

Jahrestagung der DGPK-Fachgruppe Rezeptions- und Wirkungsforschung 2022: Tagungsband

Ziegele, Marc (Ed.); Kümpel, Anna Sophie (Ed.); Dienlin, Tobias (Ed.)

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Jahrestagung der DGPuK-Fachgruppe Rezeptions- und Wirkungsforschung 2022

Tagungsband

Herausgegeben von

Marc Ziegele

Anna Sophie Kümpel

Tobias Dienlin

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Jahrestagung der DGPuK-Fachgruppe Rezeptions- und Wirkungsforschung 2022: Tagungsbericht und Beitragsübersicht

Tobias Dienlin,¹ Marc Ziegele,² Anna Sophie Kümpel³

¹Universität Wien, ²Heinrich-Heine-Universität Düsseldorf, ³Ludwig-Maximilians-Universität München

Zusammenfassung

In diesem Beitrag fassen wir die Ergebnisse der Jahrestagung der DGPuK-Fachgruppe Rezeptions- und Wirkungsforschung 2022 in Düsseldorf zusammen und stellen die vier Beiträge des Tagungsbandes vor. Die Tagung widmete sich dem Thema Inzivilität in digitalen Medien, ihrer Rezeption, Wirkung und möglichen Interventionen. Neben diesem Schwerpunkt wurden weitere aktuelle Forschungsthemen der Rezeptions- und Wirkungsforschung präsentiert, darunter die Auswirkungen sozialer Vergleiche auf die mentale Gesundheit von Rezipierenden, die Rolle von Sprachstilen bei Sprachassistenten sowie wertbasierte Kommunikationsstrategien zur Förderung umweltbewussten Verhaltens. Eine Podiumsdiskussion zu Open Science unterstrich die Bedeutung von Transparenz und Replizierbarkeit in der Forschung.

Keywords: Tagungsbericht, Inzivilität, Open Science

Summary

In this article, we summarize the results of the 2022 annual conference of the DGPK Division for Reception and Effects Research in Düsseldorf and present the four contributions included in the conference proceedings. The conference focused on the topic of incivility in digital media, its reception, effects, and potential interventions. In addition to this main theme, other current research topics in reception and effects research were presented, including the impact of social comparisons on recipients' mental health, the role of speech styles in voice assistants, and value-based communication strategies to promote environmentally conscious behavior. A panel discussion on Open Science emphasized the importance of transparency and reproducibility in research.

Keywords: Conference report, incivility, open science

“Inzivilität: Rezeption, Wirkungen, Interventionen” – unter diesem Thema stand die Jahrestagung der DGPK-Fachgruppe Rezeptions- und Wirkungsforschung, die im Jahr 2022 an der Heinrich-Heine-Universität Düsseldorf stattfand. Im Zentrum standen die im Fach rege diskutierten Fragen, wie inzivile Kommunikation in digitalen Medien rezipiert wird, welche Wirkungen sie auf Individuen und Gesellschaft hat und wie man ihr entgegenwirken kann (Heinbach, 2022). In einem breiten Spektrum an Vorträgen und Diskussionen wurde beleuchtet, welche Rolle Online-Plattformen bei der Verbreitung von Hasskommentaren und anderen Formen der Inzivilität spielen und welche psychologischen und sozialen Mechanismen dabei wirksam sind.

Die Veranstaltung – gemeinsam organisiert von Marc Ziegele, Marike Bormann, Katharina Frehmann, Dominique Heinbach, Anke Stoll und Lena Wilms – ermöglichte es, aktuelle Forschungsarbeiten vorzustellen und interdisziplinäre Perspektiven auszutauschen. Dabei wurden in drei parallelen Präsentations-Tracks sowohl das Tagungsthema als auch aktuelle Studien aus anderen Bereichen der Rezeptions- und Wirkungsforschung beleuchtet.

Ein weiterer Gegenstand der Konferenz war die Podiumsdiskussion zum Thema Open Science. Unter der Moderation von Lena Frischlich nahmen daran Isabelle Freiling, Annabell Halfmann, Tobias Dienlin und Thomas Koch teil. Die Diskussion zeigte deutlich, dass Open Science ein wichtiges Zukunftsthema für die Fachgruppe ist – und auch schon deren Gegenwart immer stärker bestimmt. Allerdings gab es verschiedene Meinungen darüber, welcher Weg eingeschlagen werden sollte, um die Prinzipien der Transparenz und Replizierbarkeit in der Forschungspraxis zu verankern: Ein Prozess, der aktuell auch international in der Kommunikationswissenschaft ausgehandelt wird (Perreault & Dienlin, 2024).

Überblick über die Veröffentlichungen

Die im Folgenden vorgestellten Publikationen stammen allesamt aus den offenen Panels der Tagung und sind somit nicht direkt mit dem Tagungsthema Inzivilität verknüpft. Sie bieten vielfältige Einblicke in aktuelle Fragestellungen der Rezeptions- und Wirkungsforschung und reflektieren damit die Diversität der Themen und Methoden, die die Fachgruppenmitglieder bearbeiten.

Anisha Arenz, Adrian Meier und Leonard Reinecke führen in ihrem Scoping Review eine umfassende Analyse der Forschung zu sozialen Vergleichen auf sozialen Medien und deren Auswirkungen auf die mentale Gesundheit von Rezipierenden durch. Die Autor:innen identifizierten 131 quantitative Studien, die seit 2011 veröffentlicht wurden, und bieten damit eine systematische Übersicht über dieses heterogene Forschungsfeld. Ihre Ergebnisse zeigen, dass Aufwärtsvergleiche (d.h. der Vergleich mit vermeintlich "besseren" Personen) auf sozialen Medien besonders häufig untersucht wurden. Interessanterweise werden andere Richtungen des Vergleichs, wie Abwärtsvergleiche (d.h. der Vergleich mit "schlechteren" Personen), und verschiedene Dimensionen der psychischen Gesundheit weniger intensiv erforscht. Die Studie verdeutlicht die Notwendigkeit, das Spektrum der untersuchten Vergleichsprozesse und deren Auswirkungen auf unterschiedliche Aspekte der mentalen Gesundheit zu erweitern.

Katharina Frehmann untersucht die Auswirkungen unterschiedlicher Sprachstile bei Sprachassistenten auf die wahrgenommene Menschlichkeit, Kompetenz, Vertrauen und Nutzungsabsicht. In einer experimentellen Online-Studie mit 244 Teilnehmer:innen analysierte sie, wie formale und umgangssprachliche Sprachstile eines fiktiven Sprachassistenten in verschiedenen Kontexten (Alltag vs. Politik) wahrgenommen werden. Die Ergebnisse zeigen, dass der umgangssprachliche Stil zwar die wahrgenommene Kompetenz und das Vertrauen in den Sprachassistenten reduziert, jedoch keinen Einfluss auf die wahrgenommene Menschlichkeit hat. Interessanterweise beeinflusste die wahrgenommene Menschlichkeit unabhängig von der experimentellen Manipulation potenziell die Nutzungsabsicht der Teilnehmenden. Die Ergebnisse betonen die Bedeutung einer sorgfältigen Gestaltung von Sprachassistenten, die sowohl vertrauenswürdig als auch menschlich wirken sollen.

Tanja Habermeyer, Janine Blessing, Helena Bilandzic und Anna-Maria Baur untersuchen den Einfluss von wertbasiertem Framing auf umweltbezogenes Verhalten im Rahmen einer Poster-Kampagne zur Plastikverschmutzung. Die Studie vergleicht egoistisches, altruistisches und biosphärisches Framing miteinander und untersucht, wie diese unterschiedlichen Kommunikationsstrategien die Einstellung und das Verhalten der Zielgruppe beeinflussen. Die Ergebnisse zeigen, dass altruistisches Framing – also die Betonung der Verantwortung gegenüber anderen Menschen – einen signifikant positiven Einfluss auf umweltbezogenes Verhalten hat, während egoistisches (fokussiert auf eigene Vorteile) und biosphärisches Framing (fokussiert auf den Schutz der Natur) keine vergleichbare Wirkung zeigten. Diese Erkenntnisse unterstreichen die Relevanz von emotional ansprechenden, wertorientierten Kommunikationsstrategien in der Umweltkommunikation.

Olaf Jandura und Carina Weinmann beschäftigen sich schließlich mit der Frage, ob es eine Diskrepanz zwischen der subjektiven politischen Selbstverortung und der auf Werten basierenden Positionierung der Befragten auf der Links-Rechts-Achse gibt. Ihre Analysen zeigen, dass bei 31 % der Befragten eine Diskrepanz zwischen der subjektiven Selbstverortung und der durch Wertorientierungen bestimmten Einordnung besteht. Die Autor:innen diskutieren, welche Variablen diese Divergenz erklären könnten und beleuchten die Implikationen für die kommunikationswissenschaftliche Forschung. Diese Ergebnisse werfen interessante Fragen hinsichtlich der Validität gängiger politischer Kategorisierungen auf und regen zu weiteren Untersuchungen dazu an, wie politische Einstellungen und Selbstwahrnehmung sinnvoll erhoben und analysiert werden können.

Fazit

Zusammenfassend lässt sich sagen, dass die Tagung in Düsseldorf eine Fülle von Erkenntnissen und neuen Perspektiven zur Rezeption und Wirkung von Medien bot. Die vorgestellten Publikationen aus den offenen Panels deckten ein breites Spektrum aktueller Forschungsthemen ab. Von mentaler Gesundheit im Kontext sozialer Medien über die Gestaltung von Sprachassistenten bis hin zu wertbasierten Kommunikationsstrategien und der Erfassung politischer Einstellungen spiegeln die Beiträge nicht nur die Aktualität der Rezeptions- und Wirkungsforschung, sondern auch deren theoretische und methodische Vielfalt wider. Sechzehn von insgesamt siebenunddreißig Konferenzbeiträgen setzten dabei selbst Open Science-Praktiken um – wie bspw. das Präregistrieren der Hypothesen oder das Teilen von Zusatzinformationen online. Dies verdeutlicht, dass Transparenz, Reproduzierbarkeit und Replizierbarkeit nicht nur ferne Ziele darstellen, sondern bereits jetzt wesentliche Qualitätsmerkmale unserer Forschung repräsentieren.

Literatur

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Social Comparison on Social Media and Mental Health: A Scoping Review

Anisha Arenz¹, Adrian Meier² and Leonard Reinecke¹

¹Johannes Gutenberg University Mainz

²School of Business, Economics, and Society, Friedrich Alexander University of Erlangen-Nuremberg

Zusammenfassung

*Soziale Medien bieten ihren Nutzer*innen eine Vielzahl von Möglichkeiten zur Online-Selbstdarstellung und stellen somit ein optimales Umfeld für soziale Vergleiche dar. Mit zunehmender Beliebtheit sozialer Medien wächst in der Öffentlichkeit und in der Wissenschaft die Sorge über negative Auswirkungen sozialer Online-Vergleiche auf die psychische Gesundheit der Nutzer*innen. Die wissenschaftliche Forschung zu diesem Thema nimmt rapide zu, wodurch das Feld heterogener und schwieriger zu überblicken wird. Ziel dieses Scoping Reviews ist es daher, eine systematische Übersicht über das fragmentierte Forschungsfeld zu sozialen Vergleichen in sozialen Medien und psychischer Gesundheit zu bieten. Anhand vordefinierter Einschlusskriterien wurden 131 quantitative Studien systematisch identifiziert, um das Forschungsfeld zu kartieren. Die Ergebnisse zeigen, dass die Zahl der Studien seit 2011 zugenommen hat und dass Erstautoren aus den Vereinigten Staaten und aus dem Fachbereich Psychologie die meisten Beiträge lieferten. In Bezug auf die untersuchten Vergleichsrichtungen, Vergleichsdimensionen und Indikatoren für psychische Gesundheit zeigen die Analysen, dass sich die Studien vor allem auf Aufwärtsvergleiche hinsichtlich verschiedener Vergleichsdimensionen sowie hedonisches Wohlbefinden konzentrierten, während Abwärtsvergleiche und andere Facetten der psychischen Gesundheit im Feld derzeit unterrepräsentiert sind.*

Keywords: Sozialer Vergleich, soziale Medien, psychische Gesundheit, Scoping Review

Summary

Social media offer their users a variety of opportunities for online self-presentation and thus represent an optimal environment for social comparisons. With the increasing popularity of social media, there is growing concern in public and scientific discourse about negative effects of online social comparisons on users' mental health. Research output on this topic is increasing rapidly, making the field more heterogeneous and difficult to oversee. This scoping review therefore aims to provide a systematic mapping of the fragmented research field on social media comparisons and mental health. Using predefined inclusion criteria, 131 quantitative studies were systematically identified to map the research field. The results showed that the number of studies has grown since 2011 and that first authors from the United States and Psychology departments were the main contributors. With regard to the comparison directions, comparison dimensions, and indicators of mental health examined, the analyses demonstrate that the studies primarily focused on upward comparisons on diverse dimensions and hedonic well-being, whereas downward comparisons and other facets of mental health are currently under-represented in the field.

Keywords: social comparison, social media, mental health, scoping review

Social media are an integral part of modern society and firmly integrated into everyday lives of many people. The use of social media is changing the way people interact and plays an important role in building and maintaining social relationships (e.g., Ellison et al., 2007). New opportunities for social comparisons emerge as platforms collect personal information about their users and make these available to others (Verduyn et al., 2020). This may increase the extent to which users compare themselves with each other, as they are always aware of what is happening in each other's lives (Verduyn et al., 2020; F.-R. Yang et al., 2019). The characteristics of social media favor positive or idealized self-presentation, which is why users are predominantly exposed to positive information about others (Appel et al., 2016; Qiu et al., 2012; Toma, 2017; see also Walther, 1996). This leads to a growing concern that social media use may have a negative impact on users' mental health via unflattering social comparisons (Verduyn et al., 2020). Various studies suggest that social media use promotes detrimental comparisons and feelings of envy and frustration, and that these comparisons are associated with lower well-being (Appel et al., 2016; de Vries et al., 2018; McComb et al., 2023; Steers, 2016; Verduyn et al., 2017). At the same time, other studies suggest there might be a positive side of social media-induced social comparisons, such as being inspired by others (e.g., Meier, Gilbert, et al., 2020; Schreurs et al., 2022).

Scientific interest in the relationship between social comparison on social media and mental health has increased rapidly in recent years (Verduyn et al., 2020). As usual in young research fields, the methodological and theoretical approaches vary widely between these studies. In a large meta-review of prior meta-analyses and systematic reviews, Meier and Reinecke (2021) show that research on social media use and mental health in general is characterized by a rather unsystematic conceptual and methodological approach. Both the measures of social media use and indicators of mental health vary considerably. Without higher-level integration, studies remain hardly comparable and such heterogeneous fields typically produce divergent results, providing little actionable insights and research progress. As research on social comparison in social media represents a sub-field within this larger body of research, it likely suffers from similar levels of heterogeneity, calling for increased efforts to further integrate this literature. To obtain an overview of a fragmented field, research syntheses through systematic literature reviews and meta-analyses are

essential (Card, 2012). Multiple non-systematic narrative reviews (Appel et al., 2016; Bayer et al., 2020; Kross et al., 2021; Meier & Johnson, 2022; Steers, 2016; Verduyn et al., 2020; Verduyn et al., 2022) as well as systematic reviews (High et al., 2022; Krause et al., 2021; McComb et al., 2023; Valkenburg, 2022; Verduyn et al., 2017; Wenninger et al., 2021; F.-R. Yang et al., 2019) on social comparison via social media have recently been published. While they shed light on the relationship between social comparison on social media and mental health, these reviews do not provide a comprehensive, systematic, and up-to-date overview of the existing evidence. For one, several reviews primarily investigate Facebook use and exclude other, now typically more popular, social media, such as Instagram (e.g., Appel et al., 2016; Steers, 2016; F.-R. Yang et al., 2019). Second, reviews so far selectively consider specific indicators of mental health (e.g., Krause et al., 2021; Verduyn et al., 2017; F.-R. Yang et al., 2019), therefore each of them synthesizes only a fraction of the available evidence. Consequently, there is a need for a systematic literature review that, on the one hand, reflects the current social media landscape more fully and, on the other hand, includes more facets of mental health. McComb, Vanman, and Tobin (2023) addressed both of these issues in their recent meta-analysis but focused solely on experimental studies and upward comparisons.

