Condition by Sample

interaction, $F(1,113) = 0.229$; $p = .633$; $\eta^2_p = .002$, 95% CI [0, 0.048]. There was a significant Time by Sample by Condition interaction, $F(1,113) = 5.414$; $p = .022$; $\eta^2_p = 0.046$, 95% CI [0.004, 0.139]. After expectation-confirming feedback, neither healthy individuals, $t(29) = 0.740$; $p = .465$; $d = 0.135$, 95% CI [-0.226, 0.493], nor depressed individuals, $t(29) = -0.942$; $p = .354$; $d = 0.172$, 95% CI [-0.190, 0.531], significantly changed their generalized expectations. In the expectation-disconfirmation condition, expectation change occurred only among healthy individuals, $t(28) = -3.722$; $p = .001$; $d = 0.691$, 95% CI [0.280, 1.092], but not among individuals with MDD, $t(28) = -0.118$; $p = .907$; $d = 0.022$, 95% CI [-0.342, 0.386]. Figure 2 shows the results for change in generalized expectations.

Insert Figure 2 here.

Change in task-specific expectations. The Time by Sample by Condition three-factorial ANOVA with task-specific expectations as the dependent variable indicated a significant main effect of Time, $F(1,113) = 16.027$; $p < .001$; $\eta^2_p = .124$, 95% CI [0.033, 0.240], with more optimistic expectations after feedback ($M = 4.95$, $SD = 1.558$) than before feedback ($M = 4.34$, $SD = 1.327$). There was also a significant main effect of Condition, $F(1,113) = 7.364$; $p = .008$; $\eta^2_p = .061$, 95% CI [0.004, 0.161], with more optimistic expectations in the expectation-disconfirmation condition ($M = 4.940$, $SD = 1.254$) compared to the expectation-confirmation ($M = 4.365$, $SD = 1.544$) condition. The Time by Sample interaction was not significant, $F(1,113) = 0.535$; $p = .466$; $\eta^2_p = .003$, 95% CI [0, 0.059], nor was the Sample by Condition interaction, $F(1,113) = 0.978$; $p = .325$; $\eta^2_p = .009$, 95% CI [0, 0.070]. However, there was a significant Time by Condition interaction, $F(1,113) = 5.100$; $p = .026$; $\eta^2_p = .043$, 95% CI [0.001, 0.135], with overall greater change in task-specific expectations in the expectation disconfirmation condition ($M = 0.965$, $SD = 1.603$) compared to the expectation confirmation condition ($M = 0.267$,

SD = 1.745). Further, there was a significant Time by Sample by Condition interaction, $F(1,113) = 5.100$; $p = .026$; $\eta^2_p = 0.043$, 95% CI [0.001, 0.135]. After receiving expectation-confirming feedback, neither the healthy, $t(29) = -0.128$; $p = .899$; $d = 0.023$, 95% CI [-0.334, 0.381], nor the clinical sample, $t(29) = -1.361$; $p = .184$; $d = 0.249$, 95% CI [-0.117, 0.610], significantly changed their task-specific expectations. In the expectation-disconfirmation condition, healthy individuals significantly changed their task-specific expectations, $t(28) = -4.421$; $p < .001$; $d = 0.821$, 95% CI [0.393, 1.238], whereas individuals with MDD did not, $t(27) = -1.964$; $p = .060$; $d = 0.382$, 95% CI [-0.015, 0.751].

Analyses of covariance. When measures of self-concept, perfectionism, and depressive core beliefs were included as covariates, the pattern of results for expectation change did not significantly change. None of these variables had unique effects on the dependent variables, and their inclusion did not change the significance of any of the other main or interaction effects. Effect sizes in the ANCOVAs were similar to those in the ANOVAs for the effects of most interest, that is, the three-way interaction effects.

Discussion

The aim of the study was to examine whether individuals with MDD and healthy individuals differ with regard to expectation change vs. maintenance after expectation-disconfirming experiences. In line with our first hypothesis, results indicated that neither healthy individuals nor people with MDD changed their expectations after expectation-confirming performance feedback. After (overly positive) expectation-disconfirming performance feedback, healthy individuals changed both their generalized and their task-specific expectations; in contrast, people with MDD maintained their previous expectations, thus confirming our second hypothesis. The present study empirically confirmed previous clinical observations suggesting that people with MDD are less likely than healthy individuals to update their expectations in light of disconfirming evidence

(Kube, Rief, et al., 2017; Rief & Glombiewski, 2016). Of note, healthy individuals and individuals MDD did not differ on actual test performance; thus, differences in expectation change cannot be attributed to performance differences. These results are in line with studies of cognitive rigidity in depression (Bridges & Harnish, 2010; Brose et al., 2015; Lefebvre, 1981; Watkins, 2008). In addition, the current results are in line with those of a recent study indicating that healthy individuals were optimistically biased in updating their beliefs about the future, while this optimistic bias was absent in MDD patients (Korn, Sharot, Walter, Heekeren, & Dolan, 2014).

By distinguishing between task-specific and generalized expectations, the present study sheds light on the inconsistency in prior findings on the utilization of feedback to update expectations (Cane & Gotlib, 1985; Hammen & Krantz, 1976; Loeb et al., 1971; Post et al., 1980). It appears that individuals with MDD, contrary to healthy individuals, have particular difficulty with changing their generalized expectations after disconfirming experiences. We argue that this is because individuals with MDD are prone to cognitive immunization, for instance, by considering disconfirming evidence to be an exception rather than the rule or by questioning its credibility.

Study 2

This study aimed to further explore the results of Study 1 by examining cognitive immunization as a possible mechanism underlying the persistence of expectations in depression. For this purpose, we experimentally varied cognitive immunization after expectation-disconfirming feedback to examine the influence of immunization on expectation change vs. maintenance. Study 2 used the basic procedure of the expectation disconfirmation condition from Study 1, with the addition of an immunization-enhancing and immunization-inhibiting manipulation. We also included a control group, which received no manipulation. We hypothesized that the three groups (immunization-enhancing

group vs. immunization inhibiting group vs. control group) would differ on expectation change. We also examined whether change in generalized expectations was associated with participants' ratings on a self-report scale assessing immunization tendencies.

