Die Transformation von Entscheidungsproblemen in Entscheidungschancen durch eine geführte Reflexion von Werten

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Zusammenfassung

Die Entscheidungstheorie unterstützt Menschen bei der Entscheidungsfindung, indem sie bei der Auswahl der gegebenen Handlungsmöglichkeiten bei vorhandenen Kriterien hilft. Dahinter steckt die Annahme, dass Entscheidungssituationen auftauchen und nicht beeinflussbar sind. Keeney (2020) hinterfragt diese Annahme und schlägt einen proaktiven Ansatz vor, bei dem Entscheidungssituationen selbst kreiert werden können. Um Entscheidungssituationen selbst zu schaffen oder unliebsame Entscheidungssituationen, die Keeney Entscheidungsprobleme nennt, in angenehme Entscheidungssituationen (Entscheidungschancen) zu transformieren, schlägt er eine werteorientierte Entscheidungsunterstützung vor. Die vorliegende Dissertation nimmt diesen Ansatz auf und stellt vier Arbeitspapiere vor, die verschiedene Aspekte von Keeneys wertorientiertem Ansatz untersuchen.

Im ersten Kapitel wird Keeneys Ansatz in den vorhandenen Forschungsstand eingeordnet. Die daraus resultierenden Forschungslücken sind im zweiten Kapitel dargestellt. In den darauffolgenden Kapiteln werden die einzelnen Arbeitspapiere vorgestellt und die zentralen Ergebnisse präsentiert. In Kapitel drei werden die verschiedenen Entscheidungssituationen theoretisch fundiert und empirisch eine Verbindung von Zufriedenheit mit der jeweiligen Entscheidungssituation aufgezeigt. Im vierten Kapitel wird untersucht, wie stabil Wertegewichte im Kontext der Corona-Pandemie sind. Es zeigt sich, dass Wertegewichte insgesamt als stabil eingestuft werden können und sich somit als Instrument zur Transformation von Entscheidungsproblemen in Entscheidungschancen eignen. Im darauffolgenden Kapitel wird ein Konzept dargelegt, wie Entscheidungsunterstützung zum Transformieren von Entscheidungsproblemen in Entscheidungschancen gestaltet werden kann. Bei der Überprüfung des Konzepts wird gezeigt, dass dieses 87,3 % der Probandinnen und Probanden hilft. Im sechsten Kapitel wird diese Unterstützung auch für Gruppenentscheidungen erfolgreich überprüft. Insgesamt ergeben sich daraus die Implikationen, dass Menschen aktiv Entscheidungschancen generieren sollten und dass die Entscheidungstheorie Methoden zur Entscheidungsunterstützung vorhält, die weiter empirisch untersucht werden müssen.

Teil A. Einleitung der Dissertation

1. Höhere Lebenszufriedenheit durch Entscheidungen

Menschen wünschen sich eine hohe Lebenszufriedenheit. Erreicht wird diese Zufriedenheit durch das Erfüllen persönlicher Bedürfnisse, Ziele und das Handeln nach persönlichen Werten. Um Bedürfnisse zu befriedigen und Ziele zu erreichen, sind Handlungen nötig (Heckhausen & Heckhausen, 2010). Vor jeder Handlung steht eine Entscheidung, genau diese Handlung durchzuführen. Entscheidungen zu treffen kann Menschen jedoch vor Herausforderungen stellen. Deshalb ist ein Ziel der Entscheidungstheorie, Menschen bei der Entscheidungsfindung zu unterstützen. Um die Entscheidungsunterstützung besser zu verstehen, kann die Entscheidungstheorie in zwei Richtungen gegliedert werden. In der präskriptiven Ausrichtung werden Modelle und Normen entwickelt, die aufzeigen, welche Entscheidungen aus normativen Aspekten rational sind. Demgegenüber unterstützt die deskriptive Richtung, indem sie das tatsächliche Entscheidungsverhalten beschreibt, dabei typische Entscheidungsfehler aufzeigt und Methoden entwickelt, diese Entscheidungsfehler zu vermeiden. Die moderne Entscheidungstheorie betrachtet dabei den Menschen mit all seinen Facetten; das Bild des Homo Oeconomicus gilt als überholt. Jeder Mensch hat individuelle Wertvorstellungen und persönliche Ziele, die in der Entscheidungsunterstützung betrachtet werden müssen (von Nitzsch, 2021).

Der Großteil der Entscheidungsunterstützung kann dabei als „fokussiert auf Handlungsmöglichkeiten“ beschrieben werden (Keeney, 2020). Das bedeutet, dass die Entscheidungstheorie dem Menschen dabei hilft, die beste Auswahl aus einer gegebenen Menge an Handlungsmöglichkeiten zu finden. Durch aufwendige und komplexe mathematische Modelle kann so die beste Handlungsmöglichkeit, selbst unter unsicheren Bedingungen, ermittelt werden. Das Problem bei dieser Art der Unterstützung ist, dass Menschen nur einen Teil der verfügbaren Handlungsmöglichkeiten wirklich bewusst wahrnehmen (Siebert & Keeney, 2015). Das Ergebnis einer Entscheidung kann jedoch nur so gut sein, wie die beste in Erwägung gezogene Handlungsmöglichkeit.

Keeney (1992) schlägt deshalb vor, den Entscheidungsfindungsprozess auf persönliche Werte zu fokussieren. Der Wechsel des Fokus hat laut Keeney zwei Vorteile. Zum einen können

Werte als Kompass genutzt werden, um aus unzähligen Entscheidungssituationen diejenigen herauszufiltern, die zu einer höheren Erfüllung von Bedürfnissen beitragen (z. B. aktive Gesundheitsvorsorge durch den Lieblingssport oder sinnvolle berufliche Weiterbildung). Zum anderen können durch eine Wertorientierung attraktivere Handlungsmöglichkeiten innerhalb einer Entscheidungssituation gefunden werden, die vorher noch nicht berücksichtigt worden sind beziehungsweise unbekannt waren. Denn der Fokus kann von den gegebenen und offensichtlichen Möglichkeiten zu kreativen Handlungsoptionen gelenkt werden (z. B. Bildung von Fahrgemeinschaften mit den befreundeten Kollegen, um Sprit zu sparen).

1.1. Entscheidungschancen und Entscheidungsprobleme

Die meisten Entscheidungen werden als „Probleme“ wahrgenommen (Hammond et al., 2015). Aufgrund von externen Umständen muss reagiert und eine Entscheidung getroffen werden. In solchen Fällen neigen Menschen dazu, das Treffen notwendiger Entscheidungen hinauszuzögern, und wenn sie eine Entscheidung treffen, dann meist mit dem Ziel, den Status wiederherzustellen, der vor Auftreten des Problems vorherrschte. Demgegenüber können Entscheidungen auch als Entscheidungschancen wahrgenommen werden. Bei Entscheidungschancen suchen Entscheiderinnen und Entscheider aktiv eine Entscheidungssituation, die sie in der Erfüllung ihrer Bedürfnisse und Werte optimal unterstützt.

Entscheidungschancen und Entscheidungsprobleme sind eine Kategorisierung verschiedener Entscheidungssituationen. Entscheidungssituationen können definiert werden als Situationen, in denen eine Abweichung vom gewünschten Zustand vorliegt, auf die Entscheiderinnen und Entscheider reagieren müssen, um in ihrem Umfeld effektiv bestehen zu können (D'Zurilla & Goldfried, 1971). Dabei ist unerheblich, ob sich der gewünschte Zustand geändert hat, oder ob der aktuelle Zustand sich so verändert, dass er dem Wunschzustand nicht entspricht.

Bei Entscheidungsproblemen verursachen externe Auslöser wie zum Beispiel die Entscheidungen anderer eine Änderung des aktuellen Zustandes. Dabei liegen Entscheidungsprobleme außerhalb der Kontrolle der Entscheiderinnen und Entscheider und werden nur widerwillig angegangen (Hammond et al., 2015). Fehlende Kontrolle bedeutet in diesem Zusammenhang, dass die Entscheiderinnen und Entscheider keinen direkten Einfluss auf das Entstehen der Situation haben (Vohs et al., 2018).

Entscheidungschancen sind Situationen, die Entscheiderinnen und Entscheider selbst schaffen und aktiv verfolgen. Entscheiderinnen und Entscheider können über die Reflexion ihrer Werte zum Entschluss kommen, dass sie einen neuen gewünschten Zustand anstreben. Anstatt darauf zu warten, dass sich ein Zustand durch Zufälle oder Entscheidungen anderer verschlechtert, schaffen die Entscheiderinnen und Entscheider Situationen, denen sie sich stellen wollen. Diese Situationen können nur geschaffen werden, sofern die Entscheiderinnen und Entscheider ein gewisses Maß an Kontrolle über die Situation haben. Das bedeutet, sie betrachten nicht nur die offensichtlichen Optionen, sondern haben die Möglichkeiten und Fähigkeiten, Handlungsoptionen selbst zu identifizieren. Entscheidungschancen können laut Keeney (2020) identifiziert werden, indem Entscheiderinnen und Entscheider ihre aktuelle Situation hinsichtlich ihrer Werte reflektieren.

Keeney (2020) differenziert nicht nur zwischen diesen Situationen, sondern zeigt auch einen Zusammenhang von Entscheidungssituationen und *Zufriedenheit* der Entscheiderinnen und Entscheider auf (Abbildung 1).

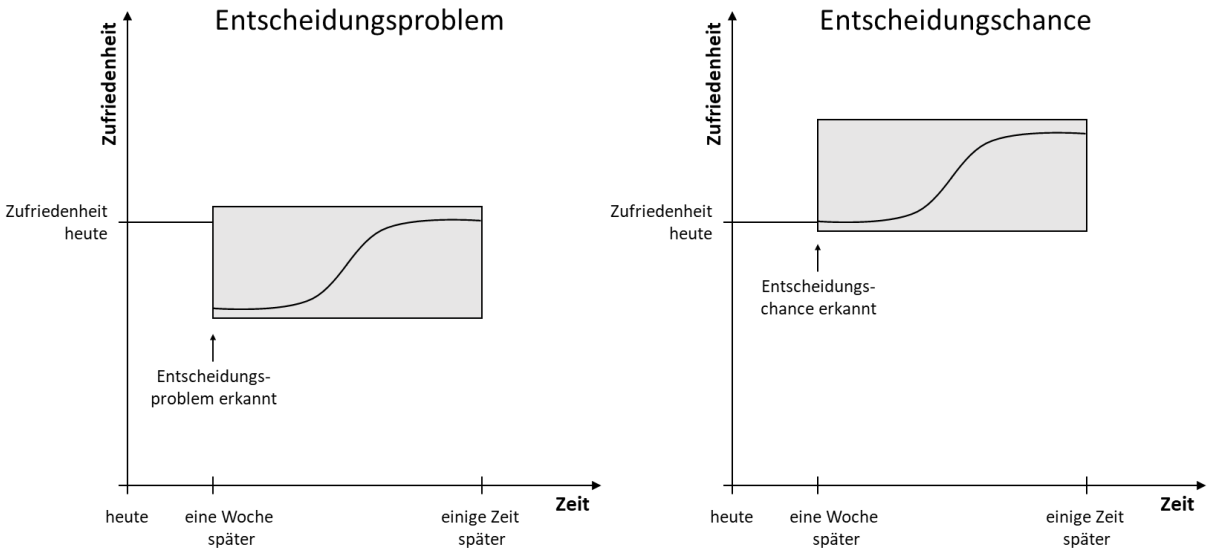

Abbildung 1: Der Zusammenhang von Entscheidungssituation und *Zufriedenheit* der Entscheiderinnen und Entscheider nach Keeney (2020)

Die linke Grafik in der Abbildung beschreibt die *Zufriedenheit* der Entscheiderinnen und Entscheider über die Zeit bei Entscheidungsproblemen. Dabei gibt es ein anfängliches Level der *Zufriedenheit*. Mit dem Auftreten des Entscheidungsproblems fällt zunächst die *Zufriedenheit*. Über den Verlauf des Entscheidungsprozesses und der Implementierung der Entscheidung steigt dann das Zufriedenheitsniveau zurück auf das Ursprungslevel.

Die rechte Grafik in der Abbildung 1 beschreibt die *Zufriedenheit* der Entscheiderinnen und Entscheider über die Zeit bei Entscheidungschancen. Sobald eine Entscheidungschance erkannt wird und der Entscheidungsprozess beginnt, steigt die *Zufriedenheit* der Entscheiderinnen und Entscheider. Nach der Implementierung der Entscheidung bleibt die *Zufriedenheit* auf einem höheren Level als die ursprüngliche *Zufriedenheit*.

1.2. Die Auswahl der Entscheidungssituation durch die Entscheidungsfrage

Was für eine Entscheidungssituation verfolgt wird, hängt von der formulierten Entscheidungsfrage ab (Ley-Borras, 2015). Das Formulieren der Entscheidungsfrage steht zu Beginn eines jeden Entscheidungsprozesses und bildet die Basis für alle weiteren Überlegungen und Analysen. Wird die falsche Entscheidungssituation gewählt, ist die Qualität der darauffolgenden Analysen und Auswertungen irrelevant, da das ursprüngliche Problem nicht gelöst beziehungsweise die ursprüngliche Chance nicht ergriffen wird (Mitroff & Featheringham, 1974).

Das Formulieren einer Entscheidungsfrage ist ein mentaler Prozess, der mit dem Erkennen einer Entscheidungssituation beginnt (Mintzberg et al., 1976). Nach dem Erkennen der Situation analysieren Entscheiderinnen und Entscheider diese unterbewusst und bauen auf diese Weise ein mentales Modell der Entscheidungssituation (Gentner & Stevens, 2014). Das mentale Modell enthält alle Informationen, die Entscheiderinnen und Entscheider über die Situation haben. Beim Formulieren der Entscheidungsfrage wird das mentale Modell verschriftlicht. Da das Modell jedoch komplex ist, können nicht alle Aspekte vollumfänglich verschriftlicht werden. Deshalb müssen die Entscheiderinnen und Entscheider bewusst bestimmen, welche Informationen ihres mentalen Modells sie verschriftlichen wollen. Es gibt verschiedene Möglichkeiten, das gleiche mentale Modell zu verschriftlichen (Baer et al., 2013).

Im Prozess des Formulierens einer Entscheidungsfrage begehen Menschen systematische Fehler, die Baer et al. (2013) kategorisiert haben (Abbildung 2). Aufgrund des unterbewusst ablaufenden Prozesses tendieren Entscheiderinnen und Entscheider dazu, das Sammeln von Informationen zu früh zu beenden und so wichtige Informationen zu übersehen. Bei unterbewussten Prozessen stehen nur eingeschränkt kognitive Ressourcen zur Verfügung und Menschen sparen kognitiven Aufwand, wenn nur offensichtliche Informationen gesammelt werden (von Nitzsch, 2021) (1. Fehler).

Nicht nur beim Sammeln von Informationen, auch bei deren Verarbeitung sparen Menschen kognitive Ressourcen. Die neu gesammelten Informationen werden mit vorhandenen Informationen abgeglichen. Bekannte Informationen können leichter verarbeitet werden. In der Folge fokussieren Entscheiderinnen und Entscheider sich auf das, was sie bereits wissen. Neue Informationen werden schneller verworfen (Soll et al., 2015). Dieses Verhalten führt zum einen zum Entstehen von Informations- und Interpretationslücken hinsichtlich des Problems (2. Fehler). Dieser Effekt wird auch „tunnel vision“ (Newton et al., 1982) genannt. Zum anderen hat das Verhalten zur Folge, dass Entscheiderinnen und Entscheider zu Lösungen springen, bevor das Problem richtig erkannt und analysiert wurde (3. Fehler).

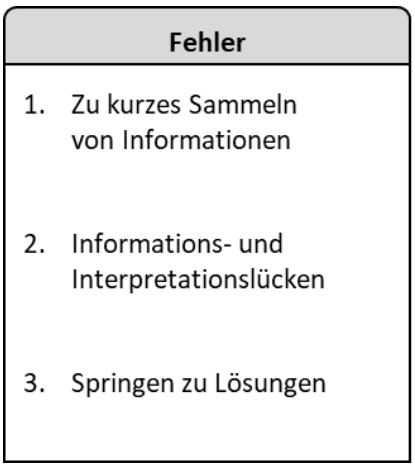

Abbildung 2: Fehler im Prozess des Formulierens einer Entscheidungsfrage nach Baer et al. (2013)

1.3. Werte in der Entscheidungsforschung

Keeney (1992) empfiehlt, den Prozess der Entscheidungsfindung auf persönliche Werte zu fokussieren, um typische Fehler im Entscheidungsprozess zu vermeiden. Es existieren viele verschiedene Definitionen von Werten. In dieser Arbeit und in den Arbeitspapieren werden folgende Definitionen und Beschreibungen für Werte verwendet.

Werte haben die Funktion von Leitprinzipien im Leben von Menschen (Sagiv & Schwartz, 2021, p. 2) und damit direkten Einfluss auf ihre Entscheidungen und ihr Handeln (Allport, 1961). Werte können somit als übergeordnetes Konzept verstanden werden, das die Motive von Menschen prägt, die wiederum deren Entscheidungen und Handeln lenken (Heckhausen & Heckhausen, 2010). Zudem sind sie elementarer Bestandteil im Entscheidungsprozess und bei der Rechtfertigung von Entscheidungen (Rokeach, 2008; Schwartz, 1992). Sie können definiert werden als „weit gefasste, wünschenswerte Ziele, die das Handeln der Menschen motivieren und als Leitprinzipien für ihr Leben dienen“ (Sagiv & Schwartz, 2021).

Die einzelnen Werte können in ein Wertesystem eingeordnet werden. In der Literatur sind mehrere Modelle persönlicher Wertesysteme bekannt. Am häufigsten verwendet wird das Wertemodell nach Schwartz (2012). In diesem sind die Werte nach dem Grad der Kompatibilität geordnet, sodass eine kreisförmige Struktur entsteht (Abbildung 3). Je näher ein Wert zu einem anderen Wert im Kreis liegt, desto kompatibler sind beide miteinander. Gegenüberliegende Werte bergen ein großes Konfliktpotential. Dabei besitzt jeder Mensch dieselben zehn Werte. Die persönlichen Wertesysteme unterscheiden sich lediglich in der Gewichtung der einzelnen Werte.

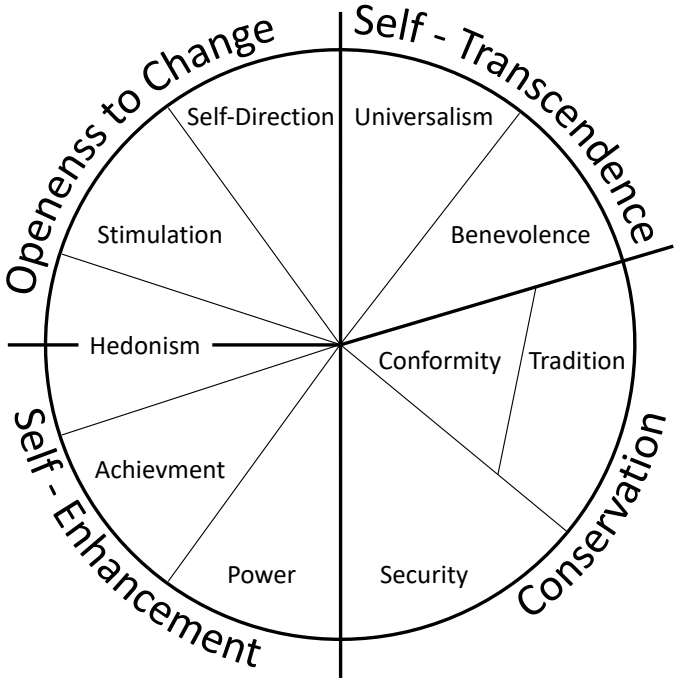

Abbildung 3: Wertesystem nach Schwartz (2012)

Die Wertegewichte eines Menschen können im Allgemeinen als stabil angesehen werden (z. B. Rokeach, 2008). Dennoch gibt es Studien über Änderungen in den Wertegewichten von Menschen. Die Änderungen treten meist bei Heranwachsenden sowie nach einschneidenden Erlebnissen auf. Bardi & Godwin (2011) entwickelten deswegen ein Modell für die Änderung der Prioritäten von Werten unabhängig vom Alter des Menschen (Abbildung 4).

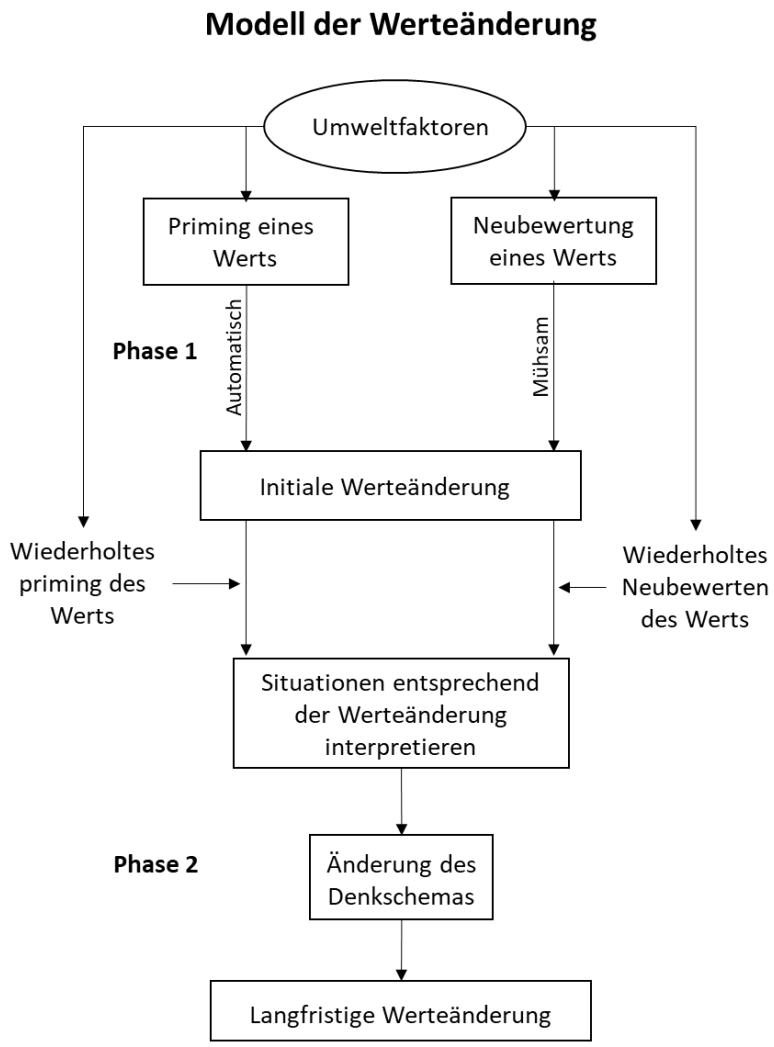

Abbildung 4: Vereinfachtes Modell der Werteänderung in Anlehnung an Bardi & Godwin (2011)

Dieses Modell beschreibt zwei Wege zur Änderung von Wertegewichten: den „automatischen“ und den „mühsamen“ Weg. Zu Beginn beider Wege steht ein externes Geschehnis („Umweltfaktoren“), welches eine Änderung der Wertegewichte initiiert. Zur Aktivierung des „automatischen“ Weges muss ein Wert geprimed, also unterbewusst aktiviert werden. Der unterbewusst aktivierte Wert kann nun zu einer initialen Änderung der Wertegewichte führen. Hingegen steht zu Beginn des „mühsamen“ Weges die bewusste Neubewertung der Wertegewichte. Gestartet werden kann dieser Vorgang zum Beispiel durch die explizite Frage nach den Wertegewichten. Überdenkt eine Person ihre Wertegewichte, kann dies zu einer initialen Werteänderung führen. Solche einmaligen Einflüsse führen jedoch nur zu kurzfristigen Änderungen der Wertegewichte (Sagiv & Schwartz, 2021).

Um eine langfristige Änderung der Wertegewichte zu erreichen, ist es dem Modell zufolge nötig, dass Werte wiederholt geprimed (z. B. durch das tägliche Hören der Sprache, die mit

gewissen Werten verbunden ist) oder dass wiederholt Wertegewichte neu bewertet werden. Denn erst durch die regelmäßige Aktivierung des jeweiligen Wertes wird dieser im Wertesystem verstärkt und das Denken und Handeln des Menschen richtet sich stärker daran aus. In der Folge ändert der Mensch sein Denkschema entsprechend der neuen Wertegewichte und die Wertegewichtsänderung bleibt langfristig bestehen.

2. Forschungslücken

2.1. Entscheidungskrisen und Zufriedenheitsverläufe

Um Entscheidungschancen zu verdeutlichen und dieses Konzept möglichst vielen Menschen zugänglich zu machen, differenziert Keeney (2020) zwischen Entscheidungsproblemen und Entscheidungschancen. Eine wissenschaftliche Fundierung wurde bei der Erstellung des Konzepts nicht benötigt, da das Hauptaugenmerk seiner Arbeit auf der Darstellung von Zusammenhängen lag. Für eine wissenschaftliche Diskussion und Analyse des Konzepts sind Begriffsdefinitionen jedoch unerlässlich. Deshalb ergeben sich verschiedene Forschungslücken aus dem Konzept, die in Abbildung 5 dargestellt sind.

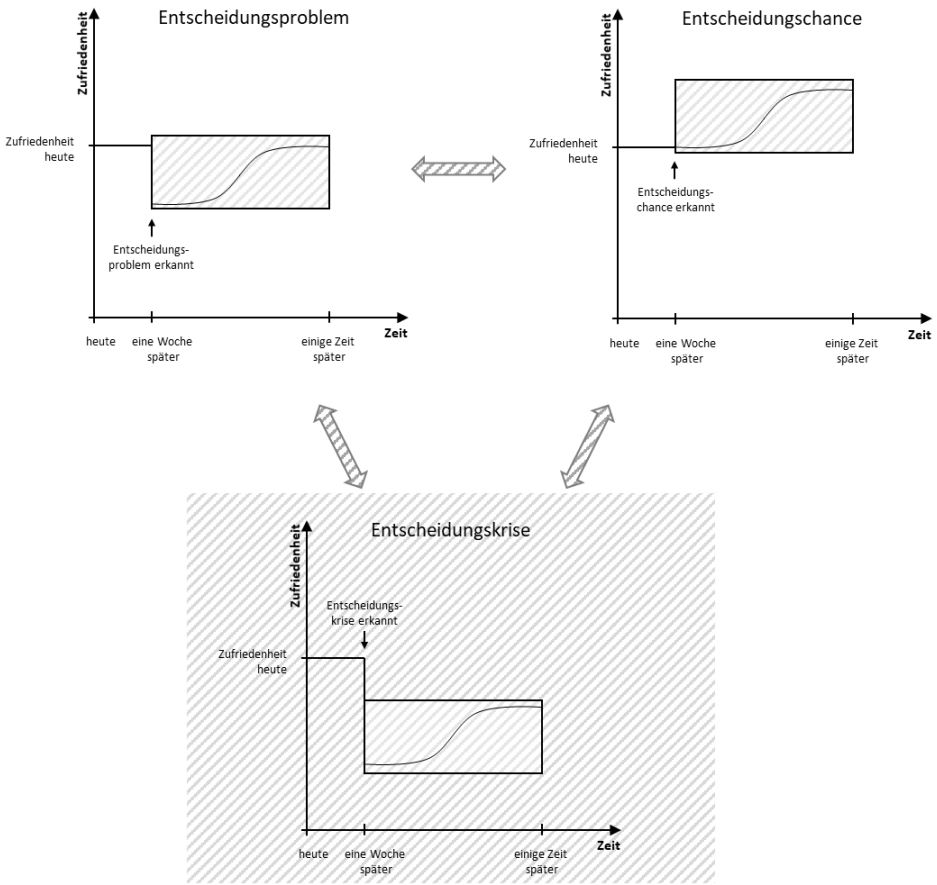

Abbildung 5: Forschungslücken (schraffiert) bei Entscheidungssituationen und Zufriedenheitsverläufen

Die Begriffe Entscheidungschance und Entscheidungsproblem sind nicht hinlänglich definiert und können nicht klar von anderen Begriffen wie der (Entscheidungs-)Krise abgegrenzt werden (schraffierte Pfeile in der Abbildung). In Kapitel 3 wird dargestellt, wie die Begriffsdefinition und die damit verbundene Konzepterweiterung im Arbeitspapier (**Paper 1: Empirical Evidence on the Effectiveness of "Giving Oneself a Nudge": The Relative Benefits of Pursuing Decision Opportunities and Solving Decision Problems.**) erreicht wurde. Darüber hinaus fehlen empirische Belege für die Zufriedenheitsverläufe über die Zeit in den jeweiligen Entscheidungssituationen (grau schraffierte Bereiche). Wie dieses anschauliche Konzept jedoch mittels Hypothesen überprüft werden kann, wird in Kapitel 3 dargestellt.

2.2. Entscheidungsunterstützung für die geführte Reflexion bei der Auswahl der Entscheidungssituation

In der Literatur sind die typischen Fehler beim Formulieren der Entscheidungsfrage bekannt (Kapitel 1.2). Um Entscheiderinnen und Entscheider bei der Formulierung der Entscheidungsfrage zu unterstützen, muss erstens analysiert werden, welche Konsequenzen die Fehler für die formulierte Entscheidungsfrage haben (Abbildung 6) und zweites eine Methode entwickelt werden, welche die negativen Konsequenzen minimiert.

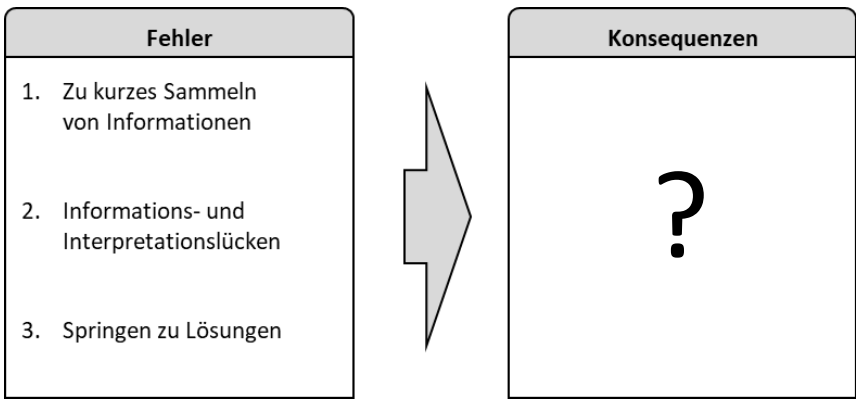

Abbildung 6: Die Konsequenzen von Fehlern im Prozess der Formulierung von Entscheidungsfragen sind unbekannt

Keeney (2020) schlägt ein allgemeines Vorgehen vor, bei dem Entscheiderinnen und Entscheider ihre Werte reflektieren. Dass die Reflexion der Werte eine sinnvolle Unterstützung in der Entscheidungsfindung ist, konnten Siebert und Keeney (2015) in einer vielbeachteten Studie aufzeigen. Sie wiesen nach, dass mit Hilfe von Wertelisten mehr und bessere Handlungsoptionen gefunden werden können, als durch unstrukturiertes Nachdenken. Wie Werte bei der Formulierung von Entscheidungsfragen und bei der Vermeidung von Fehlern im Prozess konkret helfen können, wurde bisher nicht dargelegt.

2.3. Einfluss der Corona-Krise auf das Wertesystem

Beim Konzept des wertorientierten Entscheidens kommen persönliche Werte zum Einsatz, um die Entscheidungsfindung zu optimieren. Damit eine Entscheidungsunterstützung möglichst hilfreich ist, sollten auch die Werteprioritäten in der Unterstützung stabil bleiben. Extremereignisse wie die Corona-Pandemie können dazu führen, dass sich Werteprioritäten stark verändern (Bardi & Goodwin, 2011). Eine mögliche Instabilität und deren Auswirkungen auf die Entscheidungsfindung müssen deswegen genauer analysiert werden. Bislang gibt es nur sehr begrenzt Forschung zum Einfluss von Pandemien auf das Wertesystem und noch keine uns bekannte zum Einfluss der Corona-Pandemie auf die Wertesysteme von Menschen in Deutschland. Diese Wissenslücke sollte jedoch gefüllt werden, um die Nützlichkeit des wertorientierten Entscheidens einordnen zu können.

Im Rahmen der vier Arbeitspapiere wurden die jeweiligen Forschungslücken adressiert und systematisch aufgearbeitet. Die Vorgehensweisen in den jeweiligen Arbeitspapieren und die wichtigsten Ergebnisse sind in dieser Arbeit zusammengefasst. Abbildung 7 zeigt die jeweiligen Forschungslücken und in welchem Kapitel diese thematisiert werden.

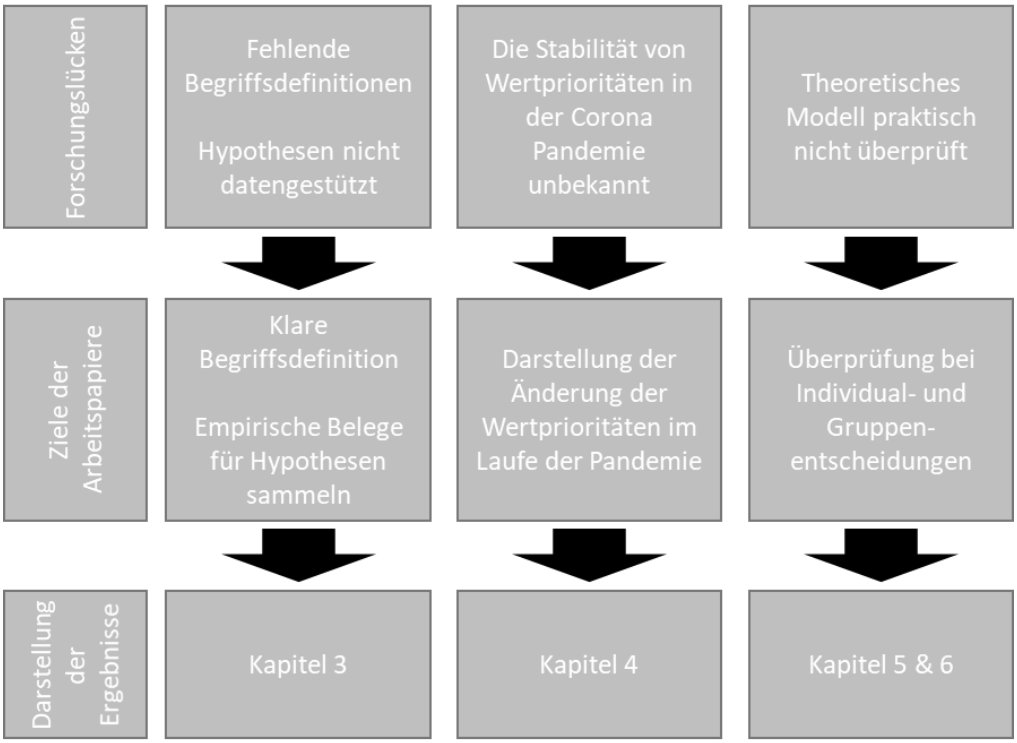

Abbildung 7: Gliederung dieser Arbeit abgeleitet aus den Forschungslücken und Zielen der Arbeitspapiere

3. Die Vorteile von Entscheidungschancen gegenüber Entscheidungsproblemen

Im Rahmen des Arbeitspapiers “Empirical Evidence on the Effectiveness of ‘Giving Oneself a Nudge’: The Relative Benefits of Pursuing Decision Opportunities and Solving Decision Problems” werden die theoretischen Grundlagen zum Thema Entscheidungschancen und Entscheidungsprobleme mittels Literatur fundiert und erweitert. Zudem werden erste Daten über den Zusammenhang von Entscheidungssituation und Zufriedenheit der Entscheiderinnen und Entscheider gesammelt.

3.1. Erweiterung des theoretischen Modells

Bei Entscheidungschancen und Entscheidungsproblemen handelt es sich um eine Kategorisierung von Entscheidungssituationen. Eine im ersten Arbeitspapier durchgeführte Literaturanalyse macht deutlich, dass Keeneys Modell um die Entscheidungssituation der Entscheidungskrise erweitert werden sollte, da Keeney diese Situation nicht betrachtet. Die Notwendigkeit der Differenzierung zwischen Problem und Krise wird in der Literatur diskutiert (Darling, 1994; Kuklan, 1988; Mintzberg et al., 1976).

Um die verschiedenen Kategorien analytisch zu überprüfen, müssen drei Schritte durchgeführt werden. Erstens müssen Kriterien für die Kategorisierung einer Entscheidungssituation definiert werden. Zweitens muss die zeitliche Dimension (x-Achse der Grafiken) exakt festgelegt werden und drittens muss eine geeignete Methode zur Messung der Zufriedenheit gefunden werden. Basierend auf diesen Vorarbeiten können Hypothesen entwickelt und Experimente zur Überprüfung derselben entworfen werden.

Gestützt von Keeneys Modell und den Überlegungen zur Entscheidungskrise werden die Zufriedenheitsverläufe über die Zeit für die jeweilige Entscheidungssituation wie in Abbildung 8 dargestellt angenommen. In der Grafik unten rechts sind die Hypothesen über die Verläufe dargestellt. Hypothesen 1a und 1b beschreiben die Unterschiede der Zufriedenheit zu Beginn der jeweiligen Entscheidungssituation, Hypothesen 3a und 3b die Unterschiede der Zufriedenheit nach Implementierung der Handlungsalternative und Hypothese 2 den Unterschied der Zufriedenheit zu Beginn und zum Schluss der jeweiligen Entscheidungssituation.