The present review addresses this research gap by compiling the available studies on social media, social comparison, and mental health. Based on several systematic literature searches, we conducted a *scoping review* that maps out the field and summarizes its conceptual and methodological scope. Thereby, we provide a general overview of previous research on social comparison processes on social media and mental health as well as a comprehensive research synthesis. Since social comparison with a focus on body and appearance (i.e., appearance comparison) is already a comparatively well-integrated sub-field in this area (see Saiphoo & Vahedi, 2019), we excluded appearance comparison from this scoping review. The paper aims to achieve three overarching research objectives: (1) First, we describe the *structural properties* of the research field, with a particular focus on publication practices and research designs. Additionally, (2) we analyze the *social comparison directions and dimensions* investigated in the social media context, and (3) the *mental health indicators* that studies have investigated so far.

Aims of the Scoping Review can help to sensitize researchers to studies from other countries and cultures and point to culture-specific biases (e.g., Henrich et al., 2010). Accordingly, the second research question is:

Structure of the Research Field

Since we aim to integrate an interdisciplinary and heterogeneous field of research (Meier, Domahidi, & Günther, 2020; Meier & Reinecke, 2021), our scoping review begins by describing its general properties to help future research better navigate the literature. To get a structural overview of the research field, we first examine the publication rate, the publication outlets, the first authors' discipline and national affiliation, as well as the research designs of the studies (e.g., correlational vs. experimental designs, cross-sectional vs. longitudinal designs). Accordingly, the below-described RQ1–RQ4 address the structure of the field.

The publication rate provides information about the total number of studies and about the (temporal) development of a research field, which in turn allows conclusions about the general scientific interest in the topic (Meier, Domahidi, & Günther, 2020). In the context of interdisciplinary research, the question also arises which disciplines deal with the topic and contribute to the research field. An overview of all disciplines involved can help broaden the research community's perceptual horizon (Meier, Domahidi, & Günther, 2020). According to Zuccala (2006), it can be assumed that science communication takes place most frequently and intensively *within* individual (sub-)disciplines ("invisible colleges"), so that scientists may hardly perceive related research from other disciplines. Furthermore, it can be assumed that scholars from different disciplines study the same issue differently due to their specialized expertise and the theoretical backgrounds in their disciplines (Wolfers & Schneider, 2021). Thus, knowledge about the discipline of the authors can help to explain different approaches of the studies. For this reason, the publication rate is presented both over time and across different disciplines. This leads to the first research question:

RQ1: How is the number of studies on social comparisons on social media and mental health distributed over time and across disciplines?

Furthermore, we assume that (informal) information exchange between researchers does not only occur within certain disciplines, but also particularly within national borders (Schott, 1991). Therefore, it should be investigated from which countries the publications in a field originate, which is approximated here by the national affiliation of the first author. This knowledge

RQ2: In which countries are the first authors of the studies on social comparisons on social media and mental health employed?

Subsequently, our focus shifts to the publication outlets. For researchers in the field, knowledge of the most important journals can be relevant to obtain an overview of possible starting points for targeted literature searches and for submitting their own publications (Meier, Domahidi, & Günther, 2020). Since articles usually first have to undergo a peer review process before being published in scientific journals (Jefferson et al., 2002), the journals can also provide approximate information about the quality of studies. In addition, the publication outlets – as well as the publication rate – allow conclusions about the general relevance the scientific community assigns to the topic (Meier, Domahidi, & Günther, 2020). Accordingly, we ask:

RQ3: In which journals are the studies on social comparison on social media and mental health published?

Additionally, we examined research designs within the field. The research field of social comparisons has long been characterized by a "growing diversity in methods" (Wood, 1996, p. 520) and it is often questionable whether study findings are comparable due to different methodological approaches (Gerber et al., 2018; Wheeler & Miyake, 1992). Depending on the design, studies can either provide causal or just correlational evidence (Stein, 2019). Accordingly, the study design determines the informational value of the studies. A final step in structurally integrating this research field is thus to consider the predominantly used methods:

RQ4: Which research designs are used in the studies on social comparisons on social media and mental health?

Social Comparison Process on Social Media

Research interest in both social media in general (Meier, Domahidi, & Günther, 2020) and social comparison on social media specifically is increasing (Verduyn et al., 2020). Social media are "computer-mediated communication channels that allow users to engage in social interaction with broad and narrow

audiences in real time or asynchronously” (Bayer et al., 2020, p. 472). They provide a suitable setting for social comparison processes, as comparison information is likely to be more salient on social media than in offline contexts (Appel et al., 2016; Verduyn et al., 2020; F.-R. Yang et al., 2019). Furthermore, due to the high level of individual control users have over the shared content, social media provide platforms for positive self-expression (“positivity bias”; Toma, 2017). Thus, users predominantly post positive experiences and emotions on social media (Qiu et al., 2012), enhancing the likelihood of upward comparisons on social media (Verduyn et al., 2020).

Next to social media use, our review focusses on two broad psychological concepts: social comparison and mental health. *Social comparison* can be defined “as the process of thinking about information about one or more other people in relation to the self” (Wood, 1996, pp. 520–521). People tend to compare themselves with other individuals and evaluate their own abilities, opinions, and characteristics in relation to others (Festinger, 1954). By comparing themselves to others, individuals obtain information about themselves, which can serve as a guide to better understand their own relative standing in a social group (Verduyn et al., 2020).

Comparisons can be made regarding different characteristics such as financial success, leisure activities, or professional performance (Peter et al., 2012), although not every dimension is of the same relevance for everyone (Verduyn et al., 2020). In the literature, various dimensions have been explored. One common, theoretically based classification of dimensions has been proposed by Peter et al. (2012), which is adopted in the present study. Here, five *comparison dimensions* can be distinguished: (1) Attractiveness/appearance, (2) finances/material possessions, (3) performance/skills, (4) social interaction/interaction with people, and (5) values/convictions.

Besides different comparison dimensions, social comparisons can also focus on different *comparison targets*. Accordingly, individuals can either compare themselves with better, worse, or equally situated people. While in *upward comparisons* one perceives the self as inferior to the target, in *downward comparisons* one perceives the self as superior (Gerber et al., 2018). Comparisons with people of equal status are so-called *lateral comparisons* (Corcoran et al., 2011; Peter, 2016). Because the relationship between social

comparison and well-being is likely to vary by comparison direction and dimension, the review examines the directions and dimensions studied in the research field.

RQ5: Which comparison directions and dimensions are considered in the studies on social comparisons on social media and mental health?

Operationalization of Mental Health

The second theoretical construct addressed by this review is mental health. Mental health can be defined as “a state of well-being in which the individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community” (World Health Organization, 2005, p. 10). In empirical research, the term mental health is often referred to and operationalized in many ways. The present review relies on the Extended Two-Continua Model of Mental Health by Meier and Reinecke (2021), which integrates different perspectives on mental health and provides an organizing framework that helps systematize the various indicators.

The model first distinguishes two independent continua of mental health. The first continuum refers to psychopathology and includes all stress-inducing behaviors that negatively affect key aspects of life, such as social relationships or work (Lahey et al., 2017). Further, two dimensions of psychopathology are identified. The *internalizing* dimension includes behaviors, emotions, and cognitions that indicate over-control (e.g., depression and anxiety). All uncontrolled behaviors, emotions, and cognitions (e.g., substance abuse), on the other hand, are classified as *externalizing* psychopathology (Conway et al., 2019; Meier & Reinecke, 2021). The second continuum addresses psychological well-being, which refers to optimal psychological functioning and experience (Ryan & Deci, 2001). Again, two dimensions are distinguished: *hedonia* describes the subjective feeling of happiness or satisfaction, and *eudaimonia* refers to a fulfilled life with a focus on self-actualization and personal growth (Deci & Ryan, 2008; Meier & Reinecke, 2021). These two continua are further supplemented by so-called *risk and resilience factors*, which can promote or compromise mental health (Meier & Reinecke, 2021). Building on this model, the review examines the dimensions of mental health studied in the research field and whether there are differences across research disciplines.

RQ6: What dimensions of mental health are considered in the studies on social comparisons on social media and mental health across disciplines?

Method

Scoping Review as a Method of Research Synthesis

Scoping reviews have become increasingly important as a method of knowledge synthesis with the goal of determining the scope of research literature on a topic and thereby identifying the available evidence in a research field (Colquhoun et al., 2014; Munn et al., 2018; Pham et al., 2014). Colquhoun et al. (2014, pp. 1292–1294) define scoping reviews “[as] a form of knowledge synthesis that addresses an exploratory research question aimed at mapping key concepts, types of evidence, and gaps in research related to a defined area or field by systematically searching, selecting, and synthesizing existing knowledge.” Although scoping reviews have been used only sporadically in Communication studies (e.g., Karnowski & Sukalla, 2018; Wolfers & Schneider, 2021), they are particularly useful in the context of heterogeneous research fields such as media effects or mental health research (Pham et al., 2014).

Systematic Literature Search

We combined several search strategies to identify as many relevant papers as possible. For an overview of the literature search and the construction of the database, see the PRISMA flowchart in Figure A1 in the appendix (Page et al., 2021).

First, the review builds on a literature base generated from multiple systematic literature searches on the relationship between computer-mediated communication and mental health conducted by Meier and Reinecke (2021) and Meier, Domahidi, and Günther (2020). Since details of these literature searches are presented in the corresponding papers, a more detailed description of the procedure is omitted here. [1] The integrated and deduplicated literature base from these two reviews ($n = 2,218$ publications) was setup as a Citavi database and then adapted to our research interest in a stepwise procedure consisting of two successive steps of coding. In the first step, a pre-selection of potentially relevant articles was determined by title and abstract screening. Based on four previously defined inclusion and exclusion criteria, described in more detail below, we identified all articles investigating the relationship between social

comparisons on social media and mental health.

In this step, all (1) *primary studies* were included in the initial sample that addressed (2) *social comparison on social media* as well as (3) *mental health*. Additionally, (4) papers dealing solely with *appearance comparison* were excluded, as this subfield is already comprehensively examined in a meta-analysis by Saiphoo and Vahedi (2019). To identify articles in the database dealing with social comparisons on social media (inclusion criterion 2), all titles as well as the abstracts of the articles were screened within the Citavi search function using an iteratively developed search string (see Table A1 in the appendix) that combined terms referring to different forms of social comparison as well as terms referring to social media in general as well as specific social media platforms (e.g., Twitter, Instagram, and Pinterest) in specific. Studies had to examine comparisons that occurred on social media. We defined social media as computer-mediated communication channels that enable synchronous or asynchronous interpersonal or mass media communication (Bayer et al., 2020). According to this definition, we considered social networking sites, messengers, blogs, forums, and chat rooms as social media. Based on this targeted search, 141 potentially relevant articles were identified in the Citavi database. These papers, and four additional papers identified through expert recommendations, were then manually checked. Through this manual title and abstract screening, the papers were checked for inclusion based on the other three inclusion criteria (1, 3, 4). This resulted in an initial literature base of 99 relevant publications. The original literature searches that the Citavi database relied on covered studied published until the end of 2019.

Therefore, secondly, a full-text search in Google Scholar was performed in August 2022 to identify the most recent publications since 2020. To this end, the search string from the Citavi search was slightly modified and adapted. The search was restricted to the period from 2020–2022 and was conducted with four separate search strings (see Table A1 in the appendix), due to inherent limitations of the Google Scholar search function. For each of the four searches, we extracted the first 50 hits (i.e., the first 5 pages with 10 hits per page). Of these 200 hits identified via Google Scholar, 61 papers were duplicates within Google Scholar and five other papers were already identified by the previous search. Thus, we were able to identify 134 additional publications for further screening.

Third, our literature sample was supplemented by a citation search using fourteen relevant reviews from the broader research field of social media and mental health (see Appel et al., 2016; Bayer et al., 2020; High et al., 2022; Krause et al., 2021; Kross et al., 2021; Meier & Johnson, 2022; Steers, 2016; Valkenburg, 2022; Verduyn et al., 2017; Verduyn et al., 2020; Verduyn et al., 2022; Wenninger et al., 2021; F.-R. Yang et al., 2019; Yoon et al., 2019). The articles referenced in these reviews were checked for inclusion based on their titles and compared with previously found articles to identify missing papers. Thereby, we found another 15 relevant publications and included them in the sample. Together, these three search strategies resulted in a preliminary sample of 248 potentially relevant publications.

Finally, the first author coded the full texts of these 248 papers. For this purpose, the articles were exported from the Citavi database to an Excel file and assigned case IDs and random numbers in alphabetical order. The subsequent full text coding was done in the accordingly randomized order. Articles were again screened for relevance based on previously defined inclusion and exclusion criteria (see Table A2 in the appendix). The four criteria used in the previous abstract coding were adopted and supplemented by additional criteria. In summary, papers had to meet the following criteria to be included in the final sample: (1) They had to be in English, (2) empirically operationalize or manipulate social comparisons, (3) examine social comparisons in the context of social media, (4) measure at least one indicator of mental health according to the Extended Two-Continua Model of Mental Health, and (5) consider only nonclinical samples. In addition, (6) the article and (7) the data set used should only be included once in the sample, (8) the full text had to be retrievable, and (9) the article had to be a quantitative (10) primary study (11) at the microlevel (i.e., focus on psychological processes). This full-text screening resulted in a final sample of 115 relevant articles.

Data Extraction

To extract data from the included papers, a standardized Excel form was used. As part of full-text coding, all retained articles were coded regarding central characteristics that are relevant for a description and systematization of the research field. At the article level, we coded the *national affiliation* and *discipline* of the first author. At the study level, we registered important *sample information* (population, size, age,

and gender distribution) and *research design*. Concerning the key constructs of our study, we coded the *comparison directions* (upward, downward, lateral, non-specified, and multiple) and *comparison dimensions* (attractiveness, performance & skills, finances & material possessions, social interaction, values & opinions, happiness, experiences, life, and global comparison).^[2] We further coded the *mental health indicators* and their *overarching mental health dimension* according to the Extended Two-Continua Model of Mental Health (internalizing psychopathology, externalizing psychopathology, hedonic well-being, eudaimonic well-being, risk and resilience factors).

Results

Data analysis was performed in SPSS Statistics 23. A table of all included studies with details of study characteristics such as authors, year of publication, population, and sample size is included in the appendix (see Table A3).

Study Characteristics

A total of 115 relevant articles were identified, including 131 original studies matching the inclusion criteria of the review. The articles were published between 2011 and 2022. On average, 381 participants were recruited per study ($SD = 331.51$, $Min = 65$, $Max = 1,621$), with a total of 49,915 participants across all studies. Mean age of respondents was 24.34 ($SD = 4.76$), and on average, the samples consisted of 64.59% women ($SD = 15.84$).