Methods

Participants

Similar to the procedure from Study 1, we determined sample size via a-priori power analysis, and we estimated the expected effect size based on the existing literature on expectation change cited above (Cane & Gotlib, 1985; Hammen & Krantz, 1976; Loeb et al., 1971; Post et al., 1980) as well as our previous study (Kube et al., 2018). As we have argued in previous work that people experiencing depressive symptoms are prone to a devaluation of positive expectation-disconfirming experiences via immunization tendencies (Kube, Rief, et al., 2017), we expected a medium to large effect for the immunization-varying manipulation. Thus, the power analysis (expected $\eta^2_p = 0.20$; power = .80) indicated a total required sample size of at least 66 participants. Participants were recruited via email lists, newspaper advertisements, and postings in public spaces. As we aimed to include only individuals reporting elevated levels of depression, interested individuals completed a pretest, and were invited to participate if they met the criterion of a BDI-II sum score ≥ 10 (indicating at least mild symptoms of depression). A total of 67 participants completed the study. Participants received course credit or financial compensation in exchange for their participation.

Procedure and Study Design

The basic procedure was the same as the procedure for Study 1. However, in Study 2, all participants received expectation-disconfirming performance feedback. After completing the TEMINT, the two experimental groups also received standardized information to vary the ease vs. difficulty of engaging in cognitive immunization

processes. A note on methodology: we could have examined cognitive immunization as a mediator variable given that it is a cognitive process that occurs after expectation-disconfirming experiences, and that results in maintenance of expectations. However, according to a recent methodological paper, classical mediational analysis is often problematic in experimental psychology (Lemmer & Gollwitzer, 2017). The recommended approach (described also by (Jacoby & Sassenberg, 2011) is to experimentally vary the psychological process (e.g., cognitive immunization) that is being tested as an explanation for a given phenomenon (e.g., expectation change vs. maintenance). We therefore decided to use this approach, and we added a post-hoc measure of cognitive immunization after the performance feedback to further examine the association of cognitive immunization with expectation change.

Group 1 received an "immunization-inhibiting" manipulation suggesting that the TEMINT has been shown to be highly relevant for daily life and professional success. In particular, participants in this condition were told that previous research had found that individuals who perform well on the TEMINT have more professional success, measurable on both subjective (e.g. work satisfaction) and objective measures (e.g., higher income). In addition, participants were told that people who perform well on the TEMINT are more satisfied with their social lives, including the quality of their relationships. We anticipated that after receiving this fake information about the TEMINT, it would be difficult for participants to engage in cognitive immunization processes because the validity and utility of the expectation-disconfirming experience were explicitly highlighted. Group 2 received an "immunization-enhancing" manipulation, with the goal of triggering the type of appraisal of positive feedback typical of individuals with depression (e.g., appraising the good performance as an exception or questioning the general relevance of the feedback). The length and writing style of this manipulation were equivalent to the immunization-

inhibiting manipulation. The immunization-enhancing manipulation indicated that the TEMINT has neither been found to predict professional success nor other aspects of life satisfaction. We anticipated that after being given this information about the TEMINT, it would be easy for participants to engage in cognitive immunization processes because the validity and utility of the expectation-disconfirming experience were explicitly questioned. Group 3 received no further information after completing the test and receiving performance feedback. Hence, the procedure for group 3 was identical to the procedure for the expectation-disconfirming condition in Study 1. Participants were randomly assigned to one of the three conditions.

After completing the TEMINT and (for groups 1 and 2) receiving the immunization-varying manipulation, participants completed several follow-up questionnaires. Next, one of two trained interviewers administered the affective disorders section from the Structured Clinical Interview for DSM-IV (SCID) (Wittchen, Wunderlich, Gruschwitz, & Zaudig, 1997) to assess whether participants met criteria for MDD. Two female psychology master's students who were specifically trained in administration of the SCID conducted all study procedures. Finally, participants were debriefed regarding the actual aim of the study. The entire procedure lasted between 45 and 75 minutes. Figure 3 illustrates the study design.

Insert Figure 3 here.

Measures

Expectation change. Expectations were assessed as described in Study 1. As in Study 1, the primary outcome in Study 2 was intra-individual change in participants' generalized performance expectations. As the goal of the experimental manipulation was to impact generalized expectations, results for task-specific expectations are not reported here.

Cognitive immunization. To more precisely assess whether expectation change is associated with immunization, we developed a brief, novel measure for cognitive immunization, the Cognitive Immunization after Performance Feedback (CIPF) scale. This questionnaire includes five items reflecting appraisal of expectation-disconfirming performance feedback. Three items assess the appraisal of the expectation-disconfirming experience as an exception ("This result is an exception for me", "This result is representative of my performance in other situations", "Normally, I find tasks like those in the test much more difficult"). The remaining two items assess to what extent participants question the credibility of the expectation-disconfirming feedback ("The test provides understandable performance feedback," and "The test is suitable for measuring a person's performance"). For the two subscales and the total score, high values reflect strong immunization tendencies. Given the small number of items, internal consistency of the CIPF in the current sample was satisfactory, $\alpha = .678$.

Other measures. Depressive symptoms, TEMINT performance, and sociodemographic variables were assessed as described in Study 1.

Statistical Analyses

Data screening was conducted as described in Study 1. One-way analyses of variance (ANOVAs) were used to check for baseline differences between the conditions (immunization-inhibiting condition vs. immunization-enhancing condition vs. control condition) in task-specific expectations, generalized expectations, TEMINT performance, depressive symptoms and age. Next, we conducted a 3 (Condition: immunization-inhibiting condition vs. immunization-enhancing condition vs. control condition) x 2 (Time: before feedback vs. after feedback) ANOVA with generalized performance expectations as dependent variable. To examine specific group differences, we computed paired samples *t*-tests with Bonferroni-Holm adjustments (Holm, 1979). To examine the

association of expectation change with scores on our novel measure of cognitive immunization, we computed correlations between the difference score for generalized expectations (post - pre) and the CIPF total score and subscale scores. Type-1 error levels were set at 5%, except for the analysis using the Bonferroni-Holm adjustments (with α_{fam} = 5%, α_1 was set at 1.7%, α_2 at 2.5%, and α_3 at 5%). We provide 95% confidence intervals (CI) for each effect size, that is η^2_p or Cohen's *d,* respectively. As in Study 1, there were no missing values due to the study design. All analyses were conducted using IBM SPSS Statistics Version 21.

Results

Sample Characteristics

Of the 67 individuals who participated in the study, 6 were identified as outliers and were therefore excluded. An additional two participants were excluded from analyses because they expressed serious doubts about the cover story. Accordingly, subsequent analyses are based on data from 59 participants (21 in the immunization-inhibiting condition, 17 in the immunization-enhancing condition, and 21 in the control condition). The mean BDI-II score was 24.88 (*SD* = 9.66), indicating moderate levels of depression (A. T. Beck et al., 1996), and 17 participants (28.8%) met criteria for a major depressive episode. Sociodemographic characteristics are presented in Table 2.