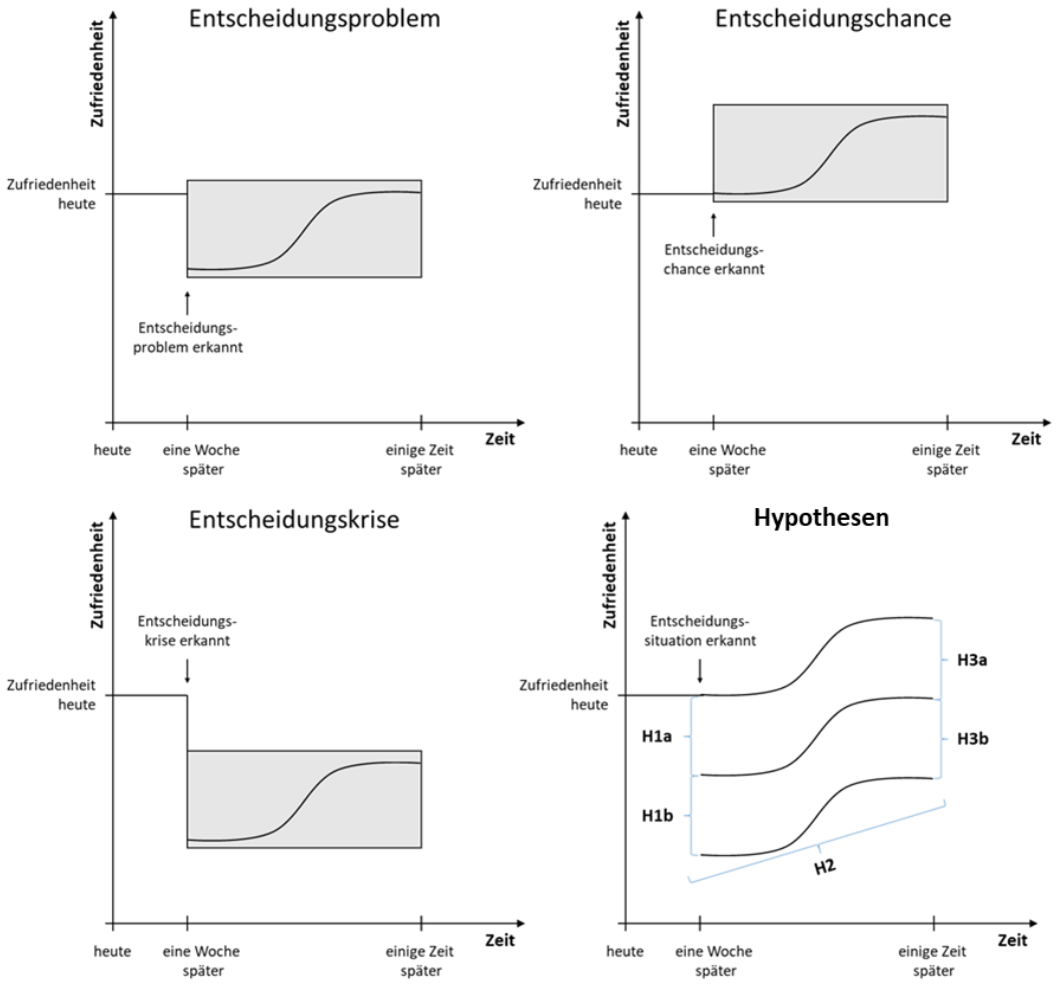

Abbildung 8: Zufriedenheitsverläufe innerhalb der jeweiligen Entscheidungssituation inklusive Hypothesen

3.2. Herangehensweise im Arbeitspapier

Zur Überprüfung der Hypothesen aus Kapitel 3.1 ist es nötig, die Zufriedenheit der Teilnehmenden an der Studie über den Zeitverlauf zu messen. In der Literatur gibt es verschiedene Ansätze, kurz- und langfristige Zufriedenheit zu messen. Da die jeweiligen Messmethoden sowohl theoretische als auch praktische Vor- und Nachteile haben, werden insgesamt drei Studien mit verschiedenen Messmethoden durchgeführt.

Die Dauer von Entscheidungsprozessen kann zwischen Personen stark variieren, deshalb werden anstelle von Zeitintervallen Meilensteine innerhalb eines Entscheidungsprozesses verwendet. Nach umfangreicher Literaturrecherche kommen vier Meilensteine zum Einsatz. Der erste Meilenstein ist das Erkennen der Entscheidungssituation, der zweite das Wählen einer Handlungsmöglichkeit zum Lösen der Situation, der dritte die Implementierung der Handlungsmöglichkeit und der letzte Meilenstein ist das Erfahren der Auswirkung der Entscheidung.

Die Kategorisierung der Entscheidungssituation als Chance, Problem oder Krise wird sowohl durch Selbsteinschätzung als auch durch eine strukturierte Expertenbewertung durchgeführt. Bei der Expertenbewertung werden die Aspekte der wahrgenommenen Kontrolle in der Entscheidungssituation, der Zeitdruck und der Auslöser der Entscheidungssituation als Kriterien zur Kategorisierung genutzt.

Es wurden drei Einzelstudien mit Teilnehmenden der RWTH Aachen University und dem Management Center Innsbruck durchgeführt, wobei verschiedene Methoden zur Messung der Zufriedenheit und der Entscheidungssituation genutzt wurden. Neben den drei Studien mit insgesamt 766 Teilnehmenden wird eine vierte Studie als Metaanalyse der Daten aus den ersten drei Studien durchgeführt. Ziel der Metaanalyse ist es, die Zufriedenheitsunterschiede für die Entscheidungssituationen innerhalb eines festen Entscheidungskontextes nachzuweisen. Als Entscheidungskontext wird die Wahl des Bildungswegs nach Abschluss der Schule gewählt.

3.3. Ergebnisse

Insgesamt können die Verläufe von Abbildung 8 nachgewiesen und die Hypothesen eins bis drei bestätigt werden. Entscheiderinnen und Entscheider, die eine Entscheidungschance verfolgen, sind zufriedener als solche, die ein Entscheidungsproblem verfolgen. Entscheiderinnen und Entscheider, die ein Entscheidungsproblem lösen müssen, sind zufriedener als solche, die eine Entscheidungskrise lösen müssen. Entscheiderinnen und Entscheider sind zufriedener, wenn sie die Auswirkung ihrer Entscheidung spüren, als sie es vor dem Auftreten der Entscheidungschance waren. Sie sind genauso zufrieden, wenn sie die Auswirkung ihrer Entscheidung spüren, wie sie es vor dem Auftreten des Entscheidungsproblems waren, und sie sind unzufriedener, wenn sie die Auswirkung ihrer Entscheidung spüren, als vor dem Auftreten der Entscheidungskrise. Zudem konnten durch Studie vier erste Hinweise gefunden werden, dass durch das bewusste Suchen nach Entscheidungschancen eine höhere Zufriedenheit mit derselben Entscheidungssituation vorliegt, als wenn die Entscheidungssituation durch Entscheidungen anderer entstanden ist.

4. Auswirkung der Corona-Pandemie auf das Wertesystem deutscher Studierender

Die Stabilität des Wertesystems ist die Voraussetzung für eine qualitativ hochwertige Entscheidungsunterstützung. Deshalb wird untersucht, ob die Corona-Pandemie einen Einfluss auf das Wertesystem von Entscheiderinnen und Entscheidern hat.

4.1. Herangehensweise im Arbeitspapier

Um die Auswirkung der Corona-Pandemie auf das Wertesystem deutscher Studierender zu untersuchen, wurden in einer Studie über vier Jahre hinweg die durchschnittlichen Wertegewichte von Studierenden der RWTH Aachen gemessen. Die demographischen Daten der Teilnehmenden sind in Tabelle 1 dargestellt.

Tabelle 1: Die demographischen Daten der Teilnehmenden

Messzeitpunkt	WS 18/19	WS 19/20	WS 20/21	WS 21/22
Teilnehmeranzahl	346	383	285	314
Geschlecht (m/w)	74% / 26%	74% / 26%	71% / 29%	66% / 34%
Studiengänge (B.Sc./ M.Sc.)	93% / 7%	88% / 12 %	94% / 6 %	94% / 6%

Die Wertegewichte der jeweiligen Messzeitpunkte wurden mit Hilfe des Entscheidungsunterstützungstools Entscheidungsnavi erfasst (www.entscheidungsnavi.de). Um eine hohe Genauigkeit bei der Messung zu erreichen, müssen individuelle Unterschiede in der Interpretation der Messskalen ausgeschlossen werden. Schwartz (2012) schlägt für diesen Fall das folgende Verfahren vor: Für jeden Datensatz wird der Durchschnittswert der individuellen Wertegewichte berechnet und von jedem einzelnen Wertegewicht in diesem Datensatz subtrahiert. Durch dieses Vorgehen werden die Wertegewichte der Teilnehmenden in relative Wichtigkeitswerte überführt.

4.2. Ergebnisse

In Tabelle 2 sind die Ergebnisse für ausgewählte Werte dargestellt. Im Folgenden werden repräsentative Ergebnisse aus der Studie kurz besprochen, um die wichtigsten Erkenntnisse aufzuzeigen.

Tabelle 2: Mittelwerte, Standardabweichungen und Ergebnisse der ANOVA der Wertegewichte (Auszug)

	Zeit				**F**	**η^2**
	T1 M (*SD*)	**T2 M (*SD*)**	**T3 M (*SD*)**	**T4 M (*SD*)**		
Finanzielle Sicherheit	9,95 (*12,11*)	10,20 (*12,16*)	9,06 (*13,47*)	10,45 (*12,40*)	0,697	,554
Freunde und soziale Beziehungen	8,75 (*12,02*)	8,87 (*11,44*)	9,39 (*13,10*)	9,62 (*12,30*)	0,375	,771
Familie und Partner	10,91 (*14,01*)	12,72 (*13,28*)	7,82 (*16,56*)	10,31 (*14,23*)	6,337	,000
Verbundenheit zur Natur	-17,12 (*16,19*)	-14,97 (*15,81*)	-11,83 (*15,48*)	-17,28 (*14,10*)	8,066	,000
Freiheit und Unabhängigkeit	4,77 (*14,03*)	4,33 (*12,75*)	6,39 (*12,95*)	7,04 (*12,91*)	3,518	,015
Intellektuelle Erfüllung	4,26 (*12,82*)	2,42 (*12,55*)	5,30 (*13,50*)	3,84 (*12,44*)	2,99	,033

Insgesamt zeigen die Ergebnisse auf, dass manche Wertegewichte signifikanten Änderungen unterliegen, während andere Wertegewichtige in der Corona-Pandemie sich kaum änderten. So haben beispielsweise die Wertegewichte von *Finanzieller Sicherheit* und *Freunde und soziale Beziehungen* keine signifikanten Änderungen in der Corona-Pandemie erfahren. Bei den Werten *Familie und Partner*, *Verbundenheit zur Natur*, *Freiheit und Unabhängigkeit* sowie *Intellektuelle Erfüllung* sind jedoch signifikante Wertegewichtsänderungen zu erkennen. Signifikante Wertegewichtsänderungen folgen dabei zwei Tendenzen. Zum einen sind langfristige Änderungen in den Wertegewichten zu erkennen und zum anderen tendieren Wertegewichte nach Aufhebung der meisten Restriktionen zur Eindämmung der Pandemie zu ihrem ursprünglichen Wert. Dieses Verhalten ist in der Literatur als „Bounce-Back"-Effekt

bekannt (Bojanowska et al., 2021). Ein Beispiel für den Bounce-Back-Effekt ist beim Verlauf der Wertegewichte von *Verbundenheit zur Natur* zu finden (Abbildung 9)

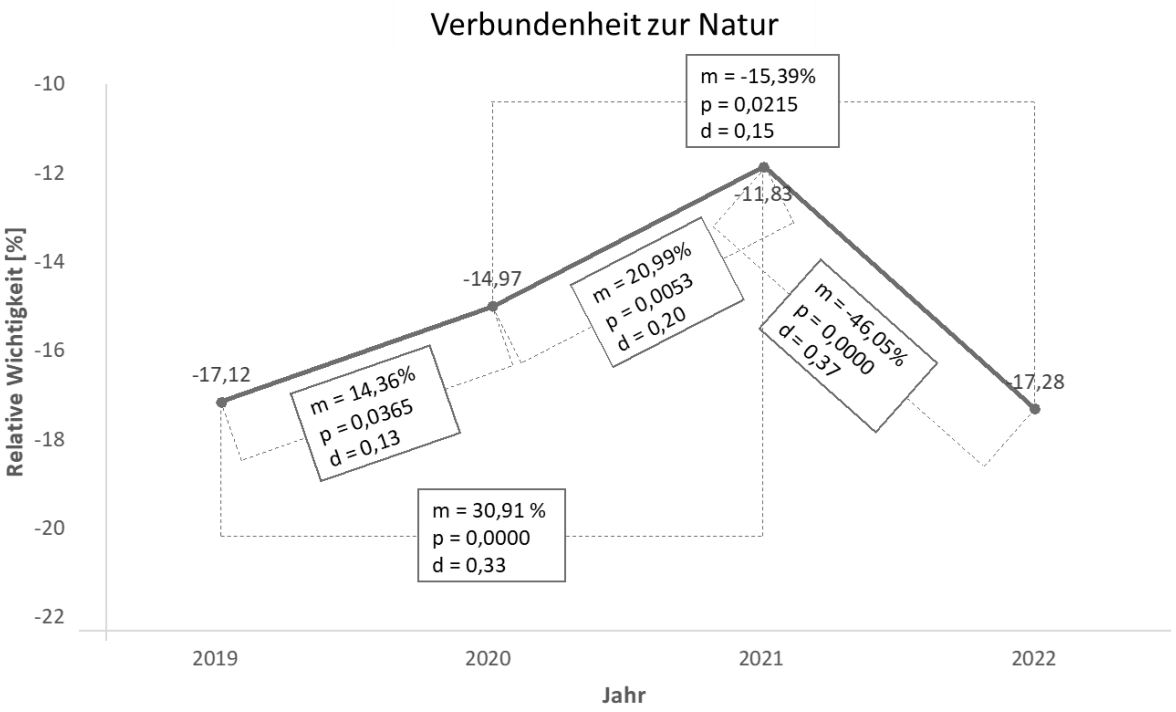

Abbildung 9: Verlauf der durchschnittlichen Wertegewichte des Wertes *Verbundenheit zur Natur* mit Signifikanzniveaus und Effektstärken

Durch die Corona-Pandemie stieg die relative Wichtigkeit des Werts von -14,97 im Jahr 2020 auf -11,83 im Jahr 2021. Diese Steigerung des Wertegewichts ist signifikant (p = 0,53 %) bei einer mittleren Effektstärke von d = 0,20. Nach Aufhebung der Maßnahmen sank die relative Wichtigkeit des Wertegewichts auf -17,28 und damit signifikant unter das Vorkrisenniveau (p = 2,15 %, d = 0,15).

Ein Beispiel für eine langfristige Änderung des Wertegewichts ist im Verlauf des Wertegewichts des Werts *Freiheit und Unabhängigkeit* zu finden (Abbildung 10). Im Jahr 2020 besaß der Wert eine durchschnittliche Wichtigkeit von 4,33 in den Wertesystemen der Studierenden. Dieses Wertegewicht stieg 2021 auf 6,39 und 2022 auf 7,04. Dabei sind die Signifikanzniveaus für die Änderungen 2,04 % beziehungsweise 27,15 %. Die Effektstärken betragen d = 0,16 und d = 0,05. Wird der erste Messzeitpunkt mit dem dritten verglichen, steigt das durchschnittliche Wertegewicht um 2,71 und das bei einem Signifikanzniveau von 0,3 % und einer Effektstärke von d = 0,21. Insgesamt ist eine nachhaltige Steigerung des Wertegewichts zu erkennen.

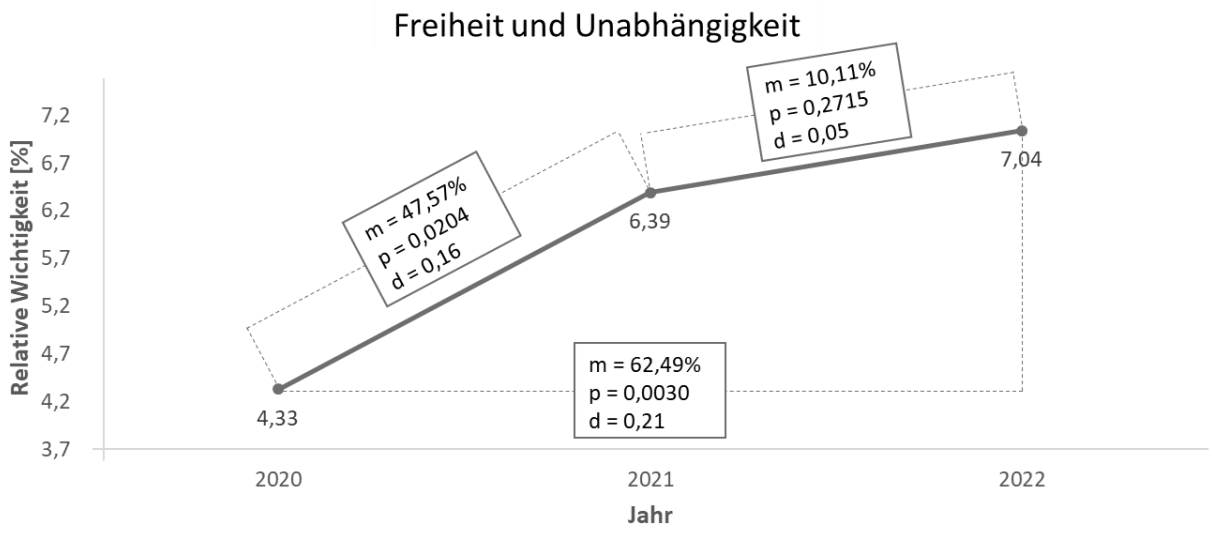

Abbildung 10: Verlauf der durchschnittlichen Werteprioritäten des Wertes *Freiheit und Unabhängigkeit* mit Signifikanzniveaus und Effektstärken

Neben diesen Haupterkenntnissen können zwei weitere Beobachtungen gemacht werden. Zum einen sind kaum Unterschiede bei den Wertegewichtsverläufen zwischen den Geschlechtern zu erkennen und zum anderen gibt es Hinweise darauf, dass parallel zu den Wertegewichtsänderungen auch die Zielgewichte in den Entscheidungen signifikante Unterschiede in derselben Richtung wie die Wertegewichtsänderungen aufzeigen.

5. Entscheidungschancen durch geführte Reflexion der Werte

Entscheidungschancen können laut Keeney durch das proaktive und offene Formulieren der Entscheidungsfrage erreicht werden. In diesem Abschnitt wird dargelegt, wie mit Hilfe des Entscheidungsnavis systematisch proaktivere und offenere Entscheidungsfragen für Individualentscheidungen formuliert werden können. Hierfür formulieren die Nutzenden zunächst ihre Entscheidungsfrage, werden im Anschluss durch eine Reflexion ihrer persönlichen Werte geführt und reformulieren ihre Entscheidungsfrage zum Schluss.

5.1. Herangehensweise im Arbeitspapier

In Kapitel 2.2 sind die Fehler bei der Formulierung von Entscheidungsfragen dargestellt. Um eine passende Entscheidungsunterstützung zu entwickeln, müssen zunächst die Konsequenzen der Fehler auf die Entscheidungsformulierung erkannt werden. Im ersten Vorgehensschritt im Arbeitspapier werden daher mittels einer systematischen Literaturrecherche die Konsequenzen erarbeitet (Abbildung 11).

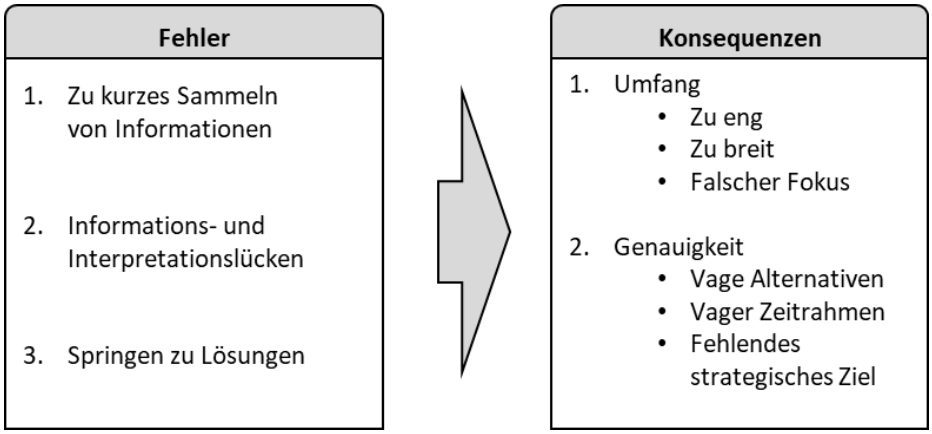

Abbildung 11: Typische Fehler und deren Konsequenzen bei der Formulierung einer Entscheidungsfrage

Im zweiten Schritt werden Bewertungsdimensionen für eine mögliche Entscheidungsunterstützung aus den Konsequenzen abgeleitet (Abbildung 12).

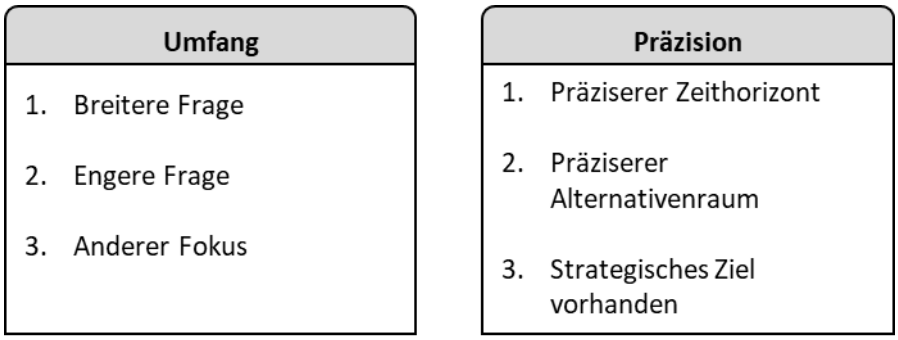

Abbildung 12: Bewertungsdimensionen für die Entscheidungsunterstützung bei der Formulierung der Entscheidungsfrage

Eine Entscheidungsfrage gilt als präziser (im Vergleich zu einer intuitiv formulierten Frage), wenn entweder der Raum an Handlungsmöglichkeiten klarer geworden ist, der Zeithorizont explizit formuliert ist oder ein strategisches Ziel für die Entscheidungssituation formuliert wurde. Der Umfang hat sich verbessert, wenn eine zu enge Frage breiter geworden ist, eine zu breite Frage enger formuliert wird oder eine Frage mit falschem Fokus einen besseren Fokus erhält.

Basierend auf diesen Bewertungsdimensionen wurde mit Hilfe verschiedener Problemstrukturierungsmethoden und der Idee der Wertereflexion eine mehrstufige Entscheidungsunterstützung für die Formulierung der Entscheidungsfrage im ersten Schritt des Entscheidungsnavis implementiert, wobei die Entscheiderinnen und Entscheider zunächst ihre intuitive Entscheidungsfrage formulieren und dann schrittweise reflektieren. Zur Bewertung der Unterstützung wird die initiale Entscheidungsfrage mit der finalen Entscheidungsfrage anhand der Kriterien *Präzision* und *Umfang* bewertet. Die Nutzerinnen

und Nutzer des Entscheidungsnavis müssen zudem ein Feedback von mindestens 2000 Zeichen über ihre Erfahrung mit dem Entscheidungsnavi einreichen. Anhand dieses Textes werden die Änderungen des Umfangs bewertet.

5.2. Ergebnisse

Das Entscheidungsnavi half 742 Teilnehmenden (87,29 %), ihr Verständnis der Entscheidungssituation zu verbessern. In 552 Fällen (74,39 %) verbesserten die Teilnehmenden ihre Entscheidungsfrage und 190 Teilnehmende (25,61 %) gaben in ihrem Feedback an, dass sich ihr Verständnis der Entscheidungssituation verbessert hat, obwohl sie die Frage nicht anders formuliert haben (Abbildung 13).

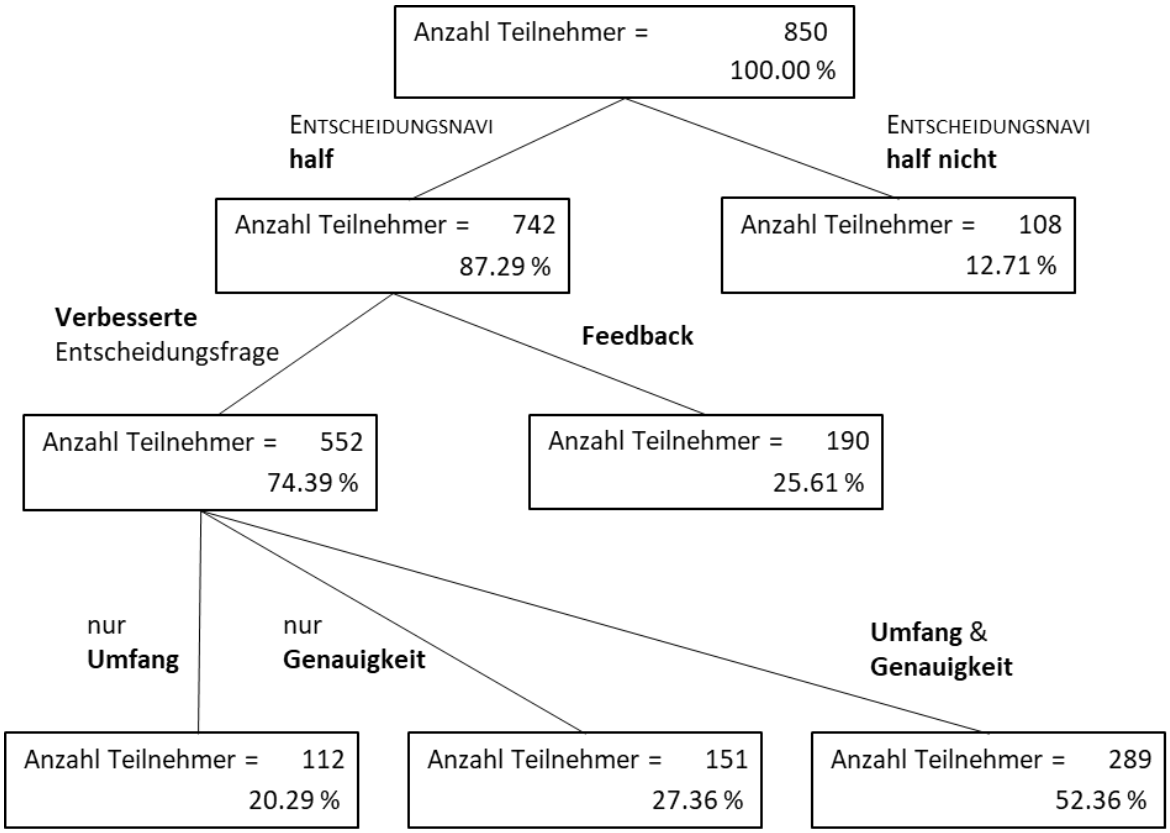

Abbildung 13: Auswertung der Entscheidungsunterstützung durch das Entscheidungsnavi

Von den 552 Teilnehmenden, die ihre Entscheidungsfrage verbesserten, überarbeiteten 289 (52,36 %) sie in Bezug auf den richtigen Umfang und ihre Genauigkeit, 151 (27,36 %) verbesserten nur ihre Genauigkeit und 112 (20,29 %) änderten ihren Umfang.

Von allen 850 bewerteten Projekten wurden 402 im Hinblick auf den Umfang der Entscheidungsfrage angepasst. Die Bewerter stuften 448 Projekte als 'gleicher Umfang', 329

als 'erweiterter Umfang', 17 als 'engerer Umfang' und 56 als 'andere Entscheidung' ein (Abbildung 14).

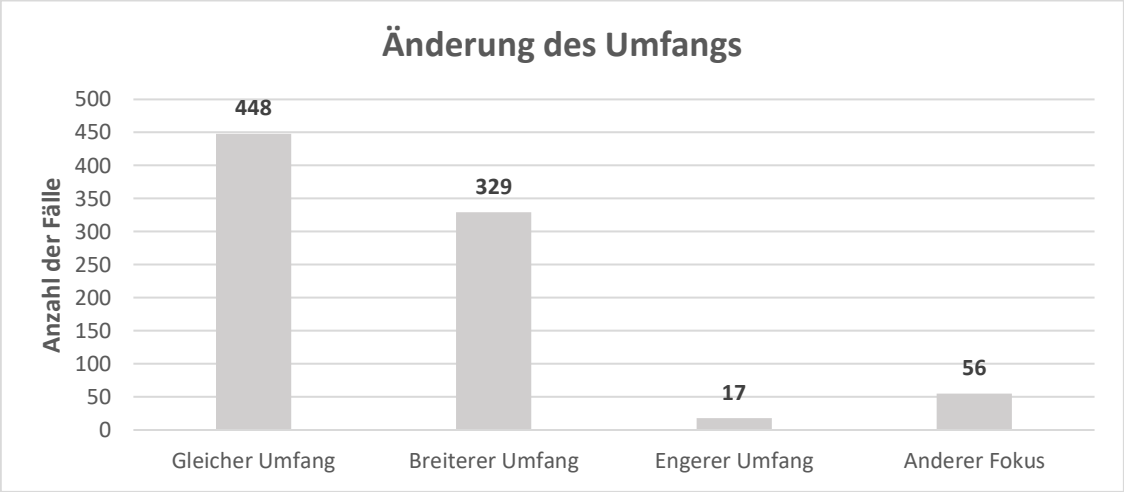

Abbildung 14: Ergebnisse für die Änderung des Umfangs

Änderte sich der Umfang der Entscheidungsfrage, wurden 81,8 % der Entscheidungsfragen breiter, in 4,2 % der Fälle wurde der Umfang der Entscheidungsfrage enger und in 13,9 % änderte sich die Entscheidungsfrage gänzlich.

Bei der Präzision änderte sich in 402 Fällen nichts, in 442 Fällen wurden die Entscheidungsfragen präziser und in 6 Fällen weniger präzise (Abbildung 15).

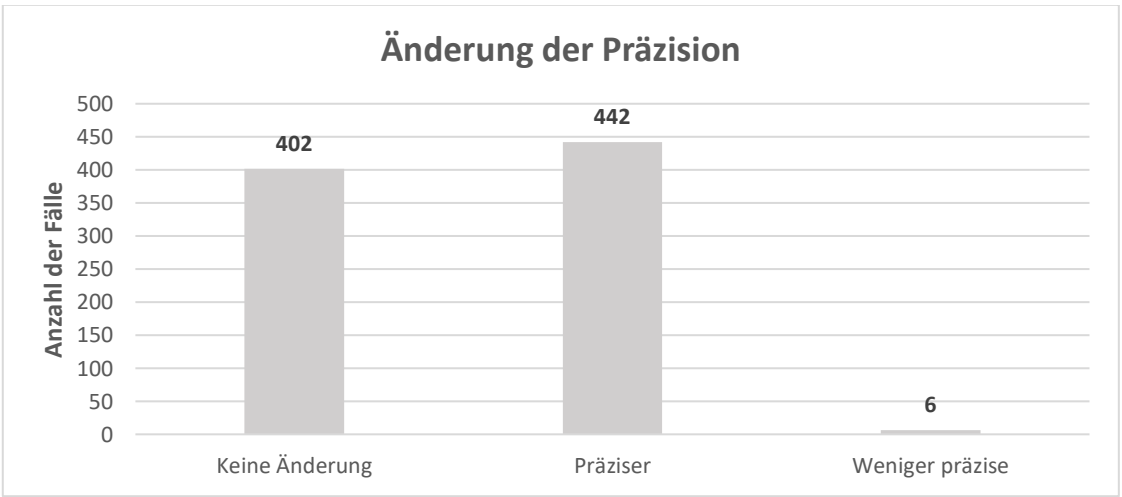

Abbildung 15: Ergebnisse für die Änderung der Präzision

Insgesamt ist festzuhalten, dass das Entscheidungsnavi dabei hilft, offenere und proaktivere Entscheidungsfragen zu formulieren. Dabei nutzt das Entscheidungsnavi eine geführte Reflexion von Werten und weitere Entscheidungsstrukturierungsmethoden, um dieses Ergebnis zu erreichen.

6. Praktische Anwendung des *Reflektiert Entscheiden*-Ansatzes im Unternehmen

In Kapitel 5 konnte gezeigt werden, dass Keeneys Ansatz praktikabel für Individualentscheidungen umgesetzt werden kann. In diesem Kapitel wird im Rahmen einer Case Study überprüft, ob die Überlegungen auch in der Praxis von Gruppenentscheidungen anwendbar sind. Für die Case Study wird ein kompletter Entscheidungsprozess durchlaufen.

6.1. Methodik

Der Ansatz wird im Rahmen einer Beratung der Lebenshilfe Aachen Werkstätten & Service GmbH (im Folgenden Lebenshilfe Aachen genannt) überprüft. Die Lebenshilfe Aachen benötigte eine organisatorische Neustrukturierung, nachdem die historisch gewachsene Unternehmensstruktur in Verbindung mit neuen gesetzlichen Anforderungen das Erreichen der Unternehmensziele zunehmend erschwerte. In der Beratung sollte eine optimale Gestaltungsalternative für die Unternehmensstruktur in mehreren Workshops erarbeitet werden.

Methodisch wurde dazu der Ansatz *Reflektiert Entscheiden* (von Nitzsch & Methling, 2021) und das Entscheidungsnavi genutzt. Der Beratungserfolg wurde anhand von drei Kriterien gemessen, welche die *inhaltliche Qualität* des Entscheidungsprozesses, die *Effizienz des Prozesses* und die *erreichte Akzeptanz* der Entscheidung im Unternehmen bewerten. Diese drei Kriterien basieren auf dem Decision Quality-Ansatz von Spetzler et al. (2016).

6.2. Ergebnisse

Mit Hilfe des *Reflektiert Entscheiden*-Ansatzes und dem Entscheidungsnavi konnte die für das Unternehmen optimale Gestaltungsalternative gefunden werden. Die Praktikabilität des Ansatzes kann dabei anhand der Kriterien bewertet werden.

Inhaltliche Qualität: Die vorhandene Prozessstruktur wurde als Leitfaden für die Workshops genutzt und garantierte eine hohe inhaltliche Qualität. Durch die Schritte des *Reflektiert Entscheiden*-Ansatzes konnte im ersten Schritt ein angemessener Entscheidungsrahmen festgelegt werden, im zweiten Schritt wurden die Ziele der Entscheidungssituation umfangreich reflektiert und mit Hilfe des dritten Schrittes konnten kreative Gestaltungsalternativen gefunden werden. Durch die Struktur konnten psychologische

Verzerrungen implizit vermieden werden. Dies führte dazu, dass die vorliegenden Informationen als zweckmäßig und zuverlässig betrachtet werden konnten.

Effizienz des Prozesses: Durch den *Reflektiert Entscheiden*-Ansatz in Verbindung mit dem Entscheidungsnavi konnte ein individuelles Ergebnis für die Lebenshilfe Aachen entwickelt werden. Die Individualität des Ergebnisses konnte hauptsächlich durch die Flexibilität des Entscheidungsprozesses erreicht werden. Bereits im dritten Schritt des Prozesses war für die Lebenshilfe Aachen klar, dass die geeignete Handlungsalternative gefunden wurde. Der Ansatz ermöglichte es dann, die folgenden Schritte verkürzt und dennoch sinnvoll zu durchlaufen. So konnten weitere Optimierungspotentiale in den nächsten Schritten aufgedeckt und die optimale Handlungsalternative erarbeitet werden. Das Ergebnis war trotz des verkürzten Prozesses fundiert begründbar.

Erreichte Akzeptanz: Die ausgearbeitete optimale Handlungsalternative wurde dem Aufsichtsrat zur Abstimmung vorgelegt. Dieser nahm die Handlungsalternative einstimmig an und bejahte die strategische Veränderung des Unternehmens. Die Umsetzung und Kommunikation der Neustrukturierung profitierte von der Nachvollziehbarkeit des Resultats, der Klarheit des Entscheidungsprozesses und der Partizipation verschiedener Instanzen am Entscheidungsprozess, sodass die Entscheidung von den Mitarbeitenden getragen wurde.

7. Implikationen

In den hier zusammengefassten Arbeitspapieren wird aufgezeigt, wie Entscheidungsprobleme mittels geführter Reflexion von Werten und Zielen in Entscheidungschancen transformiert werden können. Die Motivation hinter der Transformation wurde in Kapitel 3 dargestellt. Durch ein Modell verschiedener Entscheidungssituationen und der damit verbundenen Zufriedenheit der Entscheiderinnen und Entscheider wurde dargelegt, dass Entscheiderinnen und Entscheider durch Entscheidungschancen eine höhere Lebenszufriedenheit erreichen können. Die Transformation von Entscheidungsproblemen wird mit Hilfe von Werten erreicht. Die Wertetheorie und die Stabilität von Werten wurden in Kapitel 1.3 thematisiert. Durch ein Fallbeispiel für Gruppenentscheidungen und mehreren Fallbeispielen für Individualentscheidungen konnte aufgezeigt werden, dass die Fokussierung auf Werte erheblichen Mehrwert für den Entscheidungsfindungsprozess birgt. Insgesamt ergeben sich aus der Arbeit folgende **gesellschaftliche Implikationen**:

1. Entscheiderinnen und Entscheider sollten aktiv nach Entscheidungschancen suchen.
2. Eine klare Formulierung der Entscheidungsfrage hilft dabei, Entscheidungschancen zu entdecken und ein besseres Verständnis für die Entscheidungssituation zu erhalten.
3. Werte und Ziele spielen eine entscheidende Rolle für eine reflektierte Entscheidungsfindung.
4. Die Corona-Pandemie hat hauptsächlich kurzfristige Auswirkungen auf das Wertesystem deutscher Studierender.

Es konnten erste Hinweise gefunden werden, wonach Entscheiderinnen und Entscheider, die aktiv nach Entscheidungschancen suchen, zufriedener sind als solche, die auf Entscheidungsprobleme oder Entscheidungskrisen warten. Das Suchen von Entscheidungschancen kann mit Hilfe einer klaren Formulierung der Entscheidungsfrage erreicht werden. Zudem kann durch die Auseinandersetzung mit der Entscheidungsfrage ein besseres Verständnis für die Entscheidungssituation erzielt werden. Dieses proaktive Verhalten kann aktiv erlernt werden (Siebert et al., 2020, 2021). Werte und Ziele spielen nicht nur eine entscheidende Rolle für das Finden von Entscheidungschancen, sondern auch für einen reflektierten Entscheidungsprozess. Wie Bond et al. (2008) und Siebert & Keeney (2015) zeigen, helfen Werte und Ziele auch bei den weiteren Schritten des Entscheidungsprozesses. Werte sind sinnvolle Orientierungspunkte für wichtige Entscheidungen im Leben, da sie relativ stabil sind und selbst extreme Ereignisse wie Pandemien langfristig nur einen kleinen Einfluss auf sie haben.