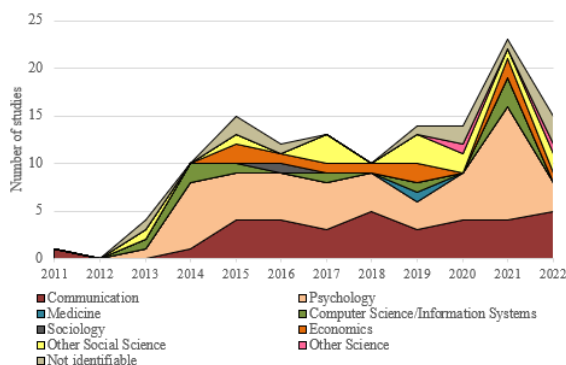
Field Description

First, we were interested in how publication rate varies over time and across disciplines (RQ1). Over time, the number of studies steadily increased from zero to 15 publications per year between 2012 and 2015 (see Figure 1). In subsequent years until 2020, the publication rate fluctuated between 10 and 14 studies per year, peaking at 23 studies in 2021. For the last reviewed year, there was a slight decrease in the publication rate by eight studies, that is, we found a total of 15 studies published by September 2022. However, it should be noted that the literature search does not cover the entire year 2022. Based on first author discipline, about 38% of the studies ($n = 50$) originated from Psychology, and another 26% ($n = 34$) from Communication. Moreover, Computer Science/Information Systems ($n = 9$, 7%), Economics

($n = 10$, 8%), Medicine ($n = 1$, 1%), Sociology ($n = 1$, 1%), Other Social Sciences ($n = 13$, 10%), and Other Sciences ($n = 2$) contributed to the research field. For 11 studies (8%), the discipline of the first author could not be identified.

Figure 1.

Publication Rate Between Disciplines Over Time

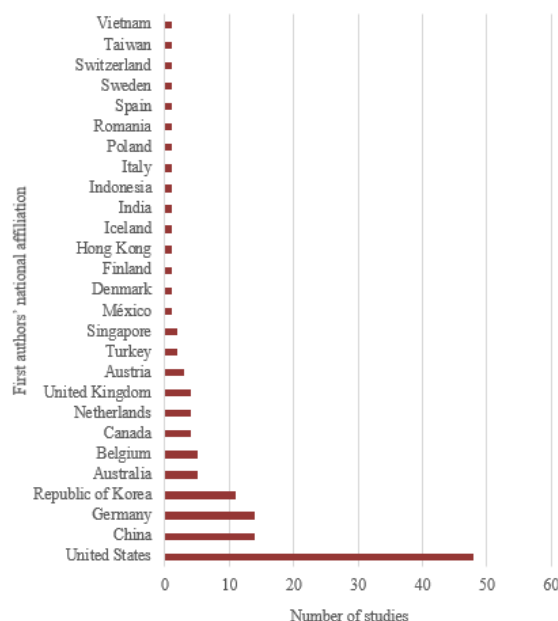


Note. $N = 131$ studies.

The second research question (RQ2) referred to the national affiliation of the first authors' universities to approximate the international scope of the research field. We identified 27 different countries in which the first authors were employed at the time of publication (see Figure 2). The distribution was extremely skewed. For example, there were 15 countries (e.g., Denmark, Italy, India, and Taiwan) where only one first author originated from. More than a quarter of the first authors were from the United States ($n = 48$, 36%), 11% ($n = 14$) were from China and Germany, respectively, and another 8% ($n = 11$) from the Republic of Korea. Accordingly, about three-quarters of the studies could be assigned to research institutions from these four countries (US, China, Germany, South Korea).

Figure 2.

National Affiliation of First Author

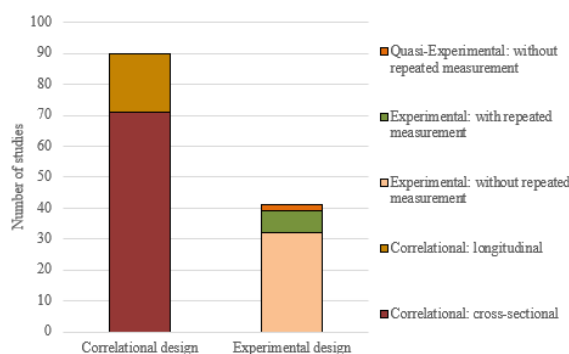


Note. $N = 131$ studies.

Research question three (RQ3) asked about the field's publication outlets. About 86% ($n = 112$) of the 131 studies were published in scientific journals (see Figure 3). The remaining 19 studies in the sample were unpublished university publications or conference papers. Data analysis also showed that the 112 published studies appeared in a total of 44 different journals. However, 27 of these journals published only one study in our sample. Accordingly, the distribution was highly skewed, and a large proportion of the studies were published in a few journals. The journal *Computers in Human Behavior* published the most studies ($n = 21$), followed by *Cyberpsychology, Behavior, and Social Networking* ($n = 10$), and *Media Psychology* ($n = 7$) as well as *Personality and Individual Differences* ($n = 7$).

Figure 3.*Relevant Journals of the Field*Note. $N = 112$ published studies.

The last research question (RQ4) in this section focused on the studies' research designs. We found that more than two-thirds of the studies (69%) used a correlational design, and that correlational studies ($n = 90$) therefore dominated over (quasi-)experimental studies ($n = 41$). Furthermore, only 26 of the 131 studies (20%) collected data at two or more different measurement points, meaning that most research in this area does not rely on repeated measurement (i.e., within-person) designs (see Figure 4).

Figure 4.*Research Designs*Note. $N = 131$ studies.

Comparison Directions and Dimensions

The fifth research question (RQ5) focused on the comparison directions and dimensions investigated in the research field. Regarding the comparison directions, we found that about 41% of the studies ($n = 54$) examined only upward comparisons. In another 41% of the studies ($n = 54$), multiple comparison directions were measured. None of the studies focused exclusively on downward or lateral comparisons (see Table 1). The remaining studies focused on comparisons with non-specified direction ($n = 23$, 17%), that is, examining only whether a comparison occurred without specifying a comparison direction.

Table 1.*Comparison Directions*

	n	%	Cumulated %
Upward comparisons	54	41.22	41.22
Multiple comparison directions	54	41.22	82.44
Non-specified comparison direction	23	17.56	100
Sum	131	100	

Note. $N = 131$ studies.

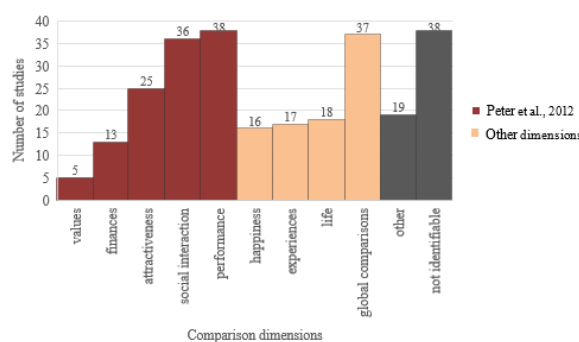
Regarding the comparison dimensions, we found a range of one to eight dimensions and a mean of 2.40 ($SD = 1.84$). Almost one third of the studies focused only on one comparison dimension ($n = 42$, 32%). In about 15% of the studies ($n = 20$) two dimensions were addressed, and 24% of the studies ($n = 32$) focused on more than two dimensions. In more than a quarter of the studies ($n = 37$, 28%), the type and number of comparison dimensions could not be clearly determined. This was the case, for example, when a scale addressed different dimensions, but the full paper only stated exemplary dimensions or items and did not specify which and how many dimensions were queried in total.

Furthermore, we analyzed the specific dimensions addressed in the studies in more detail, revealing central differences among studies (see Figure 5). Once again, it must be noted that in 37 studies (28%) the comparison dimensions were not identifiable. With regard to the comparison dimensions proposed by Peter et al. (2012), the dimensions performance ($n = 38$, 29%) and social interaction ($n = 36$, 28%) were examined most frequently. Twenty-five studies (19%) addressed comparisons regarding attractiveness, 13

studies (10%) examined the financial dimension and five studies (4%) focused on values. Beyond these five dimensions derived from existing literature on social comparison theory, we were able to identify additional comparison dimensions that were relevant in empirical studies. For example, 18 studies (14%) focused on comparisons related to life as a whole (e.g., situation in life; others have a better life), 17 studies (13%) addressed comparisons in terms of personal experiences (e.g., travel), and 16 studies (12%) examined the dimension of happiness (e.g., others are happier). In addition, 37 studies (28%) examined global comparisons, for example, by asking whether people feel overall superior or inferior to others after comparing themselves on Facebook. 19 studies (15%) addressed other comparison dimensions that could not be assigned to any of the dimensions described so far (e.g., lifestyle, fitness).

Figure 5.

Comparison Dimensions



Note. $N = 131$ studies. The figure shows how many studies addressed each dimension, whereby one study could address several dimensions. Thus, studies are included several times if they considered more than one comparison dimension.

Mental Health Operationalization

The last part of the review focused on the operationalization of mental health. Research question six (RQ6) asked about the dimensions of mental health studied and whether there were differences between disciplines.

Across all studies, 375 mental health indicators were assessed with a range of one to 14 indicators per study and an average of about three indicators per study ($M = 2.84$, $SD = 2.09$). However, most studies assessed either one indicator ($n = 33$, 25%) or two indicators ($n = 44$, 34%), suggesting that this average is affected by outliers (i.e., studies including many mental health indicators). Twenty-one studies included three indicators (16%), 12 studies collected four indicators

(9%), and 21 studies measured more than four indicators (16%). When multiple indicators were examined in one study, these indicators did not necessarily belong to the same mental health dimension: more than half of the studies examined indicators of different dimensions ($n = 76$, 58%), whereas the remaining studies assessed only one dimension each ($n = 55$, 42%).

We then examined how many studies assessed psychopathology indicators, psychological well-being indicators, resilience, and risk factors. The analysis revealed that psychological well-being was most frequently examined. About two-thirds of all studies measured at least one indicator of psychological well-being ($n = 83$, 62%), while psychopathology was examined in only 38% of all studies ($n = 51$). In addition, resilience factors were assessed in more than half of all studies ($n = 69$, 52%), whereas only 16 studies included risk factors (12%).

Within the sample of 375 indicators of mental health, hedonic well-being was measured most frequently.^[3] While 42% ($n = 156$) of all indicators measured hedonic well-being, eudaimonia – the other dimension of psychological well-being – was measured by only 8% ($n = 29$) of all indicators. Looking at hedonic indicators only, 30% measured affective states ($n = 47$), 21% ($n = 32$) assessed life satisfaction and discrete emotions, respectively, 12% addressed mood ($n = 18$), and 17% other forms of hedonic well-being ($n = 27$, e.g., domain-specific satisfaction, subjective well-being). The eudaimonic indicators covered inspiration ($n = 8$, 28%), belongingness ($n = 4$, 14%), meaningfulness ($n = 3$, 10%), and other constructs such as vitality and self-actualization ($n = 14$, 48%). With regard to psychopathology, it became apparent that only one indicator (hostility) referred to externalizing psychopathology (0.3%), whereas 19% of all mental health indicators measured internalizing psychopathology ($n = 72$). Of the 72 internalizing psychopathology indicators, 42% captured depressive symptoms ($n = 30$), 19% anxiety ($n = 14$), and the remaining 39% other psychopathological symptoms ($n = 28$, e.g., rumination, problematic media use). The remaining 109 indicators were risk ($n = 20$, 5%) and resilience factors ($n = 89$, 24%). Within the resilience factors, self-esteem ($n = 68$, 76%) was most frequently examined, followed by social support ($n = 5$, 6%), self-worth ($n = 4$, 5%) and other factors ($n = 12$, 14%). Focusing on risk factors, loneliness and fear of missing out were assessed in five indicators (25%) each, whereas the remainder captured other risk factors such

as self-consciousness or information overload ($n = 10$, 50%). Eight indicators (2%) could not be assigned to any of the dimensions of the Extended Two-Continua Model and were categorized as unclassifiable. This was the case, for example, when a mean index was calculated from several items belonging to different dimensions (e.g., mental health, upward assimilative emotions).

Analyzing the number of indicators per dimension compared across disciplines, it became apparent that research on psychopathology was mostly conducted in Psychology (see Table A4 in the appendix): indicators of internalizing psychopathology ($n = 36$, 50%) as well as externalizing psychopathology ($n = 1$, 100%) have been studied primarily by first authors from Psychology and were of minor interest in other disciplines, such as Communication (internalizing psychopathology: $n = 7$, 10%; externalizing psychopathology: $n = 0$, 0%). Regarding psychological well-being, hedonic well-being was most frequently studied by authors from Communication ($n = 57$, 37%), followed by Psychology ($n = 46$, 29%) and Other Social Sciences ($n = 10$, 6%). Eudaimonic well-being, on the other hand, was approximately equally studied in Psychology ($n = 9$, 31%) and Communication studies ($n = 8$, 28%). Looking at risk and resilience factors, we found that the few risk factors are more or less evenly distributed across different disciplines (e.g., six in Psychology, 30%; four in Communication, 20%; three in Computer Science/Information Systems, 15%). Resilience factors, on the other hand, are mainly studied in Psychology ($n = 42$, 47%) and somewhat less frequently in Communication ($n = 25$, 28%). A comparison of the two disciplines with the highest publication output in the research field showed that the ratio of the dimensions studied was much more balanced in Psychology than in Communication. Thus, internalizing psychopathology, hedonic well-being, and resilience factors were about equally prevalent in Psychology. In Communication studies, on the other hand, the focus was primarily on hedonic well-being, followed by resilience factors, which were studied less than half as often.

Discussion

The relationship between computer-mediated communication and mental health has been part of the scientific as well as public discourse for decades and the role of social comparison in this context is regarded as central by researchers and social media companies

alike (Burke et al., 2020; Meier & Johnson, 2022). As more and more people are using social media in their daily lives (Beisch & Schäfer, 2020), research interest is growing and the field is becoming more and more complex (Meier, Domahidi, & Günther, 2020; Verduyn et al., 2020). In such fragmented research fields, the need for systematic knowledge syntheses increases in order to gain sound insights despite considerable variability in operationalizations (Card, 2012). The present scoping review works towards greater research synthesis by providing an overview of studies on social comparison on social media and mental health.

With regard to the first research objective, the results revealed an upward trend in the publication rate since 2012, with Psychology showing the largest publication output. This dominance of Psychology also became apparent with regard to the two most relevant publication outlets – *Computers in Human Behavior* and *Cyberpsychology, Behavior and Social Networking* – since both are psychological journals (see also Meier, Domahidi, & Günther, 2020). Following the argumentation of Meier, Domahidi, and Günther (2020), the research field could benefit from becoming more interdisciplinary in the future, as this would provide a more comprehensive understanding of the relationship of the two key constructs – social media and social comparison – beyond the psychological perspective. Although the particular interest in the topic from Psychology can be explained by the fact that social comparison and mental health are core psychological constructs, other disciplines can help to expand the understanding of the reciprocal relationship through their respective professional expertise. Psychological research typically focuses primarily on individuals' cognitions, affects, and behaviors; yet, from a Communication perspective, for example, a stronger focus on social interaction as a process of message exchange (interaction level) or the effect of different types of content (content level) could provide new insights (Meier & Reinecke, 2021). As our findings on the operationalization of mental health illustrate, the Communication perspective also offers a stronger focus on positive outcomes and thus complements the more psychopathology-oriented perspective of psychological research. Similarly, from a Computer Science/Information Systems perspective, technological features and affordances of social media and their role in the relationship between social comparison and mental health could further broaden the perspective of social comparison and social media research. Currently, this literature mainly investigates offline psychological processes in an online context,

often without specifying, measuring, or manipulating what makes an online context (e.g., a social media app or feature) unique (Meier & Johnson, 2022). In terms of national affiliation, the first authors of the studies were employed in 27 different countries at the time of publication. While this finding may indicate a diverse international orientation of the research field and cultural diversity on first sight, a closer look revealed a dominance of the United States as well as China, Germany, and the Republic of Korea. It seems plausible that the size of a nation affects its publication output. Since the US and China are particularly large, a higher publication output is to be expected. However, this does not change the clearly documented dominance of a few nations in the field.