Insert Table 2 here.

Differences between conditions. Initial generalized expectations did not significantly differ across the immunization-inhibiting condition, the immunization-enhancing condition, and the control condition, $F(2,56) = 2.734$, $p = .074$, $\eta^2_p = 0.089$, 95% CI [0, 0.223]. The three groups also did not significantly differ on initial task-specific expectations, $F(2,56) = 0.623$, $p = .540$, $\eta^2_p = 0.022$, 95% CI [0, 0.117], depressive symptoms, $F(2,56) = 2.075$, $p = .135$, $\eta^2_p = 0.069$, 95% CI [0, 0.200], TEMINT

performance, $F(2,56) = 0.848$, $p = .434$, $\eta^2_p = 0.029$, 95% CI [0, 0.133], or age, $F(2,56) = 0.132$, $p = .877$, $\eta^2_p = 0.005$, 95% CI [0, 0.066].

Main Analyses

The Time by Condition ANOVA indicated no significant main effect of Time, $F(2,56) = 3.216$; $p = .078$; $\eta^2_p = 0.054$, 95% CI [0, 0.246], or Condition, $F(2,56) = 0.475$; $p = .624$; $\eta^2_p = 0.017$, 95% CI [0, 0.103]. However, there was a significant Time by Condition interaction, $F(2,56) = 4.977$; $p = .010$; $\eta^2_p = 0.151$, 95% CI [0.010, 0.303]. To further examine group differences in expectation change, we computed independent samples *t*-tests with Bonferroni-Holm adjustments. The difference in expectation change between the immunization-enhancing condition and the control condition was significant, $\alpha_1 = 1.7\%$, $t(36) = 2.916$; $p = .006$; $d = 0.951$, 95% CI [0.269, 1.621]. The difference between the immunization-inhibiting condition and the immunization-enhancing condition also reached significance, $\alpha_2 = 2.5\%$, $t(36) = -2.658$; $p = .012$; $d = 0.867$, 95% CI [0.192, 1.531]. The difference between the immunization-inhibiting condition and the control condition was not significant, $\alpha_3 = 5\%$, $t(40) = -0.775$; $p = .444$; $d = 0.239$, 95% CI [-0.370, 0.845]. Paired-samples *t*-tests indicated significant change in expectations among participants in the immunization-inhibiting condition, $t(20) = -2.307$, $p = .032$, $d = 0.503$, 95% CI [0.043, 0.953] and the control condition, $t(20) = -2.911$, $p = .009$, $d = 0.635$, 95% CI [0.159, 1.099], while no significant change in expectations was found among participants from the immunization-enhancing condition, $t(16) = 1.514$, $p = .150$, $d = 0.367$, 95% CI [-0.130, 0.854]. The main results from Study 2 are shown in Figure 4.

Insert Figure 4 here.

Correlational analyses for expectation change

The pre to post difference in generalized expectations was significantly correlated with the CIPF total score ($r = -.534$, $p < .001$). In addition, change in generalized

expectations was significantly correlated with the CIPF subscales for "exception" (r = -.407, p = .001) and "credibility" (r = -.489, p < 001).

Discussion

The aim of this study was to experimentally vary the ease vs. difficulty of engaging in cognitive immunization strategies after receiving expectation-disconfirming performance feedback, and to examine the influence of cognitive immunization on the change vs. maintenance of generalized performance expectations. Results indicated that varying immunization processes led to significant differences in expectation change, suggesting that cognitive immunization may be a core mechanism underlying the persistence of expectations in depression.

In particular, this study demonstrated significantly smaller change in expectations after an immunization-enhancing manipulation compared to an immunization-inhibiting condition and a control condition. The immunization-enhancing manipulation was intended to trigger an appraisal of the positive performance feedback that would be typical of appraisals found among depressed individuals. Thus, enhancing immunization tendencies (e.g., by initiating an appraisal of an expectation-disconfirming experience as an exception) decreased the likelihood of expectation change. We also examined whether expectation change could be boosted by an immunization-inhibiting manipulation that emphasized the general relevance of an expectation-disconfirming experience. However, results indicated that this immunization-inhibiting manipulation did not significantly enhance change in generalized performance relative to a control condition.

Although beyond the primary focus of the present article, we developed a novel questionnaire assessing cognitive immunization after performance feedback (CIPF) to further examine whether expectation change was associated with immunization tendencies. Indeed, change in generalized performance expectations was associated with scores on the

CIPF scale, further highlighting the relevance of cognitive immunization for expectation change.

Examination of the magnitude of expectation change among the three groups indicated that the magnitude of expectation change in the immunization-inhibiting condition was similar to the degree of change in generalized expectations found among healthy individuals in the expectation disconfirmation condition from Study 1. This suggests that emphasizing the general relevance of an expectation-disconfirming experience may be a promising strategy to initiate a healthy degree of expectation change among individuals suffering from depression. However, we found that also participants in the control group significantly changed their expectations after receiving expectation-disconfirming feedback. This is somewhat inconsistent with the results of Study 1, in which we found no significant expectation change among individuals with MDD. It is possible that this different pattern of results is due to different sample characteristics. While the participants from the clinical sample examined in Study 1 reported severe symptoms of depression, met criteria for MDD, and were seeking psychotherapeutic treatment, the participants from Study 2 reported only moderate symptoms of depression, and only 28.8% met full criteria for MDD. Thus, it is possible that expectation change in the Study 2 control group would have been attenuated if we had included participants with more severe depression.

General Discussion

The aim of these two studies was to examine whether and why people experiencing depressive symptoms tend to maintain dysfunctional expectations despite expectation-disconfirming experiences. In Study 1, we provided empirical evidence for the clinical observation that individuals with MDD have more difficulty than healthy individuals with changing their expectations after expectation-disconfirming experiences. Study 2 results

indicated that cognitive immunization may be an important mechanism underlying the persistence of expectations in depression.

The results of the present studies are in line with previous research indicating the crucial role of negative expectations in MDD (Backenstrass et al., 2006; Catanzaro & Mearns, 1990; Strunk et al., 2006; Vilhauer et al., 2012). The current research extends these previous findings by demonstrating that not only the presence of negative expectations, but also their maintenance despite disconfirming evidence, may be a core feature of MDD. Thus, the present studies provide new insights into the psychopathology of MDD: while healthy individuals are able to utilize environmental information to update their expectations after disconfirming experiences, people suffering from MDD tend to cognitively reappraise potentially useful environmental information (e.g., by considering the contradictory experience to be an exception rather than the rule). This cognitive immunization results in expectation persistence despite disconfirming evidence; thus, people with MDD appear to be disconnected from their environment, as also suggested by theories of CBASB (McCullough, 2003).