Neben den gesellschaftlichen Implikationen können auch folgende **Implikationen für die Entscheidungslehre** abgeleitet werden:

1. Entscheiderinnen und Entscheider sollten bei der Strukturierung ihrer Entscheidungen unterstützt werden.
2. Es gibt bereits nützliche Ansätze, die bei der Strukturierung unterstützen.
3. Die Messung der Entscheidungsunterstützung ist möglich, meist jedoch nur indirekt.

Im Gegensatz zur Entscheidungsunterstützung, die auf Alternativen fokussiert ist, bietet die wertfokussierte Entscheidungsunterstützung die Möglichkeit, Entscheiderinnen und Entscheidern auch bei der Strukturierung einer Entscheidung zu helfen. Die Strukturierung einer Entscheidung meint dabei die Wahl des Entscheidungsumfangs und die Generierung von Kriterien und kreativen Handlungsoptionen. Die Strukturierung einer Entscheidung wird

benötigt, bevor durch mathematische Optimierung die optimale Handlungsoption gefunden werden kann. Dass Entscheiderinnen und Entscheider bei der Strukturierung Hilfe benötigen, konnte in den vorgestellten Arbeitspapieren dargestellt werden. Leider wird die Strukturierung selten unterstützt, da es kaum wissenschaftlich untersuchte Ansätze gibt. Im Rahmen der verschiedenen Arbeitspapiere konnte jedoch gezeigt werden, dass erstens Ansätze zur Unterstützung der Entscheidungsstrukturierung vorhanden sind (besonders im Arbeitspapier 3) und es zweitens möglich ist, die Entscheidungsunterstützung wissenschaftlich zu erfassen. Die in den Arbeitspapieren drei und vier dargestellten Methoden zur Erfassung der Unterstützung messen die Unterstützung durch indirekte Attribute wie die Auswirkung der Unterstützung. Solche Ansätze sollten in Zukunft auch bei anderen Arbeiten verwendet werden.

8. Limitationen

Die Implikationen dieser Arbeit sind hinsichtlich der Limitationen der einzelnen Studien zu reflektieren. Dabei hat jede Studie theoretische und praktische Limitationen, die dazu führen können, dass die Aussagekraft der Studien reduziert wird oder nur auf bestimmte Personengruppen oder bestimmte Entscheidungssituationen zutrifft.

In der ersten Studie in Kapitel 3 wird eine erhöhte Zufriedenheit bei Entscheidungschancen im Vergleich der Zufriedenheit bei Entscheidungsproblemen oder Entscheidungskrisen gezeigt. Auch wenn es theoretische Punkte gibt, die für einen kausalen Zusammenhang sprechen, muss dies nicht unbedingt sein. Es könnten andere Aspekte, wie zum Beispiel der Optimismus einer Person, in kausalem Zusammenhang mit der Zufriedenheit in der Entscheidungssituation stehen. Zudem sind die Teilnehmenden an der Studie keine repräsentative Gruppe. Die Einschätzung der Entscheidungssituationen könnte mit der Unerfahrenheit der Teilnehmenden bei wichtigen Entscheidungen variieren. Gleichzeitig konnten nur wenige Entscheidungssituationen, wie zum Beispiel die Wahl des Berufs- oder Bildungswegs, analysiert werden. Hierdurch können die Ergebnisse nicht verallgemeinert werden.

Das Wertesystem von Schwartz wird in der zweiten Studie nicht vollständig im Entscheidungsnavi umgesetzt. Aus Praktikabilitätsgründen wurden Werte aus den Arbeiten von Reiss (2004) hinzugefügt, diese ersetzen zum Teil Werte von Schwartz. Hierdurch ist die Aussagekraft der Ergebnisse vermindert. Auch die Allgemeingültigkeit der Aussagen ist aufgrund der Stichprobenauswahl nicht gegeben.

In Kapitel 5 wird dargelegt, wie Entscheidungschancen durch eine geführte Reflexion von Zielen und Werten erreicht werden können. Die Aussagekraft der Ergebnisse ist reduziert, da nicht der komplette Reflexions- und Denkprozess im Entscheidungsnavi festgehalten wird. Die Teilnehmenden an der Studie hatten zur Bearbeitung der Entscheidungssituation mehrere Wochen Zeit und hätten die Möglichkeit gehabt, während der Arbeit im Entscheidungsnavi mit Hilfe weiterer Quellen zu reflektieren und Informationen zu sammeln. In welchem Umfang diese Reflexion stattgefunden und welche Auswirkung sie auf das Ergebnis hat, ist nicht mehr nachverfolgbar.

Bei der letzten Studie im Kapitel 6 handelt es sich um eine Fallstudie. Grundsätzlich ist an Fallstudien die geringe Generalisierbarkeit der Ergebnisse zu bemängeln. Die Ergebnisse hängen stark von den Fähigkeiten der Moderierenden ab und könnten dadurch verzerrt sein. Gleichzeitig benötigt es weitere Fallstudien mit unterschiedlichen Themen, um die Aussagekraft weiter zu bekräftigen.

9. Ausblick

Weitere Forschung sollte vor allem den Zusammenhang zwischen der Zufriedenheit einer Person und der Entscheidungssituation behandeln. Die hier vorgestellten Studien konnten erste Indizien für eine erhöhte Zufriedenheit bei Entscheidungschance finden. In den zukünftigen Forschungsarbeiten sollten weitere Hinweise gesammelt werden, um diese Vermutung zu bekräftigen. Einen großen Mehrwert kann dabei die Begleitung von Personen während des gesamten Entscheidungsprozesses bieten. Zugleich sollten auch die Persönlichkeitseigenschaften der Probanden erfasst werden, um andere Gründe für den Zusammenhang von Zufriedenheit und Entscheidungssituation ausschließen zu können.

Auch können weitere Methoden zum Finden von Entscheidungschancen hinsichtlich ihrer Effektivität untersucht werden. Die in dieser Arbeit vorgestellte Methode zeigt, dass durch das Reflektieren von Werten proaktivere Formulierungen der Entscheidungsfrage und damit ein besseres Verständnis für die Entscheidungssituation entsteht. In der zukünftigen Forschung können weitere Methoden zur effektiveren Unterstützung bei der Suche nach Entscheidungschancen entwickelt werden.

Solange die Weltgesundheitsorganisation die Corona-Pandemie nicht für beendet erklärt, sollten die Werteprioritäten der Menschen weiterverfolgt werden. Für den Messzeitpunkt im

Januar 2022 konnte ein Zurückkehren der Werteprioritäten auf das Niveau vor der Pandemie erkannt werden. Auch kann in zukünftige Forschung die Werteprioritäten von anderen Personengruppen und in anderen Ländern adressiert werden, um ein umfangreicheres Verständnis der Werteänderungen zu erhalten. In der hier vorgestellten Studie konnten erste Daten gesammelt werden, wonach Änderungen der Werte auch Änderungen in den Zielgewichten zur Folge haben. In der weiteren Forschung kann hier ansetzen werden, um Verhaltensänderungen resultierend aus der Corona-Pandemie besser zu verstehen.

Das Entscheidungsnavi als Entscheidungsunterstützungstool war Teil von drei der vier Forschungsarbeiten. Zur besseren Unterstützung sind zwei Weiterentwicklungen notwendig. Zum einen eine Teamfunktion, die Entscheidungen von Gruppen noch besser unterstützt. Und zum anderen die Veränderung der Werteliste, sodass hinter dieser ein theoretisch fundiertes Konzept steht. Der Erfolg der Unterstützung durch die Teamfunktion und die angepasste Werteliste können in zukünftiger Forschung überprüft werden.

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Part B. Forschungsarbeiten

Paper 1: Empirical Evidence on the Effectiveness of “Giving Oneself a Nudge”: The Relative Benefits of Pursuing Decision Opportunities and Solving Decision Problems.

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Empirical Evidence on the Effectiveness of "Giving Oneself a Nudge": The Relative Benefits of Pursuing Decision Opportunities and Solving Decision Problems.

In 2009, Thaler and Sunstein presented a concept of how individuals can be "nudged" to make better decisions without restricting their freedom of choice. Decision architects present alternatives such that helping individuals choose what they believe is the best for them. A decision architect is essential for applying the concept of nudging. However, in many decision situations, there is no decision architect available or the decision makers do not want a decision architect, perhaps because it is a very private or confidential decision situation. Therefore, in his 2020 book *Give Yourself a Nudge*, Keeney extended the concept of nudging to decision situations where there is no decision architect to nudge the decision-maker. The core idea is to empower decision makers to become their own decision architects. He provided several suggestions on how individuals can nudge themselves. Two important nudges are to create decision opportunities proactively and to convert decision problems into decision opportunities. These nudges are based on the assumption that decision makers are happier pursuing decision opportunities than solving decision problems. We conducted four studies with 731 participants to test this assumption. We gathered comprehensive empirical evidence suggesting that individuals facing decision opportunities are more satisfied in their decision situations throughout the decision-making process than individuals facing decision problems, even when controlling the decision situation. Furthermore, our empirical findings provide the first insights into how decision makers address decision situations that affect their life satisfaction.

Highlights

- Individuals are more satisfied pursuing decision opportunities than solving problems
- Individuals benefit from creating decision opportunities proactively
- We find a first link between addressing decision situations and life satisfaction
- Decision crises and decision problems should be differentiated

Keywords: Behavioral OR, Nudging, Decision Opportunity, Value focused thinking, Proactive Decision Making

1. Extending the Concept of Nudging by Being One's Own Decision Architect

Thaler and Sunstein (2009) provided an overview of decision situations in which individuals fail to choose the best alternative or, even worse, they choose an alternative with substantial negative consequences for their lives Keeney (2020). In their book "*Nudge. Improving decisions about health, wealth and happiness*," Thaler and Sunstein observed that presentation of alternatives could influence individuals' choice. For example, assuming that there are two options and one is the default option, many decision makers adhere to the default option, although this option is not in their best interest (Thaler and Sunstein 2009).

Thaler and Sunstein (2009) presented a concept following the so-called principle of libertarian paternalism on how individuals can be "nudged" to make decisions better for them without restricting their freedom of choice. The main idea is that the so-called decision architects can present alternatives to individuals to choose what they believe is best for them. For example, although many individuals want to eat more salad to have a healthier diet, they often eat something else. Thaler and Sunstein (2009) observed that salad consumption increases if a salad buffet is attractively presented at the entrance of a cafeteria. In a cafeteria, the owner or a specialized marketing consultancy plays the role of a decision architect nudging the customers. In many other cases, government agencies act as decision architects.

The decision architect is essential for applying the concept of nudging. However, in many decision situations, there is no decision architect available or the decision makers do not want a decision architect, perhaps because it is a very private or confidential decision situation (Li et al. 2014). Therefore, in his book, "*Give yourself a nudge. Helping smart people make smarter personal and business decisions*," Keeney (2020) extends the concept of nudging for such decision situations. The core idea is to empower decision makers to become their own decision architects. Thaler supports this idea by endorsing Keeney`s book on the book cover. The concept of self-nudging can also be found in the latest literature (Torma et al. 2018; Tontrup and Springman 2019; Reijulia and Hertwig 2020).

Keeney (2020a) categorized nudges related to elements of decision making, such as decision statement, values, alternatives, decision opportunities, authorizing a desired alternative, and evaluation of alternatives. Keeney believes that decision opportunities are to be very effective; therefore, this study focuses on this topic. He suggested that individuals should nudge themselves by systematically creating decision opportunities or by converting decision

problems into decision opportunities. It is plausible, and there is anecdotal evidence that pursuing these nudges is beneficial for decision makers. However, no empirical studies are analyzing the impact of these nudges on the decision-maker's satisfaction. This study gathers empirical evidence suggesting that pursuing decision opportunities is “better” than dealing with decision problems. Furthermore, this study finds the link between how decision makers address single-decision situations and their life satisfaction.

Section 2 differentiates decision problems and decision opportunities, introduces decision crises, and develops hypotheses about the impact of these decision situations on a decision-maker’s satisfaction. Section 3 discusses the challenges when testing the hypotheses. Particularly, we discuss the method for measuring how decision makers evaluate decision situations; measuring the time of a decision process; categorizing decision situations in decision problem, opportunity, and crisis; and how to handle the same decision situation perceived differently by the subjects. Section 4 presents a series of four studies that build on each other in which we test the hypotheses comprehensively. Section 5 discusses the results of the four studies collectively. Section 6 presents our key findings, derive recommendations, and discuss limitations and further research.

2. Theoretical Development of Hypotheses

2.1. Decision Problems vs. Decision Opportunities

Most decision situations are recognized and addressed as problems (Keeney 1992). According to Hammond et al. (2015), decision problems are made reluctantly. They argued that individuals try to avoid decisions that are not in their control and are mainly the result of circumstances and others’ decisions. Decision problems can be defined as a deviation from a desired set of conditions (Pounds 1965; Watson 1976; Smith 1989). Because of these conditions, the decision-maker “must respond in order to function effectively in his environment” (D’Zurilla and Goldfried 1971). This implies that problems require attention to restore the desired set of these conditions (Simon 1988). Individuals feel uncomfortable about decision problems because they do not have control over them. Decision problems are caused by the environment and external triggers, such as circumstances or others’ decisions. Because of these external triggers, decision makers should address decision problems (Keeney 2020).

Keeney (1992, 2020) highlighted other decision situations, namely, decision opportunities. Decision opportunities are situations created by decision makers themselves. Instead of

waiting for a decision situation to occur, decision makers create a situation they want to face proactively. Therefore, Keeney`s decision opportunities are different from opportunities mentioned in the literature (e.g., Jackson and Dutton 1988; Brand 1972). Decision opportunities are characterized by the way there are created, that is, by creating a decision situation by oneself.

Keeney (2020) described the consequences of a self-created decision situation (Figure 1). He used quality of life to describe the consequences on the vertical axis and time on the horizontal axis. Before a decision situation is recognized, the decision-maker has an initial level of quality of life. In case of a decision problem, Keeney (2020) assumed a decline in the quality of life as the decision-maker should address a situation that he or she does not want to face. To cope with the decision problem, decision makers seek alternatives to restore their quality of life. Keeney (2020) assumed that after applying the alternative, the quality of life would improve until it nearly reaches its initial level. Keeney emphasized that for each decision problem, evolving quality of life can be different and assumed that the curves for decision problems are within the shaded area in Figure 1 (top left).

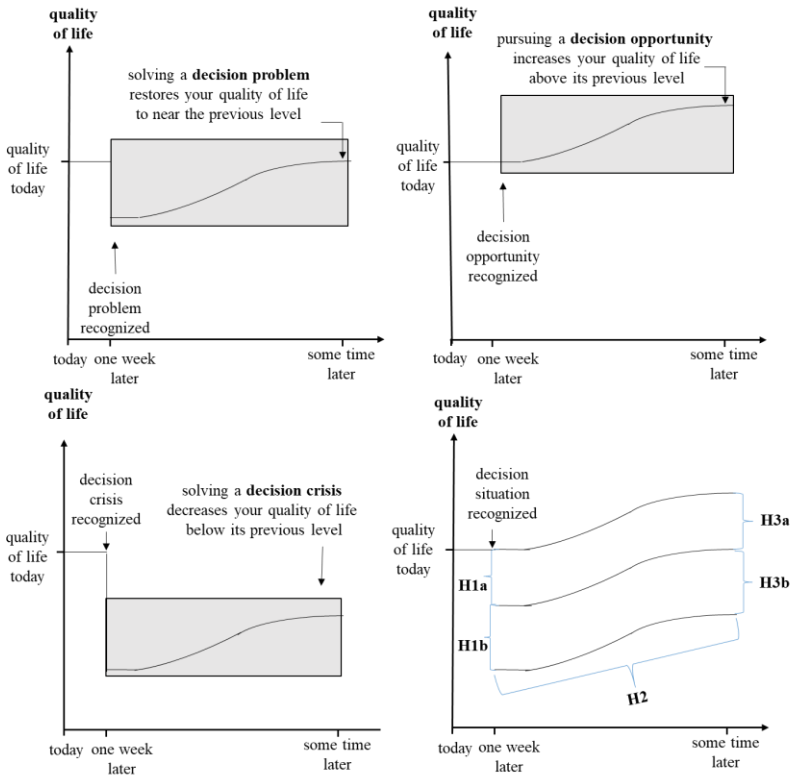

Figure 1: Relationship between quality of life over time for a decision problem (top left, adapted from Keeney 2020), a decision opportunity (top right, adapted from Keeney 2020), a decision crisis (bottom left), and illustration of hypotheses (bottom right)

In contrast to decision problems, Keeney (2020) postulated that recognizing a decision opportunity does not hamper the quality of life because nothing happens without proactive and voluntary action. The quality of life improves when a chosen alternative is implemented. Consistent with Simon (1988), Keeney assumed that the quality of life is established eventually at a higher level than at the initial. Keeney emphasized that for each decision opportunity, quality of life over time can be different and assumed that the curves for decision opportunities are within the shaded area in Figure 1 (top right).

In both decision situations, the quality of life usually improves when an alternative is implemented. Most of the critical decisions in our lives are made under uncertainty (Tversky and Kahneman 1974). The decision makers are unclear about the future occurrences in their life. With decision making, individuals can shape their future and thereby reduce uncertainty (Siebert and Kunz 2016). Therefore, the uncertainty is reduced if a decision is made, as the decision-maker is more aware of his or her future, thus creating value for the decision-maker (Camerer and Weber 1992).

Based on these considerations, three hypotheses are derived (Figure 1, bottom right). In contrast to the illustrations based on Keeney's (2020) study, we do not use concrete times and we refer to satisfaction (with the decision situation) instead of the quality of life in the hypotheses to ease verification, as discussed further in sections 3.1 and 3.2.

Hypothesis 1a: Individuals recognizing a decision opportunity are more satisfied within their decision situation than those recognizing a decision problem.

Hypothesis 2: Individuals recognizing a decision situation are less satisfied within their decision situation than those choosing an alternative.

Hypothesis 3a: Eventually, individuals who have faced a decision opportunity are more satisfied within their decision situation than those who have faced a decision problem.

2.2. Decision Crises

We assume that decision situations in which individuals are highly dissatisfied might substantially influence the study results. This might lead to a severe limitation of our studies, that is, decision problems might appear worse than the actual. Therefore, we introduce a third type of decision situation: a decision crisis.

Studies have highlighted the importance of the so-called crises (Pearson and Clair 1998; Darling 1994; Tjosvold 1984; Kuklan 1988). Mintzberg et al. (1976) distinguished between crises, problems, and opportunities on a continuum of stimuli. Crises are described as decisions triggered by a single stimulus and surface unexpectedly and unequivocally with an urgent need for immediate attention. Within a crisis, the decision-maker should respond to extreme (time-) pressure. An example of a crisis might be a fire or bankruptcy. At the other end of the continuum of stimuli, there are opportunities. Opportunities are triggered on a voluntary basis, and they can improve an already acceptable situation. Their trigger is primarily a single stimulus, for example, an idea. Between these extremes, there are many shades of decision situations, which, according to Mintzberg et al. (1976), are called problems. Problems typically have multiple stimuli, and the pressure is milder than in crises.

Figure 1 (bottom left) illustrates our assumption about the quality of life in decision crises over time. When a decision crisis is recognized, a significant loss in quality of life is expected. The decision-maker now looks for solutions to cope with the crisis. When the chosen alternative is implemented, the quality of life is expected to improve. Eventually, the quality of life will be below not only the initial level but also the level corresponding to decision problems. Accordingly, two more hypotheses are derived (Figure 1, bottom right).

Hypothesis 1b: Individuals recognizing a decision problem are more satisfied within their decision situation than those recognizing a decision crisis.

Hypothesis 3b: Eventually, individuals who have faced a decision problem are more satisfied within their decision situation than those who have faced a decision crisis.

2.3. Impact of the framing of a decision situation

It is a significant contribution to comprehensively show that individuals or more satisfied when facing an opportunity than when facing a decision problem. The hypotheses described above are straightforward (and the results in the first three studies will not be surprising). An individual who is his or her decision architect can (to some extend) frame his or her decision situation himself or herself: For example, the decision “which educational path to follow after graduating from high school” can be framed as decision problem or decision opportunity. Therefore, we will control the decision situation and analyze Hypotheses 1 to 3 for similar decision situations which are differently framed by the decision maker.

Hypothesis 4: Eventually, individuals who have faced a similar decision situation and defined it as a decision opportunity are more satisfied within their decision situation than those who described it as a decision problem.

3. Challenges for Testing the Hypotheses and Statistical Methods

This section discusses the challenges of gathering empirical evidence for testing the study hypotheses (Figure 1). The horizontal axis in Figure 1 represents the time. However, the time could vary substantially within different decision situations. Therefore, we focus on milestones in the decision-making process. Section 3.1 provides an overview of different frameworks for decision milestones, discusses them critically, and develops the framework used. The vertical axis in Figure 1 represents the quality of life. Section 3.2 discusses the challenges of measuring the quality of life and suggests using the concept of *satisfaction* instead. Different concepts of measuring *satisfaction* are presented and critically discussed, and the constructs used in our studies are justified. For testing hypotheses 1 and 3, it is necessary to assign decision situations to decision crises, problems, and opportunities. Section 3.3 discusses self-assessments and expert assessments for assigning decision situations to categories and develops the combined approach used in this study. In section 3.4, we elaborate on how similar decision situations can be identified. Section 3.5 discusses the methods for testing the validity and reliability of scales and assessments to ensure robust results.

3.1. Milestones in Decision Processes

A decision can be represented as a process. Each process involves milestones that occur over time. Keeney (2020) represented the time component of the decision process on the horizontal axis in Figure 1 and provided abstract timings, such as “some time later” (Keeney 2020, p. 122). This is suitable for a didactic example but does not provide a sound basis for an empirical study, mainly because the duration of decision processes can vary substantially. Therefore, we use milestones in the decision-making process for testing our hypothesis.

In literature, several concepts describe decision-making milestones. In most cases, the concepts refer to decision phases such as general orientation, problem definition, and generating alternatives. Table 1 provides an overview of frameworks covering three or more phases of the decision-making process and a list of concepts focusing on one phase in the decision-making process. The duration of these phases might vary substantially, and the decision makers might assess the decision situation differently at the beginning, in the middle,

or at the end of each phase. Therefore, the study uses specific points in time. Four milestones are derived, which are supposed to be self-explanatory, comprehensible for our participants, and cover the relevant aspects of decision processes: (1) recognizing a decision situation, (2) choosing the alternative, (3) implementing the (chosen) alternative, and (4) experiencing the outcome of a decision.

Table 1: Overview of milestone concepts in decision situations

Milestones used in our studies	**D`Zurilla and Goldfried (1971)**	**Mintzberg et al. (1976)**	**Frederick-son (1984)**	**Nutt (1984)**	**Further sources for the formulations of the milestone**
Recognizing a decision situation (Milestone 1)	General orientation	Identification	Situation Diagnosis	-	• Pre-Choice Screening (Beach and Potter 1992) • Problem Recognition (Cowan 1968) • Problem Identification (Watson 1976)
	Problem Definition and formulation			Formulation	• Framing (Tversky and Kahneman 1981) • Problem Formulation (Dunker 1945) • Problem-Formulation (Lyles 1981)
	Generation of alternatives	Develop-ment	Alternative Generation	Concept Develop-ment Detailing	• Creating alternatives (Keeney 1992) • Creating alternatives (Hammond et al. 2015) • Creating alternatives (Spetzler et al. 2016)
Choosing the alternative (Milestone 2)	Decision Making	Selection	Alternative Evaluation	Evaluation	• Decision Making (Janis and Mann 1979) • Decision Making (Eisenhardt and Zbracki 1992) • Decision Making (Keeney and Raiffa 1976)
Implementing the (chosen) alternative (Milestone 3)	Verification – Test & Feedback	-	Decision Integration	Implemen-tation	• Commitment to action (Spetzler et al. 2016) • Implementation (Miller et al. 2004) • Implementation (Alexander 1985)
Experiencing the outcome of a decision (Milestone 4)			-	-	• Evaluation (Nickerson et al. 2012)

A decision-making process starts with the identification of a decision situation or a decision problem. Mintzberg et al. (1976, p. 140) highlighted that "decisions do not present themselves […] in convenient ways; […] [they] must be identified." D´Zurilla and Goldfried (1971) stated that most real-world decisions are messy and should be recognized by the decision-maker. These findings are supported by other theoretical considerations (Beach and Potter, 1992; Cowan 1968; Watson 1976). Therefore, this study considers "**recognizing a decision situation**"

as the first milestone. An example of the first milestone is the moment in which someone recognizes that he or she wants to study at a university. This might occur during elementary school, high school, or much later.

On recognizing a decision situation, it should be structured, and the search for alternatives starts (Frederickson 1984). Within the search for alternatives, other processes start as well. Information about the consequences of alternatives is gathered (Keeney 1992), details about stakeholders and their values are considered (Spetzler et al. 2016), and trade-offs are stated (Keeney 1992). After the alternatives are stated and evaluated, the analysis of the decision determines the best alternative to follow (Nutt 1984). The actual decision making involves choosing the best alternative. Here, the decision-maker is aware of what he or she wants to achieve and how. Therefore, we consider "**choosing the alternative**" as the second milestone. An example of the second milestone is when someone decides at which university he or she wants to study.

Decisions are made to achieve one's objectives. Therefore, the chosen alternative should be implemented (D'Zurilla and Goldfried 1971; Howard 1988, Spetzler et al. 2016). A commitment to action accompanies the implementation. The decision makers should act and work on their decision. This action influences the decision-maker's level of satisfaction (Cooper and Wood 1974). Therefore, "**implementing the (chosen) alternative**" is considered the third milestone. An example of the third milestone is when someone moves to the town of his or her university and starts studying.

Many individuals do not distinguish between decision quality and outcome (Howard 1988). Decision quality can be defined as the lowest score in one of its seven elements: decision framing, informational excellence, creative and doable alternatives, clear values, integration and evaluation with logic, balance of the basis, and commitment to action (Spetzler et al. 2016). An entrepreneur might reach a high decision quality when deciding to start a new business. However, owing to unforeseen events, such as COVID-19, the business fails, and the decision outcome cannot be considered reasonable. It is assumed that for most participants, the influence of happenstance will be balanced. We consider "**experiencing the outcome of a decision**" as the fourth milestone. Examples of the fourth milestone are the moment at which someone receives their diploma, gets a job because of his or her grades, the knowledge and

experiences gained in a study program, or because he or she went to the same school as the one who is hiring.

3.2. Quality of Life vs. Satisfaction

Most individuals pursue the objective of improving their quality of life. In a world in which individuals do not have the opportunity to make their own decisions, quality of life is the result of other's decisions, circumstances, and happenstance (Keeney 2020). However, individuals have the opportunity to influence what matters to them with their decisions. Therefore, their decision making can actively influence the quality of life. The concept of quality of life is useful for explaining potential consequences of various decision situations. However, this concept has severe deficiencies in an experimental setting.

Flanagan (1982) introduced the 15-item *Quality of Life* scale, which measures five conceptual domains of quality of life: material and physical well-being, relationships with other people, social, community, and civic activities, personal development and fulfillment, and recreation. For example, this scale was used to assess the impact of several diseases (Burckhardt and Anderson 2003). An analysis of these 15 items showed that, on average, in most nonmedical decision situations, only one to three items might be affected. Therefore, the overall score will not change substantially. Furthermore, a 15-item scale does not appear suitable for repeated measures within one study.

The *Satisfaction With Life* scale introduced by Diener et al. (1985) is popular for measuring cognitive-judgmental aspects of subjective well-being, focusing on global life satisfaction. Siebert et al. (2020) explained a substantial share of the variance of life satisfaction with proactive decision-making skills. However, life satisfaction assessed with the *Satisfaction With Life* scale shows a degree of temporal stability, particularly within two months or less (Blais et al. 1989; Diener et al. 1985; Magnus et al. 1993; Pavot et al. 1991; Pavot and Diener 2009; Yardley and Rice 1991). This study focuses on decision situations that the participants faced within the last year. The *Satisfaction With Life* scale, thus, is not suitable for this purpose, and it will be used for complementing the study results by assessing life satisfaction in general.

Testing the study hypotheses requires a measure of satisfaction that can be repeatedly used within a study, is easy to understand, and enables participants to articulate their assessments. Accordingly, it is not supposed to be temporal stable, and it provides a relative comparison. Therefore, we mainly used sliders to measure satisfaction at each decision-making milestone.

The scale ranged from 0 to 200 points. The reference value was set to 100 before the decision situation was recognized. In the third study, we complemented this measure with a single item measuring satisfaction on a 9-point Likert scale between extremely unsatisfied and extremely satisfied.

Distinguishing between the satisfaction with the decision situation and its consequences is complicated and is assumed to be highly correlated. If an individual has only a set of inferior alternatives to choose from, we assume that he or she is not very satisfied with the decision situation. Therefore, we asked the participants about the degree of satisfaction in the decision situations without an explicit distinction.

3.3. Assigning Decision Situations to Categories

We assume differences regarding the satisfaction with a decision situation over time for decision crises, problems, and opportunities. Therefore, we should assign decision situations to the categories mentioned above. Therefore, self-assessments and expert assessments can be used. Both types of assessment have limitations, which can be clustered into three groups (Schnell et al. 1999): cognitive biases, motivational biases (Montibeller and von Winterfeldt 2015), and construct invalidity (Messick 1995). Table 2 summarizes the disadvantages of expert and self-assessments. An overview of a complete set of biases can be found in Montibeller & von Winterfeldt (2015) and Furnham (1986).

Table 2: Disadvantages of expert assessment and self-assessment

	Self-Assessment	**Expert Assessment**
Cognitive Biases (cannot understand)	Unclear definitions (Nederhof 1985)	Unclear definitions (Nederhof 1985)
Motivational Biases (does not want to understand)	Unclear cases (Otway and von Winterfeldt 1992)	Unclear cases (Otway and von Winterfeldt 1992)
Construct Invalidity (impossible to understand)	Social desirability (Nederhof 1985), Free of dissonance (Festinger 1957), Acquiescence bias (Furnham 1986)	

Self-assessments mean that the participants are presented definitions of categories, and they are asked to assign the decision situation they have described earlier to one of the categories. The first possible problem is a lack of understanding of the definitions of the categories. Participants who do not understand the categories might fail to match them correctly with their cases. Clear definitions are essential to avoid this bias (Paulhus 1991). Even with a good understanding of the task, participants tend to answer incorrectly because of motivational biases. Participants may have tendencies to distort self-reports in a favorable direction (Nederhof 1985). Furthermore, the participants might be biased to avoid cognitive dissonance

as their behavior may be questioned (Festinger 1957) or they are not motivated to correctly answer the questionnaire and just say something to finish the task (Furnham 1986). Besides cognitive and motivational biases, there is the problem of low content validity. For example, a case does not fit into any category as it was not mentioned in the literature. In this case, the participant might understand the task and want to answer correctly but cannot do so owing to the study design.

Expert assessments mean that the expert should match the cases described by the participant to the appropriate category. Understanding the intended meaning of the case is essential for correct matching. Therefore, if the case description is incomplete or incomprehensible, the expert would have trouble matching it (Otway and von Winterfeldt 1992). In addition to this cognitive bias, an expert might match in such a way that the results are according to his expectation (Brehm and Cohen 1962).

Besides the general problems with self-assessment, the study results depend on the measurement used (Churchill Jr 1979). Two measures are used in this study: single item and multiple items. Both methods have advantages and disadvantages (Table 3).

Table 3: Advantages and disadvantages of single-item and multiple-item measures (following Bergkvist and Rossiter 2007)

	Single Item	**Multiple Items**
Predicted validity	High	Low
Differentiation	Low	(Potential) High
Respondent refusal	Unlikely	Likely

Single-item measures are popular because they are cheap and quick, and there is a low likelihood of respondents' refusal to answer. However, these measures have theoretical drawbacks in terms of predictive validity and the possibility of differentiating the study results (Peter 1979). A detailed empirical review of the arguments can be found in Bergkvist and Rossiter (2007). This study used both measurement methods to obtain robust results owing to the different advantages and disadvantages. A combination of direct and indirect measures can reduce the social desirability bias (Nederhof 1985).

As every assessment method has limitations, this study uses self-assessments and expert assessments as well as single- and multiple-item constructs to complement both approaches and collectively produce results more robust to biases. We used three approaches for self-assessments of the decision situations by the participants:

1. Two 11-point scales with defined extreme poles (decision crisis and decision opportunity) based on Mintzberg et al. (1976).
2. Two single items with three linguistic variables. The participants were presented a description of the three types of decision situations twice and were asked to assign their decision situation directly.
    2.1. Decision crisis / decision problem / decision opportunity // Decision crises occur suddenly and require a fast reaction / Decision problems occur beyond your control due to decisions of others or happenstance. Decision problems require you to make a decision. / Decision opportunities are created by you and you have the full control.
    2.2. I had to face (but I did not want to face) the decision / I had to face and wanted to face the decision. / I wanted to face (but I did not have to face) the decision.
3. One indirect 9-item scale for voluntary consent (Miller et al. 2011).
    a. I made this decision.
    b. I was not the one to choose. (*r*)
    c. The decision was up to me.
    d. I was powerless in the face of this decision. (*r*)
    e. I was not in control of this decision. (*r*)
    f. I was passive in the face of this decision. (*r*)
    g. Others made this decision against my wishes. (*r*)
    h. The decision was inappropriately influenced by others. (*r*)
    i. Someone took this decision away from me. (*r*)

We used a holistic and decomposed approach for the expert assessments of the decision situations. For both approaches, the experts read the participants' responses to the following: "What was your decision?" and "Why did you deal with this decision?"

1. In the holistic approach, the expert assessed the category based on the description of and the reason for the decision situation.
2. In the decomposed approach, the expert(s) used three criteria to assess the decision situation: the "trigger" according to Mintzberg et al. (1976), the "time pressure" (Pearson and Clair 1998), and "voluntariness" (Miller et al. 2011) on five-point scale (crisis = 1, problem = 3, opportunity = 5). Average scores below two were

assigned to decision crises, between two and four to decision problems, and above four to decision opportunities.

3.4. Identifying similar decision situations

For controlling the decision situation, we have to identify similar decision situations. Real-world decision situations are of such complexity that there are no two identical. Because of this complexity, we cannot know or even control every element in the situation (Ackoff 1979). Nevertheless, two criteria will help us find similar decision situations.

First, we use the criterion of the same trigger of a decision situation. With this criterion, we are following the approach of Mintzberg et al. (1976) who structured decision processes based on their trigger of the decision situation. Furthermore, this approach is used by other researchers like Baer and his colleagues (2012).

Second, we use the criterion of the scope of the decision situation. Following Tversky and Kahneman (1981) a decision situation can be labeled as similar if the options, possible outcomes, and contingencies are identical. In the same line, other researchers (Hammond et al. 2015a; Ley-Borras 2015) argue that decision situations are comparable with the same scope.

Based on these considerations, we asked every subject to write down their decision situation in their own words and further asked to describe the trigger of their decision. We used the descriptions of the decision situation to build groups of decision situations with the same scope (e.g., choice of job, choice of academic study, purchase decision, etc.) and the same trigger (e.g., unsatisfied with current job, school ended, something broke, etc.).

3.5. Statistical Methods

Although ANOVA is one of the most used test statistics, we chose *t*-tests for mean differences between groups in this study. Our hypotheses suggest differences between and within groups over time. In this case, an ANOVA would give similar results as a *t*-test (Thompson 2006). We have chosen highly focused hypotheses and statements for an in-depth analysis. This approach is also recommended by Olejnik and Hess (1997), who explicitly recommend using *t*-tests instead of ANOVA in this case.

Inter-rater reliability of expert assessments and expertelf-assessments were tested using Cohen's Kappa (Cohen 1960).

4. Empirical Studies

Overall, we conducted four studies that build on each other. This section presents information about the participants, procedure, and results of the four studies. It discusses how the studies were developed systematically based on the feedback of many colleagues when we have presented our work in the past years to provide a comprehensive basis for testing our hypotheses. Section 5 discusses the implications of the results for the hypotheses collectively. Table 4 shows an overview of the study designs.

Table 4: Overview of the participants, design, and measures of Studies 1, 2, 3 and 4

	Study 1	Study 2	Study 3	Study 4
Language	German	English	English	English
Form	Paper and pencil	Online questionnaire	Online questionnaire	Data analysis
Participants	Full-time students enrolled in business, engineering, or computer sciences study programs at a large university in Germany	Full-time and part-time business students at a university of applied science in Austria	Full-time students enrolled in business, engineering, or computer sciences study programs at a large university in Germany	See Studies 1 to 3
Number of participants	344	221	201	422
Used participants	325	217	189	128
Percentage of used questionnaires	94.48%	98.19%	94.03%	30.33 %
Gender (female/male/other)	Not collected; similar to Study 3	55.3% / 42.9% / 1.8%	25.6% / 69.4% / 5.0%	
Nationality	Not collected; similar to Study 3	82% Austrian, 6% Italian, 5.5% German; 8 other nationalities	83% German; 22 other nationalities	
Age (average/standard deviation)	Not collected; similar to Study 3	26.04 / 5.16	22.51 / 2.37	
Incentives	No	6 euros	No	See Studies 1 to 3
Duration	10 minutes	10 minutes	10 minutes	10 minutes
Order randomized	No	No	Yes	See Studies 1 to 3
Self-assessment	Crisis [0] vs. Opportunity [10] Reactive [0] vs. Proactive [10]	Crisis, Problem, Opportunity had to / wanted to Voluntary Consent (Miller et al. 2011)	Crisis, Problem, Opportunity had to / wanted to Voluntary Consent (Miller et al. 2011)	Crisis, Problem, Opportunity had to / wanted to See Studies 1 to 3
Expert assessment	Two experts (holistic	One expert (holistic) Two experts (decomposed)	One expert (holistic) Two experts (decomposed)	See Studies 1 to 3 See Studies 1 to 3
Measuring satisfaction	Direct, single item, 80 reference point, only range between 0 and 160 points considered	Direct, single item, 100 reference point, range between 0 and 200 points	Direct, single item, 100 reference point, range between 0 and 200 points Direct, single item, 9-point Likert scale between extremely dissatisfied (1) and extremely satisfied (9) Indirect, multiple items, adapted life satisfaction scale (Diener et al. 1985)	See Studies 1 to 3

4.1. Study 1

4.1.1. Participants and Procedure

Study 1 was a paper-and-pencil study conducted in German during a guest lecture of the first author and lasted an average of 10 min. The participants were 344 full-time students enrolled

in business, engineering, or computer sciences study programs at a large university in Germany. They received no compensation.