Overall, these results indicated that the research field is dominated by a few disciplines and nations, which could point to “invisible colleges” among researchers within certain countries and disciplines. This may potentially inhibit international as well as interdisciplinary exchange and favor the emergence of certain research traditions within national boundaries or disciplines (Schott, 1991; Zuccala, 2006). However, any interpretation must consider that national affiliation does not permit a conclusive assessment of the international orientation or diversity of the research field. For one, national affiliation does not provide information about the first authors’ nationality or cultural background, but only about the country in which they were employed at the time of publication. On the other hand, only the affiliation and discipline of the first author was considered, while those of the co-authors were neglected.

The analysis of the research designs showed that almost two thirds of the studies followed a correlational approach, and that longitudinal within-person evidence is an exception in the research field. Although the effects of social media social comparison on well-being assume within-person changes, the studies largely considered between-person associations (Valkenburg et al., 2016). These correlational studies are therefore unable to provide conclusive information about the effects of social comparisons. The large number of correlational studies and studies with only one measurement point makes it difficult to draw conclusions about causal relationships. To answer the question of causality in this research field, more experimental studies and longitudinal designs will be needed in the future (see McComb et al., 2023, for a recent meta-analysis of experimental studies).

The second aim of the review was to shed light on the comparison directions and dimensions studied in the field. While social comparison theory suggests a clear distinction between upward, downward, and lateral comparisons (Corcoran et al., 2011), the latter two seem to play a minor role in the empirical research. Numerous studies dealt solely with upward comparisons, whereas no study focused exclusively on downward or lateral comparisons. Nevertheless, the theoretical distinction of the comparison directions was considered in 41% of the studies that examined several comparison directions. The large number of studies addressing only upward comparisons can likely be explained by the nature of the research object, social media. Social media are characterized by a positivity bias (Qiu et al., 2012) and favor positive self-representation among users (Appel et al., 2016; Toma, 2017). This makes upward comparisons more likely and may explain the high research interest. Nevertheless, a more balanced view on different forms of comparisons, their mutual interaction, and combined effects appears highly desirable for future research.

The analysis of the comparison dimensions showed that the typology of five comparison dimensions proposed by Peter et al. (2012) does not correspond to the variety of dimensions actually examined in the research field reviewed. One reason for this may be that the dimensions presented in Peter et al. (2012) were identified in the context of TV use, whereas we focused on social media. Hence, on social media – compared to TV use – there seem to exist additional relevant comparison dimensions (such as happiness or experience). This assumption is supported by Krasnova et al. (2015), who identify twelve categories of envy-triggering objects on social networking sites,^[4] which largely correspond to the comparison dimensions extracted in the present review. Since the findings of both studies are similar, and envy is clearly associated with upward comparison, it seems useful to consider these comparison dimensions in further theory building. Another finding of our analysis is that we were unable to identify the type and number of comparison dimensions for more than a quarter of the studies based on the reported information. This points to a reporting problem within the field. On the one hand, it is important to measure social comparison accurately. On the other hand, however, these measurements must be reported in sufficient detail.

The third part of the review addressed the operationalization of mental health. The analyses showed that empirical research has focused primarily

on the study of psychological well-being and that psychopathology has been considered less frequently. Taking into account that Psychology dominated the research field, the interest in psychological well-being may indicate a strong influence of “Positive Psychology” in the field (see F.-R. Yang et al., 2019). Positive Psychology generally examines the conditions and factors that lead to optimal functioning of individuals (Gable & Haidt, 2005), and thus is closely related to psychological well-being. A closer look at the dimensions revealed that, with regard to psychopathology, mainly internalizing psychopathology symptoms and, with regard to psychological well-being, mainly hedonic well-being were examined. In addition, findings demonstrated that mental health is often operationalized by resilience factors, suggesting that a comprehensive conceptualization of mental health should take such factors into account. Since resilience and risk factors are not considered in the majority of current mental health models (Meier & Reinecke, 2021), this finding emphasizes the potential usefulness of the Extended Two-Continua Model of Mental Health (Meier & Reinecke, 2021) to further advance and integrate the research field.

Furthermore, the findings revealed discipline-related differences in the constructs or dimensions of mental health examined. While Communication primarily considered psychological well-being, the relationship between psychological well-being, psychopathology and resilience factors was more balanced in Psychology. These findings point to different research agendas across disciplines and support the call for an interdisciplinary opening of the field to counteract a one-sided investigation of mental health. However, the results also showed that there were many studies that examined mental health with more than one indicator and including several perspectives on mental health. This, in turn, suggests that a more sophisticated and multidimensional understanding of mental health is relatively prevalent in this research field.

Limitations and Research Desiderata

The findings of the present review must be considered in light of some limitations. A first limitation refers to the fact that both the literature search and the actual coding were carried out by only the first author. This poses the risk that the review may be biased by subjective assessments and, despite all efforts, may not be objective or intersubjectively comprehensible. Second, neither inter- nor intra-coder reliability was tested. Thirdly, with regard to the inclusion and

exclusion criteria, it must be critically noted that studies were only included in the sample if social comparisons were operationalized in the context of social media, and this was explicitly stated in the wording of the items. Accordingly, a study was excluded, for example, if the use of social media was experimentally manipulated, but the subsequent questions about social comparisons were general and it was not clear from the wording that explicit comparisons on social media were measured. This may be problematic in that, although the link between social comparison and social media use was not made explicit, participants may have made this link on their own when answering the question. Thus, this exclusion criterion probably led to the exclusion of some experimental studies that might be relevant to the general research field. A further limitation resulting from the inclusion criteria is, fourth, that only quantitative papers in English were included. Although the focus on English-language papers makes our review internationally accessible and replicable, relevant articles in other languages remain disregarded. Fifth, we updated the original literature base in 2022 only through a Google Scholar search to find relevant papers published between 2020 and 2022. To increase the number of relevant studies identified, additional databases could be searched.

With regard to social comparison theory, the review only examined the comparison directions and dimensions. Further investigations should focus on other theoretical assumptions besides these two aspects, such as the cognitive orientation towards similarities or differences (*assimilation* vs. *contrast*) as well as *comparison motives* (e.g., self-improvement or self-enhancement). Moreover, due to resource limitations of our review, we did not analyze which social media platforms and which forms of social media use were investigated in the research field. Since knowledge about this can reveal further research gaps in the field and may explain divergent study findings, this would be an interesting starting point for future studies.

Conclusion

Despite these limitations, the present review provides a much-needed mapping of how the relationship between social comparisons on social media and mental health has been studied so far. Our scoping review was able to contribute to a structural and conceptual systematization of the research field. In summary, the findings illustrated that there is currently still little systematic integration of individual studies into a

theoretically coherent overall context, despite this research being grounded in a well-established psychological theory (i.e., social comparison theory). To contribute to further integration, it might be helpful to draw on the Extended Two-Continua Model of Mental Health (Meier & Reinecke, 2021), which proved a useful tool for systematizing the identified studies. However, it should be noted that research on dimensional approaches in psychopathology is still ongoing and the mental health model may need to be updated to include additional psychopathology dimensions in the future (Meier & Reinecke, 2021). Moreover, the research field could benefit from a larger number of experimental as well as longitudinal studies that allow conclusions about causal relationships. Experience sampling studies may be particularly useful in this context, as they allow the investigation of between-person versus within-person associations in situ, with a high external validity, and over a longer time period. In this way, not only short-term effects but also long-term and prospective effects of social media social comparisons could be identified (Appel et al., 2016). Despite our efforts to further integrate this research field and these first insights, the process of research synthesis is not yet completed with the present scoping review; rather our evidence map serves as a starting point for further synthesis such as statistical meta-analyses.

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Endnotes

[1] The authors combined multiple literature search methods and updated their searches several times. First, they conducted standardized academic database searches within the meta-database EBSCO Host and other databases (EBSCO: Business Source Premier, Communication Abstracts, EconLit, LISTA, PSYINDEX; ScienceDirect; and Web of Science). These database searches were supplemented by citation searches, reference searches, and Google Scholar title searches. The identified literature corpus includes journal articles, dissertations, and conference proceedings published between 1995 and 2019.

[2] The initial five dimensions were adopted from Peter et al. (2012) and the remaining dimensions were developed inductively on the material.

[3] In contrast to the previous analyses, the data analysis presented below was conducted at the indicator level rather than at the study level. This means that the number of included cases did not represent the number of all studies ($n = 131$), but the totality of mental health indicators ($n = 375$).

[4] Main categories of objects of envy according to Krasnova et al. (2015): Travel and Leisure, Relationship and Family, Success (in: Money and Material Possessions), Success (in: Job), Success (in: Studies), Success (in: General/Other), Social Interaction, Appearance, Personality, Abilities, Happiness, Other (e.g., Lifestyle, Experience).

Appendix

Figure A1.

PRISMA Flow Diagram

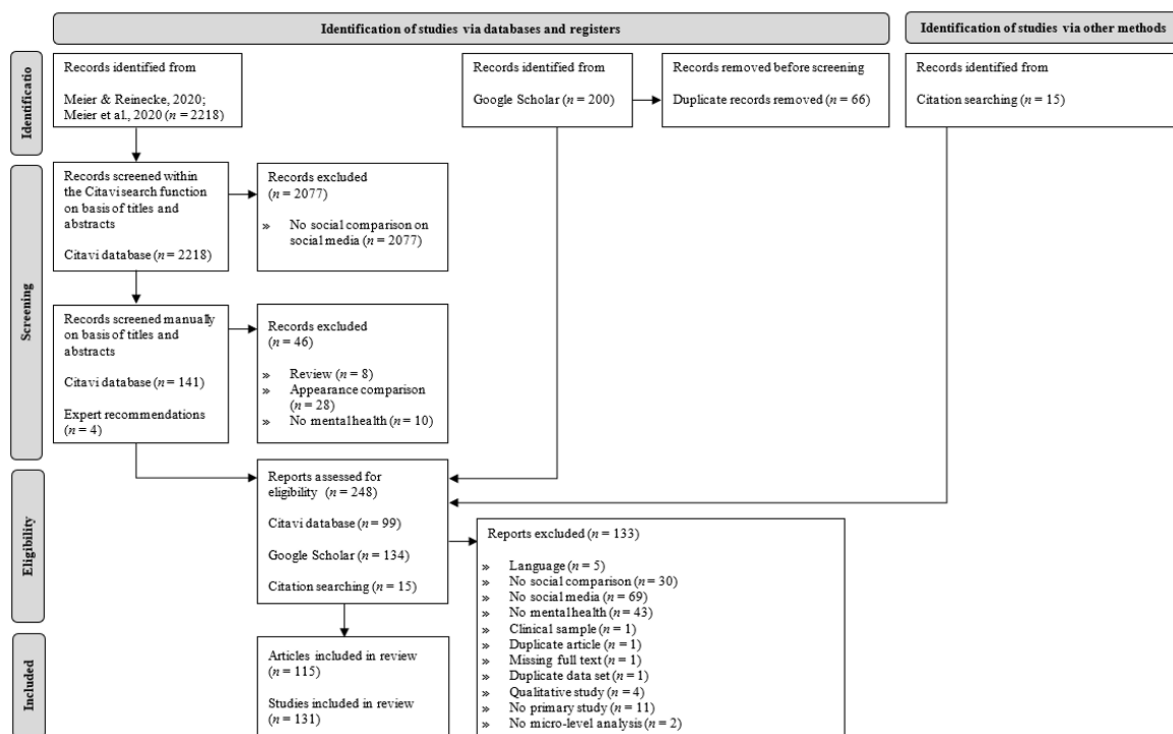


Table A1.*Search Strings***Citavi Search String**

("social comparison" OR envy OR envious* OR "upward comparison" OR "down-ward comparison" OR "social comparative" OR "comparison process*") AND ("social media" OR "social network*" OR "social-network*" OR SNS OR Facebook OR Twitter OR Instagram OR Snapchat OR Pinterest OR Tumblr OR Reddit OR YouTube OR WhatsApp OR WeChat OR QQ OR QZone OR Weibo OR Skype OR Line OR Xing OR LinkedIn OR TikTok OR "instant mess*")

Google Scholar Search Strings

"social comparison" AND ("social media" OR "social network*" OR "social-network*" OR SNS OR Facebook OR Twitter OR Instagram OR Snapchat OR Reddit OR YouTube OR WhatsApp OR WeChat OR QZone OR Weibo OR TikTok OR "instant mess*")

envy AND ("social media" OR "social network*" OR "social-network*" OR SNS OR Facebook OR Twitter OR Instagram OR Snapchat OR Reddit OR YouTube OR WhatsApp OR WeChat OR QZone OR Weibo OR TikTok OR "instant mess*")

"upward comparison" AND ("social media" OR "social network*" OR "social-network*" OR SNS OR Facebook OR Twitter OR Instagram OR Snapchat OR Reddit OR YouTube OR WhatsApp OR WeChat OR QZone OR Weibo OR TikTok OR "instant mess*")

"downward comparison" AND ("social media" OR "social network*" OR "social-network*" OR SNS OR Facebook OR Twitter OR Instagram OR Snapchat OR Reddit OR YouTube OR WhatsApp OR WeChat OR QZone OR Weibo OR TikTok OR "instant mess*")

Note. The search in Google Scholar was repeated four times, using one of the search strings each time.