Recent clinical research has often investigated how symptoms change; however, our studies illustrate the importance of also examining how and why patients' expectations persist. These results suggest a reformulation of the cognitive model of depression (A. T. Beck et al., 1979): the development of depressive symptoms might be caused by negative expectations for the future, which become increasingly immune to disconfirming experiences, hence resulting in the maintenance of depressive symptoms. Of note, this model has conceptual similarities to Jerome Frank's model of demoralization (Frank, 1973, 1974; Frank & Frank, 1991), suggesting that distressed people are characterized by diminished ability to respond effectively to stressful events, resulting in negative

consequences for the individual such as isolation and despair (Connor & Walton, 2011; Frank, 1974).

Clinical Implications

According to Wampold's (2015) contextual model, patients' expectations strongly influence psychotherapy outcomes. It has recently been argued that an increased focus on patients' expectations may optimize cognitive-behavioral treatment (CBT) of mental disorders (Rief & Glombiewski, 2016). For example, therapists may work to disconfirm patients' expectations using behavioral experiments, and thus facilitate cognitive restructuring (Dobson & Hamilton, 2003). However, the present studies show that in major depression, dysfunctional expectations are likely to be maintained despite disconfirming experiences because of cognitive immunization. Therefore, therapists should aim to inhibit immunization processes to enhance expectation change.

To inhibit immunization, therapists might emphasize the general relevance of an expectation-disconfirming experience, as in the immunization-inhibiting condition in Study 2, to prevent patients from appraising the experience as an exception. It may also be important for therapists to stress the relevance of paying attention to expectation-disconfirming experiences, and to emphasize the personal importance of disconfirming experiences for the individual. Therapists could also encourage patients to repeat a behavioral experiment under different circumstances to enhance the credibility of the information gained from an expectation-disconfirming experience. Moreover, prior to conducting a behavioral experiment, we recommend exploring potential immunization strategies with the patient and considering how to address these immunization strategies. As part of this discussion, therapists should discuss with their patients the conditions under which they would change versus maintain their expectations. Future research should

examine which strategies are most effective in preventing cognitive immunization and enhancing expectation change.

Strengths and Limitations

To our knowledge, the present studies are the first to systematically investigate differences between healthy individuals and individuals with depression with respect to change in generalized expectations following expectation-disconfirming experiences. Furthermore, we established the EXPECD as an experimental paradigm for manipulating immunization processes and thereby examining cognitive immunization as a possible mechanism of expectation persistence. Additionally, we developed the CIPF scale as novel measure of cognitive immunization that may enable future researchers to examine immunization tendencies when investigating expectation change vs. maintenance after expectation-disconfirming experiences.

However, the current studies also have several limitations. A limitation of both studies is that task-specific and generalized expectations were each assessed with a single item. This may have limited the precision of our measurement of expectations. However, we reasoned that an assessment with more items, although psychometrically superior, could raise participants' doubts about the cover story, as the cover story indicated that the study was about the evaluation of the test rather than participants' expectations. Moreover, assessing expectations with a single item is quite common in experimental research on expectations (Cane & Gotlib, 1985; Corsi & Colloca, 2017), and the measure used in the present studies has been successfully evaluated in a previous study (Kube et al., 2018). Another limitation is that we focused only on performance-related expectations. Although expectations for personal performance have been shown to be relevant in depression (J. S. Beck, 2011; Kube, D'Astolfo, et al., 2017), future studies should examine change in other types of expectations, such as expectations about social rejection. Further, we introduced

only positive disconfirming experiences after inducing negative expectations, because this is conceptually closer to theoretical models of depression, but future studies could investigate whether the persistence of expectations in depression also applies to negative disconfirming experiences. Additionally, we only assessed explicit expectations, and the possible influence of implicit expectations on our results is unclear.

An additional limitation of Study 1 is that the healthy sample was significantly younger and more highly educated than the clinical sample, thereby limiting the comparability of the two samples. Further, specific psychiatric diagnoses were not available for all participants. Regarding Study 2, the majority of the sample experienced moderate depressive symptoms, and only 28.8% of the participants met full criteria for MDD. Future studies should investigate cognitive immunization among samples with more severe levels of depression. It would also be interesting to apply the experimental procedure from Study 2 among healthy individuals to examine whether susceptibility to immunization tendencies is specific to depressed individuals.

Concluding Remarks

The present research aimed to examine whether and why dysfunctional expectations in depression persist despite expectation-disconfirming experiences. In Study 1, we found that people suffering from MDD, contrary to healthy individuals, maintained previous performance expectations despite surprisingly positive performance feedback. In Study 2, we investigated whether the persistence of expectations may be accounted for by cognitive immunization strategies (i.e. disregarding the disconfirming experience) using a sample with elevated levels of depression. Indeed, we found that varying cognitive immunization led to differences in expectation change, highlighting the crucial role of cognitive immunization in expectation change vs. maintenance. These findings provide new insights

into the psychopathology of MDD, and suggest that psychological interventions may be enhanced by actively addressing cognitive immunization.

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Conflict of interest

The authors declare no conflict of interest.

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Table 1

Sociodemographic characteristics of Study 1 participants

Variable	Clinical sample (n = 58)	Healthy sample (n = 59)
Age in years, M (SD)	46.03 (12.33)	26.14 (5.56)
Sex, N (%)		
male	23 (39.7)	17 (28.8)
female	35 (60.3)	42 (71.2)
Educational level, N (%)		
No educational degree	1 (1.7)	0
Primary education	34 (58.6)	0
Secondary education	13 (22.4)	30 (50.8)
Higher education	10 (17.2)	29 (49.2)
Employment status, N (%)		
Full-time working	22 (37.9)	2 (3.4)
Part-time working	9 (15.5)	11 (18.6)
Unemployed	4 (6.9)	5 (8.5)
Pensioners	3 (5.2)	0
Disabled	10 (17.2)	0
Homemaker	3 (5.2)	0
In training	7 (12.1)	41 (69.5)