The study consisted of three tasks. In the first task, the participants described a critical decision situation they had faced and its triggers. In the second task, the participants assessed their satisfaction within the decision situation at four milestones in decision making: recognizing the decision situation (milestone 1), choosing an alternative (milestone 2), implementing the chosen alternative (milestone 3), and experiencing the outcome of a decision (milestone 4). The reference value of the satisfaction was set to 80 points before the decision situation was recognized. We chose 80 points instead of 100 (or any other number) to prevent two potential biases. We assumed that the value of 100 might have a substantial effect as an anchor, while there might be a psychological barrier between a three- and a double-digit score, that is, changes from 100 to 101 and from 100 to 99 are different. There was no bandwidth for expressing their satisfaction provided. In the third task, the participants assessed their decision situation on 11-point scales: One scale with the extreme poles “crises that require fast reaction and occur suddenly” (0) and “opportunities that are voluntarily created” (10); the other with the extreme poles “reactive” (0) and “proactive” (10). Scores lower or equal to 2 were categorized as decision crisis (reactive), scores between 3 and 7 as decision problems (neither reactive nor proactive), and scores equal or higher than 8 were categorized as decision opportunities (proactive). Furthermore, two decision analysts categorized the decision situations based on the descriptions of and the reason for the decision situation in decision crises, problems, and opportunities using a holistic approach.

Table 5: Inter-rater reliability: Cohen`s Kappa statistics and strength of agreement (Landis and Koch 1977) for internal and external categorizations of decision situations in Study 1

	Self-Assessment		Expert Assessment	
	Crisis - Opportunity [0-10]	**Reactive - Proactive [0-10]**	**Expert 1 (holistic)**	**Expert 2 (holistic)**
Crisis - Opportunity [0-10]		.58	.54	.53
Reactive - Proactive [0-10]	Moderate		.55	.54
Expert 1 (holistic)	Moderate	Moderate		.90
Expert 2 (holistic)	Moderate	Moderate	Almost perfect	

Kappa Statistics	**Strength of Agreement**
.21-.40	Fair
.41-.60	Moderate
.61-.80	Substantial
.81-1.00	Almost Perfect

The inter-rater reliability is assessed using Cohen’s Kappa (Cohen 1960). Table 5 illustrates the results and strength of agreement. The strength of agreement between the two self-assessments and between the self- and expert assessments can be considered moderate

(Kappa statistics ranging between .52 and .58). The strength of agreement between the two experts' assessments can be considered almost perfect (Kappa statistics = .90).

4.1.2. Results

Overall, 19 participants were removed from the dataset; 11 because the description of the decision situation did not allow an expert assessment, and eight because their satisfaction was not affected over time. There were 13 outliers who assessed their satisfaction higher than 160 points; the maximum was 500 points. We set the maximum values for these outliers to 160. The core results remained unaffected by this measure.

Table 6 illustrates the number of participants, average satisfaction, standard deviations, and significant levels of several *t*-tests for the self-assessed and expert-assessed decision situations. For the first three milestones 325 participants and for the fourth milestone 305 participants assessed their satisfaction within their decision situation. At milestone 1, the satisfaction drops, on average, from the initial level of 80 to 60.3. At milestones 2 and 3, the satisfaction is almost restored (77.8 and 81.4, respectively). At milestone 4, the satisfaction is overall higher than the initial level (87.3). On average, 14.5% of decision situations were categorized as a decision crisis, 62.2% as a decision problem, and 23.3% as a decision opportunity. The standard deviations for all categories and milestones range between 19.1 and 36.5.

Table 6: Number of participants, average satisfaction, standard deviation, and *t*-tests for self- and expert assessments at four milestones in Study 1; significance levels: $p \leq .001$ = ***, $p \leq .01$ = **, $p \leq .05$ = *, $p > .05$ = *n.s.*

	Self-Assessment						Expert-Assessment						ALL
	Decision Crisis	Decision Problem	Decision Opportunity	Reactive	Neither reactive nor proactive	Proactive	Decision Crisis	Decision Problem	Decision Opportunity	Decision Crisis	Decision Problem	Decision Opportunity	
	<3	3≤ X≤7	>7	<3	3≤ X≤7	>7	Expert 1 (holistic)			Expert 2 (holistic)			
	Satisfaction [Reference Value = 80; no bandwidth provided; values > 160 set to 160]												
	Number of Participants												
M1	46	175	104	58	209	58	41	216	68	43	209	73	325
M2	46	175	104	58	209	58	41	216	68	43	209	73	325
M3	46	175	104	58	209	58	41	216	68	43	209	73	325
M4	45	164	96	56	195	54	40	201	64	42	193	70	305
	Average of Satisfaction												
M1	37.5	60.9	69.4	43.9	62.3	69.8	24.7	61.8	77.1	30.8	60.9	76.1	60.3
M2	62.0	77.5	85.2	63.0	79.9	85.1	52.5	78.2	91.9	54.5	77.3	93.0	77.8
M3	67.9	81.6	87.0	67.1	82.8	90.7	59.4	80.8	96.4	58.0	80.2	98.7	81.4
M4	74.0	86.5	94.8	73.5	87.4	101.2	68.9	87.7	97.5	65.2	87.7	99.3	87.3
	Standard Deviation												
M1	27.8	26.6	26.3	29.4	26.1	29.4	21.6	25.6	21.6	25.6	25.6	24.2	28.5
M2	25.4	24.1	26.6	28.4	23.9	26.0	28.6	23.9	19.2	28.0	24.1	19.1	26.1
M3	35.0	28.5	29.3	35.4	28.6	25.9	32.5	28.3	26.7	30.7	27.8	26.8	30.4
M4	33.5	28.8	28.4	35.7	27.3	27.1	36.5	28.1	26.5	32.5	28.3	26.0	30.0
	One-sided *T*-Tests Between Groups (Hypotheses 1a, 1b, 3a, and 3b)												
M1	***	**		***	*		***	***		***	***		
M2	***	**		***	*n.s.*		***	***		***	***		
M3	**	*n.s.*		***	*		***	***		***	***		
M4	**	*		**	***		***	**		***	**		
	One-sided paired *T*-Tests Between Milestones 1 and 2 (Hypothesis 2)												
M1M2	***	***	***	***	***	***	***	***	***	***	***	***	***

At milestone 1, for all categorizations of decision situations, the satisfaction for decision opportunities is higher than that for decision problems (Hypothesis 1a), which is higher than that for decision crises (Hypothesis 1b). At milestone 4, for all categorizations, the satisfaction for decision opportunities is higher than that for decision problems (Hypothesis 3a), which is higher than that for decision crises (Hypothesis 3b). One-sided *t*-tests reveal that these differences are significant. For all categorizations, the satisfaction is higher at milestone 2 than at milestone 1 (Hypothesis 2). One-sided paired *t*-tests reveal that these differences are significant.

4.1.3. Discussion

The intra-rater reliability of the two expert assessments is to be considered almost perfect. However, the use of holistic assessments in this study might be seen as a limitation. Therefore, holistic expert assessments are complemented with a decomposed approach in Study 2.

The strength of agreement within the self-assessments and between self-assessments and expert assessments can be considered moderate. The study sought to enhance the inter-rater reliability further. The participants were assumed to have had difficulties assessing their decision situation using the 11-point scale. Therefore, more straightforward measures were used in Study 2 by providing three categories for choice. Furthermore, an indirect, multiple-item self-assessment was used in Study 2 to enhance the robustness of our findings.

We set the reference value of the satisfaction at a level of 80 points before the decision was recognized to prevent a potential bias that the participants return to this reference value (just because of the numbers) or that the change between double and triple digits influences the scoring. However, no such effects were seen in our data. Furthermore, a couple of participants questioned the choice of the value 80. Therefore, we changed the reference value to 100 in studies 2 and 3.

Moreover, no explicit bandwidth was provided for the satisfaction scores. There were 13 outliers with values above 160 in Study 1. While the lowest evaluation by the participants (0) was 80 points lower than the reference point (80), the highest evaluation (500) was 420 points higher than the reference point. Therefore, the participants in studies 2 and 3 were provided with a bandwidth between 0 and 200 points and a reference value of 100 points.

In addition to the question regarding the decision, the participants were asked what triggered their decision as a basis for the expert assessment. The latter question might have suggested that there was supposed to be a trigger. Therefore, in studies 2 and 3, the participants were asked the open question, “why did you think about the decision?”

In Study 1, the participants were asked to assess their satisfaction in all four milestones of the decision situation. All 325 participants stated that they had reached milestone 3 in their decision situation, and 305 participants stated that they had reached milestone 4. The paper-and-pencil design of this study might have influenced the participants by implying that they are supposed to have already reached milestones 3 and 4. Therefore, we first asked the participants in studies 2 and 3 regarding the milestones they had already reached in their decision situations and then asked only for their satisfaction in these milestones. To better implement this modification, we used an online questionnaire rather than a paper-and-pencil design in studies 2 and 3. We also included a specific time horizon in studies 2 and 3. We

focused on an important decision situation that the participants had been facing in the past 12 months to increase the comparability of the decision situations.

4.2. Study 2

4.2.1. Participants and Procedure

Study 2 was the first part of a more extensive study. It used an online questionnaire in English conducted during several medium-sized lectures of the first author with about 30 participants each. The relevant part took on average, 10 minutes. The participants were 221 full-time or part-time business students at a university of applied science in Austria. They were offered 6 euros for participation.

Study 2 consisted of four tasks. In the first task, the participants described a critical decision situation they had faced within the past 12 months, and they described the reason for facing this decision situation. In the second task, the participants self-assessed their decision situations with two single items. First, they were provided with definitions of decision crisis, problem, and opportunity and assigned their decision situation to one of the three categories. Second, the participants checked whether they (1) had to face (but did not want to face), (2) had to and wanted to face, or (3) wanted to face (but did not have to face) their decision situation. Furthermore, the participants assessed their voluntary consent of their decision measured with the 9-item scale by Miller et al. (2011) on a 7-point Likert scale (1 – disagree very strongly to 7 – agree very strongly). In the third task, the participants confirmed whether they had already reached milestones 3 and 4 in their decision situation. In the fourth task, the participants assessed their satisfaction within their decision situation in the milestones already reached using a scale between 0 and 200 points with a reference value of 100 points before the decision situation was recognized.

On average, voluntary consent scored 5.83, with a standard deviation of 1.13. Scores lower than 5.0 were categorized as decision crises, those between 5.0 and 6.25 as decision problems, and those equal to or higher than 6.25 as decision opportunities. Three decision analysts categorized the decision situations based on the participants` descriptions of the decision situation and the reason for facing the situation as decision crises, problems, and opportunities. One decision analyst used a holistic approach and the others used a technical, decomposed approach by evaluating and aggregating three criteria using a 5-point scale (external vs. internal trigger, time pressure, voluntariness).

Table 7: Intra-rater reliability: Cohen's Kappa statistics and strength of agreement (Landis and Koch 1977) for internal and external categorizations of the decision situations in Study 2

	Self-Assessment			Expert Assessments		
	Direct, Single Item		Indirect, Multiple Items	Holistic	Decomposed	
	Had To / Wanted To Face	Crisis / Problem / Opportunity	Voluntary Consent (Miller et al. 2011)	Expert 1	Expert 2	Expert 3
Had to / wanted to face		.60	.47	.66	.62	.58
Crisis / Problem / Opportunity	Substantial		.56	.70	.72	.71
Voluntary Consent	Moderate	Moderate		.48	.48	.49
Expert 1 (holistic)	Substantial	Substantial	Moderate		.82	.81
Expert 2 (decomposed)	Substantial	Substantial	Moderate	Almost perf.		.82
Expert 3 (decomposed)	Moderate	Substantial	Moderate	Almost perf.	Almost perf.	

Table 7 shows the Kappa statistics and strength of agreement. Although a holistic and a decomposed approach were used, the strength of agreement between the experts can be considered almost perfect. Agreement between the two single-item self-assessments and that between single-item self- and expert assessments were strengthened compared with Study 1 and can be considered substantial with only one exception, that is, moderate. The strength of agreement between self-assessment of voluntary consent of the decision situation and the other items can be considered moderate.

4.2.2. Results

Overall, four participants were omitted from the dataset because the description of the decision situation did not allow an expert assessment. The number of participants, average satisfaction, standard deviations, and significant levels of several t-tests for the self-assessed and expert-assessed decision situations are illustrated in Table 8. Due to the almost-perfect agreement between the expert assessments, their results are similar and, therefore, only the results of expert 1 (holistic approach) are illustrated.

The number of participants decreased from 217 (milestones 1 and 2) to 191 (milestone 3) to 152 (milestone 4). At milestone 1, the satisfaction declines, on average, from the initial level of 100 to 86.4. At milestone 2, the satisfaction is restored (100.8). At milestones 3 and 4, the level of satisfaction is overall higher than the initial level (107.5 and 106.0, respectively). On average, 14.5% of decision situations were categorized as decision crises, 45.7% as decision problems, and 39.8% as decision opportunities. The standard deviations for all categories and milestones range between 19.6 and 48.6.

Table 8: Number of participants, average satisfaction, standard deviation, and *t*-tests for self-assessments and expert assessments at four milestones in Study 2; significance levels: $p \leq .001$ = ***, $p \leq .01$ = **, $p \leq .05$ = *, $p > .05$ = *n.s.* Brackets indicate that the number of participants in a t-Test is at least for one group lower than 25

	Self-Assessment									Expert-Assessment			ALL
	Direct, Single Item						Indirect, Multiple Items			Expert 1 (holistic)			
	Have to (but not want to) face	Have to and want to face	Want to (but not have to) face	Decision Crisis	Decision Pro-blem	Decision Oppor-tunity	Voluntary Consent <5	Voluntary Consent 5>=X <=6.25	Voluntary Consent >6.25	Decision Crisis	Decision Pro-blem	Decision Oppor-tunity	
	Satisfaction [0 - 200; Reference Value = 100]												
	Number of Participants												
M1	44	101	72	22	85	110	32	94	91	28	117	72	217
M2	44	101	72	22	85	110	32	94	91	28	117	72	217
M3	41	83	67	20	75	96	29	81	81	25	102	64	191
M4	30	62	60	13	63	76	19	68	65	19	84	49	152
	Average of Satisfaction												
M1	32.7	85.0	120.7	33.0	69.8	109.6	62.3	82.8	98.2	41.4	80.2	113.5	86.2
M2	63.0	97.8	128.1	53.1	88.3	119.9	77.2	99.7	110.1	59.9	97.3	122.2	100.8
M3	73.4	107.8	127.9	54.4	98.5	125.6	81.6	105.7	118.5	66.6	104.9	127.6	107.5
M4	69.4	104.7	125.8	46.5	98.4	122.6	80.8	106.1	113.3	68.2	101.4	128.6	106.0
	Standard Deviation												
M1	30.8	35.5	27.6	33.0	35.9	37.9	48.6	43.0	41.6	37.6	41.8	33.2	44.8
M2	29.6	31.2	26.5	33.8	27.0	32.3	40.2	35.7	34.6	35.4	34.4	26.5	37.4
M3	35.3	31.4	27.4	29.8	30.0	28.8	44.1	32.7	32.9	36.9	34.3	23.9	36.7
M4	30.3	29.3	29.3	19.6	28.5	30.2	41.8	34.0	32.9	37.4	32.5	23.7	35.8
	One-sided *T*-Tests Between Groups (Hypotheses 1a, 1b, 3a, and 3b)												
M1	***	***		(***)	***		*	**		***	***		
M2	***	***		(***)	***		**	*		***	***		
M3	***	***		(***)	***		**	**		***	***		
M4	***	***		(***)	***		(**)	*n.s.*		(***)	***		
	One sided paired *T*-Tests Between Milestone 1 and 2 (Hypothesis 2)												
M1M2	***	***	***	***	***	**	**	***	***	***	***	***	***

At milestone 1, for all categorizations, the satisfaction for decision opportunities is higher than that for decision problems (Hypothesis 1a), which is higher than that for decision crises (Hypothesis 1b). At milestone 4, for all categorizations, the satisfaction for decision opportunities is higher than that for decision problems (Hypothesis 3a), which is higher than that for decision crises (Hypothesis 3b). Using the voluntary consent scale, one-sided t-tests reveal that these differences are significant, except for the difference between decision problems and decision opportunity. Here, the *p*-value equals .101. Further, for six *t*-tests, the number of decision crises is lower than 25. These results are written in brackets. For all categorizations, the satisfaction is higher at milestone 2 than at milestone 1 (Hypothesis 2). One-sided paired *t*-tests reveal that these differences are significant.

4.2.3. Discussion

In the study, the participants assessed their decision situation in the second task and their satisfaction in the third task. Context effects can lead to unintended influences on

respondents' answers because they are not related to the content of the item but to the context in which the item appears (Schwarz and Strack 1990). Such item–order might affect the reliability of the study (Price et al. 2015; Strack et al. 1988). Therefore, in Study 3, the order of the categorization and assessment of the satisfaction was randomized.

The direct rating of the level of satisfaction within the decision situation assessed on a scale between 0 and 200 with a reference value of 100 produces stable and reasonable results. To confirm whether the results are independent of the measure of satisfaction, in Study 3, we use another single-item measure of satisfaction in one treatment group to produce robust findings.

Both measures of satisfaction used in Study 2 were developed. Although they were carefully developed and tested, other researchers have not validated these measures yet in different settings. Therefore, we used an adapted version of the commonly used *Satisfaction With Life* scale (Diener et al. 1985) in Study 3 to complement our findings.

4.3. Study 3

4.3.1. Participants and Procedure

Study 3 used an online questionnaire in English during a guest lecture of the first author. The study lasted 10 minutes, and the participants received no compensation. The participants were 201 full-time students enrolled in business, engineering, or computer sciences study programs at a large university in Germany.

Study 3 consisted of five tasks. The first three tasks were similar to those in Study 1. In the first task, they described a critical decision situation they had faced within the past 12 months and the reasons for facing it. In the second task, the participants checked whether they had reached milestones 3 and 4 in their decision situations. In the third task, the participants assessed their decision situation. In the fourth task, the participants were randomly divided into two groups. Half of the participants assessed their satisfaction within the decision situation at up to four milestones using a scale between 0 and 200 points with a reference point of 100 points, as in Study 2. The other half of the participants assessed their satisfaction using a single item with a 9-point Likert scale (1 – extremely dissatisfied to 9 – extremely satisfied). The order of the categorization (third task) and assessment of satisfaction (fourth task) was randomized. In the fifth task, the participants were asked about their life satisfaction

under the assumption that the one decision situation they had described earlier is considered to be representative of all their decision situations. We used five items by Diener et. al. (1985) measured on a 7-point Likert scale for Satisfaction With Life (1 – disagree very strongly to 7 – agree very strongly).

Table 9: Intra-rater reliability: Cohen's Kappa statistics and strength of agreement (Landis and Koch 1977) for internal and external categorizations of the decision situations in Study 3

	Self-Assessment			Expert Assessment		
	Direct, Single Item		Indirect, Multiple Items	Holistic	Decomposed	
	Had To / Wanted To Face	Crisis / Problem / Opportunity	Voluntary Consent	Expert 1	Expert 2	Expert 3
Had to / wanted to face		.54	.51	.55	.61	.55
Crisis / Problem / Opportunity	moderate		.50	.66	.68	.73
Voluntary Consent	moderate	moderate		.53	.52	.58
Expert 1 (holistic)	moderate	substantial	moderate		.86	.78
Expert 2 (decomposed)	substantial	substantial	moderate	almost perf.		.84
Expert 3 (decomposed)	moderate	substantial	moderate	substantial	almost perf.	

The process of categorizing the decision situations was similar to Study 2. The Kappa statistics and strength of agreement are illustrated in Table 9. Overall, the results are similar to those in Study 2.

4.3.2. Results

Overall, 12 participants were excluded from the dataset because the description of the decision situation did not allow an expert assessment. The number of participants, average satisfaction, standard deviations, and significant levels of several *t*-tests for the self-assessed and expert-assessed decision situations are illustrated in Table 10. Due to the almost-perfect agreement between expert assessments, only the results of expert 1 (holistic approach) are considered. For the two assessments of satisfaction, the number of participants decreased from 93 and 96 (milestones 1 and 2, respectively) over 74 and 80 (milestone 3) to 62 and 62 (milestone 4). The directly measured satisfaction drops, on average, from the initial level of 100 to 91.7 at milestone 1. At milestones 2, 3, and 4, the level of satisfaction is higher than the reference value (110.4, 113.3, and 109.8, respectively). The indirectly measured satisfaction is 4.98 at milestone 1, while the level of satisfaction is again higher (5.74, 6.14, and 5.92, respectively) at milestones 2, 3, and 4. On average, 10% of decision situations were categorized as decision crises, 47.4% as decision problems, and 42.6% as decision opportunities. The standard deviations for all categories and milestones range from 21.3 to

56.2 for the satisfaction measured on the scale between 0 and 200 points and from .79 to 2.13 for the satisfaction measured on the 9-point Likert scale.

At milestone 1, for all categorizations, the satisfaction for decision opportunities is higher than that for decision problems (Hypothesis 1a), which is higher than that for decision crises (Hypothesis 1b) for both satisfaction measures. At milestone 4, for all categorizations, the satisfaction for decision opportunities is higher than that for decision problems (Hypothesis 3a), which is higher than that for decision crises (Hypothesis 3b) for both satisfaction measures. One-sided *t*-tests reveal that these differences are significant, except for the difference between decision problems and decision crises. In these *t*-tests, the number of participants is lower than 12. Moreover, life satisfaction measured using the Diener et al. (1985) adapted 5-item scale is higher for decision opportunities than for decision problems, which is higher than that for decision crises. One-sided *t*-tests reveal that these differences are significant with two exceptions, where the *p*-values equal .099 and .057.

Table 10: Number of participants, average satisfaction, standard deviation, and *t*-tests for self- and expert assessments at four milestones in Study 3; significance levels: $p \leq .001$ = ***, $p \leq .01$ = **, $p \leq .05$ = *, $p > .05$ = *n.s.* Brackets indicate that the number of participants in a *t*-test is at least for one group lower than 25

	Self-Assessment									Expert-Assessment			ALL
	Direct, Single Item						Indirect, Multiple Items			Expert (holistic)			
	Have to (but not want to) face	Have to and want to face	Want to (but not have to) face	Decision Crisis	Decision Problem	Decision Opportunity	Voluntary Consent <5	Voluntary Consent 5≤=X≤6.25	Voluntary Consent >6.25	Decision Crisis	Decision Problem	Decision Opportunity	
	Satisfaction [0 - 200; Reference value = 100]												
	Number of Participants												
M1	12	51	30	7	32	54	11	46	36	8	48	37	93
M2	12	51	30	7	32	54	11	46	36	8	48	37	93
M3	11	40	23	7	25	42	7	36	31	7	39	28	74
M4	10	33	19	6	19	37	6	28	28	6	31	25	62
	Average of Satisfaction												
M1	37.42	84.65	125.47	66.43	67.78	109.19	49.27	80.48	119.06	45.38	83.33	112.62	91.7
M2	76.42	105.84	131.83	82.00	93.81	123.96	81.27	106.04	124.94	60.13	103.77	129.95	110.4
M3	82.64	111.05	131.87	81.14	100.84	126.07	78.86	107.33	128.00	73.57	108.59	129.79	113.3
M4	74.80	108.79	129.95	75.00	97.74	121.62	76.83	100.93	125.71	69.83	103.00	127.80	109.8
	Standard Deviation												
M1	35.2	31.9	32.9	41.6	34.7	39.1	36.6	39.3	30.6	21.3	41.2	36.7	42.7
M2	48.4	33.6	23.2	50.0	37.7	28.5	45.7	38.1	25.4	29.7	31.9	31.7	37.1
M3	54.7	31.5	25.0	54.4	35.6	29.1	44.7	37.3	28.2	56.2	31.2	30.7	37.2
M4	45.3	38.5	27.6	40.2	42.7	34.8	48.1	37.4	35.8	40.4	34.9	38.7	40.4
	One-sided *T*-Tests Between Categories (Hypotheses 1a, 1b, 3a, and 3b)												
M1	*(***)*	***		*(n.s.)*	***		*(*)*	***		*(*)*	**		
M2	*(*)*	***		*(n.s.)*	***		*(n.s.)*	*		*(***)*	***		
M3	*(*)*	*(**)*		*(n.s.)*	**		*(n.s.)*	*		*(*)*	**		
M4	*(*)*	*(*)*		*(n.s.)*	*(*)*		*(n.s.)*	*		*(*)*	*		
	One-sided paired *T*-Tests Between Milestones 1 and 2 (Hypothesis 2)												
M1M2	*(**)*	***	*n.s.*	*(*)*	***	***	*(**)*	***	*n.s.*	*(*)*	***	**	***

Satisfaction [Extremely dissatisfied (1) - Extremely satisfied (9)]
Number of Participants

M1	13	49	34	7	28	61	14	56	26	4	48	44	96
M2	13	49	34	7	28	61	14	56	26	4	48	44	96
M3	10	39	31	5	20	55	7	51	22	4	36	40	80
M4	10	32	23	5	18	42	5	44	16	4	29	32	65
Average of Satisfaction													
M1	4.23	4.73	5.62	3.71	4.54	5.33	4.14	4.82	5.77	3.00	4.23	5.98	4.98
M2	5.31	5.63	6.06	4.71	5.18	6.11	4.86	5.68	6.35	4.25	4.98	6.70	5.74
M3	5.10	6.03	6.61	4.20	5.40	6.58	5.43	5.84	7.05	4.25	5.50	6.90	6.14
M4	5.40	5.63	6.57	4.40	5.44	6.31	5.00	5.73	6.75	4.25	5.41	6.59	5.92
Standard Deviation													
M1	1.42	1.91	1.81	1.25	2.13	1.71	1.96	1.91	1.48	1.15	1.80	1.44	1.87
M2	1.25	1.78	1.63	1.25	1.59	1.64	1.66	1.70	1.41	0.96	1.62	1.19	1.67
M3	1.20	1.65	1.56	0.84	1.54	1.49	0.79	1.65	1.40	0.96	1.54	1.34	1.62
M4	1.71	1.70	1.75	0.89	1.76	1.72	1.58	1.69	1.81	0.96	1.92	1.39	1.76
One-sided *T*-Tests Between Categories (Hypothesis 1 and 3)													
M1	(***)	*		(***)	*		(***)	*		(***)	***		
M2	(***)	*n.s.*		(***)	**		(***)	*		(***)	***		
M3	(***)	*n.s.*		(***)	(**)		(***)	(**)		(***)	***		
M4	(***)	(*)		(***)	(*)		(***)	(*)		(***)	**		
One-sided paired *T*-Tests Between Milestones 1 and 2 (Hypothesis 2)													
M1M2	*(**)*	***	*	*(*)*	*	***	*(*)*	***	*	*(**)*	***	***	***

Life Satisfaction (Adapted from Diener et al. (1985)												
Number of Participants												
25	100	64	14	60	115	25	92	72	12	96	81	189
Average of Satisfaction												
4.15	4.74	4.97	3.84	4.51	4.96	4.22	4.67	5.00	3.58	4.53	5.16	4.74
Standard Deviation												
1.39	1.05	1.20	0.96	1.14	1.14	1.36	1.17	1.03	0.98	1.14	1.06	1.18
T-Tests Between Groups (Hypothesis 3)												
*	*n.s.*		*(*)*	**		*n.s.*	*		*(**)*	***		

For all categorizations, the satisfaction is higher at milestone 2 than at milestone 1 (Hypothesis 2). One-sided paired t-tests reveal that these differences are significant with two exceptions, where the *p*-value for two methods to categorize decision situations by self-assessment equals .119 and .068.

4.3.3. Discussion

Studies 1 and 2 were limited because the order of the categorization (third task) and assessment of satisfaction (the fourth task) was not randomized. This limitation was addressed in Study 3, where the order of these tasks was randomized. Nevertheless, no significant differences were induced by order of tasks.

No significant differences were seen in the results obtained for the two measures of satisfaction, which can be considered an indicator of the robustness of our results.

The number of participants was too low to provide a sound basis for analyzing the hypotheses. Particularly, the limited decision crises appear critical. Therefore, comparisons with less than 25 participants were not considered in at least one group.

In Studies 1 and 2, we only measured the satisfaction within one decision situation. Therefore, the participants in Study 3 were asked to answer the life satisfaction scale by Diener et al. (1985) under the assumption that the decision situation they had described was considered representative of all their decision situations. The results conform to the other measures. This is an interesting first empirical finding suggesting a link between single decision situations and life satisfaction.

4.4. Study 4

4.4.1. Participants and Procedure

Study 4 uses the data of all participants of Studies 1 to 3 and aims to show the other studies' robustness. We conducted this study to validate the findings while allowing a subjective perception of the decision situation the subjects are facing. First, we used the written description of every participant about their decision situation and the decision trigger to categorize their situation in similar cases. Then, based on the same decision situation, "which educational path to follow after graduating from high school," we evaluated differences in satisfaction when the subjects said they were facing a problem or an opportunity.

4.4.2. Results

We identified similar decisions situations using the criteria described in section 3.4. Nearly 2/3 of the participants used decision situations for their academic study choice ($n = 155$) and choice of a job ($n = 51$). Narrowing these decisions down to comparable situations, we then applied the second criterion, the trigger of the decision. As a result, the most faced decision situation was choosing academic study after finishing school ($n = 128$). We then analyzed the average satisfaction for every milestone in these decisions. In Table 11, the results, including the number of cases, the average satisfaction, the standard deviation, and the level of significance, are illustrated.

Table 11: Number of participants, average satisfaction, standard deviation, and *t*-tests for self- and expert assessments at four milestones in Study 3; significance levels: $p \leq .001$ = ***, $p \leq .01$ = **, $p \leq .05$ = *, $p > .05$ = *n.s.*

Decision Situation: Choosing academic study after finishing school			
	Decision Problem	**Decision Opportunity**	**ALL**
Number of Participants			
M1	87	41	128
M2	87	41	128
M3	86	40	126
M4	86	39	125
Average of Satisfaction			
M1	75.95	95.48	82.2
M2	95.23	112.23	100.7
M3	98.83	113.72	103.6
M4	102.04	114.12	105.8
Standard Deviation			
M1	30.9	31,8	32,4
M2	26.5	25,4	27,3
M3	28.5	32,8	30,6
M4	26.0	35,4	29,7
One-sided *T*-Tests Between Categories (Hypothesis 4)			
M1	**		
M2	***		
M3	**		
M4	*		

None of the participants viewed their decision as a crisis, but 87 categorized it as a decision problem and 41 as a decision opportunity. The average satisfaction for decision problems drops from an initial 100 to 75,95 at the first milestone and recovers from 95.23 at milestone 2 over 98.83 points in satisfaction at milestone 3 to 102.04 in the last milestone. There is only a slight drop in satisfaction at the first milestone (95.48) for decision opportunity cases. Afterward, the satisfaction exceeds the initial level at the second milestone and stays at this level (112.23, 113.72, and 114.12). For all four milestones, the average satisfaction for decision opportunities is higher than for decision problems. One-sided *t*-tests reveal that these differences are significant.

4.4.3. Discussion

The results of this fourth study are in the same line as the results of the other three studies conducted in this paper. These results indicate our findings' robustness and show that it does not matter if the decision situation was categorized (into problem or opportunity) on an objective or subjective basis. We only gathered data for one decision situation (choosing academic study after finishing school) and only for the problem and opportunity categories. We are missing data for other decision situations to show the robustness of Hypothesis 4 and data for the crisis categorization.

5. Discussion of the Results of the Empirical Studies

Each study design, measure, and categorization of decision situations has its limitations. Therefore, a series of four studies that build on each other was conducted, considering many valuable suggestions of colleagues and using different measures for the satisfaction within the decision situation and several approaches for categorizing decision situations based on self- and on expert assessments. Collectively, our studies provide comprehensive evidence supporting the hypotheses (Table 12).

Table 12: Overview of the significance level for testing Hypotheses 1 to 3. Significance levels: $p \leq .001$ = ***, $p \leq .01$ = **, $p \leq .05$ = *, $p > .05$ = *n.s.* Brackets indicate that the number of participants in a t-test is at least for one group lower than 25. Note: For testing Hypothesis 2, we only report the lowest significance level for the three decision situations

			Hypothesis					
	Assessment	**Measuring Satisfaction**	**1a**	**1b**	**2**	**3a**	**3b**	**4**
Study 1 **N = 344**	Self-Assessment (Crisis - Opportunity 11-point scale)	Direct, single item, 80 reference point, only range between 0 and 160 points considered	**	***	***	*	**	
	Self-Assessment (reactive - proactive 11-point scale)		*	***	***	***	**	
	Expert 1 (holistic)		***	***	***	**	***	
	Expert 2 (holistic)		***	***	***	**	***	
Study 2 **N = 222**	Self-Assessment (have to / want to face the decision situation)	Direct, single item, 100 reference point, range between 0 and 200 points	***	***	***	***	***	
	Self-Assessment (decision crisis, problem, opportunity)		***	(***)	**	***	(***)	
	Voluntary Consent (9 items)		**	*	**	*n.s.*	(**)	
	Experts (holistic/decomposed)		***	***	**	***	(***)	
Study 3 **N = 200**	Self-Assessment (have to / want to face the decision situation)	Direct, single item, 100 reference point, range between 0 and 200 points	***	(***)	*n.s.*	*	(*)	
	Self-Assessment (decision crisis, problem, opportunity)		***	(*n.s.*)	*	(*)	(*n.s.*)	
	Voluntary Consent (9 items)		***	(*)	*n.s.*	*	(*n.s.*)	
	Experts (holistic/decomposed)		**	(*)	*	*	(*)	
	Self-Assessment (have to / want to face the decision situation)	Direct, single item, 9-point Likert scale between extremely dissatisfied (1) and extremely satisfied (9)	*	***	*	*	***	
	Self-Assessment (decision crisis, problem, opportunity)		*	***	*	*	***	
	Voluntary Consent (9 items)		*	***	*	*	***	
	Experts (holistic/decomposed)		***	***	**	**	***	
	Self-Assessment (have to / want to face the decision situation)	Indirect, multiple items, adapted life satisfaction scale (Diener et al. 1985)				*n.s.*	*	
	Self-Assessment (decision crisis, problem, opportunity)					**	(*)	
	Voluntary Consent (9 items)					*	*n.s.*	
	Experts (holistic/decomposed)					***	(**)	
Study 4 **N = 128**	Data from Study 2 and Study 3 Same decision scope Same decision trigger	Data from Studies 2 and 3						**

Discussion for Hypotheses 1a and 1b

Overall, 635 participants assessed their satisfaction with the decision situations using a direct scale with reference points 80 in Study 1 and 100 in studies 2 and 3, respectively. The values in Study 1 were multiplied by 1.25 to compare the results of all four studies. When a decision situation is recognized (milestone 1), the satisfaction drops, on average, from the reference value of 100 to 43.7 points for decision crises and to 78.2 points for decision problems. In contrast, the satisfaction for decision opportunities is slightly higher (103.8) than the reference value of 100. The difference between decision opportunities and decision problems is significant in all four studies (Hypothesis 1a), and that between decision problems and decision crises is also significant (Hypothesis 1b). These results are similar when using a single-item 9-point Likert scale of satisfaction in Study 3. Moreover, the results are stable when using different self- and expert assessments for categorizing the decision situations. We conclude that our data suggest accepting hypotheses 1a and 1b.

Discussion of Hypothesis 2

Overall, 635 participants assessed their satisfaction with the decision situation when recognizing it (milestone 1) and choosing an alternative (milestone 2). The satisfaction increases for decision crises from 43.7 to 72.5, for decision problems from 78.2 to 100.4, and for decision opportunities from 103.8 to 119.9. One-sided paired *t*-tests reveal that these differences are significant; with two exceptions, where the *p*-value for two methods to categorize decision situations by self-assessment equals .119 and .068. The results are similar for 96 participants when using a single-item 9-point Likert scale of satisfaction in Study 3. We conclude that Hypothesis 2 can be accepted as individuals recognizing a decision situation are less satisfied than when choosing an alternative. Notably, solving a decision problem restores the initial level of satisfaction, and pursuing an opportunity increases the level of satisfaction compared with the reference level.

Discussion of Hypotheses 3a and 3b

Overall, 519 participants assessed their satisfaction with the decision situations at the point at which they had been affected by the outcome of their decision (milestone 4) using a direct scale with a reference point. On average, the satisfaction for decision crises (81.4) is lower than that for decision problems (107.0), which is lower than that for decision opportunities

(122.7). In all four studies, the difference between decision opportunities and decision problems is significant (Hypothesis 3a) as well as that between decision problems and decision crises (Hypothesis 3b). These results are similar when using a single-item 9-point Likert scale for measuring satisfaction with the decision situation in Study 3. One-sided *t*-tests reveal that these differences are significant with only two exceptions, for which the *p*-value equals .099 and .057. We conclude that hypotheses 3a and 3b are accepted. The results are similar also for the two remaining milestones of decision making: choosing an alternative (milestone 2) and implementing a chosen alternative (milestone 3).

Discussion of Hypotheses 4

Overall, 128 participants assessed their satisfaction with choosing an academic study after finishing school. On average, the satisfaction for decision problems is lower than for decision opportunities. In all four studies, the difference between decision opportunities and decision problems is significant. These results are similar when using objective criteria or subjective impressions to categorize the decision situation (Hypothesis 4). Therefore, we conclude that hypothesis 4 is accepted. This can be seen as first empirical evidence supporting Keeney`s (2020) suggestion that empowering individuals to reframe decision problems as decision opportunities is beneficial for individuals.