Table A2.*Description of the Inclusion and Exclusion Criteria in Detail*

Criteria	Description
(1) language	Due to the international nature of the research field, only English-language papers were considered in order to make the review accessible to the entire research field and to ensure the replicability of the results.
(2) social comparison	Only papers that examined social comparisons in the context of an empirical study were included. To meet this criterion, the method and/or results section of a paper had to clearly indicate that social comparisons were operationalized or manipulated in some way. A theoretical argument along the lines of social comparison theory without an appropriate operationalization was not sufficient (e.g., Burke & Kraut, 2016; Dion, 2016; Holmgren & Coyne, 2017). If it was apparent from the full text that only appearance comparison was being investigated, this paper was also excluded (e.g., Strubel et al., 2018). In addition, papers were excluded if the social comparison items were aggregated with other items to form a global index and were not analyzed separately (e.g., Nesi et al., 2017; A. R. Smith et al., 2013; Ouwerkerk & Johnson, 2016).
(3) social media	The scoping review was only interested in social comparisons on social media. If a paper operationalized social comparison processes but did not refer to social media but only to an offline context, it was excluded. The reference to social media had to be explicit in the formulation of the operationalization. If this was not the case, the article was excluded (e.g., Alfasi, 2019; Burnell & Kuther, 2016; Clark et al., 2018; Ferguson et al., 2014).
(4) mental health	We only included those papers that measured at least one indicator of the Extended Two-Continuum Model of Mental Health. This covers indicators of psychopathology and psychological well-being as well as risk and resilience factors. However, if no indicator of mental health in terms of the Extended Two-Continuum Model was assessed, the paper was excluded (e.g., Burke et al., 2020; Latif et al., 2021; Wenninger et al., 2019).
(5) non-clinical sample	To draw conclusions about the general population, only non-clinical samples were considered. Papers examining a sample consisting only of physically or mentally ill participants were excluded. Since according to this criterion only participants without (chronic or acute) illnesses or limitations should be considered, samples consisting of special education classes were also excluded (see Nesi & Prinstein, 2015).
(6) duplicate article	Papers were only allowed to be included once in the sample. If the full text of a paper was already coded once, the duplicate paper had to be excluded (e.g., Krasnova et al., 2013).
(7) duplicate data set	Each data set was considered only once in the sample. If a dataset was analyzed in several articles and one of these articles was already coded in the full-text coding, the second article with the identical dataset was excluded (see Tromholt et al., 2015).
(8) missing full text	The full texts of the articles had to be retrievable through the online licenses of the Johannes Gutenberg University Mainz, the Friedrich Alexander University Erlangen-Nuremberg or the Ludwig Maximilian University Munich. If the full text of an article could not be found even after intensive online search, the article had to be excluded (see Kik, n.d.).
(9) quantitative study	If a paper presented qualitative rather than quantitative evidence, the paper was excluded (see Fox & Moreland, 2015; Stefanita et al., 2018; Weinstein, 2018).
(10) primary study	Non-empirical as well as non-scientific papers such as reviews, commentaries, opinion articles, or case studies were excluded (see Clark et al., 2018; Uhler, 2015; Wiederhold, 2016).
(11) no micro-level analysis	Only articles examining the relationship between social comparisons on social media and mental health at the personal level, i.e., the micro level, were included. Studies on the meso or macro level were not considered.

Table A3.*Study Overview*

ID	Study	Discipline	Sample	Affiliation	N	Age (M) ^a	Age (SD) ^a	Prop. of women ^b (%)	Design ^c
1	Appel et al., 2015	Psychology	Other	Germany	89	27.45	8.1	85	Quasi-experimental: without repeated measurement
2	Balaban & Spoaller, 2020	Communication	Emerging Adults	Romania	411	22.06	4.89	62.5	Correlational: Cross- Sectional
3	Burnell et al., 2020	Other Social Science	Emerging Adults	United States	134	22.15	0.48	55	Correlational: Longitudinal
4	Burnell et al., 2019	Other Social Science	Students	United States	717	21.47	4.64	69	Correlational: Cross- Sectional
5	Chae, 2018a	Communication	Other	Singapore	1064	29.3	5.32	100	Correlational: Longitudinal
6	Chae, 2018b	Communication	Other	United States	782	29.3	5.32	100	Correlational: Longitudinal
7	Choi & Kim, 2021 (study 1)	Communication	Students	Republic of Korea	133	23.62	3.23	71.43	Quasi-experimental: without repeated measurement
8	Choi & Kim, 2021 (study 2)	Communication	Other	Republic of Korea	117	23	2.91	61.54	Correlational: Longitudinal
9	Chow & Wan, 2017	Psychology		Hong Kong	282	33.19	10.1	30.85	Correlational: Cross- Sectional
10	Coyne et al., 2017	Other Social Science	Other	United States	749	30.38	5.15	100	Correlational: Cross- Sectional
11	Cramer et al., 2016	Communication	Students	United States	267	23.63	6.06	67	Correlational: Cross- Sectional
12	Cretti, 2014	Psychology	Other	United States	656	29.23	7.17	100	Correlational: Cross- Sectional
13	de Vries & Kuhne, 2015	Communication	Emerging Adults	Netherlands	231	22.3	2.2	69	Correlational: Cross- Sectional
14	de Vries et al., 2018	Communication		Netherlands	126	21.4	2.4	81	Experimental: without repeated measurement
15	Dibb & Foster, 2021	Psychology	Other	United Kingdom	114	35.65	15.1	80.8	Correlational: Cross- Sectional
16	Ding et al., 2017	Psychology	Students	China	707	19.06	1.12	50	Correlational: Cross- Sectional
17	Dündar & Tufan, 2022		Other	Turkey	205			67.81	Correlational: Cross- Sectional
18	Faranda & Roberts, 2019	Psychology	Other	Australia	181	21.9	2.14	71.82	Correlational: Cross- Sectional
19	Feinstein et al., 2013	Psychology	Students	United States	268	19.66	2.29	62	Correlational: Longitudinal
20	Frison & Eggermont, 2016	Communication	Adolescents	Belgium	1621	14.76	1.41	48	Correlational: Longitudinal

ID	Study	Discipline	Sample	Affiliation	N	Age (M) ^a	Age (SD)	Prop. of women ^b (%)	Design ^c
21	Gerson et al., 2016	Psychology	Other	United Kingdom	337	36.5	11.3	60	Correlational: Cross-Sectional
22	Greitemeyer, 2016 (study 1)	Psychology	Other	Austria	509	23	4.5	70	Experimental: without repeated measurement
23	Greitemeyer, 2016 (study 2)	Psychology	Other	Austria	479	26.1	9.8	77	Experimental: without repeated measurement
24	Guðlaugsdóttir, 2016	Psychology	Other	Iceland	136	28.67		100	Correlational: Cross-Sectional
25	Haferkamp & Krämer, 2011	Communication	Other	Germany	103	23.11	3.44	58	Experimental: without repeated measurement
26	Hanna et al., 2017	Other Social Science	Students	United States	1104	19.23		62.5	Correlational: Cross-Sectional
27	Hansen, 2016	Psychology	Students	United States	119	29.87		78	Correlational: Cross-Sectional
28	He et al., 2020	Other Social Science	Students	China	668	20.05	1.38	55	Correlational: Cross-Sectional
29	Hughes, 2016		Other	United States	108	22.2	7.3	52	Correlational: Cross-Sectional
30	Jabłońska & Zajdel, 2020	Other Science	Other	Poland	974	33.5		100	Correlational: Cross-Sectional
31	James et al., 2017	Computer Science / Information Systems	Other	United States	798			67.54	Correlational: Cross-Sectional
32	Jang et al., 2016	Communication	Students	Republic of Korea	313	21.17	1.95	70	Correlational: Cross-Sectional
33	Jin, 2018	Economics	Other	Republic of Korea	141	33.3		100	Experimental: without repeated measurement
34	Johnson, 2021	Communication	Adults	United States	163	26.97	10.34	62.6	Correlational: Cross-Sectional
35	Johnson & Knobloch-Westerwick, 2014	Communication	Students	United States	174	19.59	2.16	67	Experimental: without repeated measurement
36	Johnson & Knobloch-Westerwick, 2017 (study 1)	Communication	Students	Netherlands	152	20.62	3.45	55	Experimental: without repeated measurement
37	Johnson & Knobloch-Westerwick, 2017 (study 2)	Communication	Students	Netherlands	168	21.64	3.69	64	Experimental: without repeated measurement
38	Kaiser et al., 2021	Psychology	Adults	United States	1294	32	9.7		Correlational: Cross-Sectional
39	J. Kang & Liu, 2019	Communication	Students	United States	143	19.83	0.8	84	Experimental: without repeated measurement
40	S. Kang et al., 2013		Adolescents	United States	366	15.9	1.2	53.3	Correlational: Cross-Sectional
41	Kim, 2022	Communication	Other	Republic of Korea	567	36.1	10.14	55.56	Correlational: Cross-Sectional

ID	Study	Discipline	Sample	Affiliation	N	Age (M) ^a	Age (SD)	Prop. of women ^b (%)	Design ^c
42	Kohler et al., 2021	Communication	Students	United States	81	19.07	1.56	65.43	Experimental: with repeated measurement
43	Krasnova et al., 2013	Computer Science / Information Systems	Other	Germany	227			68	Correlational: Cross-Sectional
44	Krasnova et al., 2015	Computer Science / Information Systems	Students	Switzerland	509			67	Correlational: Cross-Sectional
45	J. K. Lee, 2022	Communication	Other	Republic of Korea	236	25.8		43.6	Correlational: Cross-Sectional
46	S. Lee, 2022		Other	Republic of Korea	1332	40.53		50.83	Correlational: Cross-Sectional
47	S. Y. Lee, 2014	Computer Science / Information Systems	Students	United States	191	19.9		38	Correlational: Cross-Sectional
48	Lemay et al., 2019	Medicine	Students	Canada	119	17.96	1.14	64.71	Correlational: Cross-Sectional
49	Lim & Yang, 2015	Economics	Other	Republic of Korea	446	22.83		44	Correlational: Cross-Sectional
50	Lin & Utz, 2015 (study 1)	Communication	Other	Germany	207	41.7	14.6	64	Correlational: Cross-Sectional
51	Lin & Utz, 2015 (study 2)	Communication	Other	Germany	146	25	6.3	84	Experimental: without repeated measurement
52	C. Liu & Ma, 2020		Students	China	519	19.42	1.49	58.38	Correlational: Cross-Sectional
53	H. Liu et al., 2019	Economics	Other	United States	303	27		46	Experimental: without repeated measurement
54	J. Liu et al., 2016	Communication	Other	United States	163	32.71	11.41	53	Experimental: without repeated measurement
55	Q.-Q. Liu et al., 2017	Psychology	Students	China	1205	19.86	1.27	51	Correlational: Cross-Sectional
56	Loi et al., 2020	Psychology	Emerging Adults	Australia	173	22.07	2.37	58.38	Correlational: Cross-Sectional
57	Luong et al., 2021		Students	United States	292	20.34	2.73	59.9	Experimental: without repeated measurement
58	Lup et al., 2015	Psychology	Other	United States	117	24.81	2.51	84	Correlational: Cross-Sectional
59	Meier, Gilbert, et al., 2020 (study 1)	Communication	Other	Germany	270	23.55	5.35	72	Experimental: without repeated measurement
60	Meier, Gilbert, et al., 2020 (study 2)	Communication	Other	Germany	408	28	6.34	76	Experimental: with repeated measurement
61	Meier & Schäfer, 2018	Communication	Other	Germany	385	22.64	4	82	Correlational: Cross-Sectional
62	Midgley et al., 2021 (study 1)	Psychology	Students	United States	213	18.98	1.64	73.71	Correlational: Cross-Sectional

ID	Study	Discipline	Sample	Affiliation	N	Age (M) ^a	Age (SD)	Prop. of women ^b (%)	Design ^c
63	Midgley et al., 2021 (study 2)	Psychology	Adults	United States	91	32.95	10.19	69.23	Experimental: without repeated measurement
64	Midgley et al., 2021 (study 3)	Psychology	Other	United States	415	37.55	12.79	59.04	Experimental: without repeated measurement
65	Midgley et al., 2021 (study 4)	Psychology	Students	United States	79	20.15	2.4	64.56	Correlational: Longitudinal
66	Morry et al., 2018 (study 1)	Psychology	Students	Canada	172	19.54	3	53	Experimental: without repeated measurement
67	Morry et al., 2018 (study 2)	Psychology	Students	Canada	180	19.56	2.76	63	Experimental: without repeated measurement
68	Muench et al., 2015	Psychology		United States	489	35.63		61	Correlational: Cross-Sectional
69	Mukesh & Goncalves, 2013	Other Social Science	Other	Spain	245	29		48	Experimental: without repeated measurement
70	Mwiinga, 2015	Other Social Science	Other	Sweden	65	25.5		51	Correlational: Cross-Sectional
71	Nayenggita & Adishesa, 2021	Psychology		Indonesia	158	21.53	1.21	74.05	Correlational: Cross-Sectional
72	Niu et al., 2022	Psychology	Other	China	764	14.23	1.75	47	Correlational: Cross-Sectional
73	Niu et al., 2018	Psychology	Students	China	986	20.79	1.11	51.22	Correlational: Cross-Sectional
74	Noon et al., 2022	Other Social Science	Emerging Adults	United Kingdom	177	22.12	2.28	74.31	Correlational: Longitudinal
75	Noon & Meier, 2019	Other Social Science	Adolescents	United Kingdom	266	15.22	1.69	55	Correlational: Cross-Sectional
76	Oswald, 2021 (study 1)	Psychology	Students	United States	250	19.4	8.34	62.4	Experimental: without repeated measurement
77	Oswald, 2021 (study 2)	Psychology	Working Adults	United States	161	26.79	2.53	100	Experimental: without repeated measurement
78	Ozimek & Bierhoff, 2020	Psychology		Germany	75	22.33	4.32	77.33	Experimental: without repeated measurement
79	Ozimek et al., 2021	Psychology	Adults	Germany	110	25.52	8.149	79.1	Experimental: without repeated measurement
80	Pang, 2021	Communication	Students	China	318	22.5	0.917	50.3	Correlational: Cross-Sectional
81	Panger, 2014	Computer Science / Information Systems	Other	United States	240			52	Correlational: Cross-Sectional
82	J. Park et al., 2021	Computer Science / Information Systems	Other	Republic of Korea	330	34.05	8.25	51.82	Correlational: Cross-Sectional
83	S. Y. Park & Baek, 2018	Communication	Other	Republic of Korea	331	32.05	12.74	53	Correlational: Cross-Sectional

ID	Study	Discipline	Sample	Affiliation	N	Age (M) ^a	Age (SD)	Prop. of women ^b (%)	Design ^c
84	Richmond et al., 2022	Psychology	Students	United States	109	18.97	1.06	100	Experimental: without repeated measurement
85	Rosenthal-von der Pütten et al., 2019	Other Social Science		Germany	118	22.52	1.88	51	Experimental: with repeated measurement
86	Rousseau et al., 2017	Communication	Other	Belgium	1621	14.76	1.41	48	Correlational: Longitudinal
87	Ruggieri et al., 2021	Other Social Science	Other	Italy	80	32.05	8.01	66.25	Correlational: Longitudinal
88	Samra et al., 2022		Students	Australia	144	20.15	3.94	45	Experimental: without repeated measurement
89	Scherr et al., 2019	Communication		Belgium	841	34.74	13.88	62.8	Correlational: Longitudinal
90	Schmuck et al., 2019	Communication	Adults	Austria	833	45.44	14.83	54	Correlational: Longitudinal
91	Schreurs et al., 2022 ^d	Communication	Adolescents	Belgium	1032	14.55	1.65	57.8	Correlational: Longitudinal
92	Sharma et al., 2022	Other Science	Other	India	726			30.7	Correlational: Cross-Sectional
93	Song et al., 2019	Economics	Students	Republic of Korea	237; 294	23.52	5.87	67	Correlational: Cross-Sectional
94	Spitzer et al., 2022	Psychology	Students	United States	456	19.16	1.61	86.8	Correlational: Cross-Sectional
95	Stapleton et al., 2017	Psychology	Other	Australia	237	23.12	2.17	60	Correlational: Cross-Sectional
96	Steers et al., 2014 (study 1)	Psychology	Students	United States	180	24.41	5.88	78	Correlational: Cross-Sectional
97	Steers et al., 2014 (study 2)	Psychology	Other	United States	154	22.55	4.22	62	Correlational: Longitudinal
98	Tandoc et al., 2015	Communication	Students	Singapore	736	19	2.51	68	Correlational: Cross-Sectional
99	Tandon et al., 2021	Economics	Other	Finland	321	21.5		55.4	Correlational: Cross-Sectional
100	Tobin et al., 2020	Psychology	Other	Australia	188	25.1	10.64	82	Correlational: Cross-Sectional
101	Tosun & Kaşdarma, 2020	Psychology	Students	Turkey	319	20.72	2.48	52	Correlational: Cross-Sectional
102	Tromholt, 2016	Sociology	Other	Denmark	1095	34	8.74	86	Experimental: with repeated measurement
103	Valerio-Ureña et al., 2020		Students	México	86	18.33		59	Correlational: Cross-Sectional
104	van Tran et al., 2022	Economics	Students	Vietnam	318	21		55.7	Correlational: Cross-Sectional