Note. M = Mean, SD = Standard deviation, N = Number

Table 2

Sociodemographic characteristics of Study 2 participants

Variable	Immunization-inhibiting condition (n = 21)	Immunization-enhancing condition (n = 17)	Control condition (n = 21)
Age in years, M (SD)	26.67 (11.59)	27.41 (9.63)	25.81 (7.13)
Sex, N (%)			
male	5 (23.8)	5 (29.4)	8 (38.1)
female	16 (76.2)	12 (70.6)	13 (61.9)
Educational level, N (%)			
No educational degree	0	0	0
Primary education	0	1 (5.9)	1 (4.8)
Secondary education	16 (76.2)	13 (76.5)	14 (66.7)
Higher education	5 (23.8)	3 (17.6)	6 (28.5)
Employment status, N (%)			
Full-time working	3 (14.3)	4 (23.5)	3 (14.3)
Part-time working	3 (14.3)	2 (11.8)	3 (14.3)
Unemployed	4 (19.0)	1 (5.9)	1 (4.8)
Disabled	0	1 (5.9)	0
In training	11 (52.4)	9 (52.9)	14 (66.7)

Note. M = Mean, SD = Standard deviation, N = Number

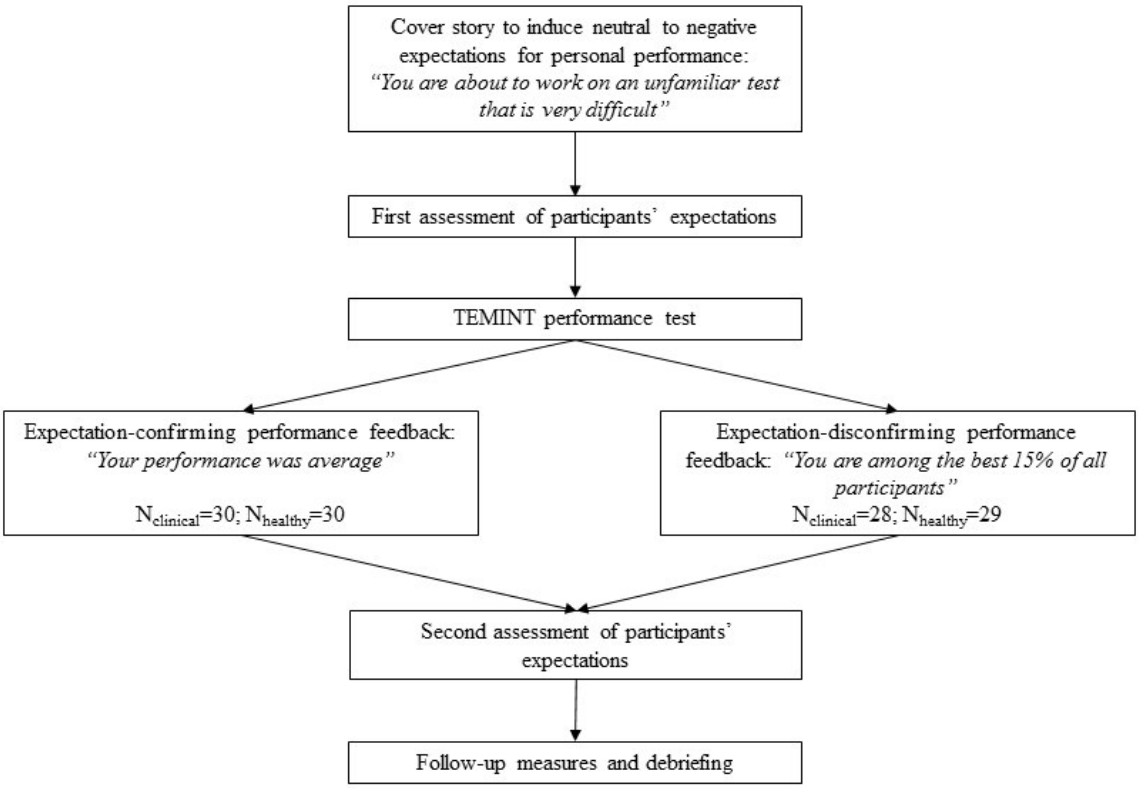

Figure 1. The basic procedure of the **EX**perimental **P**aradigm to investigate **E**xpectation **C**hange in **D**epression (EXPECD). After inducing neutral to negative expectations about one's ability to work successfully on an unknown test, participants' expectations are assessed for the first time. Next, participants perform the Test for the Measure of Emotional Intelligence (TEMINT), on which they receive standardized performance feedback that either confirms or disconfirms their previous expectations. Subsequently, participants' future expectations are assessed again, followed by a follow-up measure and debriefing.

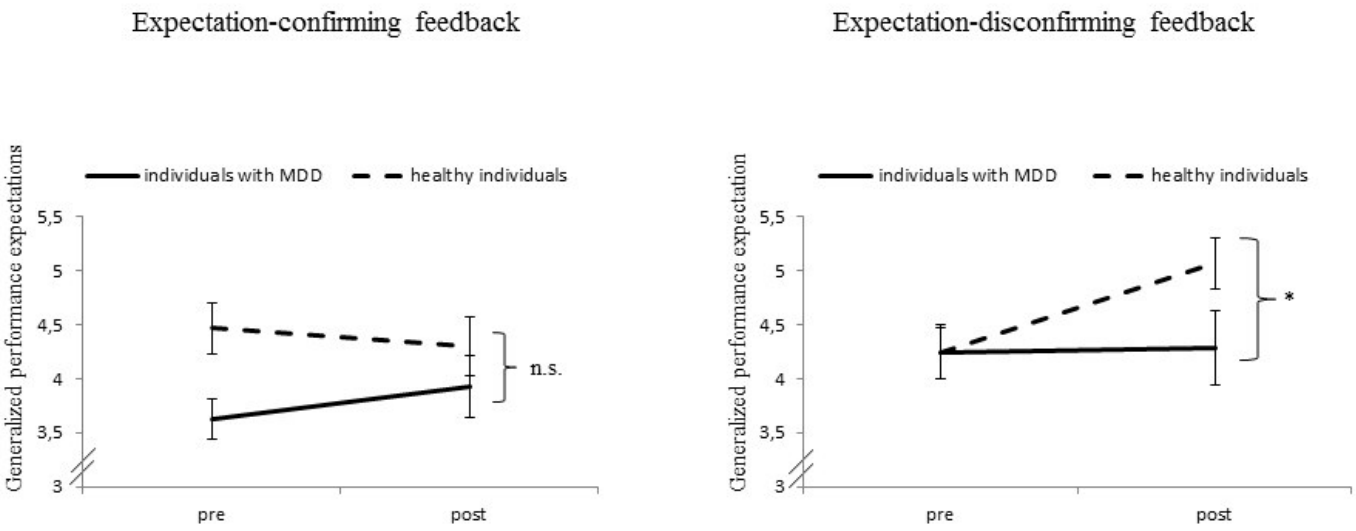

Figure 2. Illustration of the main results from Study 1. Results indicated that after receiving expectation-confirming performance feedback, neither healthy individuals nor individuals with major depression changed their generalized performance expectations. In the expectation disconfirmation condition, however, healthy individuals significantly changed their generalized expectations, while individuals with major depression maintained their previous expectations. *Note.* n.s. = not significant, * = $p < .05$.