The linkage between decision situations and life satisfaction

In our studies, we analyzed how different types of decision situations influence the satisfaction of decision makers. Therefore, we used a common approach to analyze one decision situation of each participant. For example, several researchers analyzed one decision situation of participants and found empirical data suggesting that individuals are unaware of their objectives in decision situations (Bond et al 2018, 2010), that they are unaware of their alternatives, and that the nudge “prompting with objectives” leads to more and better alternatives (Pitz et al. 1980; Jungermann et al. 1983; Gettys et al. 1987; Butler and Scherer 1997; Selart and Johansen 2011; Siebert and Keeney 2015; Siebert and Kunz 2016). The researchers claimed that more and better alternatives are beneficial to the decision-makers. However, there is no study yet linking what a decision-maker is doing in one decision situation with a general construct, such as life satisfaction or happiness. It would be interesting to analyze how decision situations collectively influence the life satisfaction of participants. As a first step, we adapted the Diener et al. (1985) *Satisfaction With Life* scale by emphasizing that

the participants should assume that the one decision situation they had considered in the study earlier was representative of all their decisions. The results are promising. The life satisfaction measured with the Diener et al. (1985) adapted 5-item scale is higher for decision opportunities than for decision problems, which is significantly higher than the satisfaction for decision crises. This finding complements those on single decision situations discussed earlier.

Furthermore, it is the first link between how decision-makers address a single decision situation and their life satisfaction. Proactive decision making (PDM) suggests, among others, to create decision opportunities (Siebert and Kunz 2016) and explains a substantial share of life satisfaction on a general level, that is, not with an explicit reference to a single decision situation (Siebert et al. 2020). Our finding might be helpful to explain how PDM influences life satisfaction.

The importance of decision crises

We have introduced decision crises for a better comparison of the impact of decision problems and opportunities. In three studies with 731 participants, 13.3% were decision crises, 52.6% decision problems, and 34.1% decision opportunities. Without the distinction between decision crises and decision problems, there would have been a substantial bias in favor of accepting hypotheses 1 and 3. Given that a relatively high percentage of decision situations were categorized as decision crises (13.3) and they reduce the individuals' satisfaction substantially and sustainably, we recommend that such decision situations should be further studied.

Insights about the motivation of implementing an alternative

Decision-makers can only influence their environment if a chosen alternative is implemented. However, in practice, individual and organizational decision-makers often fail to implement a chosen alternative. Therefore, Howard (1988) considered the implementation of a decision alternative as a crucial element of decision quality. However, why decision-makers strive hard to make a decision but not enough to implement a decision alternative is debatable. Our study provides an interesting empirical finding relevant to this discussion. On average, the difference in satisfaction between choosing an alternative (milestone 1) and recognizing a decision situation (milestone 2) is 21.2, while the difference in satisfaction between implementing an alternative (milestone 3) and choosing it (Milestone 2) is only 2.5. Assuming that decision-

makers want to maximize their satisfaction, the motivation to choose an alternative seems to be more than eight times higher than implementing it.

6. Conclusions

Keeney (2020) extended the concept of nudging to decision situations where there are no external decision architects. The premise is to empower decision-makers to become their own decision architect. Keeney suggested about two dozen nudges with which decision makers "can give himself or herself a nudge." Among others, Keeney (2020) recommended converting a decision problem into decision opportunities and creating decision opportunities proactively. Thereby, he assumed that pursuing decision opportunities benefits a decision-maker than solving decision problems. In this study, we gathered empirical data to suggest the validity of this assumption. Our study has five key findings:

1. Decision-makers dealing with decision opportunities are more satisfied with their decision situation than those addressing decision problems.
2. Framing a similar decision situation as a decision problem or decision opportunity significantly influences satisfaction.
3. Decision crises and decision problems should be differentiated.
4. Decision-makers addressing decision problems are more satisfied with their decision situation than those addressing decision crises.
5. Recognizing decision problems or decision crises reduces the decision-maker`s level of satisfaction.

Furthermore, this study derived empirical evidence suggesting two "by-catch-findings," which were not the focus of the study but could be helpful for further research and make a valuable contribution to ongoing discussions.

1. Self- and expert assessments of decision situations are highly correlated. Therefore, researchers could use both in further studies.
2. The reward in terms of satisfaction is about eight times higher when choosing an alternative than when implementing it. This finding might be useful in the discussion on why most decision-makers fail to implement their decisions.

A specific decision situation is not in itself faced as a decision problem or opportunity. Consequently, from the definitions above, the classification of a decision situation depends on the decision-maker. In our study, an often-described decision situation is "what to do after

graduating from high school." In two-fifths of cases, the participants appear thrilled by the opportunity to actively shape their future and for reaching one`s objectives of deepening one's knowledge in one's favorite topic, which accompanies living on alone and experiencing new freedom. Contemplating their decision on what they might do creates values. In three-fifths of the cases, the participants believe that they should cope with this decision situation. Given that there is no specific alternative, the participants cannot immediately get what they desire. Nevertheless, they should face the decision. If they do not do so, the alternatives get worse. Thus, a decision problem can shift to a decision opportunity and vice versa (Mintzberg et al., 1976).

This study suggests, consistent with Keeney (2020), that the decision-makers should "give themselves a nudge" by converting decision problems into decision opportunities and creating decision opportunities proactively. Furthermore, individuals should, first, work on anticipating decision crises systematically before they occur and, second, to proactively seek measures to minimize the probability of a crisis occurring, which helps them to be in a better situation to deal with a probable decision crisis (Siebert and Keeney 2020a, 2020b).

Section 3 discussed the challenges of testing the hypotheses. These studies were based on this discussion. Furthermore, Section 4 developed our studies systematically, considering the valuable comments from several colleagues to provide a comprehensive basis for testing our hypotheses. Instead of using one measure and one categorization, we used several measures and categorizations to produce robust results. However, there are still limitations regarding the degree to which the results can be generalized. These limitations relate to the concept of decision-making milestones, measures of satisfaction used, and sample.

In our experiments, we asked the participants about their satisfaction over time. Instead of concrete times, we use milestones in the decision-making process. Hence, we derived a concept of four milestones, which should be considered for further research. We recommend that our studies are replicated with different concepts of decision-making milestones or concepts capturing the aspect of time in decision-making processes.

Instead of measuring the quality of life, we used different measures of satisfaction to test the hypotheses comprehensively. The study results appear stable across different measures and categorizations of decision situations. However, we suggest replicating our studies with

further constructs capturing the consequences in decision situations in terms of satisfaction, happiness, and quality of life in decision situations.

Satisfaction, in this case, can be understood as satisfaction with the decision process and general satisfaction. We did not differentiate for the sake of simplicity of the execution of the experiments for the participants. Satisfaction with the decision-making process impacts general satisfaction (Siebert et al. 2020). Furthermore, the results of the measurement of life satisfaction indicate that general satisfaction with decision opportunities is higher than with decision problems or decision crises. Nevertheless, future studies should distinguish between these two types of satisfaction.

Participants of all four studies were undergraduates studying business administration or industrial engineering in Germany or Austria. This sample is homogeneous, as they have similar educational and cultural backgrounds (Middendorff et al. 2017). Moreover, the study participants are students from reputed universities in their respective countries, which leads to the assumption that the participants are highly motivated students. This sample thus reflects only a limited population (Arnett 2008). Other studies have already shown that the perception of decision-making situations and risk within a situation depends on the participants' cultural background (e.g., Breuer et al. 2017; Hsee and Weber 1999). These facts might be evident in framing a situation as a crisis, problem, or opportunity. In the present sample, the participants assessed the same situation differently.

The limitations above should be addressed in further research. Furthermore, we recommend the following three directions for further research.

1. Further research should focus on decision crises because of their potential negative impact on individuals.
2. The consequences of other nudges that individuals might use to nudge themselves should be empirically analyzed.
3. The link between how decision-makers address single decision situations and their life satisfaction should be investigated.

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Paper 2: Changes in Value Priorities due to the COVID-19 Pandemic - A 4-year longitudinal study with German students

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Changes in Value Priorities due to the COVID-19 Pandemic - A 4-year longitudinal study with German students.

In March 2020, the WHO declared the corona disease 19 as a pandemic. Since then, the German government has tried to control the spread of the virus with various restrictions. These restrictions had a direct impact on the life of German students. In this study, we investigate to which extend the restrictions lead to a change of value priorities of German students. From January 2019 to January 2022 we conducted a longitudinal study with four measurement points and, in total, 968 participants. Two measurement points before the first outbreak of the COVID-19 in Germany, one in the second lockdown phase and the third after two years in the pandemic. In this study, the students were asked to indicate their value priorities while solving a real-world decision problem important to them. Results indicate increased value priorities of the values *Intellectual Fulfillment* and *Environment and Nature* and a decrease of *Family and Partner* value priority as a direct effect of the second lockdown phase. We also found small differences between the male and female subjects. The data show bounce-back effects as the pandemic became more normal to the students. In the long run, value priorities seem to be stable with the exception of an increase in *Freedom and Independence*.

Highlights

- Most value priorities show a bounce-back effect
- Value priority of *Freedom and Independence* show a long-lasting increase
- Minor gender differences in the behaviour of value priorities

Keywords: COVID-19, Value-Change, Decision-Making, Entscheidungsnavi, Gender Differences

1. Introduction

The current COVID-19 pandemic poses a major threat to physical and mental health. It has severely affected people's lives worldwide for more than two years. Especially at the beginning, the images in the news (e.g., from Bergamo in Italy) caused concern and fear. Governments worldwide were challenged to respond quickly and efficiently to this threat. Therefore, several governments initiated lockdowns to protect the population, bringing public life to a standstill and limiting personal contact. The resulting social distancing and loneliness also had a negative impact on the mental health of many people, affecting all age groups and population segments (Vindegaard & Benros, 2020).

Such an incisive event provides an opportunity for various scientific investigations, including behavioral research (Cifuentes-Faura, 2020; Pedrosa et al., 2020). Several studies looked at extreme behavior, such as panic hoarding, especially the struggle for toilet paper (Baddeley, 2020; David et al., 2021). For some people, the pandemic caused long-term behavioral changes, e.g., anxiety disorders, depression, and sleep disorders (Bourmistrova et al., 2022).

We are interested in people's decision-making behavior and the possibilities of supporting people to make decisions in a well-reflected manner. A person's value system is the basis for this because inner values represent personal factors in the process of motivated action (Schiffer, 2022, p.35), and individuals use them as guidelines for their decisions and behavior (Allport, 1961; Sagiv & Schwartz, 2021). In general, values are considered stable personal factors. However, repeated priming, actively reconsidering one's values, or extreme situations can cause changes in the value system (Bardi et al., 2014; Bardi & Goodwin, 2011) and affect the decision-making behavior. Initial studies suggest that the COVID-19 pandemic, as an extreme event, also shifts individuals' value systems (Bojanowska et al., 2021; Daniel et al., 2022).

Our study aims to investigate changes within the value system of German students in the context of the COVID-19 pandemic. Hence, the second chapter presents the basics of value theory, a model of value change, the results of value research in the context of the Corona pandemic and the relationship between decisions and values. Based on this knowledge, we present hypotheses on value change in the context of the COVID-19 pandemic in chapter 0. Using data collected from 2019 to 2022 (chapter 4.2) we examine the differences in values at the four measurement points and check our hypotheses in chapter 5. By looking at multi-year

data, we expect indications of the stability of values and whether the pandemic has spurred longer-term value changes.

2. Value theory

There are many different definitions of values. Kluckhohn defined values as „a conception, explicit or implicit, distinctive of an individual, or characteristic of a group, of the desirable which influences the selection from available modes, means and ends of action“ (Kluckhohn, 1951, p. 395). He distinguished between implicit, inner values, which are not observable, and explicit values, which a person attributes to themself. This differentiation is also found in the concept of motives (Heckhausen & Heckhausen, 2010, pp. 4–5). In the literature, values and motives are sometimes used synonymously (and equally synonymously with needs, desires, attitudes, preferences, objectives, norms, and virtues) since the boundaries between the individual constructs are blurred (Biernat, 1989; Kehr, 2004, p. 481; Rohan, 2000, p. 258). Nevertheless, these are different concepts (Hutcheon, 1972, p. 184). Values can be differentiated into external, cultural values of the environment and internal, individual values in the form of personal factors (personal values). The inner values are shaped by the outer values in that they are learned through upbringing, training, contact, etc. (Staehle et al., 1999, p. 171). It can be assumed that inner values are formed in children and young people over time. From adulthood onward, inner values can then be described as consolidated and largely stable (Rokeach, 1973). In this paper, we refer to these inner, individual values of a single person that determine what they consider important in their life (Friedman et al., 2006, p. 349) and which Schwartz defines as: “broad desirable goals that motivate people’s actions and serve as guiding principles in their lives” (2021, p.2). In this sense, they can also be referred to as "values of one's life".

2.1. Value systems

Rokeach dealt extensively with human values and developed the Rokeach Values Survey (RVS) with 18 fundamental and 18 instrumental values (1973). Another instrument is the List of Values, based on Rokeach's explanations and insights of Feather (1975) and Maslow (1954). In this list, Rokeach's fundamental values were modified and reduced to 9 core values: self-respect, security, warm relationships with others, sense of accomplishment, self-fulfillment, sense of belonging, being well respected, fun and enjoyment, and excitement (Beatty et al., 1985). Values can be arranged in a so-called value system (Rohian, 2000) and the best-known value system was developed by Schwartz (Maio, 2010). Schwartz (2021) ranks values

according to the degree of compatibility of the objectives pursued by the values. He uses two bipolar dimensions to illustrate the "motivational goals" behind the values.

The first dimension differentiates between the opposing poles of Openness to Change and Conservatism. This dimension addresses the conflict between values that focus on independent thinking, acting and feeling, readiness for change (self-direction, stimulation), and values that reflect the structure, discipline, preservation of the past, and resistance to change (security, conformity, tradition). The second dimension differentiates between Self-Enhancement and Self-Transcendence, contrasting the conflict between values focusing on the pursuit of self-interest, relative success, and relative power over others (power, achievement) and values focusing on the welfare and interests of others (universalism, benevolence). The individual values in Schwartz's model are not to be understood as concrete entities but as levels on a continuum (Schwartz, 1994). Therefore, Schwartz arranges them in a circular shape, with values with a high potential for conflict having a large distance in the circle. This, in turn, means that people who prioritize the values of one dimension particularly strongly usually weight the opposite values lower. Originally Schwartz defined ten values (Schwartz, 2012; Schwartz & Bilsky, 1987), which are still considered a reference in many studies today. In the meantime, a second, extended version with 19 values also exists (Schwartz et al., 2012). The relationships are illustrated in Figure 1.

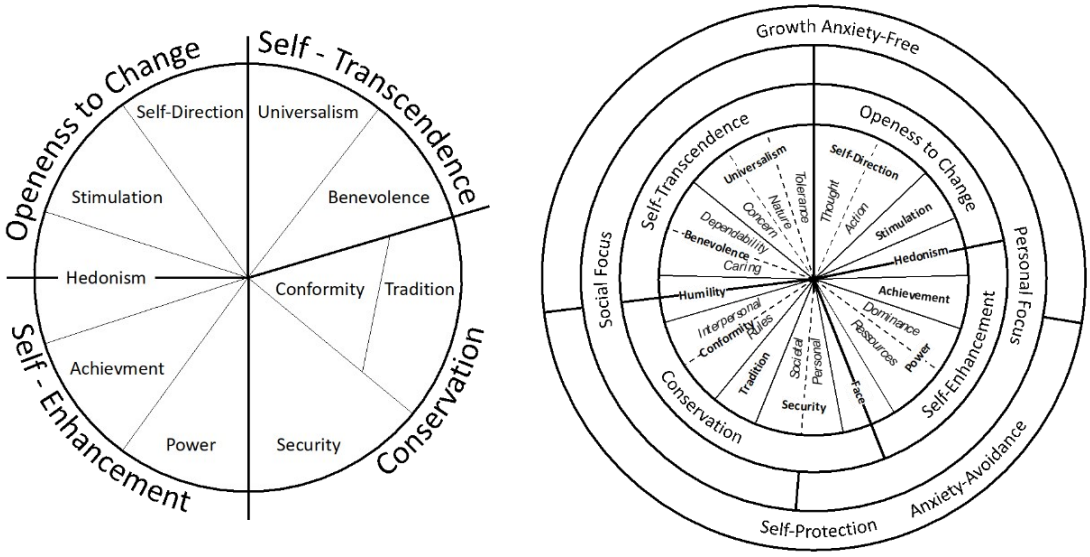


Figure 1: Value system according to Schwartz in the original and the extended version (Schwartz, 2012)

The assumption behind the value system is that the values of all people can be covered by it. Individuals, therefore, do not differ in the number of their values but the prioritization of the respective values.

2.2. Model of value change

Value priorities are generally considered stable (Rokeach, 1973) and are rarely subject to sudden and sustained change (Sheldon, 2005; Schwartz, 2005). Nevertheless, researchers have long been concerned with the issue of changing values because values impact people's decision-making behavior (Keeney, 1996; Lee et al., 2022). For example, personal values have been found to develop at a young age and change throughout life. It is found that older people tend to prioritize values from the Conservation and Self-Transcendence dimensions, while younger people often prioritize Self-Enhancement and Openness to Change (Schwartz, 2007; Verkasalo et al., 2009). The stability of value priorities also changes with age. According to the Aging-Stability Hypothesis, value priorities become more stable the older the individual is (Pöge, 2020). However, some studies (e.g., Bardi et al., 2009; Gouveia et al., 2015; Robinson, 2013) contradict this and show remarkable changes in value priorities at older ages.

The question of what triggers a change in values is particularly interesting. Bardi and Goodwin (2011) provide a theoretical model that explains the process of individual value change (Figure 2).

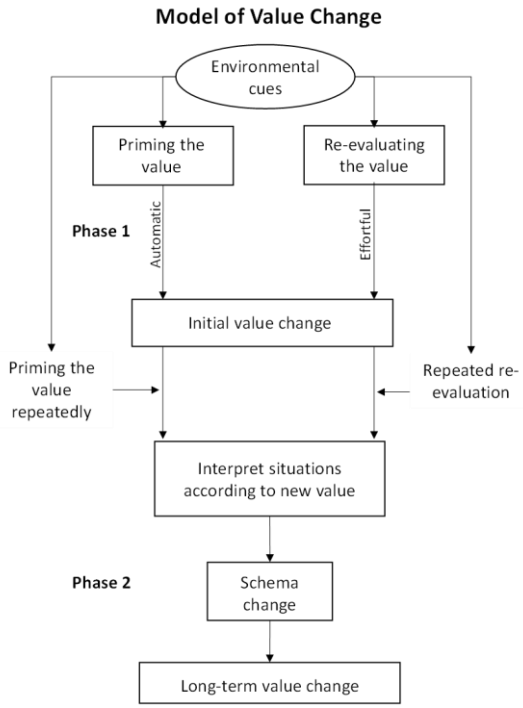


Figure 2: Simplified model of value change based on Bardi & Godwin 2011

This model describes two ways to change value priorities: the "automatic" and the "effortful" ways. At the beginning of both paths, an external event ("environmental cues") initiates a change in value priorities. A value must be primed to activate the "automatic" path. Various environmental factors can prime the person's values, for example, hearing a language associated with specific values or a visualization in the form of posters, photos, etc., in which a situation that addresses a particular value is depicted. The subconsciously activated value can now lead to an initial change in value priorities. At the beginning of the "effortful" path is the conscious re-evaluation of the value priorities. The re-evaluation can be started by explicitly asking about the value priorities, for example. The reconsideration of a person's value priorities can lead to an initial change in values, just as in the “automatic” path. However, such one-time influences only lead to short-term changes in value priorities (Sagiv & Schwartz, 2022).

According to the model, values must be primed repeatedly (e.g., listening to the language associated with specific values every day) or value priorities need to be re-evaluated repeatedly to achieve a long-term change in value priorities. Only through regular activation the particular value is reinforced in the value system, and the person's thinking and actions become more aligned. As a result, the person changes their thought pattern to fit the new value priorities, and the value change persists in the long run.

According to Bardi and Godwin (2011), even a single, highly influential event can permanently change value priorities. Sagiv and Schwartz (2022) also emphasize that major life events can lead to substantial changes in value priorities. In this case, the event must be so incisive for a person that the person deeply examines their values. Examples of a change in value priorities as a result of an extreme event are, for instance, the birth of a child and the resulting responsibility as a parent (Lönnqvist et al., 2018), the financial crisis in 2008 (Sortheix et al., 2019), and terrorist attacks, such as the attack on the World Trade Center in 2001 (Verkasalo et al., 2006), or wars (Daniel et al., 2013). Due to such drastic events, either values can be reprioritized in the long term, or they can change only temporarily. The temporary change can last for different lengths of time. Verkasalo et al. report a return to original value levels between eleven days and five months and call this the “bounce-back effect” (2006).

Bardi and Goodwin's model shows one way to resolve the discrepancy between the aging-stability hypothesis and a substantial change in values in old age. On the one hand, the stability of value priorities in old age can be explained by the fact that priorities are "strongly

crystallized" over time (Bardi & Schwartz, 1996). On the other hand, drastic life changes play a significant role in the studies mentioned above (Bardi et al., 2009; Gouveia et al., 2015; Robinson, 2013).

2.3. Value change due to the Corona pandemic

The corona pandemic represents an extreme event that has a global impact on human life. Therefore, it is reasonable to assume that this event is also associated with a change in value priorities. Initial studies have already investigated the impact of the Corona pandemic on value systems: Bojanowska et al. (2021) considered, among other things, how value priorities changed as a result of the imposition of the first lockdown in Poland. To do so, they asked adults in Poland about their value priorities (Schwartz's 19 values Portrait of Values Questionnaire) nine months before the first lockdown (in March 2020) and two and four weeks afterwards. They found that self-direction (thought), conformity (rules), humility, and universalism (nature and tolerance) were prioritized more strongly at time points two and three than before, while hedonism declined in importance. In contrast, the values (personal and social) security, interpersonal conformity, caring, and universalistic concern were temporarily more prioritized at time point two but converged to the initial level at time point three. Daniel et al. (2022) analyzed adults' values in Australia (Schwartz's ten values best worst survey). They compared data from five surveys (three pre-pandemic in 2017-2019; the fourth in April; and the fifth in late 2020). They found that conservation values (order and stability) were more prioritized in the pandemic. In contrast, openness to change values (*self-direction* and *stimulation*) became less important at the pandemic's beginning, with this effect leveling off by the end of 2020. Self-transcendence values (care for close others, society and nature) were less prioritized at the end of 2020. The effects were more pronounced for individuals with stronger fears regarding the pandemic.

2.4. Value-focused decision-making

Essential for inner values is their function as guiding principles in people's lives (Sagiv & Schwartz, 2021, p. 2) and thus their influence on decisions and actions. Hence, Allport stated: „Personal values are the dominating force in life, and all of a person’s activity is directed toward the realization of his values“ (Allport, 1961, p. 543). Values can thus be understood as an overarching concept that shapes people's motives, guiding decisions, and actions (motivated action as an interaction of person and situation) (Heckhausen & Heckhausen,

2010, pp. 3–5). Consequently, they are an integral part of decision-making processes and the justification of decisions (Rokeach, 2008; Schwartz, 1992).

Keeney (1992) therefore argues that people should be more concerned with inner values when making decisions to improve decision quality. Each alternative in a decision context is a means of realizing one's values (Keeney, 1993, p. 63). Therefore, in his value-focused thinking approach, he recommends that the process of decision-making be directly aligned with personal values. People should start the process by thinking about what is important in their situation before they consider how to achieve the desired. Keeney defines values as "principles used for evaluation" (Keeney, 1992, p. 6), which are concretized by "objectives". The ultimate objective or value for everyone should be to maximize one's quality of life, as everyone strives for a life characterized by happiness and joy. However, what is understood by quality of life varies from person to person and is based on inner values. Therefore, everyone must define what quality of life means to them (Frey, 2008, p. 3; Frey & Stutzer, 2002, p. 402; Keeney, 2020, p. 185). In value-focused thinking, the "objectives" relevant to a decision-making situation can be identified through various methods, such as wish lists, alternatives, different perspectives, etc. Each of these methods requires creative and intensive thinking about the decision situation (Keeney, 1992, 56 ff.).

Keeney distinguishes the value-focused thinking process from the alternative-focused thinking approach, which starts by looking at what options are available and choosing the best among the available options.

The success of the value-focused thinking approach has been proven in many studies. In their work, Siebert and Keeney (2015) show that more and better options for action can be generated with the help of this approach than with conventional approaches. A comprehensive overview of further studies on value-focused thinking can be found in Parnell et al. (2013).

We analyze decision-making behavior with the help of the Entscheidungsnavi. The Entscheidungsnavi (www.entscheidungsnavi.de) is a decision support system that supports users in reflective decision-making in a five steps process. It combines Keeney's value-based approach with various problem structuring and debiasing methods. In the Entscheidungsnavi, users must also reflect on their values and identify their "objectives". This tool goes one step further than Keeney, who defines values and objectives differently but does not ask for them

separately in the process step (Keeney, 1992, 49 ff.). In the Entscheidungsnavi, the decision maker is first asked to reflect on the important values for his decision situation. For private decisions, these are the inner values according to the above definitions by Kluckhohn (1951) and Sagiv and Schwartz (2021). In the second step, the decision maker identifies the objectives relevant to his decision statement, taking into account his five most important values, which are automatically suggested as objectives by the system. The 12 values for private decisions asked for in the Entscheidungsnavi are listed in Table 1. We elaborated on this list during the development of the tool in a brainstorming session with several people.

Table 1: List of the 12 values used in our study

Values used in our study	
Family and Partner	Excitement and New Experiences
Friends and Social Relations	Competence
Justice and Fairness	Power and Leadership
Environment and Nature	Wealth
Intellectual Fulfilment	Financial Security
Freedom and Independence	Honesty and Ethics

3. Hypotheses

The preceding discussion has shown that extreme events can trigger a change in value prioritization among individuals, especially for those values strongly addressed by the event. Based on these insights gained, in the following, we formulate hypotheses about the value changes that might have arisen among German students due to the Corona pandemic. We refer to expected effects in January 2021, i.e., ten months after the pandemic's start.

The severe restriction of social interaction may be a starting point for changes in value priorities. For example, Bojanowska et al. (2021) report that the pandemic situation in Poland increased the value priorities of Benevolence, Universalism, and Self-direction - Thought. Benevolence describes the value of prioritizing the welfare of people with frequent and close contact. Due to the contact restrictions in Germany, interaction has been limited to a small group of people. Family and partners were seen frequently, but relationships with friends and other contacts were more challenging to maintain (Walper et al., 2021). Therefore, we suspect that the Friends and social relations value will increase due to the lack of social relationships with (distant) friends and casual acquaintances.

H1: The value priority of *Friends and social relations* will increase significantly in 2021.

Students have often been at their parent's homes due to the lack of presence at the university. Furthermore, they have digitally participated in their studies. Therefore, many students' contact with family and partners intensified due to the pandemic. The need for family and partner is thus fulfilled substantially or even over-fulfilled, especially during curfews and contact restrictions. Such a strong exceeding of the individual "set point" can lead to a loss of strength of the individual need for a certain time (Reiss, 2004, pp. 186–188; Reiss & Havercamp, 1996, pp. 626–627). Therefore, we assume that this value priority decreases.

H2: The value priority of *Family and Partner* will decrease significantly in 2021.

The lockdowns triggered by the pandemic caused people in Germany to spend much more time in nature (Büssing et al., 2020; Morse et al., 2020). Nature was, in some cases, the only place besides one's home where people were allowed to spend time without personal restrictions. Bojanowska et al. (2021) also suggest an increase in this value priority. Accordingly, we expect that preserving the environment and nature has become more important as a value.

H3: The value priority of *Environment and Nature* will increase significantly in 2021.

The contact and movement restrictions reduced the ability to move freely in society. At the same time, there was a major debate about the appropriateness of measures to restrict the virus (Hövermann, 2020). Due to unreliable data, people in Germany could form their own opinions on the subject while at the same time allowing for other views. Developing one's opinion became an important issue (Schöberl & Kieweg, 2021). We, therefore, assume that the value priority for the values of freedom and independence, and intellectual fulfillment increases. Bojanowska et al. (2021) also identified a rise in these value priorities in Poland.

H4a: The value priority of *freedom and independence* will increase significantly in 2021.

H4b: The value priority of *intellectual fulfillment* will increase significantly in 2021.

For the value priorities *Competence*, *Power and leadership*, *Wealth*, *Honesty and ethics*, *Excitement and new experiences*, and *Justice and fairness*, we do not expect any significant changes in connection with COVID-19 because these values were not significantly addressed by the pandemic among the students we examined. Thus, while students' learning situation has changed, they have still been challenged to demonstrate their competence in exams now administered digitally. And while student life has been severely curtailed, and it can be argued

that this has made excitement and new experiences less possible, the lockdowns have also offered new challenges and new types of experiences. We also do not expect a significant change in the value priority of *Financial security*. In general, studies on value change due to extreme events indicate that the value priority of security often increases as subjects find themselves in a more uncertain situation. Uncertainty has been described as financial uncertainty during the financial crisis (Sortheix et al., 2019) and health uncertainty during the World Trade Center attack (Verkasalo et al., 2006). In the context of the Corona pandemic and the first lockdown in Poland, Bojanowska et al. (2021) also reported an increase in the value priority of security, but in this case, only in the short term. In their evaluation, they found that the value priority *Security* significantly increased two weeks after the lockdown, while this effect was already weakened again after four weeks. Students in Germany receive alimony or student loans and thus a secure income. Financial losses could occur during the pandemic due to the loss of part-time jobs, e.g., in the catering industry. At the same time, however, the lockdown reduced the usual expenses as parties were banned and restaurants and cultural venues were closed.

4. Methodology

4.1. Procedure and participants

In our study, subjects run through a decision-making process that is relevant to them in their professional context with the help of the Entscheidungsnavi (Nitzsch et al., 2020). The Entscheidungsnavi combines Keeney's value-based approach with various problem structuring and debiasing methods.

The study participants were students of the course "Decision Theory" at RWTH Aachen University. As part of the lecture, the students had the opportunity to systematically work out a complex decision that was important to them by using the Entscheidungsnavi and receive a bonus on their course grade if they worked on it appropriately. In principle, personal decisions, socio-political issues, or business topics could be considered for this purpose. Our study only assesses data sets on personal career decisions where intrinsic values are directly relevant.

In the first step of the decision-making process the participants define their decision situation. In the spirit of value-focused thinking (Keeney, 1992), subjects are encouraged to reflect on their values and motives. For this purpose, the Entscheidungsnavi provides a list of values and motives for self-assessment, whereby each item can be weighted and adjusted according to

personal assessment (continuous scale from "small impact" to "high impact"). Since motives, unlike values, are situational, they are irrelevant to this study and, therefore, not considered in detail.

After reflecting on personal values and a final decision statement, the participants work out their objectives within the decision situation, systematically develop alternatives for action, and evaluate these with the help of the objectives in a consequences table. At the end of the decision-making process, the Entscheidungsnavi ranks the alternatives based on the respective utility values. The participants can then reflect their result and adjust any deficiencies in the decision model.

Our study was designed as a long-term study with four measurement points. The measurement points as well as the most important events regarding the COVID-19 pandemic in Germany (Imöhl & Ivanov, 2021), are shown in Figure 3.

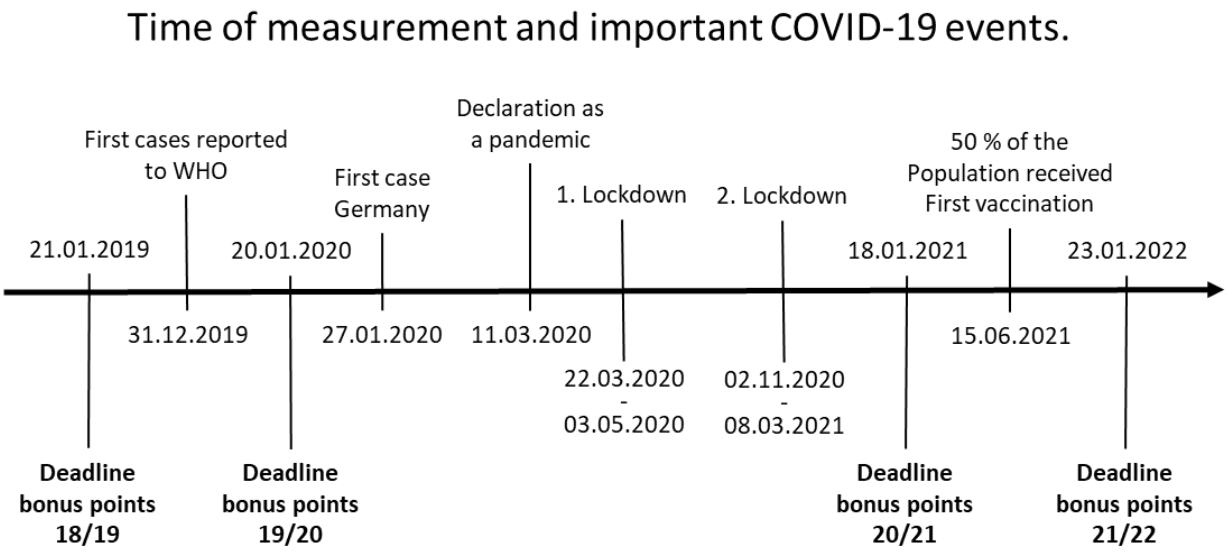


Figure 3: Measurement time point of the study and important COVID-19 events in Germany

The first measurement point was in January 2019, nearly a year before COVID-19 became known. The first cases of disease were reported to the WHO on December 31, 2019 (World Health Organization, 2022). Measurement point two in January 2020 was a few days before the first case in Germany occurred (January 24, 2020), where the population could not yet guess what would happen a few weeks later. Only then did the COVID-19 cases rapidly increase, both worldwide and in Germany. For that reason the WHO declared the disease a pandemic on March 11, 2020 (World Health Organization, 2022). To keep infection numbers down and to better control the situation, the federal government imposed a strict lockdown

on March 22, 2020 (Bundesregierung Deutschland, 2020), severely restricting people's freedom for seven weeks. A second lockdown followed in December 2020 (Imöhl & Ivanov, 2021), during which the third measurement point in January 2020 falls to which our hypotheses refer. In the meantime, a vaccination campaign was already carried out in Germany, whereby the younger population (excluding risk groups), i.e., also the students considered by us, could only be vaccinated with the lifting of the vaccination prioritization from June 2021 onwards (RKI, 2022). At the fourth measurement point in January 2022, 61.5 million people in Germany were already primed (www.impfdashboard.de), and compared to time 3, there were significantly fewer restrictions due to the pandemic by the federal government.

The participants in the study were predominantly undergraduate students in the first semesters of their studies. A total of 1328 people took part in the study. Due to the gender distribution in the study programs, there are significantly more male subjects than female subjects in all data sets. The details are shown in Table 2 for each measurement time point.

Table 2: Demographic data of the participants

Measurement point	WS 18/19	WS 19/20	WS 20/21	WS 21/22
Number of subjects	346	383	285	314
Gender (male/female)	74% / 26%	74% / 26%	71% / 29%	66% / 34%
Degree course (B.Sc. / M.Sc.)	93% / 7%	88% / 12 %	94% / 6 %	94% / 6%

4.2. Data collection

The approach of value-focused decision-making is the basis for the data collected in this study. As explained in 4.1, the participants reflect on their values in a career decision currently relevant to them, which they elaborate in a structured manner in the Entscheidungsnavi. The 12 values we asked about are listed above in Table 1. The students were able to reflect on these 12 basic values on a continuous scale between "rather less important" (corresponds to value 0) and "particularly important" (corresponds to value 80).

In addition to the values, we also used five questions in 2021 and 2022 to record the extent to which students were affected financially, health-wise, and socially by the Corona pandemic (Table 3).

Table 3: Additional questions on being affected by the Corona pandemic

To what extent can you agree with the following statements? (0 = strongly worsened; 1 = worsened; 2 = slightly worsened; 3 = no change; 4 = slightly improved; 5 = improved; 6 = strongly improved; additionally "no statment" possible)
How has your financial situation changed as a result of the Corona pandemic?
How has your health situation changed as a result of the Corona pandemic?
How has your social life changed as a result of the Corona pandemic?
How has your family/friends' financial situation changed due to the Corona pandemic?
How has your family/friends' health situation changed due to the Corona pandemic?

4.3. Analysis

The analysis of the data obtained by the Entscheidungsnavi was carried out step by step. In the first step, all decision projects processed by the Entscheidungsnavi were checked for completeness and extensive elaboration by the chair's staff. Incomplete and not seriously edited data sets were sorted out.

In the second step, the participants' value priorities were normalized. The objective of this study is to determine the value priorities, i.e., the relative importance between values. In principle, individuals may interpret the endpoint-named scale ("small impact" to "high impact") of the importance of values in the Entscheidungsnavi differently. For such scales, some people use them only in the upper range, others in the lower range, but only a few use the whole range. Individual differences must therefore be excluded to achieve high accuracy in the measurement. For this purpose, we use the procedure of Schwartz (2012), who proposes subtracting the average value of the individual value weights from each value for each data set. This procedure converts the value weights of each participant into relative importance values. At the same time, this procedure tests mean stability rather than rank stability. The analysis of mean stability has the advantage that a more differentiated analysis is possible (Sagiv & Schwartz, 2021).

In the third step, we analyzed the value priorities of the four measurement time points using ANOVA. For further detailed analyses to evaluate the established hypotheses, we performed pairwise comparisons in the form of t-tests. To better interpret the data, we considered the effect sizes according to Cohen (1988), which allows an understanding independent of the sample size. Here, we refer to Gignac and Szodorai's (2016) recommendations for the classification of effect sizes. They recommend effect sizes of 0.10 as relatively small, 0.20 as typical, and effect sizes of 0.30 and above as relatively large.

5. Results

We explain the results in the following three sections. In 5.1, we look at how the Corona pandemic affected people. In 5.2, we describe the differences within the four measurement points. In 5.3, we test the hypotheses stated at the beginning. In 5.4, we analyze the data for possible gender effects and in 5.5 we discuss the results and present the first indications of the influence of the value system on the participants' objective systems.