ID	Study	Discipline	Sample	Affiliation	N	Age (M) ^a	Age (SD)	Prop. of women ^b (%)	Design ^c
105	Verduyn et al., 2015	Psychology	Other	Belgium	89	20.23	2.1	61	Correlational: Longitudinal
106	Vogel et al., 2015	Psychology	Students	United States	120	18.93	3.94	77	Experimental: without repeated measurement
107	Vogel et al., 2014 (study 1)	Psychology	Students	United States	145	19.64	2.87	73	Correlational: Cross- Sectional
108	Vogel et al., 2014 (study 2)	Psychology	Students	United States	128	19.08	1.63	73	Experimental: without repeated measurement
109	H.-Z. Wang et al., 2019		Students	China	266	19.77		76.76	Correlational: Longitudinal
110	J.-L. Wang et al., 2017	Psychology	Other	China	696	19.43	1.65	77	Correlational: Cross- Sectional
111	N. Wang et al., 2019	Computer Science / Information Systems	Other	China	318			56.6	Correlational: Cross- Sectional
112	T. Wang et al., 2021	Economics	Adults	Taiwan	144			63.2	Experimental: without repeated measurement
113	W. Wang et al., 2020	Psychology	Adults	China	514	35.42		62	Correlational: Cross- Sectional
114	Weber et al., 2022 (study 1)	Communication		Germany	391	27.5	8.55	70.6	Experimental: without repeated measurement
115	Weber et al., 2022 (study 2)	Communication	Other	Germany	184	27.49	5.6	50	Experimental: without repeated measurement
116	Weinstein, 2017	Other Social Science	Adolescents	United States	507	15.3	1	47	Experimental: with repeated measurement
117	Wirth et al., 2015		Other	Germany	421	38.81	11.52	41.7	Correlational: Cross- Sectional
118	Wirtz et al., 2021	Psychology	Students	Canada	77				Correlational: Longitudinal
119	J. Wu & Srite, 2015		Students	United States	387			42.9	Experimental: without repeated measurement
120	J. Wu & Srite, 2021 (study 1)	Computer Science / Information Systems	Students	United States	109	27		45	Correlational: Cross- Sectional
121	J. Wu & Srite, 2021 (study 2)	Computer Science / Information Systems	Other	United States	376	27		37.5	Correlational: Cross- Sectional
122	J. Wu, 2015 (study 1)	Economics	Students	United States	386				Correlational: Cross- Sectional
123	J. Wu, 2015 (study 2)	Economics	Students	United States	387			43	Correlational: Cross- Sectional
124	Y. Wu et al., 2017	Economics		China	213	22.5		50	Experimental: without repeated measurement
125	C. Yang, 2022	Other Social Science	Students	United States	219	18.29	0.75	74	Correlational: Longitudinal

ID	Study	Discipline	Sample	Affiliation	N	Age (M) ^a	Age (SD)	Prop. of women ^b (%)	Design ^c
126	C. Yang et al., 2018	Psychology	Students	United States	219	18.29	0.75	74	Correlational: Longitudinal
127	Yin et al., 2021	Psychology	Adolescents	China	704	16.8	0.92	57.2	Correlational: Cross-Sectional
128	Yuen et al., 2019	Psychology	Students	United States	312	18.8		79	Experimental: with repeated measurement
129	Zheng et al., 2020	Psychology	Students	China	799	19.86	1.63	100	Correlational: Cross-Sectional
130	Zuo, 2014 (study 1)	Psychology	Students	United States	417	18.96		54	Correlational: Cross-Sectional
131	Zuo, 2014 (study 2)	Psychology	Students	United States	127	20		50	Experimental: with repeated measurement

Note. N = 131 studies. Empty cells indicate that the relevant information is not reported in the paper.

^a If the mean age was not stated, the mean value was calculated manually (if possible) based on the information given (e.g. age range or age groups).

^b If the percentage was not stated, it was calculated manually (if possible) based on the absolute values given in the study.

^c The study design stated here refers to the variables of research interest. If a study used a longitudinal research design, but the relevant variables were only measured at one measurement point, we considered this as cross-sectional or without repeated measures.

^d At the time of our literature search, this paper was an unpublished manuscript and was included in the review as such. In the meantime, however, the paper has been published and the reference refers to the published version.

Table A4.

Dimensions of Mental Health by Discipline

Discipline	PTH internalizing	PTH externalizing	PWB Hedonia	PWB Eudaimonia	Risk factors	Resilience factors	Not classifiable	Sum
Communication	7	0	57	8	4	25	3	104
Psychology	36	1	46	9	6	42	1	141
Medicine	0	0	1	0	0	0	0	1
Computer Science / Information Systems	5	0	7	5	3	2	2	24
Sociology	0	0	2	0	0	0	0	2
Economics	6	0	4	0	1	4	0	15
Other Social Science	9	0	10	6	4	8	0	37
Other Science	2	0	1	0	0	1	1	5
Not identifiable	7	0	28	1	2	7	1	46
Sum	72	1	156	29	20	89	8	375

Note. N = 375 indicators. PTH = Psychopathology; PWB = Psychological Well-Being.

“Buckets of rain!” - Effects of colloquial and formal speech style of a voice assistant on humanness, competence, trust, and intentions to use

Katharina Frehmann

Department of Social Sciences, Heinrich Heine University

Zusammenfassung

Sprachassistenten als Informationsintermediäre werden beliebter. Typisch für sie ist ihre anthropomorphe Erscheinung, wie ihre menschlichen und seit neustem auch umgangssprachlichen Stimmen. Laut der CASA-Forschung kann Anthropomorphismus die Wahrnehmung von Menschlichkeit steigern, was auch Vertrauen stärkt. Umgangssprache könnte also über wahrgenommene Menschlichkeit das Vertrauen von Nutzern erhöhen, welche jedoch oft intransparente, unvollständige Antworten erhalten. Andererseits könnte der Sprachstil ähnlich wie Dialekt und Akzent die Wahrnehmung von Kompetenz und damit das Vertrauen verringern. Die Studie untersucht, wie der Sprachstil eines fiktiven Sprachassistenten Vertrauen und Nutzungsabsichten über die wahrgenommene Menschlichkeit und Kompetenz beeinflusst. Eine experimentelle Online-Vignetten-Studie mit einem 2 (formelle vs. umgangssprachliche Sprache) x 2 (informelle Alltags- vs. formelle politische Themen) Between-Subjects-Design (N = 244) ermittelte, dass der Sprachstil keine Wirkung auf die wahrgenommene Menschlichkeit hat. Umgangssprache reduziert jedoch die Kompetenz, was einen negativen Effekt auf Vertrauen vermittelt. Ein umgangssprachlicher Sprachassistent scheint also keine positiven Einstellungen und Verhaltensweisen von Nutzenden zu fördern. Unabhängig von der experimentellen Manipulation wurde jedoch ein direkter Effekt der Menschlichkeit auf die Nutzungsabsicht beobachtet, was dennoch die Relevanz des anthropomorphen Designs für die Nutzung zeigt.

Keywords: Sprachassistent, Sprachstil, Umgangssprache, Menschlichkeit, Kompetenz, Vertrauen, Nutzungsabsicht

Summary

Voice assistants are gaining popularity as new information intermediaries. A typical feature is their anthropomorphic design reflected in their voices and, as of late, colloquial speech style. According to CASA, anthropomorphism leads to perceptions of humanness in technology which strengthens trust. Colloquialism could thus increase the trust of users via perceived humanness which the opaque assistants and their oftentimes deficient answers might not deserve. On the other hand, colloquialism, similar to the use of dialect and accents, could also decrease the perception of competence, and therefore diminish trust. The current study investigates how the speech style of a fictitious voice assistant affects people's trust and their intentions to use the assistant via perceived humanness and competence of the assistant. A vignette-based experimental online study with a 2 (formal vs. colloquial language) x 2 (informal everyday vs. formal political issues) between-subjects design was conducted (N = 244). Results showed that speech style had no effect on perceived humanness, but colloquial speech reduced perceived competence, which mediated a negative effect on trust. An informally speaking voice assistant thus does not seem to further users' positive attitudes and behaviors towards it. However, independent of the experimental manipulation, a direct effect of perceived humanness on intentions to use was observed, stressing the relevance of anthropomorphic design for users.

Keywords: Voice assistants, speech style, colloquialism, humanness, competence, trust, intentions to use

Introduction

Voice assistants are gaining popularity worldwide (Newman et al., 2019, 2020, 2021, 2022). They are digital software agents on mobile or stationary devices that respond to spoken requests with spoken responses and can be interpreted as artificial companions that rely on automation (Hepp, 2020; Hoy, 2018). They are being used for different tasks, such as entertainment (e.g., playing music), assistance (e.g., setting timers) and the search for information (e.g., Arnold et al. 2019). Their use for information purposes and news has been growing internationally in recent years (Newman et al., 2019, 2020) and in 2020, up to 20 percent of German adults asked their voice assistant about the COVID-19 crisis on a weekly basis (Viehmann et al., 2022). Thus, voice assistants increasingly act as gatekeepers and information intermediaries that select, process and present information and therefore gain relevance due to their possible influence on the opinion building of individuals (Frehmann et al., 2022). A special feature of voice assistants is their anthropomorphic design, reflected in the human-sounding voices, names like "Alexa" or "Siri", and their social reactions and behaviors. According to research regarding the CASA paradigm (Computers as social actors), these anthropomorphic features can be considered social cues that trigger social perceptions and reactions in users and increase trust and intentions to use the technology (Lee & Nass, 2010). Current developments of anthropomorphism in voice assistants involve an increasing use of dialect and colloquial speech of the assistants (Blutag, 2022; Bültermann, 2022). This changed speech style can be interpreted as an effort to make assistants appear more human and natural in their interactions with users. Though a colloquial speech style is assumed to support feelings of humanness and intimacy and therefore the building of trust (Grünenfelder et al., 2021), the effects of the use of colloquialism by voice assistants have not been investigated yet. The following study uses an experimental online survey to examine the indirect effects of colloquial speech by a fictitious voice assistant on users' trust and intentions to use, compared to formal language, via the variables of humanness and competence. Considering that voice assistants become more relevant for information purposes, the examination of effects of human features in digital agents prove to be of great importance. Credibility of voice assistants might be achieved via communication style and be transferred to the contents of their answers

which do not hold up to journalistic standards (Frehmann et al., 2022).

Voice assistants and information seeking

Voice assistants such as Amazon Alexa, Apple's Siri and Google Assistant are software programs in form of digital agents on both mobile devices and stationary smart speakers. These assistants use natural language processing and machine learning algorithms and can therefore be seen as a form of artificial intelligence. They understand commands in spoken language and execute them while responding verbally (Hepp 2020; Hoy 2018). These commands can range from simple requests such as setting an alarm to more complex tasks such as controlling smart home devices or asking for factual and current information (Arnold et al., 2019). The dissemination and use of voice assistants, for example in form of smart speakers, has been growing internationally over the last years (Newman et al., 2020). In the UK, almost a quarter of the population (24%) owns a smart speaker (Newman et al., 2022). Though smart speakers are less common in Germany, with only 15 percent of Germans owning one (Newman et al., 2022), the majority (85%) owns at least one device that has a voice assistant installed, such as smartphones, laptops, tablets or speakers (Arnold et al., 2019). In 2020, about 30 percent of German online users had used a voice assistant before and in younger groups a percentage of 58 percent did so (ARD & ZDF, 2020).

Voice assistants' relevance for society and communication science has been growing recently due to a new development in the usage scenarios: Voice assistants are increasingly being used as information sources (Newman et al., 2019, 2020). According to different studies, during the pandemic, people used them to stay updated about general news and information, as well as a source for specific facts about the current crisis (Brocks, 2020; NPR & Edison Research, 2020; Strathmann et al., 2022). In the first year of the pandemic, from mid to end of 2020, up to 20 percent of German adults asked a voice assistant at least once per week about the current situation (Viehmann et al., 2022). However, content analyses of typical answers of voice assistants to questions concerning the pandemic showed information of fluctuating quality: Although no false information was detected, voice assistants often could not answer a question or gave incomplete information on a topic (Frehmann et al., 2022). Furthermore, they did not

always disclose their sources (Frehmann et al., 2022, Goh et al., 2021). Similar results had been found before regarding different health-centered topics (e.g., Miner et al., 2016).

By selecting, processing, and presenting certain information, voice assistants act as new information intermediaries and gatekeepers (Frehmann et al., 2022). Considering this new role and the accompanying influence on users, the observed lack of precision and transparency is concerning. Additionally, verification of their statements is difficult because the assistants do not provide any insights into how they find and compile information (Natale & Cooke, 2021). If people base their knowledge and opinions on facts retrieved from voice search, they are at risk of believing in incomplete, untrustworthy or, in the worst case, wrong information. To date, it is unclear why people seem to rely on answers given by assistants whose ways of working they cannot observe. A possible explanation for the use of voice assistants despite this lack of transparency could be the concept of trust.

Trust in voice assistants

Trust is an important component of everyday life. It takes effect whenever a person expects the performance of another party without being able to control their actions. By trusting and relying on the other party called "trustee", the person called "trustor" accepts their own vulnerability and receives a reduction of uncertainty and social complexity in turn. This makes them more willing to take the risk of trusting the trustee (Luhmann, 2014; Mayer et al., 1995). Several studies have identified three central determinants of trust, also known as "trusting beliefs": The trustor should perceive the trustee as competent, meaning capable of meeting the expectations of the trustor. Furthermore, a trustee should appear benevolent, that is showing positive intentions towards the trustor and having their best interest in mind. Lastly, the integrity of the trustee should show a set of shared values with the trustor that justifies the perception of reliability (Mayer et al., 1995; McKnight et al., 1998). Though these dimensions have hence been adapted to better fit technological trustees, they remain relevant for human-seeming applications (Lankton et al., 2015; McKnight et al., 2011). If trust is given, trusting intentions and behaviors can be the consequences of the interaction. In the case of technology being the trustee, trust mainly leads to intentions and behaviors concerning the (continued) use of this technology (e.g., Lankton et al.,

2015; Zhou, 2013).

Applying this definition to voice assistants, trust could be an explanation as to why users turn to them for information despite their lack of transparency. Trusting the assistants and their work to be competent, benevolent, and having integrity could balance out the uncertainty about how and why they chose the given information and reduce the perception of risk. Dealing with the complexity of questioning the methods of the assistants can be avoided by simply trusting that they are capable and do their job well. Therefore, continued trust in a voice assistant may explain its ongoing use.

Studies on voice assistant use support these assumptions. In accordance with research concerning other technologies, trust has already been shown to positively affect the use (intentions) of voice assistants (e.g., Chérif & Lemoine, 2019; Nasirian et al., 2017, Scheuer, 2020). Nevertheless, how and why trust in voice assistants is formed, especially when they act as information intermediaries, is still not fully investigated. However, a recent study does confirm that the three dimensions of trust, that is competence, benevolence, and integrity, influence trust in voice assistants as well (Weidmüller, 2022). Additionally, the perception of voice assistants as an anthropomorphic and social actor, opposed to an inanimate object, is of relevance and increases trust (Weidmüller et al. 2022).