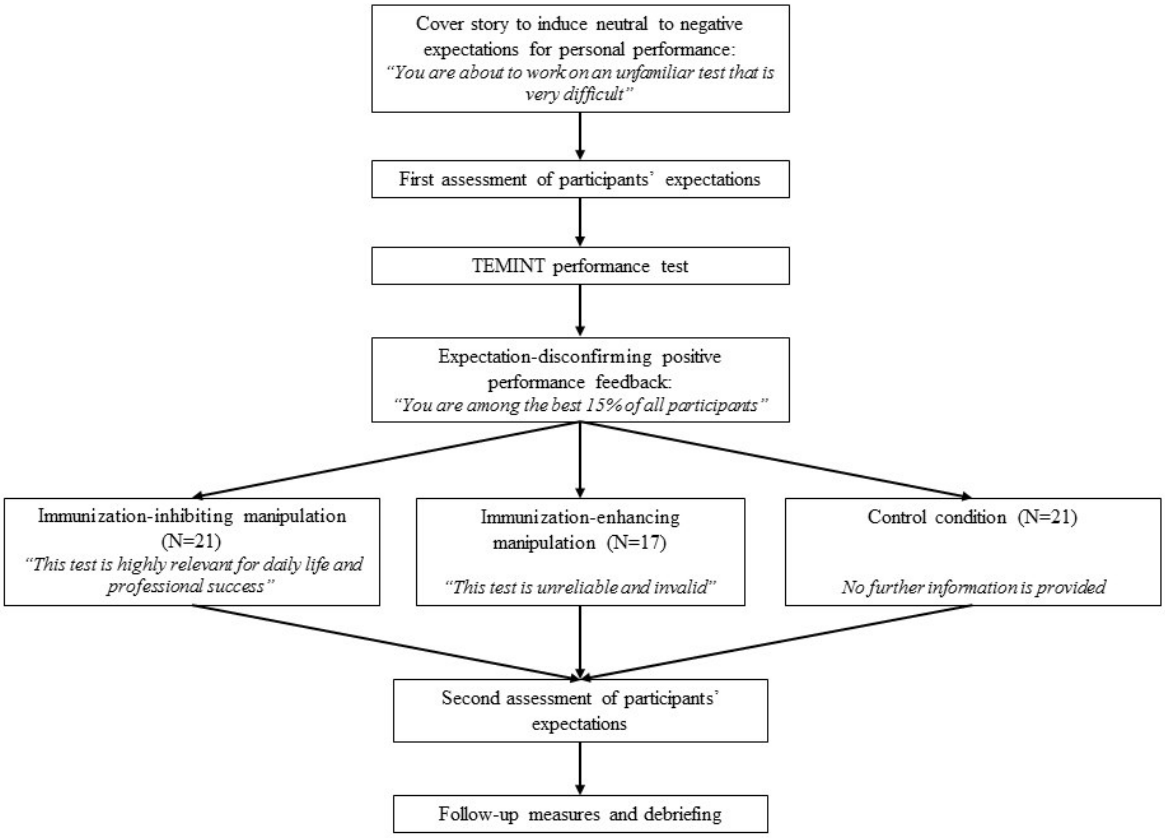

Figure 3. Study design of Study 2. In contrast to Study 1, all participants received expectation-disconfirming feedback. In addition, two of the three experimental groups received an immunization-varying manipulation with the aim of varying participants' appraisals of the expectation-disconfirming performance feedback.

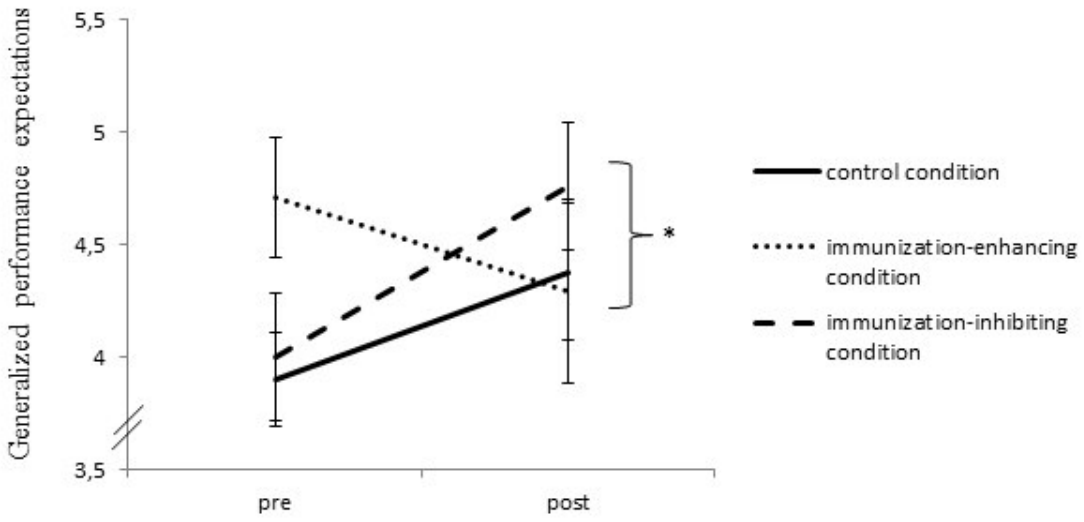

Figure 4. Illustration of the main results from Study 2. Results indicated that varying immunization processes led to significant differences in change in generalized expectations. Participants from both the control condition and the immunization-inhibiting condition significantly changed their expectations, whereas participants from the immunization-enhancing condition did not significantly change their expectations *Note.* n.s. = not significant, * = $p < .05$.