5.1. Corona Pandemic Affectedness

In 2021 and 2022, we explicitly asked students how much their financial, health, and social situations had changed due to the Corona pandemic. The results are shown in Table 4.

Table 4: Mean values, standard deviation (SD) and significance levels (Mann-Whitney test) of the responses to the additional questions (0 = strongly worsened, 3 = no change, 6 = strongly improved).

Impact of the pandemic	January 2021		January 2022		Mann-Whitney
	mean	SD	mean	SD	sig. (2-sided)
financial	3,018	1,070	3,060	1,246	0,892
health	2,524	1,169	2,190	1,155	<,001
social	0,830	0,969	1,329	1,132	<,001
Family/friends financial	2,532	1,020	2,695	1,067	0,088
Family/friends health	2,266	1,002	2,150	0,929	0,099

Overall, students in both years indicate that their financial situation has not worsened, and there is no significant deviation from the value 3 (= no change) (Mann-Whitney Asympt. Sig. 2-sided 0.403 and 0.777). This supports our expectation that the priority of the value *Financial security* should not have changed significantly.

For all other questions regarding their private situation, there is a significant deviation from the value 3 and thus a change due to the Corona pandemic (Mann-Whitney asympt. Sig. 2-sided $p < 0.001$). On average, respondents describe the financial situation of family and friends as only slightly worsened. Students also rate their health situation as only slightly worsened, as does the situation of family/friends. In contrast, they perceive the restrictions in their social life as a significant deterioration

Between 2021 and 2022, significant mean differences are shown in the description of own health and social limitations. Health limitations are significantly higher in 2022 than in 2021 because more students had COVID-19 than in the previous year. Negative social life restrictions are perceived as considerably higher in 2021 than in 2022 since there were stronger restrictions in January 2021 than in 2022 due to the second lockdown. These results undermine our presumed trends of value priorities in chapter 3. We assumed they would mainly be affected by restricted social contact and that financial concerns are irrelevant to them.

5.2. Difference between the measurement times

In Chapter 2.2, we illustrated that changes in value priorities could arise either through regular questioning or priming of values or through extreme events. The Corona pandemic can be seen as triggering the questioning of value priorities. Accordingly, significant changes in values are not expected until 2021, our third measurement time point.

Table 5 shows the value priorities' mean values and standard deviations over the measurement periods. After ANOVA, there are significant mean differences for the values *Family and Partner*, *Environment and Nature*, *Intellectual Fulfillment*, *Freedom and Independence*, *and Power and Leadership*.

Table 5: Means (M), standard deviations (SD) and significant levels (η2) of relative value priorities at the four measurement points (T1 -T4)

Value	Time				F	η^2
	T1 M (*SD*)	T2 M (*SD*)	T3 M (*SD*)	T4 M (*SD*)		
Family and Partner	**10,91 (*14,01*)**	**12,72 (*13,28*)**	**7,82 (*16,56*)**	**10,31 (*14,23*)**	**6,337**	**,000**
Friends and Social Relations	8,75 (*12,02*)	8,87 (*11,44*)	9,39 (*13,10*)	9,62 (*12,30*)	0,375	,771
Justice and Fairness	-2,43 *(12,12)*	-1,33 *(13,27)*	-1,58 *(12,72)*	-2,29 *(12,63)*	0,610	,609
Environment and Nature	**-17,12 (*16,19*)**	**-14,97 (*15,81*)**	**-11,83 (*15,48*)**	**-17,28 (*14,10*)**	**8,066**	**,000**
Intellectual Fulfillment	**4,26 (*12,82*)**	**2,42 (*12,55*)**	**5,30 (*13,50*)**	**3,84 (*12,44*)**	**2,99**	**,033**
Freedom and Independence	**4,77 (*14,03*)**	**4,33 (*12,75*)**	**6,39 (*12,95*)**	**7,04 (*12,91*)**	**3,518**	**,015**
Excitement and New Experiences	-1,42 *(13,81)*	-1,43 *(13,50)*	0,35 *(14,75)*	0,03 *(13,98)*	1,461	,224
Competence	1,54 *(11,17)*	0,48 *(12,11)*	1,34 *(12,64)*	0,78 *(11,33)*	2,106	,098
Power and Leadership	**-8,69 *(15,21)***	**-9,96 *(15,38)***	**-12,21 *(14,96)***	**-10,55 *(15,13)***	**2,842**	**,037**
Wealth	-12,40 *(17,40)*	-12,73 *(16,24)*	-15,00 *(16,05)*	-12,93 *(15,45)*	1,548	,200
Financial Security	9,95 (*12,11*)	10,20 (*12,16*)	9,06 (*13,47*)	10,45 (*12,40*)	0,697	,554
Honesty and Ethics	1,88 *(13,25)*	2,36 *(12,89)*	0,96 *(12,80)*	1,00 *(12,66)*	0,939	,421

If we look at the mean value trends, the picture shown in Figure 4 emerges. Values prioritized higher (relative value prioritization usually > 0) are shown in black. Values prioritized lower (relative value prioritization usually < 0) are shown in dark gray. Consequently, the values *Family and Partner*, *Financial Security*, *Friends and Social Relations*, *Freedom and Independence*, and *Intellectual Fulfillment* are greatly important to students. In contrast, the

values *Power and Leadership*, *Wealth*, and *Environment and Nature* were weighted below average by the respondents. What is interesting for our study is the development of the individual relative value priorities over time, i.e., whether and to what extent changes in direction can be observed by 2021.

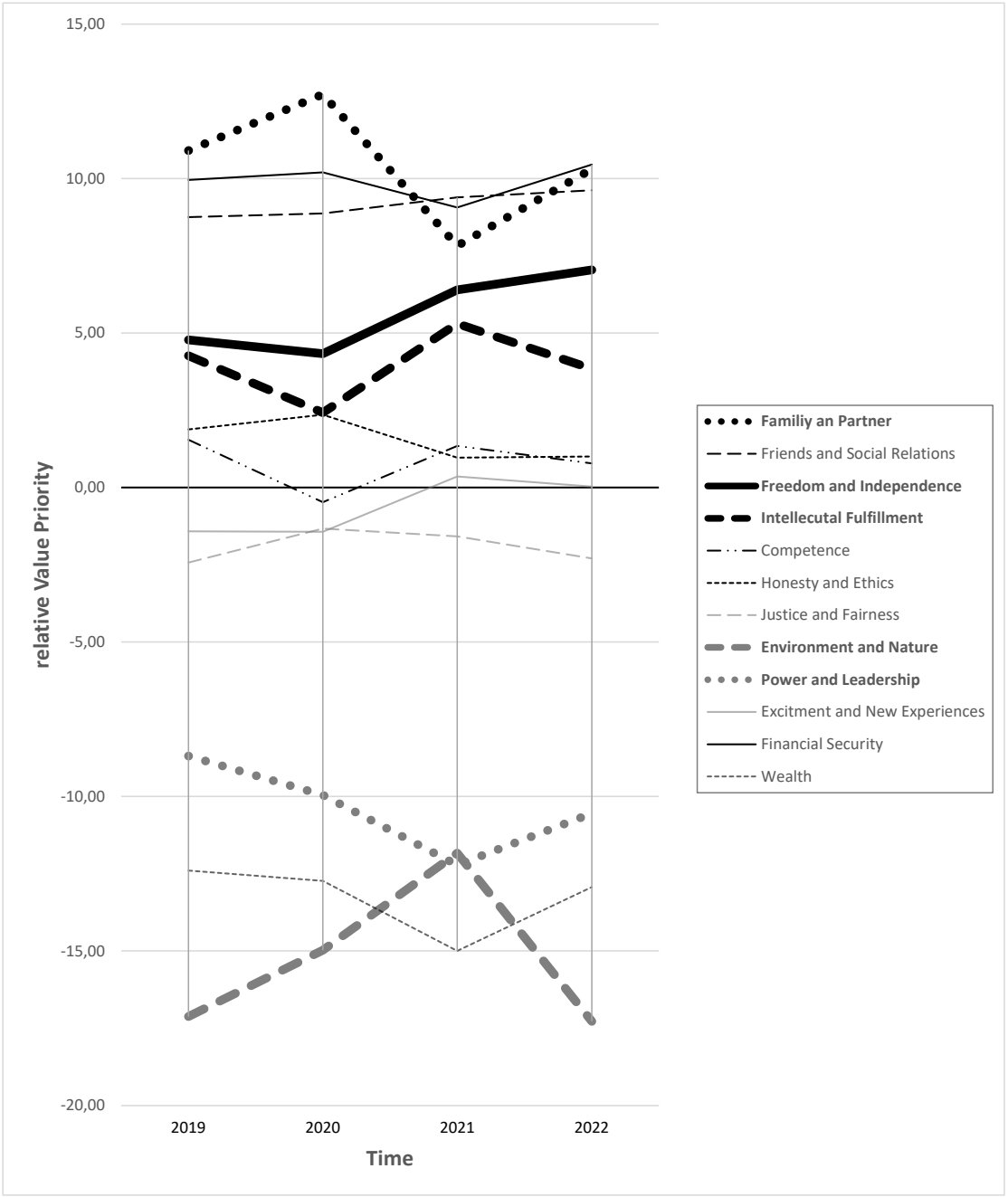


Figure 4: Changes in value priorities over time

We categorize the changes in value priorities over time into three groups. The first group is value changes without statistical significance, the second group is value changes with statistical significance and bounce-back effect, and the third group is more long-term value changes.

The first group (thin lines) includes the values *Friends and Social Relations*, *Justice and Fairness*, *Excitement and New Experiences*, *Competence*, *Wealth*, *Financial Security* and *Honesty and Ethics*. For these values, the ANOVA showed no significant changes ($p > 5\%$). As shown in chapter 3, these values are not particularly affected by the Corona pandemic; accordingly, we did not expect a change. The exception is the value *Friends and Social Relations*. The value trend is examined in more detail in the hypothesis verification in chapter 5.3.

The second category of values (thick, dotted/dashed lines) comprises the values Family and Partner, Environment and Nature, Intellectual Fulfillment, and, to a somewhat lesser extent, Power and Leadership. For all values, there is a significant change in value by ANOVA and t-test between 2020 and 2021 ($p < 5\%$). However, after 2021, the value changes moved back toward pre-crisis levels in 2022. This effect is known in the literature as the bounce-back effect (Verkasalo et al., 2006). The exact courses, including the p-values and effect sizes, are presented in the following chapter.

The third category (thick black line) comprises the value *Freedom and Independence*. This is the only value for which a significant change in value priority is maintained in 2022. Since the WHO has not yet declared the pandemic over, it is not yet possible to speak of a long-term effect, even though this value is a possible candidate for it.

5.3. Verification of the hypotheses

To verify the hypotheses from chapter 3, in the following we test the mean differences between the measurement time points for statistical significance and evaluate them with the help of the effect sizes.

The *Friends and Social Relations* value falls into Group 1 of non-significant changes. However, we hypothesized that this would increase significantly by 2021. Figure 5 shows the course of the average value priorities over the respective measurement points.

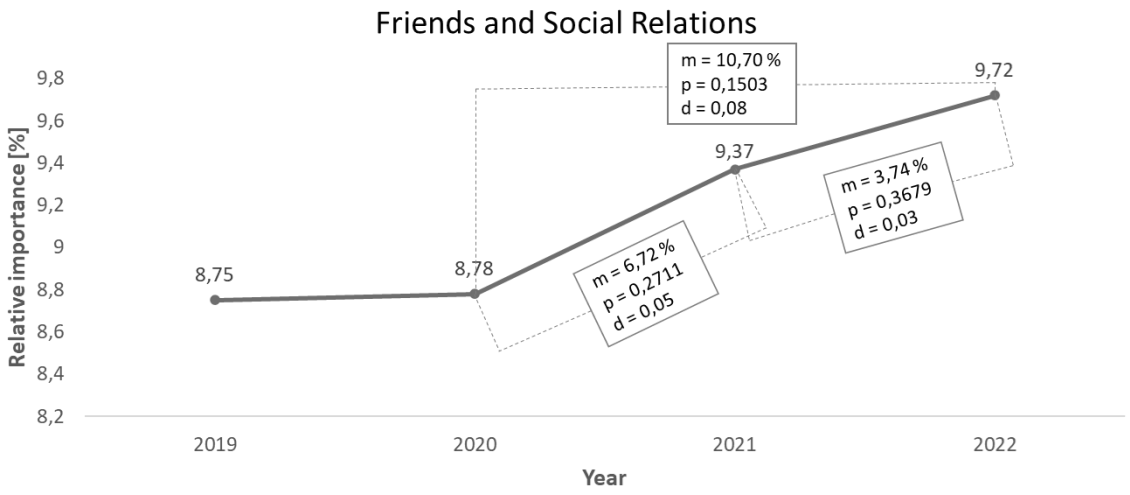


Figure 5: Course of the average value priorities of the *Friends and Social Relations* value with significance levels and effect sizes

In 2019, this value had an average importance of 8.75 and increased to 8.78 in 2020. In 2021, the value priority further increased to 9.37, and in 2022 to 9.72. Significance levels for the changes are p = 0.489 and p = 0.271 and p = 0.368. The effect sizes are d = 0.00, d = 0.05, and d = 0.03, respectively, and they turn out to be minimal. When the second measurement time point is compared to the third, the average value priority increases by 0.59 (p = 0.150 and d = 0.08). Overall, although there is an increase according to our hypothesis, it is minimal and therefore not significant. Hypothesis 1 must therefore be rejected.

The values *Family and Partner*, *Environment and Nature*, *Intellectual Fulfillment*, and *Power and Leadership* belong to group 2, the significant changes in value priorities with a bounce-back effect. Figure 6 shows their courses.

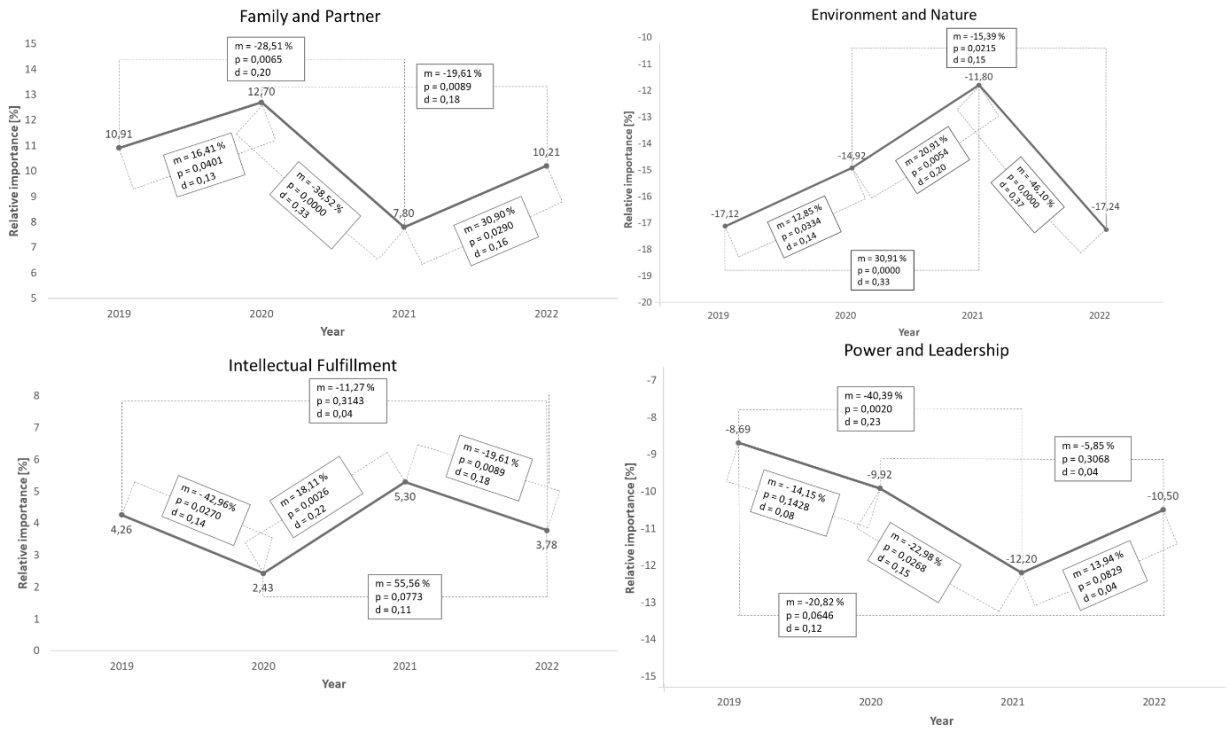


Figure 6: Course of the average value priorities of *Family and Partner*, *Environment and Nature*, *Intellectual Fulfillment*, and *Power and Leadership* with significance levels and effect sizes

In 2019, the Family and Partner value had an average relative importance of 10.91 and increased to 12.70 in 2020. Subsequently, the value priority decreased to 7.80 at 2021 and again increased to 10.21 in 2022, with significance levels for the changes all less than 0.1 (p = 0.040, p = 0.000, and p = 0.029). Hypothesis 2, "Family and Partner value priority decreases significantly toward the year 2021", can thus be confirmed. The effect sizes are d = 0.13, d = 0.33, and d = 0.16 and can be rated as typical to large according to Gignac and Szodorai (2016). When the first measurement time point is compared to the third, the average value priority decreases by 28.51 % (p = 0.007) with a typical effect size (d = 0.20). Overall, the Corona pandemic thus significantly decreased the average value priority. The magnitude of the effect size also suggests that the Corona pandemic mitigation measures strongly affect the average value priority here. At time point 4, there is already a bounce-back effect and, thus, a trend reversal. However, the pre-crisis level has not yet been reached.

In 2019, the value *Environment and Nature* had an average relative importance of -17.12 in the students' value systems. The negative sign here means that students prioritize this value at a lower-than-average level than other values. This value priority increased to -14.92 in 2020 and further to -11.80 in 2021. Subsequently, the relative importance decreased to -17.24 by 2022, with significance levels for the changes being p = 0.033, p = 0.005, and p = 0.000. The

effect sizes are d = 0.14, d = 0.20, and d = 0.37. In 2021, the value priority increased significantly compared to the two previous measurement points (p = 0.000 for 2019 and p = 0.005 for 2020), so hypothesis 3, "The value priority of *Environment and Nature* increases significantly to 2021", can be confirmed. At the same time, the bounce-back effect with an effect strength of d = 0.37, which can be rated as large, is remarkable.

In 2019, the value *Intellectual Fulfillment* possessed an average relative importance of 4.26 in students' value systems. This value priority dropped to 2.43 in 2020, rose to 5.30 by 2021, and then dropped to 3.78 in 2022. Thus, this value gained relative importance in the Corona pandemic, although a subsequent bounce-back effect is also observed. Here, the significance levels for the changes are p = 0.027, p = 0.003, and p = 0.009. The effect sizes are d = 0.14, d = 0.22, and d = 0.18. Overall, Hypothesis 4b, "The value priority of *Intellectual Fulfillment* increases significantly to 2021", can, thus, be accepted, with a typical effect size.

In addition to the values addressed in the hypotheses, there was a further value with significant changes in value priorities. In 2019, the value *Power and Leadership* had an average relative importance of -8.69 in the students' value systems. This value priority decreased to -9.92 in 2020 and -12.20 in 2021 before increasing to -10.50 in 2022. Here, the significance levels for the changes are p = 0.143, p = 0.027, and p = 0.083. The effect sizes are d= 0.08, d = 0.15, and d = 0.04. Thus, the change from 2020 to 2021 is significant at $p < 0.05$, and a bounce-back effect follows again. One explanation for why the students rated this value lower in 2021 may be that the possibilities regarding power and leadership were perceived as limited due to the imposed lockdown.

The value *Freedom and Independence* belongs to group 3, which is characterized by a significant value change without a subsequent bounce-back effect. Figure 7 shows the course of the average value priorities over the respective measurement times.

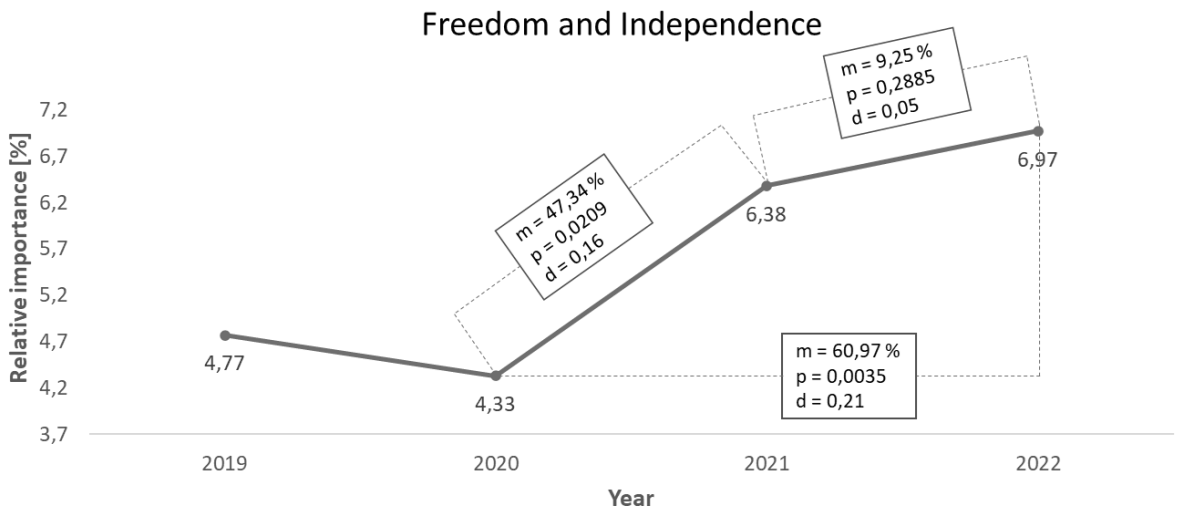
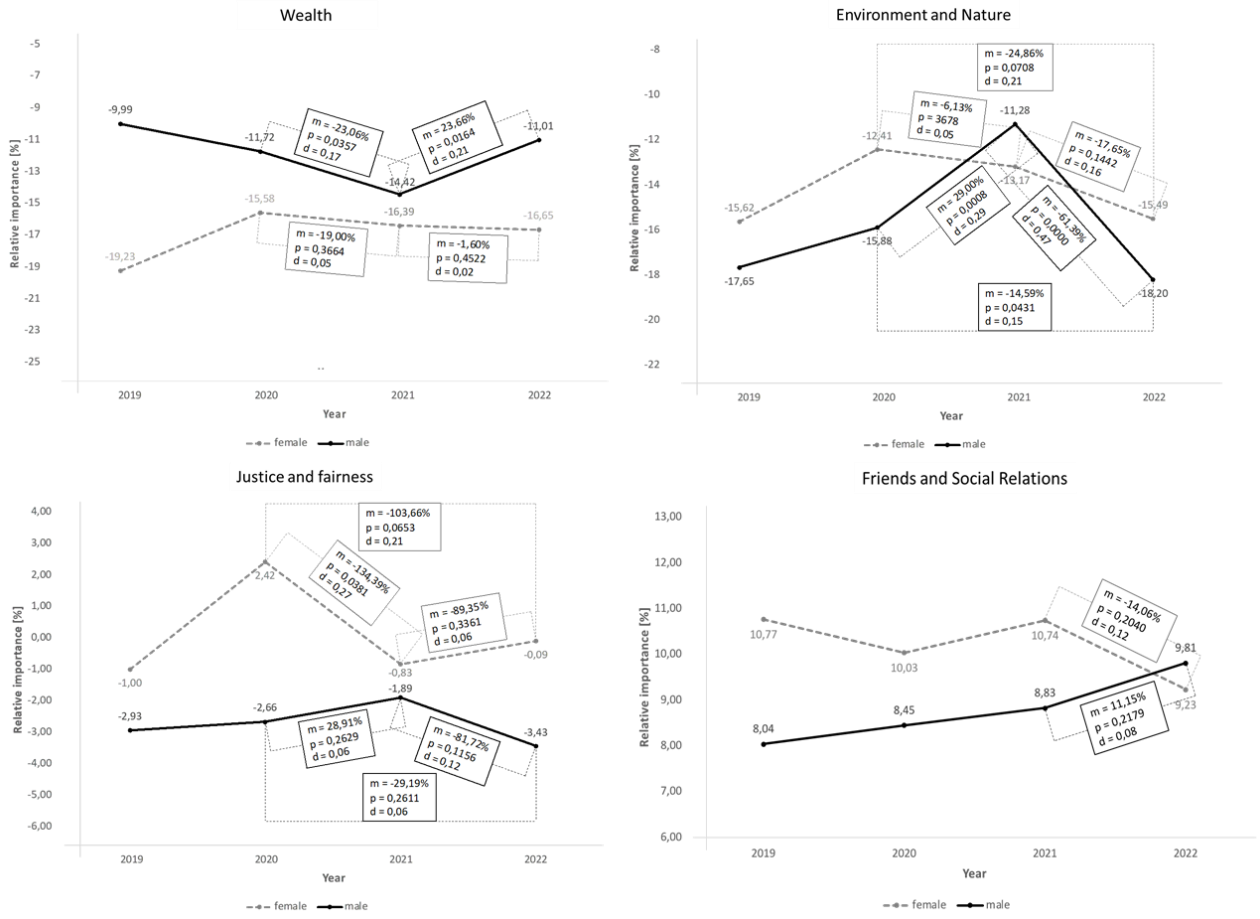


Figure 7: Course of the average value priorities of the value *Freedom and Independence* with significance levels and effect sizes

In 2019, this value had an average importance of 4.77 in the students' value systems. This value priority decreased slightly to 4.33 in 2020 and increased to 6.38 and 6.97 in the following years, with significance levels p = 0.329, p = 0.020, and p = 0.289. The effect sizes are d = 0.03, d = 0.16, and d = 0.05, respectively. Thus, the change from 2020 to 2021 is significant at p < 0.05 with small to moderate effect sizes so that hypothesis 4a can be confirmed. When the second measurement time point is compared to the fourth, the average value priority increased significantly by 2.64 (p = 0.004) and an effect size of d = 0.21, which is medium size according to Gignac and Szodorai (2016). Overall, it can be said that the value priority has increased significantly. The lack of a bounce-back effect may mean that this value priority will be higher in the long term. However, it is equally possible that the bounce-back effect will only occur with a delay.

5.4. Further results

In addition to verifying the hypotheses, we analyzed whether gender effects are evident. Figure 8 shows the courses of value priorities for significant differences between genders. We did not find significant differences in the value trajectories for the other values due to the Corona pandemic (Appendix 1: Value priorities over time and by gender).



	2019	2020	2021	2022
Females	87	100	83	107
Males	247	283	202	206

Figure 8: Gender differences in value priorities

Overall, there are hardly any differences in the trends of value priorities between the genders. Exceptions are the trends for the values Wealth, Environment and Nature and Justice and Fairness. Look at Wealth's value trend (Figure 8, top left). We see that the value priority drops significantly between 2020 and 2021 only for the male subjects and then rises again (significantly). For the female subjects, the value of 2022 is even lower than that of 2020, although not significantly. The difference between the sexes is visible in the Environment and Nature value curve (Figure 8, top right). While the results for the male subjects are consistent with the overall trend, the trend for the female subjects shows a steady downward movement from 2020 to 2022. We measured no increase in value priority for the female students surveyed during the Corona pandemic. The value progression of Justice and Fairness is different for the two genders (Figure 8, bottom left). We can see that the female subjects reacted much more strongly to the Corona pandemic, and the value priority dropped significantly (p = 3.81%) for them and did not increase significantly afterward. Overall, the

value priority is lower than the 2020 level. In contrast, we see no significant changes in the value priority in the male subjects. However, the difference may also be due to chance because the relatively small sample of women relaxed. For the value Friends and Social Relations the graphs are congruent. Only in 2022, the priority drops for the male subjects and increases for the female subjects. However, both changes are not significant.

The slight differences in value priority changes between genders are consistent with other researchers' findings (Schwartz, 2012). Differences can be seen between the sexes, but these differences are smaller than differences attributed to age or particular life experiences (Sagiv & Schwartz, 2021).

5.5. Discussion

In this paper we examined the impact of the Corona pandemic on the value priorities of German students. For data collection, we used the decision support tool Entscheidungsnavi and analyzed value priorities at two points before the COVID-19 outbreak and at two points afterward. We found that most value-priority changes are not sustained but are subject to a bounce-back effect. We found this to be the case for four values (Friends and Social Relations, Environment and Nature, Intellectual Fulfillment, and Power and Leadership). They showed a significant change at the first time point after the outbreak of the Corona virus and a return to the original level at the second time point after the outbreak. Only in the case of Freedom and Independence, there is a difference between 2019 and 2022 that is still significant ($p<0,05$). Nevertheless, a reversal of the effect of the Corona pandemic can also be seen for this value (Figure 6), and it is possible that this effect is not yet complete. Bounce-back effects have also occurred following other extreme events (e.g., Verkasalo et al., 2006; Bojanowska et al., 2021, and Daniel et al., 2022) and are attributed to the adaptive capacity of humans. At the first moment, people are overwhelmed by the extreme event. Still, they can quickly adapt to the new situation, and their initial value changes return to the pre-crisis level sooner or later. We found a significant increase in the value Freedom and Independence without a previous return to the pre-crisis level. Here, a further increase was evident at the last measurement point, so a bounce-back effect may not occur until later or may not occur at all.

In analyzing the trends caused by the Corona pandemic, we are supported by the measurement data from 2019. The fact that not just one but two measurement points were already available before the pandemic means that general trends can also be detected and the influence of the Corona pandemic can be better put into context. For the Family and

Partner and Intellectual Fulfillment values, we could discover a trend before the Corona pandemic that changed to the opposite in the third measurement point ($p < 0,01$). This trend change is another indication of the (strong) effect of the Corona pandemic on the value priorities. For the value weights of Environment and Nature, we already discovered an upward trend between 2019 and 2020. One reason may be the Fridays for future movement, which was initiated by Greta Thunberg in August 2018 and supported by young people in Germany since January 2019 (Fridays for Future Deutschland). The prevailing trend was enhanced after the COVID-19 outbreak and continued to increase for the moment. Especially the first lockdown caused people in Germany to spend much more time in nature. However, at the fourth measurement time point, the value priority dropped to the 2019 level. This can be the result of an over-fulfilment of needs as well as an effect of reduced climate reporting. Due to the Corona pandemic, topics such as climate change and protecting nature and the environment took a back seat, and issues such as vaccinations and personal protection were addressed more intensively (Krug et al., 2021; Welthungerhilfe).

By surveying value priorities in the context of real decisions, we have a unique database. Thanks to the focused decision context and the guidance of the Entscheidungsnavi, the subjects can relate their decision situation to the values that are relevant to them. The values we gathered can also be classified according to Schwartz`s value system (Table 6).

Table 6: Values used in this study and their corresponding value in Schwartz's value system

Values used in this study	Corresponding value at Schwartz	Schwartz's Value Definition
Family and Partner	Benevolence	"Preserving and enhancing the welfare of those with whom one is in frequent personal contact (the 'in-group'). […] Most critical are relations within the family and other primary groups." (Schwartz 2012, p. 7)
Friends and Social Relations	Benevolence	
Justice and Fairness	Universalism	"Understanding, appreciation, tolerance, and protection for the welfare of all people and for nature. […] People may […] realize that failure to accept others who are different and treat them justly will lead to life-threatening strife." (Schwartz 2012, p. 7)
Environment and Nature	Universalism	

Intellectual Fulfilment	Self-direction	"Independent thought and action--choosing, creating, exploring. Self-direction derives from organismic needs for control and mastery […] and interactional requirements of autonomy and independence" (Schwartz 2012, p. 5)
Freedom and Independence	Self-direction	
Excitement and New Experiences	Stimulation	"Stimulation values derive from the organismic need for variety and stimulation" (Schwartz 2012, p. 5)
Competence	Achievement	"Defining goal: personal success through demonstrating competence according to social standards." (Schwartz 2012, p. 5)
Power and Leadership	Power	"Defining goal: social status and prestige, control or dominance over people and resources." (Schwartz 2012, p. 5)
Wealth	Power	
Financial Security	Security	"Defining goal: safety, harmony, and stability of society, of relationships, and of self." (Schwartz 2012, p. 6)
Honesty and Ethics	Conformity	"Conformity values derive from the requirement that individuals inhibit inclinations that might disrupt and undermine smooth interaction and group functioning" (Schwartz 2012, p. 6)

By assigning the values this way, we could compare and classify the results with research based on Schwartz's value system. This assignment already helped us formulate the hypotheses and allowed us to interpret our results in relation to the results of other surveys. Thus, Daniel et al. (Daniel et al., 2022) first report a decrease in Openness to Change values, especially stimulation, and a subsequent bounce-back Effect, mainly based on a higher value prioritization of self-Direction. Since our first measurement point after the pandemic's start is posterior to their survey, a similar development can be observed here. Self-Direction values are also prioritized higher in our results and at Bojanowska et al. (Bojanowska et al., 2021). The lower prioritization of benevolence in the pandemic (Daniel et al., 2022) is also reflected in our results. In contrast, we find an initially higher prioritization for Environment and Nature, which is also indicated by Bojanowska et al. (2021). Regarding the higher-level dimensions, we can note the following: Our results suggest that within the dimension Self-Transcendence, there are opposing tendencies in the way that Benevolence values were temporarily

prioritized lower due to increased need satisfaction and Nature was prioritized higher. In the dimension Openness to Change, we observe a temporarily higher prioritization due to the pandemic, and in the dimension Self-Enhancement, a temporarily lower prioritization.

Chapter 2.4 refers to a direct connection between the change of value priorities and the decision behavior of people. Although this paper does not aim to show this connection, we could discover a tendency between the change of value priority and objective weights by analyzing the objectives used in the Entscheidungsnavi. We examined the subjects' objectives systems for objectives with the same name as the values. Within the Entscheidungsnavi, students are asked to indicate the weights of their objectives based on the trade-off procedure (Keeney et al., 1993; Nitzsch & Methling, 2021). Based on these trade-offs, we collected the objective's weights and compared them to the value priorities. We only identified a sufficient set of equivalent objectives across 2020 to 2022 for the Friends and Social Relations value (n = 167). The distribution of projects by year, including the means and standard deviations for the objective weight, is shown in Table 7.

Table 7: Average objective weights of the objective "friends and social relations" in the measurement years

Year	n	Average objective weight	Standard deviation
2020	19	16,21 %	0,071
2021	42	19,77 %	0,053
2022	106	18,89 %	0,061

The average objective weight of Friends and Social Relations increased from 16.21% in 2020 to 19.77% in 2021 and subsequently decreased to 18.89%. A one-sided t-test showed a significant increase to the year 2021 ($p = 0.035$) with effect size, according to Cohen, of $d = 0.60$. Consequently, the effect can be rated as large. Overall, therefore, there is an indication of a similar tendency in the objective weight, as is the case with the value weight. However, studies with a larger sample are necessary for more concrete statements.

6. Limitations and Outlook

This study has some limitations. One limitation is the sample selection. First, the sample is German undergraduate students, so the results are only valid for this group. Second, not the same individuals were interviewed during the pandemic. However, the composition of the

respondents was very similar in each of the four years. At the same time, the decision context was identical so that we can assume a largely homogeneous group. We considered this in the analysis in that we set the limits of the p-values lower (0.05; 0.01; 0.001) than usual (0.1; 0.05; 0.001). Moreover, one argument for not surveying the same students over four years is that students' value priorities continue to develop over their studies, so this could otherwise have led to biases (Feather, 1975; Krishnan, 2008; Krosnick & Alwin, 1989). Our measurement gives us the advantage that the results do not need to be adjusted for this effect. In future research, the limitations highlighted could be addressed. Thus, changes in value priorities in the overall population of Germany could be studied and related to real decision behavior. Such a study would have two advantages at once. First, the magnitude of the influence of value changes on decision behavior could be determined, and second, such a study could further validate the results analyzed here.

Another limitation is our list of twelve values. Since the Entscheidungsnavi is a practical tool designed to help people make real decisions more reflectively, the twelve values were developed concerning personal decision-making situations in brainstorming sessions. However, as shown, this also means that our results can only be compared to a limited extent with other studies that are based, for example, on Schwartz's values. The latter, however, independently poses a problem since no worldwide standard exists here. Likewise, the results of Bojanowska et al. (2021) and Daniel et al. (2022), which both refer to Schwartz's values, use different degrees of differentiation (10 values vs. 19) and different outcome methods (portrait of values questionnaire vs. best worst survey).

7. Conclusion

The Corona pandemic has had a powerful impact on people's lives. The world's governments used and still use, in some cases, strong restrictions on contact and freedom to get the pandemic under control. This exceptional situation is an opportunity for behavioral research. Thus, the influence of extreme situations on the psychology and behavior of people can be studied. We used data collected over four years examining students' values at a German university. Since human behavior depends on personal values, this thesis investigated the pandemic's influence on German students' value system.

Our results suggest that the Corona pandemic has a moderate to strong effect on students' value priorities. We found significant changes associated with the pandemic for five values.

Among these, most of the changes in values showed a bounce-back effect. This means that the values return to the original level after a change. The values of *Family and Partner*, and *Power and Leadership* fell with the onset of the pandemic but rose back to pre-pandemic levels as the pandemic progressed. The value priorities of *Intellectual Fulfillment* and *Environment and Nature* increased at the start of the pandemic and fell back to pre-pandemic levels throughout the pandemic. Only the *Freedom and Independence* value shows no bounce-back effect so far. Further research is needed here to determine whether this is a long-term change in value prioritization or whether the bounce-back effect is slower for this value. The research on the influence of gender on value changes comes to the same conclusion as other researchers have already done (Sagiv & Schwartz, 2021): There are gender differences, but they are only of a small magnitude. Preliminary evidence of the link between changes in value priorities and objective weights in real decisions has also been found. This link is presented in the literature, but it has rarely been empirically tested so far.