Voice assistants as social actors

Voice assistants are designed to be anthropomorphic, that is human-seeming. They often have human names like "Alexa" or "Siri" and use voices that resemble human speech (Wagner & Schramm-Klein, 2019). The effects of such anthropomorphism in technology have been studied in context of the "Computers as social actors" paradigm (CASA) in the field of Human-Computer Interaction (HCI) and Human-Machine Communication (HMC). CASA postulates that people behave socially towards technology that possesses human features or behaves in a human way. These features are interpreted as social cues and influence the perception of technology as social actors (Nass & Brave, 2005; Nass et al., 1994). Communicating via voice rather than text can already trigger this social perception of "humanness" in technology, as well as a human voice rather than a synthetic one (Chérif & Leomine, 2019; Cho et al., 2019). The consequences of the perception of technologies as human and social concern cognitions, affections and behaviors of users: Human-seeming agents are evaluated better than non-

human-seeming ones, they have greater influence on users' attitudes and evoke the appliance of social rules and prejudices, for example, politeness and gender stereotypes (Nass & Brave, 2005; Nass et al., 1994). For voice assistants, different effects of perceived humanness have been found: Simple cues like a human name in an assistant can impact how persuasive its statements appear (Voorveld & Araujo, 2020). If an assistant shows social support for its user and discloses “personal” facts about itself, users can develop feelings of friendship towards them (Ki et al., 2020). By and large, perceived humanness of an application increases trust in different technologies (Lee & Nass, 2010; Rheu et al., 2021) as well as in voice assistants specifically which in turn impacts the intentions to use it positively (Chérif & Leomine, 2019; Cho et al., 2019).

Voice assistants are constantly being updated in hard- and software and further developed in their design. Current advances in the anthropomorphic appearance of different assistants include, for example, that Apple added new voice options for different male or female voices that sound more natural than the original female Siri voice (Panzarino, 2021). Amazon now offers a new creative function for its assistant Alexa who tells co-created stories about characters that users imagine together with the assistant (Amazon, 2022). The progress in anthropomorphic design does not only affect the voice itself or the contents of the answer, but also the style the assistants answer in: When encountered with personal questions and statements, for example, “I love you”, Siri has long been answering with informal expressions such as “Oh, I bet you say that to all your Apple products” (Bellegarda, 2014). Recently, an increasing use of dialect and colloquial expressions can be observed in various assistants. Even typical commands and factual questions evoke colloquial answers using modern expressions and informal idioms (Blutag, 2022; Bültermann, 2022). This colloquialism seems to be another effort to humanize the assistants and align their speech style with that of their users. It could then strengthen the perception of humanness in voice assistants and increase intimacy and trust between the user and the assistant through the informal interaction (Grünenfelder et al., 2021). So far, however, if and how colloquialism affects the perceived humanness of voice assistants is unknown.

Speech Style and its effects on trust

When it comes to perceived humanness due to anthropomorphism and social cues in voice assistants, especially in their *voices*, most studies compare either different modalities like text versus voice (e.g., Cho et al., 2019), different levels of authenticity of the voice itself (e.g., Chérif & Lemoine, 2019) or different genders of the voice (e.g., Tolmeijer et al., 2021). Up until now, the effects of different speech styles a voice assistant can use, namely a colloquial or a formal one, have not been studied. It can be assumed that colloquial language, when compared directly with formal language, is interpreted as a stronger sign of humanness: Humans regularly use colloquial language when conversing with each other, while technology such as voice assistants only uses “human language” when conversing with humans and is just beginning to integrate colloquialism into its speech style (Blutag, 2022). According to various CASA studies, the perception of humanness in technology is associated with increased trust in technology (e.g., Lee & Nass, 2010; Rheu et al., 2021). In fact, the modality of voice compared to text can already increase perceived humanness of a technology and, through that, indirectly increase trust in technology (Cho et al., 2019). Designing the voice modality to be even more anthropomorphic, in our case via a colloquial speech style, should increase trust via perceived humanness further. Transferring these assumptions, we hypothesize:

H1a: Compared to a voice assistant that uses a formal speech style, a colloquial speech style will increase people's perceived humanness of the assistant.

H1b: There is a positive correlation between the degree of perceived humanness of a voice assistant and people's trust in it.

H1c: Compared to a voice assistant that uses a formal speech style, a colloquial speech style will indirectly increase people's trust in the voice assistant, mediated via an increase of the assistant's perceived humanness.

However, taking studies concerning the effects of speech style of humans into consideration, colloquial speech could also be detrimental to the evaluation of a speaker: A meta-analysis found that humans who do not communicate in “standard” language but rather in dialect and non-standard accents are evaluated as of lesser status, as less lively and as less trustworthy (Fuertes et al., 2012; see also Vögele & Bachl, 2017).

This phenomenon could be explained by the observation that listeners attribute less competence to individuals speaking in accents or dialect than to individuals speaking standard language, partly due to stereotypes and prejudices (e.g., Blair & Connor, 1978; Cuddy et al., 2008). This observation might be transferable to colloquialism which also differs from standard formal language and might evoke prejudice in listeners as well. Furthermore, perceived competence is a strong determinant of trust in human-like technologies such as voice assistants (Lankton et al., 2015; McKnight et al., 2011; Weidmüller, 2022), meaning that a negative evaluation of competence of voice assistants would also negatively impact trust. Applied to this study, we hypothesize:

H2a: Compared to a voice assistant that uses a formal speech style, a colloquial speech style will reduce people's perceived competence of the assistant.

H2b: There is a positive correlation between the degree of perceived competence of a voice assistant and people's trust in it.

H2c: Compared to a voice assistant that uses a formal speech style, a colloquial speech style will indirectly decrease people's trust in the voice assistant, mediated via a decrease of the assistant's perceived competence.

Trust is a relevant predictor when it comes to intentions and behaviors of the trustor. In the case of technology being the trustee, trust determines intentions and behaviors concerning the (continued) use of it. The effect of trust in a technology on intentions to use it has been proven for different applications (e.g.; Lankton et al., 2015; Zhou, 2013) as well as voice assistants (e.g., Chérif & Lemoine, 2019). If trust is indirectly influenced by speech style as assumed in H1c and H2c, speech style will also have an indirect effect on intentions to use the voice assistant, mediated via trust. We therefore hypothesize:

H3a: Trust in the voice assistant will be positively related to people's intentions to use the assistant.

H3b: Compared to a voice assistant that uses a formal speech style, a colloquial speech style will indirectly increase people's intentions to use the voice assistant, serially mediated via an increase of the assistant's perceived humanness and trust.

H3c: Compared to a voice assistant that uses a formal speech style, a colloquial speech style will indirectly

decrease people's intentions to use the voice assistant, serially mediated via a decrease of the assistant's perceived competence and trust.

Method

Design and participants

To test the hypotheses, we conducted a vignette-based experimental online survey in a 2 (speech style: formal language vs. colloquial language) x 2 (context: informal everyday issues vs. formal political issues) between-subjects design in July 2021. The manipulation of context was included to assess the generalizability of the findings across two different topics. For this purpose, we computed single-group models (see Results section). A vignette-design is a demonstrational approach typical for research in the field of HMC and describes a scenario with the help of prerecorded materials which participants imagine themselves in. It is especially useful for manipulating specific features of a digital agent while keeping all other conditions equal. It is also the most manageable version of an experiment for larger online samples (Greussing et al., 2022). The created scenarios described an interaction between a newly developed voice assistant and the participant as a user. Either the context was an informal everyday interaction on the weather and a musician, or the context was more formal, containing questions on the political program of three German parties. The voice assistant then answered either in a colloquial or in a formal speech style. The answers were prerecorded using the freely available demo version of the text-to-speech solution **Readspeaker** (<https://www.readspeaker.com/de/>). We adjusted the frequency of the voice in the program Audacity. Thereby we tried to create a genderless and unknown voice to avoid any effects of prior attitudes or stereotypes. Participants were asked to evaluate the gender of the voice in the main questionnaire (see Discussion section).

We recruited the participants for the study via the contacts of students of an undergraduate course at Heinrich-Heine-University Düsseldorf, Germany and the German commercial online access panel Respondi. A sample of 275 completed questionnaires was obtained. Participants that spent too much or not enough time on the stimulus pages ($n = 17$), failed quality checks ($n = 9$) or had technical issues ($n = 5$) were excluded. The final sample consisted of 244 participants with an average age of 42 years. 50 percent identified as male, 49 percent as female and 1 percent

as diverse. Regarding education, 31 percent of participants presented a low education from no degree up to a middle school degree, 32 percent held a high school diploma and 35 percent a university degree.

Procedure and stimulus

Participants first answered general questions on demographics and use of and attitudes towards voice assistants. Afterwards they were asked to imagine an interaction with a supposedly new voice assistant named "Q" which is being developed but, at the current time, cannot interact with users directly. After randomization by age, gender and education, participants were sorted into one of the four experimental groups. Depending on their assigned group, participants were prompted to imagine asking the voice assistant either three pre-formulated questions on the topic of everyday life (e.g., "What will the weather be like?") or politics (e.g., "What is the name of the Green Party candidate for chancellor?") which were written out on screen (see Table 1 in Appendix for all questions). After each question, participants could access the voice assistant's answer via a clickable audio file. Either the answers were provided in a colloquial speech style or a formal speech style. After hitting the play button and listening to all three answers, participants were asked to evaluate Q and the imagined interaction.

We manipulated the speech style of the voice assistant in each answer in used idioms and wordings. The online website of the German spelling dictionary "Duden" provided some colloquial alternatives to formal expressions that we expanded on. For example, the German equivalent of the formal "raining heavily" was replaced by the informal "raining buckets" (see Table 1 in Appendix for answers in both speech styles). The speech style was successfully tested in a pretest ($N = 30$) via a colloquialism scale containing the items "conventional", "formal", "everyday language", "casual", "colloquial", "informal", "educational language" 1 = "Strongly disagree", 5 = "Strongly agree", $\alpha = 0.87$). Participants interpreted the speech style as intended ($M_{\text{formal}} = 2.51$, $M_{\text{colloquial}} = 3.64$, $t(28) = -4.680$, $p < .001$). All audio files of Q's answers (in German) and the written-out stimulus texts both in German and English are also available in an OSF repository: <https://osf.io/bvwe6/>

Measures

Dependent variables were measured using items and scales of previous work in the HMC and HCI field (for items, cronbach's alpha, CFA, general means and means per experimental group including CI see Table 2): We measured perceived humanness on a semantic differential scale in accordance to Ho and MacDorman (2010). Participants had to evaluate four contrary attribute-pairs differentiating between human and technical characteristics on a seven-point scale. For competence, we chose four reoccurring items in several studies of the HCI/HMC-field revolving around the ability to fulfil given tasks (Burgoon et al., 2000; Carolus et al., 2019; Lee, 2003). Participants evaluated the competence items on seven-point-scales (1 = "Strongly disagree", 7 = "Strongly agree") which were later compiled to a competence index. Similarly, trust was assessed through five items regarding trustworthiness and reliability (Burgoon et al., 2000; Lee, 2003) later compiled to an index. For intentions to use, we contrived four typical items that were tailored to our scenario of the newly developed voice assistant Q.

Additional control variables were measured before the stimulus was shown. These variables included gender, age and education as well as the use frequency of voice assistants (1 = "never", 2 = "seldomly", 3 = "at least once per month", 4 = "at least once per week", 5 = "at least once per day") and, in accordance to Arnold et al. (2019), prior attitudes regarding voice assistants on a seven-point-scale ("user-friendly", "time-saving", "useful", "independent", "needs-centered", "innovative", $\alpha = .83$, $M = 4.35$, 95% CI [4.20; 4.49]). The treatment check was conducted via the same items used in the pretest to measure colloquialism on a seven-point-scale ("conventional", "formal", "everyday language", "casual", "colloquial", "informal", "educational language", $\alpha = 0.87$, $M = 4.08$, 95% CI [3.94; 4.23]).

Table 2: Summary of scale for humanness, competence, trust and intentions to use and individual items

	α	CFA	M	M _{form} [95% CI]	M _{coll} [95% CI]
1. Humanness	.94		2.99	2.99	2.99
H1: artificial – natural	.91	.91	2.93	[2.74; 3.24]	[2.73; 3.24]
H2: human-made – human-like	.89	.89	2.89	[2.70; 3.24]	[2.61; 3.15]
H3: inanimate – living	.82	.82	3.14	[2.64; 3.20]	[2.59; 3.13]
H4: synthetic – real	.92	.92	3.00	[2.82; 3.36]	[2.89; 3.49]
2. Competence	.93		4.43	4.43	4.43
C1: competent	.91	.91	4.67	[4.37; 4.88]	[3.95; 4.49]
C2: intelligent	.87	.87	4.22	[4.56; 5.15]	[4.16; 4.80]
C3: experienced	.85	.85	4.04	[4.39; 4.85]	[4.05; 4.85]
C4: professional	.85	.85	4.49	[4.08; 4.70]	[3.73; 4.37]
3. Trust	.92		4.20	4.20	4.20
T1: trustworthy	.84	.84	3.99	[4.20; 4.55]	[3.80; 4.35]
T2: reliable	.85	.85	4.44	[4.07; 4.55]	[3.80; 4.35]
T3: responsible	.80	.80	3.72	[4.16; 4.45]	[3.49; 4.13]
T4: sincere	.80	.80	4.20	[4.53; 4.85]	[4.04; 4.66]
T5: credible	.88	.88	4.64	[3.83; 4.45]	[3.31; 3.89]
4. Intentions to use	.90		2.84	2.84	2.84
U1: I could imagine using Q.	.92	.92	2.90	[4.21; 4.50]	[3.88; 4.49]
U2: I would like to have a “real” conversation with Q.	.68	.68	2.93	[4.84; 5.10]	[4.10; 4.48]

Notes: $n = 244$, individual items measured on seven-point-scales, 1 = “Strongly disagree”, 7 = “Strongly agree”

Table 3: Zero-order correlations

	1	2	3	4
1. Perceived humanness	1			
2. Competence	.476**	1		
3. Trust	.501**	.786**	1	
4. Intentions to use	.577**	.569**	.565**	1

Notes: $n = 244$, ** $p < .01$, scales compiled of items measured on seven-point-scales, 1 = “Strongly disagree”, 7 = “Strongly agree”

Data analysis and results

Randomization and treatment check

The four experimental groups were randomized by age, gender, and education and are roughly of the same size ($n_{\text{everyday/colloquial}} = 56$, $n_{\text{everyday/formal}} = 65$, $n_{\text{politics/colloquial}} = 65$, $n_{\text{politics/formal}} = 56$). No significant differences between the groups were found regarding the sociodemographic variables age ($F(3,240) = 0.31$, $p = .816$), gender ($\chi^2 = 1.62$, $df = 3$, $p = .655$), education ($\chi^2 = 7.84$, $df = 9$, $p = .55$) nor in variables of use frequencies ($\chi^2 = 11.53$, $df = 12$, $p = .484$) or prior attitudes ($F(3,240) = 0.53$, $p = .662$) regarding voice assistants. The treatment check was successful, participants that listened to the colloquial assistant perceived it as more colloquial than the formal speaking one ($t(220.541) = -7.84$, $p < .001$, $M_{\text{colloquial}} = 4.62$, $M_{\text{formal}} = 3.56$).