Anhang G: Curriculum Vitae und Publikationen

Tabellarischer Lebenslauf

Persönliche Daten

Name:	Tobias Kube
Staatsangehörigkeit:	deutsch
Geburtsdaten:	26.08.1989 in Berlin
Familienstand:	ledig

Ausbildung

1996-2000	Grundschule in der Gartenstadt Berlin Hohenschönhausen
2000-2006	Descartes Oberschule (Gymnasium) Berlin Hohenschönhausen
2006-2009	Barnim Oberschule (Gymnasium) Berlin Lichtenberg Abschluss: Abitur (Durchschnittsnote: 1,2)
10/2009-09/2010	Studium der Energie- und Prozesstechnik (BSc) Technische Universität Berlin
10/2010-05/2015	Studium der Psychologie Philipps-Universität Marburg Abschluss: Diplom-Psychologe („sehr gut“)
	Vertiefungsrichtungen: Klinische Psychologie, Kognitive Neurowissenschaften
	Diplomarbeit zum Thema „Welche Erwartungen sagen postoperative Depressivität und Ängstlichkeit bei herzchirurgischen Patienten am stärksten vorher?“ in der AG Klinische Psychologie und Psychotherapie (Anleitung: Dipl.-Psych. Charlotte Auer, Prof. Dr. Winfried Rief)
seit 10/2015	Ausbildung zum Psychologischen Psychotherapeuten (Verhaltenstherapie) am Institut für Psychotherapieausbildung Marburg

Berufliche Tätigkeit und Praktika

02/2011-04/2011	Forschungspraktikum an der Technischen Universität Dresden, Lehrstuhl für Biopsychologie (Prof. Dr. Clemens Kirschbaum) Tätigkeitsbereich: Mitarbeit bei verschiedenen Forschungsprojekten zur biopsychologischen Stressforschung
08/2011-12/2012	Studentische Hilfskraft in der AG Kognitive Psychophysiologie (Prof. Dr. Anna Schubö) Tätigkeitsbereich: Durchführung und Auswertung von EEG-Experimenten zur visuellen Aufmerksamkeit
07/2012-10/2012	Forschungspraktikum an der Eberhard Karls Universität Tübingen Institut für Medizinische Psychologie und Verhaltensneurobiologie (Prof. Dr. Niels Birbaumer, Prof. Dr. Jan Born) Tätigkeitsbereich: Mitarbeit bei einem Forschungsprojekt zum Zusammenhang von Schlaf und Gedächtnis
10/2013-02/2014	Studentische Hilfskraft in der AG Kognitive Psychophysiologie (Prof. Dr. Anna Schubö) Tätigkeitsbereich: Tutor für das Experimentelle Praktikum (Thema: Visuelles Arbeitsgedächtnis)
01/2013-06/2014	Studentische Hilfskraft in der AG Klinische Psychologie und Psychotherapie (Prof. Dr. Matthias Berking) Tätigkeitsbereich: persönliche Unterstützung von Prof. Berking in seiner Lehr- und Forschungstätigkeit
04/2014-09/2014	Studentische Hilfskraft in der AG Kognitive Psychophysiologie (Prof. Dr. Anna Schubö) Tätigkeitsbereich: Tutor für die Vorlesung „Kognition und Sprache“
06/2014-12/2014	Studentische Hilfskraft in der AG Klinische Psychologie und Psychotherapie (Prof. Dr. Winfried Rief) Tätigkeitsbereich: Eigenverantwortliche Mitarbeit im Projekt „Klinische Anwendungen von Erkenntnissen der Placebo-Forschung: Optimierung von Erwartungseffekten bei Personen mit Herzoperationen“ bei Dipl.-Psych. Charlotte Auer und Dipl.-Psych. Stefan Salzmann
10/2014-02/2015	Studentische Hilfskraft am Institut für Medizinische Psychologie (Prof. Dr. Kati Thieme), Fachbereich Medizin Tätigkeitsbereich: Trainer für das „Selbstsicherheitstraining für Medizinstudierende“ im WiSe 2014/15
03/2015	Studentische Hilfskraft in der AG Klinische Psychologie und Psychotherapie (Prof. Dr. Winfried Rief) Tätigkeitsbereich: Tutor für das Fallseminar von Dr. Gaby Bleichhardt

04/2015-07/2015	Studentische Hilfskraft in der AG Allgemeine und Biologische Psychologie (Dr. Nicola Ferdinand) Tätigkeitsbereich: Tutor für die Vorlesung „Kognition und Sprache“
05/2015-07/2015	Studentische Hilfskraft in der AG Klinische Psychologie und Psychotherapie (Prof. Dr. Winfried Rief) Tätigkeitsbereich: Eigenverantwortliche Mitarbeit im Projekt „Klinische Anwendungen von Erkenntnissen der Placebo-Forschung: Optimierung von Erwartungseffekten bei Personen mit Herzoperationen“ bei Dipl.-Psych. Stefan Salzmann
10/2015-07/2017	Promotionsstipendiat in der AG Klinische Psychologie und Psychotherapie der Philipps-Universität Marburg (Anleiter Prof. Dr. Winfried Rief)
seit 08/2017	Wissenschaftlicher Mitarbeiter an der Philipps-Universität Marburg, AG Klinische Psychologie und Psychotherapie (Prof. Dr. Winfried Rief)
	Koordinator der DFG-geförderten Placebo-Forschergruppe (FOR1328)

Lehrerfahrung

SoSe 2017	Anleitung der Übung zu klinisch-psychologischen Interventionsverfahren („Interventionspraktikums II“)
WiSe 2017/2017	Anleitung der Übung zu klinisch-psychologischen Interventionsverfahren („Interventionspraktikums I“)
WiSe 2017/2017	Leitung des Seminars „Kognitive und emotionsfokussierte Interventionen“
seit 10/2015	Betreuung von bisher insgesamt vier Bachelorarbeiten und 18 Masterarbeiten

Auszeichnungen und Förderungen

10/2015-07/2017	Promotionsstipendium der Philipps-Universität Marburg
04/2017	3. Platz bei der Wahl zum besten Poster auf der 1. Konferenz der Society of Interdisciplinary Placebo Studies (SIPS) in Leiden, Niederlande

Publikationen

Zeitschriftenartikel (peer reviewed)

Kube, T., Rief, W., Gollwitzer, M., Gärtner, T., & Glombiewski, J. A. (submitted). Why dysfunctional expectations in major depression persist - Results from two experimental studies investigating cognitive immunization. *Journal of Abnormal Psychology*.

Kube, T., Herzog, P., Michalak, C., Glombiewski, J. A., Doering, B. K., & Rief, W. (submitted). Do situational expectations rather than global beliefs predict depressive symptoms? A longitudinal study. *Cognitive Therapy and Research*.

Kube, T., Glombiewski, J. A., & Rief, W. (in revision). Utilizing different expectation mechanisms to optimize treatment of patients with medical conditions - A systematic review. *Psychosomatic Medicine*.

Kube, T., Siebers, V. H. A., Herzog, P., Glombiewski, J. A., Doering, B. K., & Rief, W. (in revision). Integrating situation-specific dysfunctional expectations and dispositional optimism into the cognitive model of depression - A path-analytic approach. *Journal of Affective Disorders*.