Appendix 1: Value priorities over time and by gender

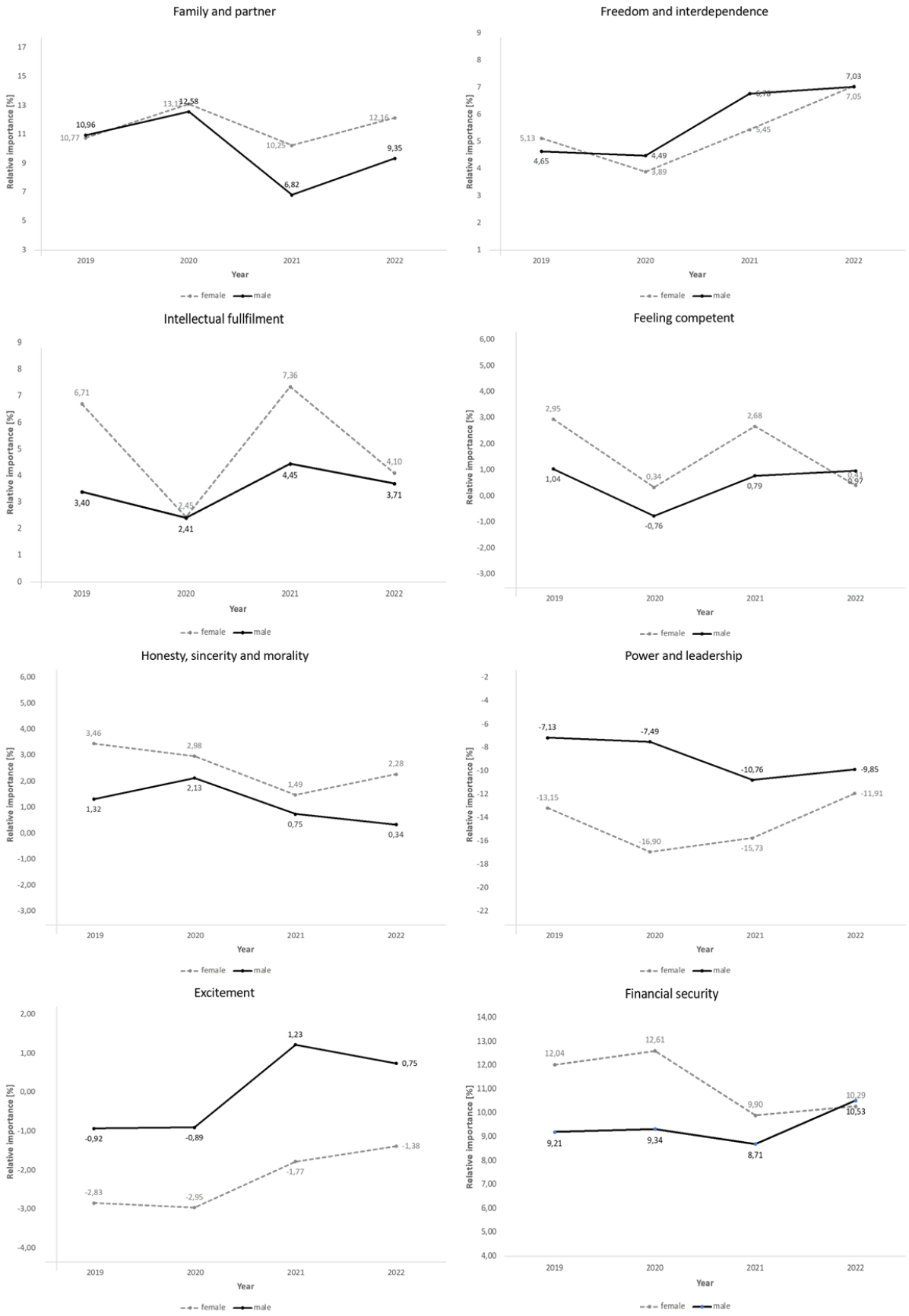


Figure 9: Value priorities over time and by gender without significant differences

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Paper 3: A systematic approach to problem formulation in a decision support system.

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A systematic approach to problem formulation in a decision support system.

Formulating a decision statement is the foundation for systematically solving a decision. In ill-defined decisions, formulating is particularly difficult. Therefore, a decision analyst helps with formulating the problem. Some decision-makers may not afford a decision analyst but need help formulating. We designed a decision support system (DSS) that systemises problem structuring methods (PSMs) to support problem formulation. These PSMs were combined with multi-attributive utility theory (MAUT) in the DSS Entscheidungsnavi. Helping to formulate a decision statement means helping to improve understanding of the decision. Therefore, we measure how the DSS helped to enhance the decision-makers' understanding. We employ the criteria of right scope, preciseness of the decision statement, and users' written feedback. We used the Entscheidungsnavi in an empirical study with 850 students. It helped in 87% of all cases. In 552 cases, the subjects improved their decision statement, and 190 participants did not change their decision statement but wrote that their understanding improved.

Keywords: problem formulation, decision support systems, DSS, problem structuring, problem structuring methods, PSM, Entscheidungsnavi

1. Introduction

The activity of structuring a decision situation is the most difficult and, at the same time, the most important to solve a problem (Winterfeldt and Fasolo 2009). Without problem structuring, you cannot solve complex problems correctly. Complex problems are problematic as there are many elements connected to the problem, a lot of uncertainty prevails, and several people are usually affected by the decision. Thereby, the interests of the persons affected by the decision are not transparent or even opposing. Other choices are also affected by the decision, and decision-makers face a so-called 'Ill-defined' (Simon 1973) or 'wicked' (Rittel and Webber 1973) situation. Therefore, usually, a decision analyst helps decision-makers with understanding and structuring the problem.

There are different approaches in the literature to tackle these ill-defined situations. The main goal of all approaches is to improve the decision-makers' understanding of the problem. One of the most common approaches is the soft system methodology (SSM) of Checkland (1989). In the SSM, a decision analyst helps the decision-makers analyzing the problematic situation with a holistic system-thinking approach. The problem is divided into the real world and a systematic model of the real world. This differentiation should foster thinking about the problem and the solutions (Mingers and Rosenhead 2001). Other approaches like SODA (Eden 1995), The Strategic Choice Approach (Friend 2011), and value-focused thinking (Keeney 1996) are all applied with the help of decision analysts. Even researchers like Baer et al. (2013) use group consultancy methodologies to improve problem formulation.

We wanted to bring this 'Art' of problem structuring (Franco and Montibeller 2011) into a decision support system to make problem structuring more accessible. Decision-makers may not afford a decision analyst for every complex decision they face but would like to be supported with their decisions. Therefore, we use approaches from the decision sciences to improve decision-makers' understanding of the problem. We systemize these known methods in a DSS called Entscheidungsnavi and test our DSS in an empirical study.

The first paragraph introduces the problem formulation process, the remedies to a good process, and the consequences of a suboptimal one. The approaches from decision sciences we use in the Entscheidungsnavi will be introduced in the third paragraph, where we also illustrate the systematization of these methods in the DSS. Afterwards, we introduce criteria to measure the success of the new approach in the fourth paragraph. In the fifth paragraph,

we present the study we conducted with the Entscheidungsnavi and 850 real-world cases. The last chapter draws our conclusions and looks into future research possibilities about problem structuring without a decision analyst.

2. Problem Formulation

All literature dealing with problem formulation focuses on problem formulation and problem structuring for decisions made in groups (Franco and Montibeller 2011). Literature focuses on decisions made in groups due to two reasons. First, the most relevant and complex decisions are strategic decisions, usually faced by a group of people (Baer et al. 2013). Second, PSMs use the perspective of many stakeholders involved in the decision-making process and consider the stakeholders as active participants in the decision-making process. Therefore, we base our considerations of problem formulation on the research about group problem formulation and expand it with literature about individual decision-making when we think it is reasonable. There is no rich body of literature dealing with problem formulation for individual problem formulation.

In the first section of this paragraph, we will describe the basics of the problem formulation process. The typical pitfalls that occur in the process of formulating a problem and their consequences are presented in the second section.

2.1. Problem Formulation Process

When we speak about problem formulation, the process of problem formulation is meant. This process starts with recognizing a problematic situation (Mintzberg et al. 1976) and then a subconscious analysis of this situation (Cowan 1986). While the situation is automatically analyzed, the decision-makers build a mental model of the problem (Gentner and Stevens 2014). The process ends with a formulated decision statement. The problem formulation process can then be restarted consciously if the decision-makers want to adjust their formulation (Baer et al. 2013).

In the first place, the decision-makers must recognize a situation to decide about (Cowan 1986, Mintzberg et al. 1976). When the decision situation is identified, people automatically create a mental model about this situation. This mental model contains all information the decision-makers have about the decision (Massey and Wallace 1996). Therefore, the mental model equals the decision-makers' understanding of the situation (Gentner and Stevens

2014). Ideally, the decision-makers have all relevant information about the situation, and this information is unbiased.

When it comes to the formulation of a decision statement, the information of the mental models is needed to be represented verbally (Norese 1995). The decision-makers need to become more conscious about the details in their mental model to write down a clear and complete decision statement. Therefore, the decision statement represents the decision-makers' understanding of the decision situation. We want to stress that there are many possible decision statements for the same mental model (Baer et al. 2013). Due to the complexity of the mental model, it is not possible to catch every aspect of it in a decision statement (Johnson-Laird 1983). Furthermore, researchers agree that there is no perfect decision statement (Baer et al. 2013; Chae et al. 2005).

2.2. Impediments and their consequences

In the process of building an understanding of the decision situation, there are some impediments to a suitable understanding. Baer et al. (2013) identify three main impediments of the problem formulation process: Narrow sampling of information, representational gaps, and jumping to solutions.

A narrow sampling of information and representational gaps can both be explained by the way information is processed. In general, information processing mainly uses information that is available with little resource input. This phenomenon is called narrow thinking (Soll et al. 2015). Several phenomena that endanger the rationality of a decision have already been demonstrated through narrow thinking (Winterbottom et al. 2008; Murdock, JR. 1962). Narrow thinking also occurs when it comes to the formulation of decisions. Information is sampled narrowly and will lead to the myopic problem representation bias (Montibeller and Winterfeldt 2015).

Representational gaps occur for the same reason. Decision-makers only focus on what they already know and miss different representations of the problem; this phenomenon is also known as ‘tunnel vision’ (Mason and Mitroff 1981) or ‘focussing’ (Legrenzi et al. 1993).

The third impediment is applicable for individual and group decision-making. Due to a heterogeneous set of objectives within the group, a member may show self-interest behaviour and force the group to jump to solutions that fit one’s individual objectives. Individuals may jump to solutions to avoid investing time and effort into the formulation process (Mitroff and

Featheringham 1974) and therefore formulate premature decision statements and solutions (Baer et al. 2013). All in all, the impediment leads to a narrower problem formulation comprehensives with fewer formulation alternatives and reduced relevance of the given alternatives (Baer et al. 2013).

All these impediments have consequences for the *scope* of the mental model and the decision statement (Figure 1). First, the *scope* of the decision situation can be too narrow, as the myopic problem representation biases show it (Montibeller and Winterfeldt 2015). Second, the *scope* focuses on the wrong decision, reported by Mitroff and Featheringham (1974). Third, the *scope* can be too broad and includes so much information and problems that the decision-makers fail to solve the problem (Volkema 1988).

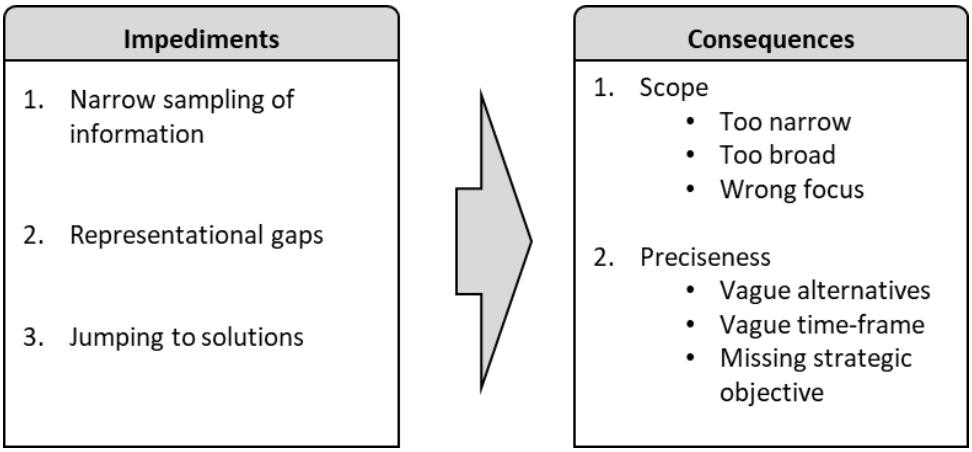

Figure 1: Impediments of problem formulation and the consequences

Furthermore, the impediments have consequences for the *preciseness* of the decision statement. Keeney (2020) argues that the decision-makers can precisely name their decision situation with a proper understanding of the decision situation. He calls three indicators for precise decision statements. First, a clear time frame of the decision situation. When the decision-makers know about the time frame of decision-making and implementation time of the options, they have excellent knowledge about details in their decision situation.

Second, a strategic objective in the decision statement. In line with Keeneys' (1996) value-focused thinking approach, he (2020) argues that a decision statement should have a strategic objective to lead the decision-makers through the decision-making process. The decision-makers must invest considerable thought into the decision situation to know their strategic object. Therefore, understanding the decision situation improves if the decision-makers write down a strategic objective in their decision statement.

Third, a clear spectrum of alternatives. The spectrum is unclear when there are decision statements like “Should I do A?”. There is no explicit consideration of the decision-makers' actions if they refuse A. The decision statement also lacks *preciseness* if the decision statement does not cover a decision, but feelings or facts like “My job is not very interesting” (Keeney 2020, p. 40). Only decision-makers with a good understanding of the decision situation can state a clear spectrum of alternatives.

3. Systematization in the Entscheidungsnavi

This paragraph presents how we implemented the different approaches from decision science into the Entscheidungsnavi to improve the problem formulation process without a decision analyst. The basis for the implementation is the decision-making paradigm for DSS of Courtney (2001).

3.1. Systematic approaches used

The main impediments of problem formulation are caused by narrow sampling and processing of information. We used approaches that will systematically help the user of the Entscheidungsnavi sampling and processing relevant information.

Following the idea of Baer et al. (2013), we want the decision-makers to state all the symptoms of the problematic situation. Therefore, we ask them to state all connected decisions to the decision they are facing. Stating connected decisions to improve the understanding of the situation is an essential step in the Soft Systems Methodology, the SODA-approach (Mingers and Rosenhead 2001), and the PrOACT-approach of Hammond et al. (2015). Furthermore, thinking about connected decisions brings structure to the situation, as it facilitates thinking about what decision should be made now (Spetzler et al. 2016).

Next to stating connected decisions, we want the users of the Entscheidungsnavi to follow the idea of value-focused thinking (Keeney 1996) as it shows remarkable improvement for decision-making (e.g., Siebert and Keeney 2015). We are convinced that using values will help the users of the Entscheidungsnavi to think broadly about their decision situation and help them focus on the relevant information to reach their values.

With that value-focused mindset, the users of the Entscheidungsnavi should then challenge their assumptions about the decision situation. Different authors (Legrenzi et al. 1993; Montibeller and Winterfeldt 2015; Mitroff and Featheringham 1974) explicitly recommend

challenging assumptions to avoid the named biases in 2.2. Challenging assumptions will help broaden the scope of the decision situation and support the decision-makers in finding short-cuts that they may have taken in the first place.

Finally, we want the users of the Entscheidungsnavi to reframe their decision situation as recommended by various authors (Kahneman 2012; Larrick 2009; Lyles 1981a; Maule and Villejoubert 2007; Nutt 1992). They recommend reframing for two reasons. First, the process of problem-solving is an ongoing process in which the decision-makers constantly gather new information. Reframing can be helpful because of the new and improved information situation (Smith 1989). Second, reframing can produce a broader view of the decision situation so that the named errors in 2.2 are at least reduced (Maule and Villejoubert 2007).

3.2. The Entscheidungsnavi

The Entscheidungsnavi is a freely available decision support tool based on MAUT and value-focused thinking (von Nitzsch et al. 2020). The Entscheidungsnavi contains five steps to support the users in formulating a decision statement. We systematized the systematic approaches from 3.1 in these steps to improve the problem formulation. The first step is about an initial formulation of the decision statement, followed by a proper consideration of fundamental values in the second step. Afterwards, the users are asked several questions about the appropriate scope of their decision. In the last step, support is given by asking for a reformulation of the initial decision statement with all results of intensive thought about the decision situation.

3.2.1. Initial formulation

In the first step, decision-makers are asked to formulate the decision statement. Thereby they get hints on how they can find a suitable formulation (Figure 2). The Entscheidungsnavi gives explicit tips for a suitable formulation. We took the formulation tips from the work of Keeney (1996, 2020). The Entscheidungsnavi advises the decision-makers to start their statement with an open question like “how”, “which”, or “what”.

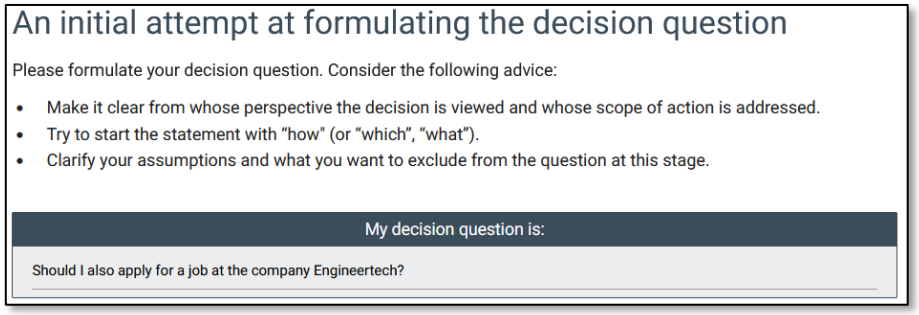

Figure 2: The first formulation of the decision statement

Underneath the first formulation, the decision-makers can indicate basic assumptions about the decision (Figure 3). These assumptions will be challenged in the third step. Next to the premises, the decision-makers should list connected decisions. These decisions are decisions that they already made or they want to decide later.

Figure 3: Space for assumptions and connected decisions

3.2.2. Fundamental values

In the second step, the decision-makers should think about their fundamental values. Thinking about fundamental values follows the problem structuring idea of value-focused thinking (Keeney 1996). When decision-makers consider their fundamental values, it will be easier to evaluate what is essential within the messy decision situation and what is not.

The Entscheidungsnavi presents 26 values to the decision-makers (Figure 4). We derived the values from the work of Schwartz (1992), Maslow (1943), and Reiss (2004).

The decision-makers should now indicate what impact the values have on their life and decision. Thereby, they are free to adapt the list by adding, deleting, or renaming the values. After stating the impact of the fundamental values, the decision-makers can sort their values from most important to least important. By using the sorting function, the Entscheidungsnavi calculates the relative impact of each fundamental value. When the decision-makers see the relative impact of the fundamental values, they should become aware of the trade-offs they have to face within the decision situation. If the decision-makers are satisfied with their list, the next step starts.

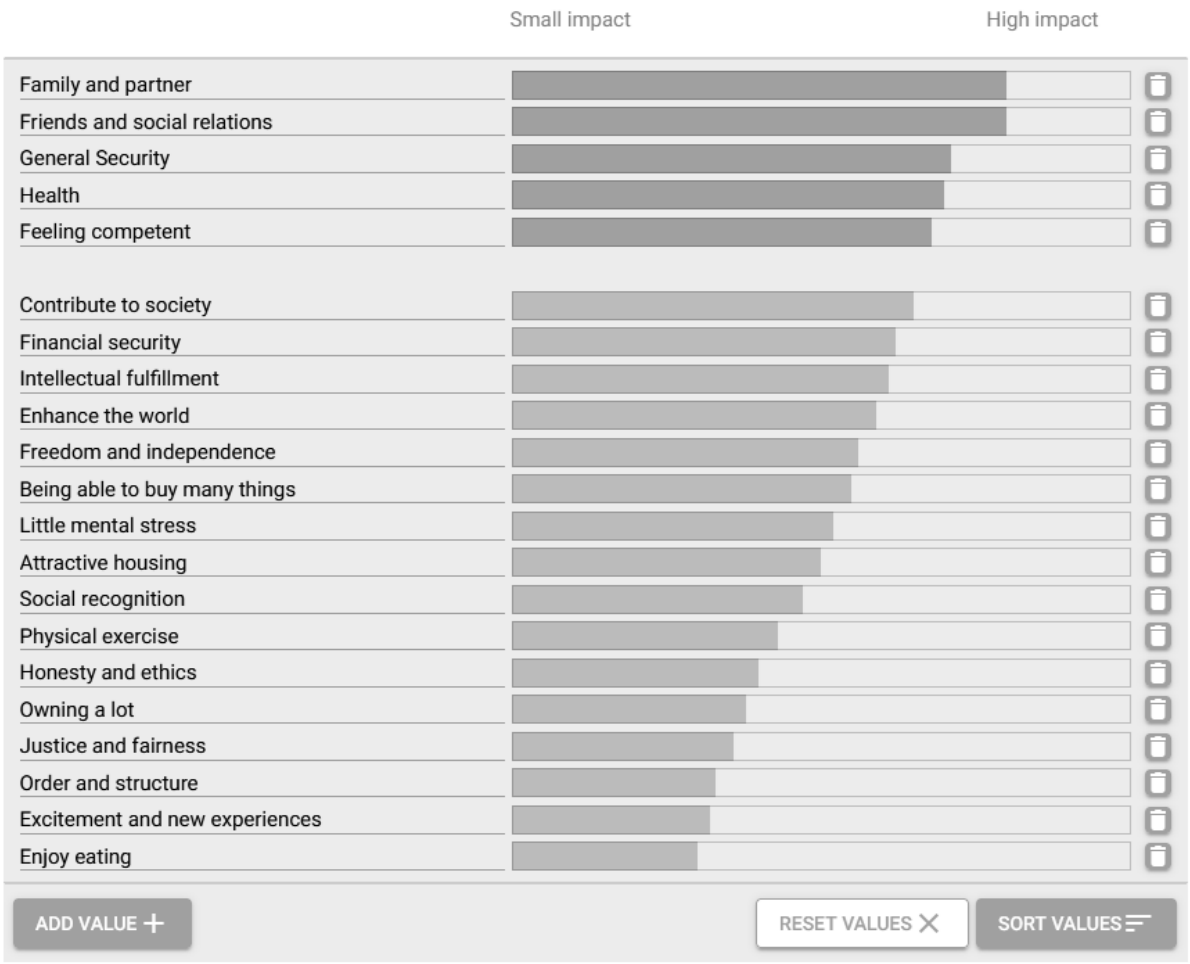

Figure 4: List of fundamental values within the Enstcheidungsnavi

3.2.3. Challenging the assumptions

In the third step, impulses for the formulation of the decision statement are given (Table 1). This step aims to initiate more profound thought about the elements that are stated as given and foster broader thinking. Unique information should be made explicit and discussed here. The Entscheidungsnavi presents questions about the initial formulation and challenges the decision-makers' assumptions.

Table 1: Impulses for the formulation of decision statement

	Impulses for the formulation of the decision statement
A	If you only decide whether to do something or not: Did you think about what you will do after rejecting the decision? Are there any other alternatives coming up in your mind?
B	If you just react to an occurred decision problem, please think about what actually matters in that kind of situation independently of the offered alternatives!
C	What could be other ways to solve your problem more rudimentarily?
D	Perhaps your decision problem is based on assumptions that are too restrictive. Is it possible to question the validity of some or all of the basic assumptions and to formulate the decision problem more comprehensively? What could such a formulation look like?

In total, the decision-makers can answer four questions (A to D). For every question, they can take notes for answers.

3.2.4. Reformulation

In the last step, the decision-makers are asked to reformulate the initial decision statement. The Entscheidungsnavi helps the decision-makers come to an appropriate decision statement by assisting them in reflecting on the new information they gathered in the steps done before. The reflecting should help to improve the understanding of the decision situation.

The Entscheidungsnavi displays the information of the earlier steps. The tool shows the earlier mentioned assumptions and connected decisions. Furthermore, it shows the five most essential values without their relative importance. Similarly, only the notes of the questions of the third step are given, but not the questions themselves.

4. Methodology

We want to measure the success of the Entscheidungsnavi based on the participants' improved understanding of the decision situation. To measure the enhanced understanding, we use the improved decision statement and the written feedback of the participants. We measure the improved decision statement with the criterion of *right scope* and the criterion of *preciseness*.

4.1. Criteria for improved decision statements

First, we use the criterion of *right scope*. We use this criterion based on the considerations in 2.2. Decision-makers can only find the *right scope* of the decision if they truly understand the

situation. Therefore, we use the *right scope* of the problem formulation to measure the decision-makers' understanding of a decision situation.

A too narrow decision statement will lead to a small set of considered alternatives and objectives (Montibeller and Winterfeldt 2015), which eventually leads to suboptimal decision-making (Siebert and Keeney 2015). Therefore, we assume broadening the problem formulation will improve the scope of the decision situation (Chae et al. 2005).

Next to broadening, we also expect a conscious change of the decision to another decision improves the scope. In messy or ill-structured decisions, decision-makers may claim the problem's structure too early, so they are focusing on the wrong problem (Franco and Montibeller 2011). Having the wrong problem formulation may lead to a sound solution, but to the wrong problem (Mitroff and Featheringham 1974). Therefore, a conscious change of the scope of the problem improves the problem formulation (Courtney and Paradice 1993).

The scope also improves if the first scope is too broad and becomes narrower. A narrow sampling of information and representational gaps may lead to overlooking critical aspects of the problem (Franco and Montibeller 2011). Without knowing these critical elements, decision-makers may increase the scope of the problem, as they do not understand what is essential and what is not (Keeney 2020). A too broad decision statement will not solve the decision problem, as the solution to the problem will be too holistic (Spetzler et al. 2016). Therefore, a conscious change improves the problem formulation.

In 2.2, we showed that a too narrow problem formulation is one of the most significant issues of problem formulation. Therefore, we expect that most decision statements will become broader when the users change their decision statements.

Second, we use the criterion of *preciseness* of the decision statement as a proxy for the decision-maker’s understanding of the decision situation. Only decision-makers with a clear and structured knowledge of their decision situation can formulate a precise decision statement (Hammond et al. 2015). They are well aware of the essential elements of the decision and can state them precisely. We use Keeneys’ three indicators from 2.22.2 for this criterion: a specific time frame, a strategic objective, and a clear spectrum of alternatives.

Third, we use the written feedback of the users of the Entscheidungsnavi to measure an improved understanding. All participants had to give a written Feedback of at least 2000

characters about their learnings and general feedback on the usability of the Entscheidungsnavi. We wanted to uncover the participants with an improved understanding of the situation but an unchanged decision statement with this feedback. Therefore, we searched the feedback for phrases that indicate an enhanced understanding of the decision situation. We introduce the key phrases we were looking for in the next paragraph.

4.2. Categorization of decision statements

When measuring the differences in scope and *preciseness,* we can assign the overworked decision statements to different categories. Regarding the *right scope*, the categories are “narrower scope”, “different decision”, and “broader scope”, and, further, there was the possibility that the subjects of the study would not change their decision statement. We categorize this case as “the same scope”.

Two independent raters categorized the cases by using two criteria to determine the scope of the decision statement. First, they used the criterion of the size of the alternative space (Keeney 1996) Second, they used the criterion of the extent of the decision situation, which varies from a limited extent to a more general and conceptional extent (Ley-Borrás 2015). Determining the *preciseness* of the decision statement, they considered the existence of a precise time frame, a clear scope of alternative, and the presence of a strategic objective (Keeney, 2020). Regarding the *preciseness*, the categories are “more precise”, “less precise”, and “no change in preciseness”. The inter-rater reliability was high with a Cohen’s Kappa of .998 for the *right scope* and .981 for *preciseness* (Landis and Koch 1977).

Two independent raters analyzed the written feedback of the participants and used key phrases and the overall context to determine if participants' understanding improved. Keywords they used were, becoming aware of new aspects, gaining insights about alternatives, values, or dependencies, understanding the situation, aspects or importance, getting new perspectives, the whole picture or thought-provoking ideas, and basic orientation within the situation. The inter-rater reliability was perfect with a Cohen´s Kappa of 1 for this categorization.

5. Study

We introduce the subjects and their decision situations of our in the first paragraph. The result section shows how the Entscheidungsnavi helped the participants improve their

understanding of the decision situation. In the last paragraph, we will discuss interesting insights from the result analysis.

5.1. Participants and decision situations

The subjects of this study were the participants of the course “Decision Theory” at the RWTH Aachen University. They were given the opportunity to work up an ill-structured decision problem analytically which is relevant to them and their studies. In the analysis of their problem, the participants utilized the Entscheidungsnavi. For the extensive analysis of their situation, the subjects received a grade bonus of 10 %. We introduced the Entscheidungsnavi at the beginning of the course to familiarize the subjects with the decision support system.

A total of 1068 students submitted their analysis. Thereupon, four employees of the chair evaluated the projects regarding their quality. The data basis for our analyses were the 850 complete and high-quality projects.

Most of the participants in the study were students from business and economics courses (50.7 %). Further study courses were engineering (31.1 %), computer science and mathematics (18 %), and other study courses (0.2 %). Around 73 % of the respondents were male, and 27 % were female. Over 92 % of the subjects were in their bachelor’s studies.

5.2. Results

The Entscheidungsnavi helped 742 participants (87.29 %) to improve their understanding of the decision situation. In 552 cases (74.39 %), the participants improved their decision statement, and 190 participants (25.61 %) gave feedback about their improved decision statement (Figure 5).

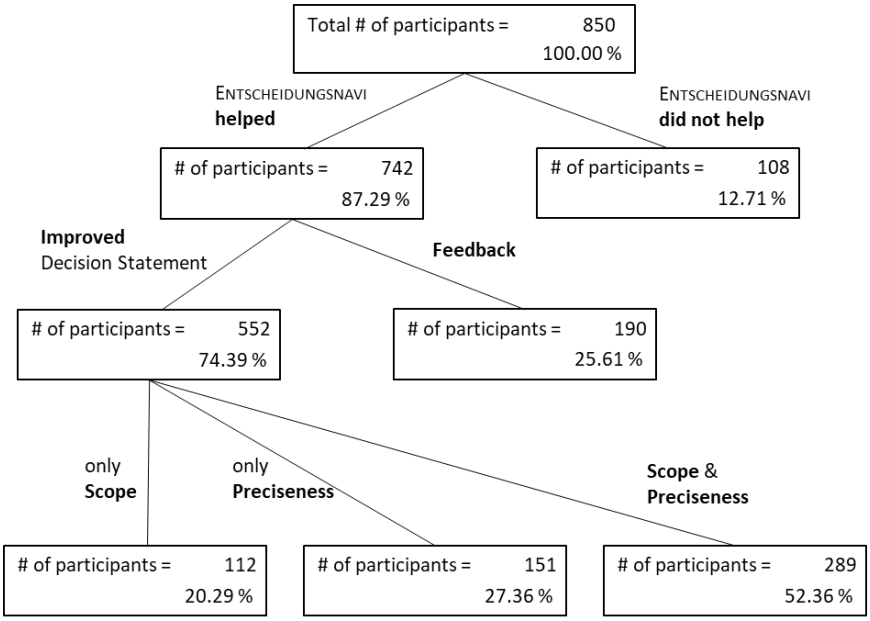

Figure 5: Results for the Entscheidungsnavi

Of the 552 subjects that improved their decision statement, 289 (52.36 %) improved regarding the *right scope* and their *preciseness*, 151 (27.36 %) only enhanced their *preciseness,* and 112 (20.29 %) improved their scope.

Of all 850 projects evaluated, 402 projects were adapted regarding the scope of the decision statement. The rater classified 448 projects as "the same scope", 329 as "broader scope", 17 as "narrower scope", and 56 as "different decision" (Figure 6).

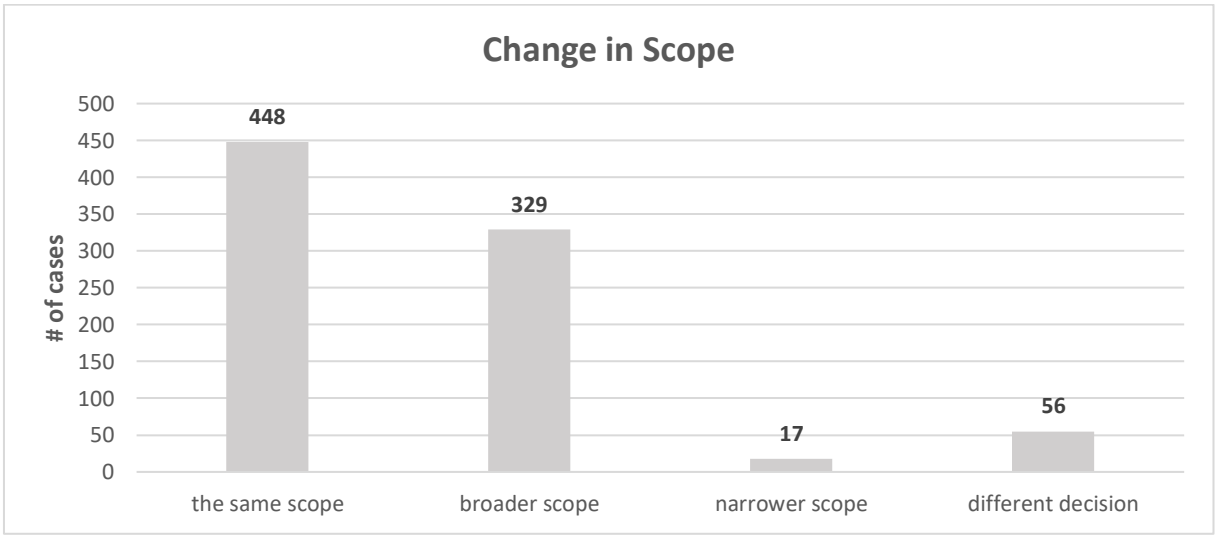

Figure 6: Change in scope

When the scope of the decision statement changed, 81.8 % of the decision statements became broader, in 4.2 % of the cases, the decision scope became narrower, and in 13.9 %, the decision changed utterly.

In 4.1, we hypothesized that most of the decision statements would become broader. Looking at the results, we can confirm this hypothesis. When there is a scope change, the decision statements become broader in most cases (81.8 %).

Regarding the *preciseness* of the decision statements, the rater classified 402 statements as "no change in preciseness", 442 as "more precise", and six as "less precise" (Figure 7).

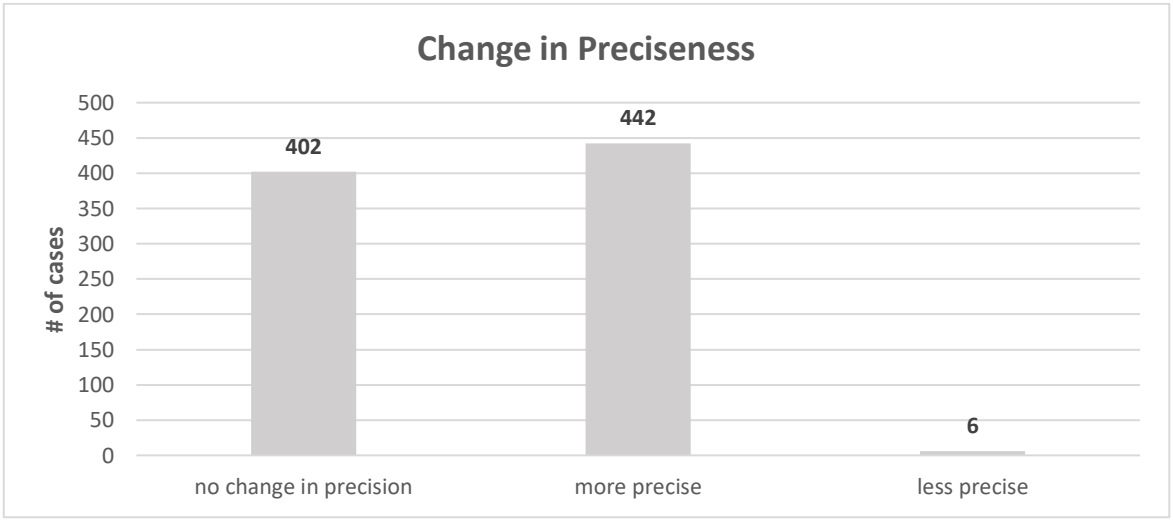

Figure 7: Change in precision

In 52 % of the cases, the precision changed to a more precise decision statement. Most decision statements increased their precision regarding the strategic objective (78 % of cases), followed by a higher precision within the spectrum of alternatives (43 %). The precision regarding a time frame improved in 18 % of the cases. As one decision statement can improve in all three categories of precision, the sum of the numbers is higher than 100 %. All in all, it can be said that using the approach within the Entscheidungsnavi improved the *preciseness* in 52 % of the cases and led in 0.7 % of the cases to a less precise decision statement.

5.3. Discussion

Next to the consequences of the broader scope, we want to gain more insight into the situations where the scope changed or became narrower. First, we had a special look into the decision statements that were altered to a different decision. The change in the decision was mainly a change to a follow-up decision. For example, the first decision statement was about

whether to go abroad while studying, and the reformulated decision statement was about where to study overseas. This indicates that the participants were not clear about the decision they already had taken. By thinking more deeply about the decision situation, the subjects realized that they already decided on the first decision and now wanted to deal with the follow-up decision.

Second, subjects with a more narrow decision statement indicated that they consciously wanted to narrow down their decision situation as they realized what they wanted. Furthermore, the participants with an unchanged decision statement wrote that by using the Entscheidungsnavi, they became more confident that this was the right decision to take. Some noted that they had learned something about making further decisions resulting in an increased decision competence.

6. Conclusion

We wanted to help decision-makers understanding their decision situation better without the help of a decision analyst. Therefore, we looked for typical pitfalls of the problem formulation process and systematic approaches to avoid these pitfalls. Then, we implemented these approaches in our DSS Entscheidungsnavi and evaluated the success of the Entscheidungsnavi in a study with 850 participants. We used the criteria of *preciseness, right scope* of the decision statement, and participants' feedback to measure their improved understanding of their decision situation.

The Entscheidungsnavi helped in 87.3 % of cases. In 74.4 % of these cases, the participants improved their decision statement, where the most common change was broadening the scope of the decision. Subjects who changed their decision situation changed it to a follow-up decision of their first decision situation. The other 25.6 % of the participants gave written feedback that indicates their improved understanding of the decision situation. Furthermore, some noted that using the Entscheidungsnavi could reduce uncertainty in their decision situation and improve their decision competence.

We designed the Entscheidungsnavi to help individual decision-makers improve their decision-making for two reasons. First, we wanted to make decision-making support more accessible to people who do not want to afford a decision analyst. Second, we assume that helping individuals is easier than assisting groups in making better decisions. With the Entscheidungsnavi, we could show one effective way to help individual decision-makers, but

there is still the task to support the problem formulation process of groups. There are important differences between the problem formulation process of groups and individuals. Therefore in future research, this task should be faced. The essential differences between both processes and typical pitfalls of the group problem formulation process can already be found by Baer et al. (2013). What is missing so far is an experimentally verified approach to improve the group problem formulation process without a decision analyst.

Structuring a decision means finding the suitable problem formulation and finding the right criteria and alternatives. In this research, we focus on problem formulation. Still, future research should investigate whether finding the right criteria and alternatives can be supported for individual decision-makers without the help of a decision analyst. Siebert and Keeney (2015) already showed a possibility to improve the search for alternatives. Other techniques should be reviewed and systematized into a DSS to make decision-making more accessible.

With our research, we created a fundament for further improvement of individual decision-making and hopefully for the support of group problem formulation without the help of a decision analyst so that the art of problem formulation can become a handy tool for all decision-makers.

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Paper 4: Reflektiert Entscheiden für Unternehmen

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Zusammenfassung

Strategische Entscheidungen in der Organisationsgestaltung und -entwicklung sind von einer hohen Komplexität geprägt. In den Entscheidungswissenschaften wurden einige Ansätze für den Umgang mit komplexen Entscheidungen entwickelt. Diese sind in der Regel nicht ganzheitlich konzipiert, sondern konzentrieren sich auf einzelne Phasen komplexer Entscheidungen. Der generische Ansatz *Reflektiert Entscheiden* bündelt die wichtigsten Erkenntnisse der entscheidungswissenschaftlichen Vorgehensweisen und ist in einem Online-Tool implementiert. Im Beitrag wird der Ansatz zunächst vorgestellt und anschließend in einer Fallstudie zur Gestaltung der Aufbauorganisation eines mittelständischen Unternehmens auf seine praktische Eignung überprüft. Das Praxisbeispiel zeigt, dass der strukturierte Prozess die Entscheidungsfindung in der Gruppe zielgerichtet unterstützt und vereinfacht hat. Ebenso überzeugte die Adaptierbarkeit des Ansatzes im Hinblick auf die spezifischen Bedarfe des Unternehmens.

Stichwörter: Reflektiert Entscheiden, Organisationsgestaltung, Entscheidungsunterstützung, Entscheidungsunterstützungssystem, Online-Tool, Entscheidungsnavi

1. Einleitung

Gestaltung und Entwicklung einer Organisation gehen mit einer Vielzahl an strategischen Entscheidungen einher. So sollten bei einer ganzheitlichen Betrachtung der Organisation unter anderem die Herausforderungen der digitalisierten und vernetzten Arbeitswelt berücksichtigt werden (Lemke, 2020). Zu diesen Herausforderungen gehören beispielsweise eine steigende Informationsverfügbarkeit und die Schnelllebigkeit von Innovationen (Yoo et al., 2012). Die durch die Herausforderungen entstehende Komplexität prägt strategische Entscheidungssituationen (Baer et al. 2013) und kann zu Unsicherheiten hinsichtlich des Entscheidungskontextes, der einzubeziehenden Instanzen und der notwendigen Maßnahmen führen (Beisswenger 2016). Die Rahmenbedingungen derartiger Entscheidungen sind für jedes Unternehmen individuell. Neben der Größe des Alternativenraums sind auch der Zeitpunkt und die Dauer der Umsetzung meist nicht eindeutig bestimmt oder zumindest unsicher (Baer et al. 2013). Das bedeutet, dass bei Entscheidungen über die Organisationsgestaltung eine unstrukturierte Entscheidungssituation vorliegt. Unstrukturierte Entscheidungssituationen stellen Entscheidungsverantwortliche vor besondere Herausforderungen. Sie zeichnen sich dadurch aus, dass sie eine große Anzahl an Variablen beinhalten, von denen einige nicht direkt beobachtbar sind und lediglich aufgrund ihrer Wirkungen abgeleitet werden können (Baer et al., 2013). Zudem liegt eine hohe Konnektivität zwischen den Variablen der Entscheidungssituation vor, sodass die Veränderung einer Variablen einen Einfluss auf die anderen bedeutet und eine hohe Unsicherheit bezüglich der Einschätzung der Handlungsalternativen herrscht (Baer et al. 2013).

Einen Weg für den Umgang mit der steigenden Unsicherheit in Entscheidungsprozessen bietet das Involvieren verschiedener Sichtweisen (Nickerson und Zenger 2004). Um strategische und unstrukturierte Entscheidungen zu bewältigen, bilden Unternehmen häufig Teams, die als Gruppe die Entscheidung zu treffen haben (Baer et al. 2013). Die Ergebnisse von Gruppenentscheidungen werden als qualitativ hochwertiger und harmonischer im Gegensatz zu Einzelentscheidungen eingeschätzt (Baer et al. 2013). Durch Heterogenität und verschiedene Blickwinkel auf die Entscheidungssituation soll ein möglichst vollständiges Bild des Problems und des Alternativenraums erarbeitet werden, um so zu einer Entscheidung mit hoher Entscheidungsqualität zu gelangen (Baer et al. 2013; Mingers und Rosenhead 2001). Bei Gruppenentscheidungen können jedoch zwischenmenschliche Dynamiken entstehen, die verzerrte Wahrnehmungen erzeugen und die finale Entscheidungsqualität negativ

beeinträchtigen (van Swol 2007). Diese können zum Beispiel dazu führen, dass Unternehmensziele, Abteilungsziele und persönliche Ziele der Teammitglieder im Entscheidungsprozess nicht eindeutig voneinander getrennt werden und in der Folge eine für das gesamte Unternehmen suboptimale Entscheidung getroffen wird (Keeney 2020). Zur Vermeidung derartiger Probleme und Verzerrungen bei strategischen Entscheidungen wird die Verwendung geeigneter Prozesse und Instrumente, beispielsweise von Entscheidungsunterstützungssystemen, empfohlen (u.a. Klatt und Möller, 2011; Beisswenger, 2016).

Für das Treffen strategischer Entscheidungen in Gruppen ist eine Vielzahl an Ansätzen und Instrumenten vorhanden, die zur Entscheidungsunterstützung genutzt werden können (s. Übersicht u.a. bei Klatt und Möller 2011). Diese konzentrieren sich entweder auf einzelne Phasen eines Entscheidungsprozesses (Hodgkinson und Maule 2002) oder legen den Fokus auf einen spezifischen Aspekt der Entscheidungsunterstützung, beispielsweise Debiasing, ohne den vollständigen Entscheidungsprozess zu berücksichtigen. So können Analysen der Entscheidungssituationen beispielsweise über eine *SWOT-Analyse* oder eine *Balanced Scorecard* erfolgen. Instrumente zur Prognose sind unter anderem die *Delphi-Methode* oder eine *Input-Output-Analyse*, während eine Alternativengenerierung über *Brainstorming* oder *Flow Charts* umsetzbar ist. Eine Bewertung der betrachteten Situation kann beispielsweise über *Risikoanalysen* oder *Kosten-Nutzen-Analysen* vorgenommen werden.

Zur Modellierung und Strukturierung eines Entscheidungsproblems und des zugehörigen Alternativenraums werden allgemeinere Methoden wie beispielsweise sogenannte *Problemstrukturierungsmethoden (PSM)* genutzt (Rosenhead 2013). Zu den bekanntesten *PSM* gehört die *Soft System Methodolgy (SSM)*, die im Organisationskontext oft zur Restrukturierung oder Leistungsevaluation eingesetzt wird (Mingers und Rosenhead 2001). Das Ziel der Methode besteht darin, dass eine Gruppe von Entscheidungsträgern möglichst viele Ansichten des Problems erarbeitet und sich dann auf eine gemeinsame Sichtweise einigt (Mingers und Rosenhead 2001). Dabei bedient sich die *SSM* verschiedener Werkzeuge wie zum Beispiel der *CATWOE-Methode*. *CATWOE* ist ein englisches Akronym für die sechs Elemente der Methode und steht für *Kunden*, *Akteure*, *Transformationsprozess*, *Weltanschauung*, *Verantwortliche* und *Begrenzungen durch die Umwelt*. Bei der Problembetrachtung wird jedes einzelne Element detailliert besprochen, um selbstauferlegte Grenzen oder Sichtweisen aufzubrechen und ein tieferes Verständnis für das Problem und

dessen wichtigste Eigenschaften zu erhalten (Basden und Wood-Harper 2006). Ein weiterer Ansatz, der häufig bei strategischen Entscheidungen genutzt wird, ist jener des *Value-focused Thinking* (Keeney 2020). In diesem Ansatz wird einer Reflexion der Ziele, Werte und Bedürfnisse der Beteiligten ein hoher Stellenwert beigemessen und der gesamte Entscheidungsprozess darauf abgestimmt. In einer Vielzahl von Studien konnte nachgewiesen werden, dass dadurch die Entscheidungsqualität verbessert werden kann (Parnell et al., 2013).

Die vorhandenen Methoden zur Entscheidungsunterstützung legen den Fokus meist auf einzelne Phasen des Entscheidungsprozesses, sodass zur vollständigen Problembetrachtung eine Kombination verschiedener Methoden notwendig sein kann (Marttunen et al. 2017). Es fehlt bislang ein ganzheitlicher und praktikabler Ansatz, der alle Phasen eines Entscheidungsprozesses begleitet. Deswegen wird in Kapitel 3 der Ansatz Reflektiert Entscheiden vorgestellt, der die wichtigsten Erkenntnisse der Entscheidungsforschung in einem fünfschrittigen, generischen Prozess zusammenfasst und die Entscheidungsfindung in Form eines frei verfügbaren Entscheidungsunterstützungssystems unterstützt.

Dieser Ansatz wurde erstmalig bei einer Gruppenentscheidung auf dem Gebiet der Organisationsgestaltung und -entwicklung in einem realen betrieblichen Entscheidungsprozess bei der *Lebenshilfe Aachen Werkstätten & Service GmbH* angewendet. Im Zuge der Darstellung in Kapitel 4 wird auch auf notwendige Anpassungen und Erweiterungen eingegangen. Der Gesamtnutzen für das Unternehmen wird dabei anhand von drei Faktoren beurteilt: *Entscheidungsqualität*, *Effizienz des Prozesses* sowie *Akzeptanz im Unternehmen*. Diese Faktoren werden in Kapitel 2 hergeleitet.

2. Qualitätskriterien in unternehmerischen Entscheidungsprozessen

In der Entscheidungstheorie gibt es verschiedene Ansätze, die Qualität einer Entscheidung zu bewerten. Gemeinsam haben die Ansätze, dass nicht das Ergebnis einer Entscheidung bewertet wird, sondern der Prozess der Entscheidungsfindung. Bezogen auf den Unternehmenskontext ist der *Decision Quality (DQ)*-Ansatz von Spetzler et al. (2016) einer der bekanntesten. Nach diesem Ansatz hängt die Qualität einer Entscheidung von sechs Bedingungen ab:

(1) Zunächst muss der Entscheidungsrahmen sauber eingegrenzt und definiert werden, damit alle Beteiligten über dasselbe Problem reden.

(2) Es müssen klare Werte und Ziele definiert werden, anhand derer der Erfolg der Entscheidung festgemacht werden kann.

(3) Die betrachteten Handlungsoptionen müssen ausreichend kreativ sein, damit keine attraktiven Lösungsmöglichkeiten übersehen werden.

(4) Es müssen zweckmäßige Informationen und Datenquellen herangezogen werden.

(5) Es muss mit logischen und nachvollziehbaren Überlegungen vermittelt werden können, warum die gewählte Entscheidung die beste ist.

(6) Es muss eine Bereitschaft vorliegen, die getroffene Entscheidung auch tatsächlich umzusetzen.

Ist nur eine der Bedingungen nicht erfüllt, kann nicht von einer hohen Qualität gesprochen werden. Gleichfalls verlangt der *DQ*-Ansatz einen effizienten Ressourceneinsatz. Jede durch entsprechenden Zusatzaufwand im Prozess erreichbare Verbesserung in der Erfüllung einer Bedingung sollte nur dann angestrebt werden, wenn der erreichbare Nutzen dies rechtfertigt.

Im Rahmen dieser Veröffentlichung wird der Gesamtnutzen des geführten Entscheidungsprozesses anhand dreier Kriterien bewertet: Die ersten fünf *DQ*-Bedingungen werden unter dem Begriff *Entscheidungsqualität* zusammengefasst, die *Effizienz des Prozesses* wird als zweites Kriterium bewertet und die sechste *DQ*-Bedingung wird durch das dritte Kriterium *Akzeptanz im Unternehmen* berücksichtigt.

3. Der Ansatz Reflektiert Entscheiden

Der *Reflektiert Entscheiden*-Ansatz wurde am *Lehr- und Forschungsgebiet für Entscheidungsforschung und Finanzdienstleistungen* der *RWTH Aachen University* entwickelt und verbindet den theoretischen Ansatz des *Value-focused Thinking* mit *PSM*, verschiedenen *Brainstorming*- und *Debiasing*-Methoden. Innerhalb eines fünfschrittigen Prozesses entlang der DQ-Kriterien werden Entscheiderinnen und Entscheider dabei unterstützt, ihre Entscheidungssituation zu strukturieren, das Entscheidungsproblem sowie die fundamentalen Ziele zu formulieren und bestehende Handlungsmöglichkeiten zu bewerten (Abbildung 1). Dieser mehrschrittige Prozess ist in dem Entscheidungsunterstützungssystem Entscheidungsnavi (www.entscheidungsnavi.de) umgesetzt. Da das Entscheidungsunterstützungssystem zum Zeitpunkt der Durchführung der Fallstudie keine

Gruppenfunktion beinhaltete, wurden innerhalb der Workshops verschiedene moderative Methoden zur Umsetzung der Gruppenentscheidung genutzt.

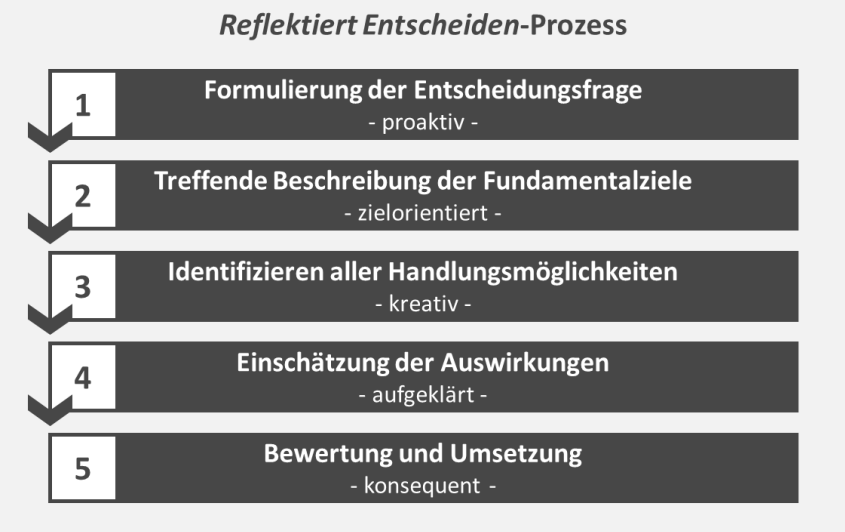

Abbildung 1: Schritte des reflektierten Entscheidungsprozesses nach von Nitzsch & Methling (2021), ***eigene Darstellung***

Ein Entscheidungsprozess beginnt mit der Formulierung einer Entscheidungsfrage. Wichtig ist in diesem Schritt, ein gemeinsames Verständnis aller Beteiligten für das Problem und die Rahmenbedingungen der Entscheidungssituation zu schaffen.

Der zweite Schritt beinhaltet eine Analyse der Werte und eine Formulierung der Fundamentalziele in Anlehnung an den *Value-focused Thinking*-Ansatz (Keeney 2020). Fundamentalziele sind Ziele, die durch die Entscheidung erfüllt werden sollen und einen eigenen Wert besitzen. Instrumentalziele hingegen dienen als Mittel zum Zweck und haben keine eigenständige Bedeutung, sondern lediglich eine positive Wirkung auf die Fundamentalziele. Die Fundamentalziele werden im späteren Prozess als Bewertungskriterien für den Nutzen der Handlungsalternativen verwendet. Da die Unterscheidung von Fundamental- und Instrumentalzielen schwierig ist, gehört das Erstellen einer Zielhierarchie zu den anspruchsvollsten Aufgaben bei der Strukturierung einer Entscheidungssituation (von Nitzsch & Methling, 2021).

Nach der Zielformulierung ist die Identifikation der Handlungsalternativen vorzunehmen. Da aus Studien (Siebert und Keeney 2015; Bond et al. 2010, 2008) bekannt ist, dass sich Menschen in vielen Fällen aufgrund des sogenannten *Narrow Thinkings* nur circa die Hälfte ihrer möglichen Handlungsalternativen bewusst machen können, unterstützt das Entscheidungsnavi mit systematischen Methoden bei der Suche nach Handlungsoptionen. So

wird neben anderen Methoden zur Anregung der Kreativität die sogenannte *Stellhebel*-Methode genutzt, um den Handlungsraum vollständig abzudecken. Dabei abstrahieren die Entscheiderinnen und Entscheider die elementaren Gestaltungsfaktoren der Entscheidungssituation, die sie selbst beeinflussen können, und kombinieren sie zu neuen Handlungsalternativen (von Nitzsch und Methling 2021).

Im vierten Schritt ist die Erfüllung der Fundamentalziele durch die jeweiligen Handlungsalternativen anzugeben. Beim Aufstellen der Wirkungsprognosen in der sogenannten Ergebnismatrix besteht jedoch sowohl bei Gruppen- als auch bei Einzelentscheidungen die Gefahr von psychologischen Verzerrungen in der Ergebniseinschätzung (Kahneman, 2017). Im reflektierten Entscheidungsprozess werden die wichtigsten *Biases* explizit adressiert, sodass eine möglichst unverzerrte Angabe von Einschätzungen möglich ist.

Zuletzt werden die Handlungsalternativen bewertet. Hierzu müssen die Schätzungen aus der Ergebnismatrix in subjektive Nutzenwerte überführt und Zielgewichte für die Fundamentalziele vergeben werden. Dabei soll die Alternative mit dem größtmöglichen Nutzen gefunden werden (Tzeng und Huang 2011). Im Anschluss wird das analytische Ergebnis mit der Intuition der Entscheiderinnen und Entscheider abgeglichen, um mögliche Diskrepanzen aufzulösen. Sobald die Intuition und das Modell dasselbe Ergebnis zeigen, kommt es zur Umsetzung der Entscheidung (Spetzler et al. 2016).

4. Die strategische Organisationsgestaltung mit Hilfe von Reflektiert Entscheiden

Die Anwendung des *Reflektiert Entscheiden*-Ansatzes erfolgte im Rahmen einer Potenzialberatung des *Instituts für Arbeitswissenschaft (IAW)* der *RWTH Aachen University* bei der *Lebenshilfe Aachen Werkstätten & Service GmbH (Abbildung 2)*.

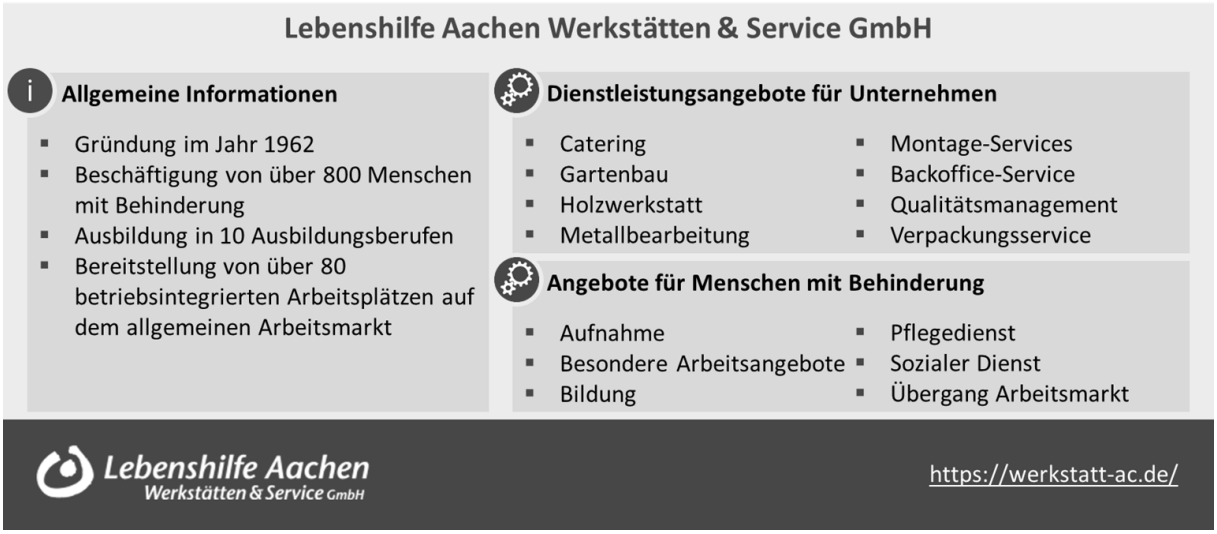

Abbildung 2: Vorstellung der Lebenshilfe Aachen Werkstätten & Service GmbH, *eigene Darstellung* (Quelle: Website der Lebenshilfe Aachen Werkstätten & Service GmbH (https://werkstatt-ac.de/))

Dort bestand die Notwendigkeit der Neustrukturierung der Aufbauorganisation. Die historisch gewachsenen Unternehmensstrukturen erschwerten zunehmend den adäquaten Umgang mit internen und externen Einflussfaktoren, wie personelle Veränderungen, divergierende Anforderungen der Stakeholder und gesetzliche Vorgaben zur Inklusion, und in der Folge die Erreichung der strategischen Unternehmensziele. Im Verlauf der Potenzialberatung sollte gemeinsam mit dem erweiterten Führungskreis und Mitgliedern des Betriebsrats eine nutzwertmaximale, zukunftsorientierte Gestaltungsalternative für die Aufbauorganisation des Unternehmens gefunden werden. Realisiert wurde die Beratungsleistung durch ein Projektteam des *IAW* in Form von moderierten Workshops und unter Einsatz des Entscheidungsnavis. Die in der Potenzialberatung hinzugezogenen Methoden sind der nachfolgenden *Abbildung 3* zu entnehmen.

Abbildung 3: Methodische Unterstützung des *Reflektiert Entscheiden*-Ansatzes in der Potenzialberatung, *eigene Darstellung*

4.1. Formulierung der Entscheidungsfrage

Das Formulieren einer Entscheidungsfrage ermöglichte eine deutliche Abgrenzung von anderen Entscheidungsproblemen und lenkte den Fokus auf die Werte sowie aktuellen Bedürfnisse des Unternehmens. Die ergänzend genutzte *CATWOE*-Methode unterstützt eine Berücksichtigung aller Stakeholder-Perspektiven (vgl. Basden und Wood-Harper, 2006) und verhinderte eine Unvollständigkeit des Entscheidungsraumes. Durch die Nutzung des Online-Tools konnte ein gemeinsames Verständnis der Gruppe für die Entscheidungssituation, die bisherigen Unternehmensstrukturen und die vorhandenen Probleme erzeugt werden. Die Entscheidungsfrage lautete, wie die vorhandene Aufbauorganisation zukunftsorientiert gestaltet werden soll. Um die Findung der Ziele und Handlungsalternativen nicht vorab durch die Entscheidungsfrage einzuschränken, wurde die Formulierung allgemein gehalten.

4.2. Formulierung der Fundamentalziele

Ziel des zweiten Schrittes war die Entwicklung einer gemeinsamen Zielhierarchie für die Entscheidungssituation. Anhand von Impulsfragen konnten wichtige Aspekte der Entscheidungssituation gesammelt und im Anschluss daran mehrfach mit dem Fragewort „Warum“ hinterfragt werden. Auf diese Weise wurde überprüft, welche Ziele der fundamentalen Ebene entsprangen und welche lediglich auf ein anderes Ziel für die neue Aufbauorganisation hinwirkten. Nach der Durchführung dieses Prozessschrittes lag eine Zielstruktur mit sieben Fundamentalzielen vor, die jeweils durch die gemeinsam ermittelten Instrumentalziele konkretisiert wurden. Eine beispielhafte Ausarbeitung des Fundamentalzieles *Gesellschaftliche Grundaufgabe erfüllen* und der vier zugehörigen Instrumentalziele ist der nachfolgenden *Abbildung 4* zu entnehmen.

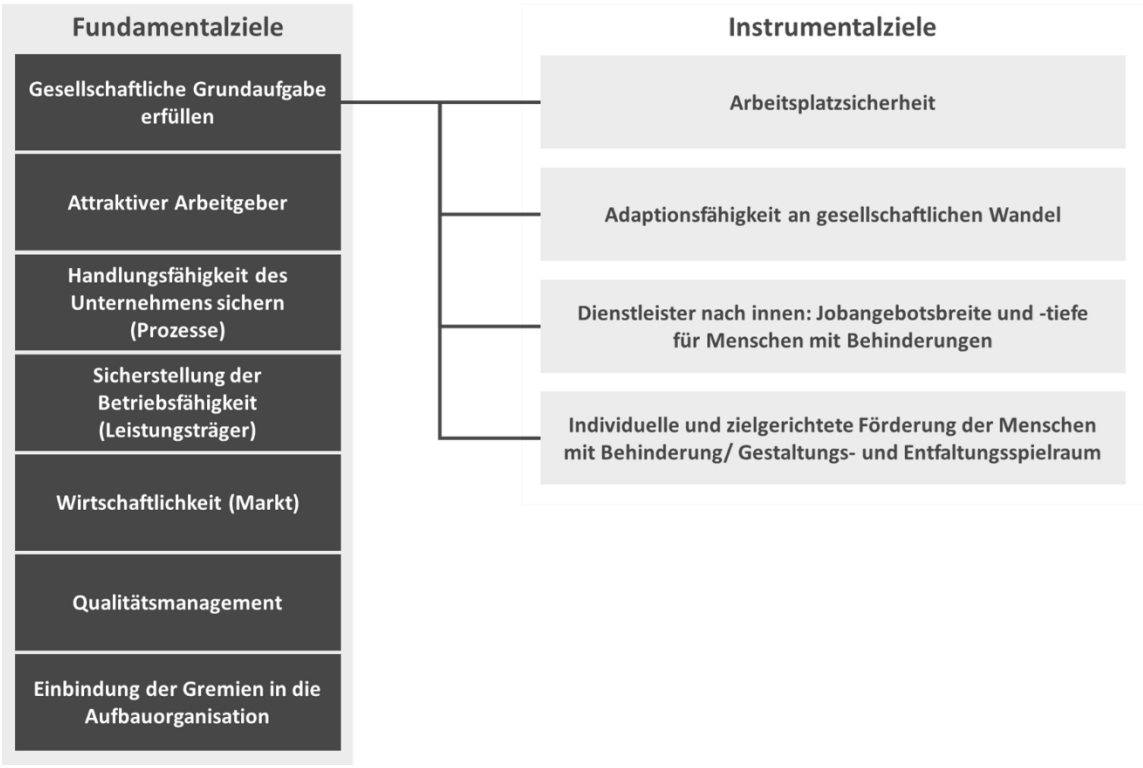

Abbildung 4: Zusammenhang zwischen den Fundamentalzielen der Entscheidungssituation und den zugehörigen Instrumentalzielen, *eigene Darstellung*

Das Ermitteln der Zielhierarchie des Unternehmens gehörte zu den schwierigsten und aufwendigsten Aufgaben im Entscheidungsprozess. Die Intention des generischen Ansatzes, durch mehrfaches Hinterfragen die Fundamentalziele herauszuarbeiten, erzeugte eine produktive Gruppendynamik. Der Weg über die Instrumentalziele schuf dabei ein gemeinsames Verständnis in Bezug auf die eher abstrakt formulierten Fundamentalziele. Die vorgegebene Struktur im Rahmen der Ermittlung der Fundamentalziele erzeugte eine gute Ausgangslage für eine Entscheidungsfindung in den nachfolgenden Schritten.

4.3. Identifizieren von Handlungsmöglichkeiten

Ziel des dritten Schrittes war die Identifikation von Handlungsmöglichkeiten für die vorliegende Entscheidungssituation. Dazu sollten die Teilnehmenden unter Berücksichtigung der Fundamentalziele mögliche Gestaltungsalternativen für eine zukunftsorientierte Aufbauorganisation sammeln. Um den Teilnehmenden die Möglichkeit zu bieten, ihre Vorstellungen von einer zukunftsorientierten Aufbauorganisation nachzubauen, wurden LEGO®-Bausätze verwendet. Dadurch konnten erste Gestaltungsaspekte herausgearbeitet und in Form von Impulsvorträgen präsentiert werden. Allerdings zeigte sich ebenso, dass die Methode allein nicht ausreichen würde, um vollumfängliche Alternativen identifizieren zu können. Daher wurde anschließend die *Stellhebel*-Methode des *Reflektiert Entscheidens*

genutzt, um unter Einbezug verschiedener Operatoren, Führungsstrukturen, Produktions- und Prozessorientierungen die Vollständigkeit des betrachteten Alternativenraums zu fördern. Danach wurde das aktuell *gelebte Organigramm* mittels der Methodik der *Kartenabfrag*e hinterfragt, um herauszufinden, in welchen Organisationseinheiten und Schnittstellen Schwachstellen der aktuellen Aufbauorganisation und mögliche Verbesserungspotenziale vorlagen. Das Vorgehen zur Identifikation der Schwachstellen erfolgte analog der Beschreibung im Entscheidungsnavi und wurde in der Gruppe als *Kartenabfrage* durchgeführt. Die Kombination dieser Ergebnisse mit jenen der *Stellhebel*-Methode ermöglichte die Entwicklung von zwei Gestaltungsalternativen und bereitete den Weg zur Findung einer individuellen Lösung für das Unternehmen.

Die zentralen Ergebnisse wiesen die Idee der Bündelung bereits vorhandener Bereiche sowie beispielsweise eine übergeordnete Kundenakquise auf. Die beiden Gestaltungsalternativen für die Aufbauorganisation zeigten Unterschiede im Hinblick auf die Anordnung bestimmter Organisationseinheiten sowie deren Benennung. Bei der Diskussion der Alternativen im Plenum einigten sich die Teilnehmenden auf eine der Alternativen, sodass mit einer Konkretisierung der Details begonnen werden konnte. Weitere Ideen, die über den Rahmen der Potenzialberatung hinausgingen, wurden für zukünftige Umsetzungsphasen in einem *Maßnahmen- und Themenspeicher* festgehalten.

Der systematische Entscheidungsprozess ermöglichte eine bedachte Erarbeitung von Alternativen für die vorliegende Entscheidungssituation. Durch den mehrschrittigen Ansatz konnten sich die Teilnehmenden zielorientiert mit der Thematik einer zukunftsorientierten Aufbauorganisation auseinandersetzen. Die gewählten Kreativitätsmethoden halfen dabei, neben den klassischen Unternehmensstrukturen auch eine individuelle Lösung in Betracht zu ziehen.

4.4. Bewertung und Umsetzung

Die beiden letzten Schritte vier und fünf des Entscheidungsprozesses dienen der Bewertung, inwieweit die festgelegten Fundamentalziele mit der ausgewählten Gestaltungsalternative erfüllt werden. Die Bewertung der Erfüllung der Fundamentalziele wiederum basiert auf der Summe der Einschätzungen der einzelnen Instrumentalziele aus dem zweiten Schritt. Da sich die Teilnehmenden bereits im dritten Schritt auf eine Alternative einigen konnten, wurden die

beiden letzten Schritte dazu genutzt, die gewählte Struktur für die Aufbauorganisation auf Schwachstellen zu prüfen und zu optimieren.

Dazu wurde für die Bewertung der Alternative eine Skala mit drei Ausprägungsstufen gewählt, welche stets eine Relation zum Status Quo ermöglichen sollte: *Verschlechterung zum Status Quo (-1)*, *bleibt unverändert (0)*, *Verbesserung zum Status Quo (1)*. Die Bewertung der betrachteten Alternative im Vergleich zur bisher vorhandenen Aufbauorganisation des Unternehmens diente dazu, potentielle Schwachstellen und Umsetzungshindernisse zu identifizieren und darauf aufbauend die gewählte Gestaltungsmöglichkeit zu konkretisieren. In einer moderierten Diskussion konnte jedes Instrumentalziel einzeln besprochen und bewertet werden. Dieses Vorgehen führte dazu, dass am Ende eine finalisierte Gestaltungsform der Aufbauorganisation vorhanden war, die in allen Fundamentalzielen besser als der Status Quo abschnitt (*Abbildung 5*). Das Skizzieren der Umsetzungsphase konnte somit beginnen.

Abbildung 5: Ausgewählte Inhalte und Ergebnisse der Potenzialberatung bei der *Lebenshilfe Aachen Werkstätten & Service GmbH*, *eigene Darstellung*

Die ausführliche Ausarbeitung der Fundamentalziele und ihrer jeweiligen Instrumentalziele stellte sich in diesem Schritt als besonders hilfreich heraus. Die vereinfachte Messskala und der Vergleich mit dem Status Quo erleichterte es der Gruppe, zu einer konsensualen Bewertung zu gelangen. Durch das gemeinsam erarbeitete Verständnis und das stringente Vorgehen bei der Bewertung konnten die Teilnehmenden gezielt über eine weitere Optimierung der zukunftsorientierten Gestaltungsform diskutieren.

5. Fazit: Erkenntnisse für die Praxis

Der *Reflektiert Entscheiden*-Ansatz wurde bei der *Lebenshilfe Aachen Werkstätten & Service GmbH* für die Gestaltung einer zukunftsorientierten Aufbauorganisation genutzt. Die Wirksamkeit bei der strategischen und strukturellen Entscheidung kann dabei anhand der drei Kriterien *Entscheidungsqualität*, *Effizienz des Prozesses* und *Akzeptanz im Unternehmen* beurteilt werden.

Entscheidungsqualität: Der Ansatz *Reflektiert Entscheiden* soll Entscheiderinnen und Entscheider innerhalb eines fünfschrittigen Prozesses dabei unterstützen, eine hohe Entscheidungsqualität zu erreichen. Bei der Anwendung im Unternehmenskontext sind besonders die Schritte *Formulierung der Fundamentalziele* und *Identifizieren von Handlungsmöglichkeiten* positiv aufgefallen. Das umfassende Reflektieren der Ziele führte dazu, dass den Teilnehmenden bewusst wurde, auf welchen Aspekten der Fokus des Unternehmens bei dieser Entscheidung liegen sollte. Dieses Bewusstsein führte im dritten Schritt dazu, dass in Relation zu den Fundamentalzielen die optimale Handlungsalternative für das Unternehmen identifiziert werden konnte und somit weitere Alternativen ausgeschlossen wurden. Mithilfe von kreativitätssteigernden Methoden konnte die für die zukünftige Aufbauorganisation gewählte Gestaltungsform systematisch auf Schwachstellen geprüft und verbessert werden.

Effizienz des Prozesses: Ein Prozess ist effizient, wenn die Informationssuche nach Aufwand-Nutzen-Überlegungen erfolgt. Die Effizienz des *Reflektiert Entscheiden*-Ansatzes ist vor allem auf die Flexibilität des Prozesses zurückzuführen. So wurde in dieser Fallstudie ein geeigneter Entwurf einer Gestaltungsform für die Aufbauorganisation bereits vor dem vollständigen Durchlaufen des dritten Schrittes gefunden. Durch die Flexibilität des Prozesses war es möglich, ohne Beendigung des dritten Schrittes die beiden letzten Schritte durchzuführen. Der Aufwand für die strategische Entscheidungsfindung lag insgesamt bei circa sechs Projekttagen und kann im Vergleich zu anderen Gruppenentscheidungen im strategischen Unternehmenskontext als effizient betrachtet werden (u.a. Butler et al., 1991; Cheng et al., 2010; Nees, 1983).

Akzeptanz im Unternehmen: Die klare Struktur des Ansatzes ermöglichte eine strukturierte Dokumentation des Entscheidungsprozesses und begünstigte die Kommunikation der erarbeiteten Resultate an den Aufsichtsrat. Da die Entscheidung als Gruppenentscheidung

unter Partizipation von verschiedenen Verantwortlichen erfolgte, konnten zugleich vielfältige Interessen im Alternativenraum berücksichtigt werden. Das Einbeziehen der verschiedenen Sichtweisen auf das Entscheidungsproblem und die Reduzierung psychologischer Verzerrungen durch die Berücksichtigung von Erkenntnissen und Methoden der deskriptiven Entscheidungstheorie förderten die Authentizität der getroffenen Entscheidung (vgl. Siebert & von Nitzsch, 2018). Im Anschluss an die Workshops wurde der Entwurf der zukunftsorientierten Aufbauorganisation vom Aufsichtsrat einstimmig angenommen und die Realisierung der strategischen Veränderungen bejaht.

Die Fallstudie bei der *Lebenshilfe Aachen Werkstätten & Service GmbH* zeigt den Ablauf eines qualitativ hochwertigen und effizienten Entscheidungsprozesses. Das Ergebnis dieses Prozesses erfuhr in der später begonnenen Umsetzung eine hohe Akzeptanz der Mitarbeitenden des Unternehmens. Herr Norbert Zimmermann, Geschäftsführer der *Lebenshilfe Aachen Werkstätten & Service GmbH*, reflektierte die Potenzialberatung folgendermaßen: „Der Einsatz des Entscheidungsnavis im Rahmen unserer Potentialberatung hat uns ermöglicht, einen Perspektivwechsel vorzunehmen, sodass wir uns mit den fundamentalen Werten des Unternehmens beschäftigen und fundierte Entscheidungen treffen konnten. Das Entscheidungsnavi gab uns Raum für kreative Ansätze, ohne dabei die Struktur zu verlassen."

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