Kube, T., Rief, W., Gollwitzer, M., & Glombiewski, J. A. (2018). Introducing an EXperimental Paradigm to investigate Expectation Change (EXPEC). *Journal of Behavior Therapy and Experimental Psychiatry, 59,* 92-99.

Laferton, J., **Kube, T**., Salzmann, S., Auer, C., and Shedden-Mora, M. (2017). Patients' Expectations Regarding Medical Treatment: A Critical Review of Concepts and their Assessment. *Frontiers in Psychology* 8(233)

Kube, T., Rief, W., & Glombiewski, J.A. (2017). On the Maintenance of Expectations in Major Depression – Investigating a Neglected Phenomenon. *Frontiers in Psychology* 8(9).

Kube, T., & Rief, W. (2017). Are placebo and drug-specific effects additive? – Questioning basic assumptions of double-blinded randomized clinical trials and presenting novel study designs. *Drug Discovery Today*, *22*(4), 729-735

Kube, T., D'Astolfo, L., Glombiewski, J. A., Doering, B. K., & Rief, W. (2017). Focusing on situation-specific expectations in major depression as basis for behavioural experiments–Development of the Depressive Expectations Scale. *Psychology and Psychotherapy: Theory, Research and Practice, 90*(3), 336-352.

Auer, C. J., **Kube, T.**, Laferton, J. A., Salzmann, S., Shedden-Mora, M., Rief, W., & Moosdorf, R. (2016). Welche Erwartungen sagen postoperative Depressivität und Ängstlichkeit bei herzchirurgischen Patienten am stärksten vorher? *Zeitschrift Für Klinische Psychologie und Psychotherapie, 45*(2), 93-108.

Kongressbeiträge

Kube, T., Rief, W., & Glombiewski, J. A. (2017). „Why dysfunctional expectations in major depression persist - Experimental investigations on cognitive immunization and implications for clinical practice“. Vortrag auf dem 47. Kongress der European Association of Behavioral and Cognitive Therapies (EABCT), Ljubljana, Slovenia.

Kube, T. & Rief, W. (2017). „Interaktionen von Placebo- und medikamentenspezifischen Effekten - Implikationen für klinische Studien“. Vortrag auf dem 35. Kongress der Deutschen Gesellschaft für Psychologie, Fachgruppe Klinische Psychologie und Psychotherapie, Chemnitz, Germany.

Kube, T., Rief, W., Konrad, R., Gollwitzer, M., & Glombiewski, J.A. (2017). "Immunization as core mechanism underlying expectation persistence in major depression - Results from an experimental study" Posterpräsentation bei der 1. Konferenz der Society for Interdisciplinary Placebo Studies (SIPS) in Leiden, Niederlande, 2017

Kube, T., D'Astolfo, L., Glombiewski, J. A., Doering, B. K., & Rief, W. (2016). "Erfassung dysfunktionaler Erwartungen bei depressiver Symptomatik - Entwicklung der Depressive Expectations Scale (DES)." Posterpräsentation auf dem 34. Kongress der Deutschen Gesellschaft für Psychologie, Fachgruppe Klinische Psychologie und Psychotherapie, Bielefeld, Germany.

Kube, T., Salzmann, S., Laferton, J.A.C., Auer, C.J., Moosdorf, R., Rief, W. (2016). "Steigerung von körperlicher Aktivität nach Herzoperationen - Effekte einer präoperativen psychologischen Intervention." Posterpräsentation auf dem 15.

Kongress der Deutschen Gesellschaft für Verhaltensmedizin und Verhaltensmodifikation (DGVM), Mainz, Germany.

Rheker, J., Auer, C.J., **Kube, T.,** Salzmann, S., Moosdorf, R., Rief, W. (2015). "Der Einfluss von präoperativ wahrgenommener Kontrolle auf postoperative Ängstlichkeit bei herzchirurgischen Patienten: Ergebnisse einer randomisiert-kontrollierten Studie". Posterpräsentation auf dem 33. Kongress der Deutschen Gesellschaft für Psychologie, Fachgruppe Klinische Psychologie und Psychotherapie, Dresden, Germany.

Anhang H: Eidesstattliche Erklärung

Hiermit versichere ich, meine Dissertation “Dysfunktionale Erwartungen bei Personen mit depressiver Symptomatik - Relevanz, Aufrechterhaltung und Mechanismen der Veränderung” selbst und ohne fremde Hilfe verfasst zu haben. Ich habe keine anderen als die angegebenen Quellen und Hilfsmittel genutzt. Alle vollständig oder sinngemäß übernommenen Zitate sind als solche gekennzeichnet. Die Dissertation wurde weder in der vorliegenden noch in einer ähnlichen Form bei einer anderen in- oder ausländischen Hochschule anlässlich eines Promotionsgesuchs oder zu anderen Prüfungszwecken eingereicht.

Marburg, Dezember 2017

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Tobias Kube

Anhang I: Prozentverteilung der Publikationen

Studie I: Focusing on situation-specific expectations in major depression as basis for behavioural experiments–Development of the Depressive Expectations Scale.

Kube, Tobias	50%
D'Astolfo, Lisa	15%
Glombiewski, Julia Anna	10%
Doering, Bettina Katharina	10%
Rief, Winfried	15%

Studie II: Integrating situation-specific dysfunctional expectations and dispositional optimism into the cognitive model of depression - A path-analytic approach

Kube, Tobias	35%
Siebers, Verena Helena Anna	35%
Herzog, Philipp	10%
Glombiewski, Julia Anna	5%
Doering, Bettina Katharina	5%
Rief, Winfried	10%

Studie III: Do situational expectations rather than global beliefs predict depressive symptoms? A longitudinal study

Kube, Tobias	60%
Herzog, Philipp	10%
Michalak, Charlotte Marie	10%
Glombiewski, Julia Anna	5%
Doering, Bettina Katharina	5%
Rief, Winfried	10%

Studie IV: On the Maintenance of Expectations in Major Depression – Investigating a Neglected Phenomenon

Kube, Tobias	65%
Rief, Winfried	15%
Glombiewski, Julia Anna	20%

Studie V: Introducing an EXperimental Paradigm to investigate Expectation Change (EXPEC).

Kube, Tobias	60%
Rief, Winfried	15%
Gollwitzer, Mario	10%
Glombiewski, Julia Anna	15%

Studie VI: Why dysfunctional expectations in depression persist - Results from two experimental studies investigating cognitive immunization.

Kube, Tobias	60%
Rief, Winfried	10%
Gollwitzer, Mario	10%
Gärtner, Thomas	5%
Glombiewski, Julia Anna	15%

Marburg, Dezember 2017

_____ _____

Prof. Dr. Winfried Rief Tobias Kube