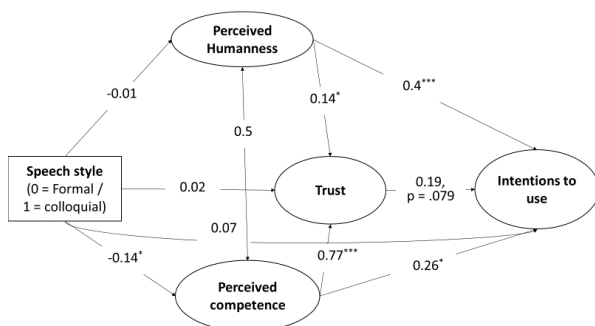
Data Analysis

To analyze the data, we applied a structural equation model (SEM) using AMOS 28. The experimental manipulation of the *speech style* of Q was used as an indicator, and the modelled latent variables of perceptions of *humanness* and *competence* as mediators. Perceived *trust* and *intentions to use* of Q acted as outcomes. We also added the correlation between perceived humanness and competence (Table 2). Indirect effects were assessed via bootstrapping ($m = 5,000$, bias-corrected 95% confidence intervals).

For the single-group analyses, context (formal political vs. informal everyday issues) was used as a grouping variable. Since there were no significant differences between the experimental groups regarding our measured control variables, we did not include them in the model. The model fit the data well: $\chi^2 (126) = 242.58$, $df = 126$, $p = .000$, $\chi^2/df = 1.93$, CFI = .968, RMSEA = .062, SRMR = .042 (Hu & Bentler, 1999). Figure 1 shows the structural equation model.

Hypothesis Testing

Figure 1: Structural equation model of effects of speech style manipulation



Notes: $n = 244$, maximum likelihood estimation, calculated with AMOS 28, $\chi^2(126) = 242.58$, $df = 126$, $p = .000$, $\chi^2/df = 1.93$, $CFI = .968$, $RMSEA = .062$, $SRMR = .042$; * $p > .05$, ** $p < .01$, *** $p < .001$, total effect of speech style on trust: $B = -0.265$; $p = .169$; 95% CI [-0.660; 0.099], total effect of speech style on intentions to use: $B = 0.048$; $p = .856$; 95% CI [-0.407; 0.495]

Hypotheses 1a-c concerned the relationship of speech style, perceived humanness and trust. Contrary to our hypothesis, colloquial speech did not influence perceived humanness ($\beta = -.006$, $p = .926$), H1a had to be rejected. Although perceived humanness correlated positively with participants' trust in the voice assistant ($\beta = .143$, $p = .005$) and H1b was accepted, no mediation of speech style via humanness on trust was observed ($B = -.003$, $p = .881$, 95% CI [-0.061; 0.057]). Hence, H1c had to be rejected as well.

Hypotheses 2a-c predicted an influence of speech style on trust via perceived competence. In line with H2a, a colloquial speech style negatively affected the voice assistant's perceived competence ($\beta = -.143$, $p = .033$). When Q used a colloquial speech style, it was perceived as less competent than when it used a formal speech style. Competence, in turn, was positively related to participants' trust in the voice assistant ($\beta = .768$, $p < .001$) as H2b assumed. The indirect effect of speech style on trust via competence was significant and negative ($B = -.315$, $p = .034$, 95% CI [-0.600; -0.025]). H2a-c are therefore accepted.

H3a-c assumed a mediation of speech style via humanness or competence and trust on intentions to use. The model showed only an effect of speech style on competence, not on humanness (see H1a), which is

why H3b is rejected. A positive correlation was observed between trust and intentions to use, which, however, slightly missed the conventional level of significance ($\beta = .191$, $p = .079$). Similarly, the indirect effect of speech style on intentions to use via competence and trust only approached the conventional level of significance ($B = -.070$, $p = .085$; 95% CI [-0.261; 0.008]). Still, H3a and H3c are rejected. Interestingly, intentions to use the voice assistant correlated positively both with perceived competence ($\beta = .263$, $p = .032$) and humanness of the assistant ($\beta = .404$, $p = .001$).

Regarding the direct effects of a colloquial speech style, no such effects were observed on participants' trust in the assistant ($\beta = .019$, $p = .659$) and on participants' intentions to use it ($\beta = .072$, $p = .137$). There were also no significant total effects of the colloquial speech style on participants' trust ($B = -0.265$; $p = .169$; 95% CI [-0.660; 0.099]) and on their intentions to use ($B = 0.048$; $p = .856$; 95% CI [-0.407; 0.495]).

Generalizability across two topics

To assess the generalizability of our findings, we computed single grouped SEMs for each level of the context variable, with the “formal political” versus “informal everyday” topic conditions as a grouping variable. We then restricted the models by iteratively setting equal the strength of one path of one model with the respective path of the other model. A moderation effect is significant when this restriction significantly impedes the quality of the models (measured by chi-square tests of difference) because then, it cannot be assumed that the path strengths are equal for both groups (Byrne, 2010). Table 2 shows the results of this analysis. As can be seen, the models in which single paths were set equal as well as the fully restricted model did not differ significantly from the unrestricted model. We therefore conclude that the effects and relations reported in the previous section occur across different topics.

Table 4: Moderation effects of context on the effects and correlations assumed

	Path(s) set equal	χ^2 (df)	χ^2_{diff}	p
Unrestricted model				
		427.945 (252)		
H1a	coll → hum	427.945 (253)	0.00	1.000
H1b	hum → trust	428.106 (253)	0.161	0.688
H2a	coll → comp	428.563 (253)	0.618	0.432
H2b	comp → trust	429.151 (253)	1.206	0.272
H3a	trust → use	428.126 (253)	0.181	0.671
Direct 1	coll → trust	428.393 (253)	0.448	0.503
Direct 2	coll → use	429.693 (253)	1.748	0.186
Direct 3	hum → use	427.964 (253)	0.019	0.890
Direct 4	comp → use	428.280 (253)	0.335	0.563
Fully restricted model				
	all the above	432.533 (261)	4.588	0.869

Notes: coll = colloquial speech style; hum = perceived humanness; trust = trust in the assistant; comp = perceived competence; use = intentions to use

Discussion and limitations

In this paper, we reacted on current observations of colloquialism in the speech style of voice assistants and checked its possible effects on trust and intentions to use via mediations of humanness and competence. Colloquialism could act as a human-seeming feature and trigger perceived humanness which, according to research concerning technology and the CASA paradigm, can positively influence trust. However, according to research regarding human speech, dialect and accents evoke a negative influence on competence and later trust in comparison to standard language. Colloquialism could have a similar effect. Trust in turn usually has a positive influence on intentions to use and might be indirectly influenced by speech style. The findings of our experimental online study only confirmed that colloquial speech reduced perceived competence which mediated a negative effect on trust. No further significant effects were found in a structural equation model (SEM).

Even though the SEM revealed no total effect of speech style on trust or intentions to use, the findings still contain interesting insights into the perception of voice assistants: The current study did not find support for the assumptions based on the CASA paradigm. H1a and H1c and consequently H3b had to be rejected, because no influence of colloquialism was found on perceptions of humanness. This observation might point to a problem with our small sample and consequently low power in the mediation analysis which we discuss as a limitation (see below).

Nevertheless, this came as a surprise, as informal expressions and idioms are a characteristic way of human communication. Possibly, the expressions in the stimulus material either were not strong enough in their colloquialism to have an effect on humanness or trying too hard to feel like “natural” human speech. However, the treatment check confirmed that colloquialism was perceived as intended in comparison to the formal speech style. An alternative explanation might be that an intervening factor prevented any effects of colloquialism on humanness: Possibly, the used artificial and genderless voice of Q felt too unfamiliar for participants and deviated too much from usual voices of current assistants to be perceived as human. Checking with the data, the ambiguous gender of Q did not seem to confuse people too much: Only 17 percent of all participants were not able to assign Q a gender, while 29 percent felt the voice was male and 54 percent perceived it as female. Nevertheless, some participants communicated their frustration with the voice of Q via a general comment field at the end of the questionnaire, describing its voice as “choppy sounding”, “monotonous” and “slow-motion”, “annoying” and “unnatural” which made one participant “aggressive”. This dissatisfaction with Q’s voice could have been reflected by participants in the evaluation of humanness of Q. It is striking that the mode of the variable is “1”: 15 percent of all participants perceived Q as clearly artificial. To check for possible floor-effects and ask for perceptions of humanness on a more finely graded measurement, we also included a scale of humanness-evaluation with a slider between 1 = “thing” and 100 = “person” (Etzrodt et al., 2021). Again, we found the clustering trend on the left extreme point: 16 percent of participants clearly stated that they perceived Q as a definite “thing” by answering with the extreme value and mode of “1”, and even more than half (51%) placed the slider in the first quartile of this scale (M = 32,2, SD = 27,51). It seems the use of the freely available voice that was additionally edited was a poor decision to measure effects of speech style on the perceived humanness, because Q and its voice were not perceived as pleasant and human-like to begin with and were therefore not susceptible to an influence by speech style. Furthermore, the frequent use of the extreme scale points could be a sign of reactance or even defiance in participants: In the current time of fake news and a growing body of convincing artificial agents and chatbots (Verma, 2022), participants may have wanted to clearly show that they can identify artificial entities and are not fooled by designs that are meant to be anthropomorphic.

H2a-c, however, were accepted, meaning that the assumptions based on prior studies regarding the perception of human speech styles were confirmed. A colloquial speaking voice assistant is perceived as less competent (H2a), competence and trust are positively related (H2b) and therefore, colloquial speech has a negative indirect effect on trust via competence (H2c). This observation confirms two presuppositions: One, colloquialism and its effects on the evaluation of a speaker are similar to those of dialect and accents. Prior studies concerned themselves with various degrees of non-standard-language but mainly focused on accents and dialects and not exclusively on colloquialism (e.g., Fuertes et al., 2012). The current study now shows that colloquialism suffices to reduce interpersonal evaluations as accents and dialects do. Two, prior findings on *human* speakers are transferable on an *artificial* speaker, in this case a voice assistant which could be a subtle proof for the CASA paradigm, after all. The social rules of human prejudice due to non-standard language and their effects on evaluations of human speakers were applied to a digital agent. This social treatment of the assistant was possibly triggered due to perceptions of humanness in the assistant on a subconscious level which could not be measured by the questionnaire (see above). It remains uncertain whether this perception of humanness was caused by the colloquialism or the assistant itself. Several features of Q that were not experimentally manipulated could have had this influence, for example the ability to speak in a voice, the knowledge on topics, the level of interactivity and so on.

Finally, the variable of intentions to use offers some new insights, though the corresponding results slightly missed the conventional level of significance and H3a and H3c were hence rejected. Possibly, in a bigger sample containing more statistical power, a significant direct effect of trust as well as an indirect effect of speech style via competence and trust on intentions to use could be found that we only observed by trend. Interestingly though, significant direct relations of intentions to use with competence and humanness were found. Competence is often considered a subdimension of trust or a "trusting belief" that, in combination with benevolence and integrity, forms the concept of trust as a whole (e.g., Lankton et al., 2015; Weidmüller 2022). The findings of this study confirm that competence can clearly be seen as a closely related concept to trust, as they are strongly correlated ($r = .786, p < .01$) and the different relationships with intentions to use and speech style show that competence is not completely equal to trust. It is more of a subdimension or

determinant of it and is additionally more relevant to intentions to use than the broad concept of trust. Further, perceptions of humanness had a direct positive relation with intentions to use. This relation could be a sign of users' shifting demands when it comes to information requests: Information intermediation by voice assistants might be attractive for the very reason of interactive and spoken out answers that mirror human conversations. Hearing the answer to a specific question in a friendly and personal voice could be preferable compared to general, impersonal news content in "classical" media. Thus, the process of information retrieval becomes more dialogic, personalized and individual. Therefore, humanness in an information intermediary might not only increase trust in them but be also a key selling point for information search via voice assistants and influence intentions to use directly.

This study has to be interpreted in light of a few limitations: First, some expected effects were not found or only observed as a trend that slightly missed the significance level which could be due to our sample: We did not perform an a-priori-power analysis to assess the needed sample size to find expected effects. Therefore, our sample might have been too small to obtain the needed power for a reliable detection of all existent effects and relations. Future studies should hence include such prior analyses and aim for larger samples to perform mediation analyses with more power. Furthermore, we recruited participants via student contacts and a commercial panel and cannot rule out that these groups had distorting effects on our results. Therefore, representative samples could be helpful to review our findings on a firmer basis. Especially the direct effects of humanness and competence on intentions to use had no connection to our experimental manipulation and should be verified for a representative sample.

Second, the used voice of Q has to be criticized. We purposely designed the voice of Q as gender-ambiguous and different to current options on the market to avoid prior attitudes regarding voice assistants. However, the sound and way of speaking of Q did not appeal to some participants as some comments revealed which might have had an intervening effect on the relation between colloquialism and perceived humanness. Future studies should implement more typical and smoothly speaking voices into experimental designs and check again for effects of colloquialism as proof for the CASA paradigm. One option is to record real voice assistants

like Alexa or Siri that can read out loud written stimulus texts. These studies have to control for attitudes and experiences concerning the specific assistants and their providers though. Another option is to use other highly developed artificial voices that are lesser-known, for example Microsoft's text-to-speech assistant Zira (Greussing et al., 2022; Yuan et al., 2019). This method allows to avoid intervening effects due to prior experiences.

Third, the vignette-design of the study may have had a central disadvantage. Participants were asked to imagine an interaction with a newly developed voice assistant but did not actually speak with the assistant. The lack of action from participants and real reactions of Q could have negatively influenced how interactive the situation was perceived. This missing feeling of interactivity could have had effects on measured attitudes towards the assistant. Future study designs should avoid this problem, for example by using stimulus videos from the first-person perspective (e.g., Whang & Im, 2021) or by switching to laboratory experiments to enhance external validity. A wizard-of-Oz-design is helpful to simulate an interaction between user and voice assistant in the lab while the given answers are actually controlled by a hidden researcher. In doing so, researchers can better control the experimental conditions and avoid confounding variables (Greussing et al., 2022).

Lastly, due to prior literature connecting the speech style of human speakers with competence and trust, we only focused on one of the three typical determinants of trust and omitted two further trusting beliefs. Additional measurements of benevolence and integrity as well as the determinants of technical trust – namely functionality, helpfulness and reliability (Lankton et al., 2015; McKnight et al., 2011) – could have been added to our questionnaire. Technical trust has recently been proven to be relevant to voice assistants as well as human trust (Weidmüller, 2022). Future studies should look into effects of colloquialism on these different determinants of trust and how they play together to build trust in voice assistant. Possible additional dimensions of trust specific to the information intermediation of voice assistants should be considered as well. When users turn to voice assistants for current information, aspects of their methods of information research and editing may also be relevant in forming trust. In fact, recent findings do point to the fact that the influence of anthropomorphic design on trust has been overestimated due to the undetected impact of credibility of the statements a voice assistant makes

(Weidmüller et al., 2022). Future studies should additionally include measures regarding the credibility of the given information.

Taken together, the current study showed that independent of the topic a voice assistant talks about, its colloquial speech style – compared to a formal one – has a negative effect on competence evaluations, which also mediates a negative effect of speech style on trust. In contrast, humanness is not influenced by a colloquial speech style. Based on these findings, a voice assistant will therefore not benefit from a colloquial speech style regarding the perceptions and behaviors of its users. However, future studies should carefully review these findings with a bigger sample containing more statistical power and use a more common voice for the assistant. Possibly the found harmful relation of colloquialism and trust via competency can be balanced out by an additional positive influence on trust via perceived humanness which we could not observe. Furthermore, the found direct relationship of perceived humanness and intentions to use the assistant reveals more research potential: If an anthropomorphic and human-seeming design encourages users to turn to voice assistants, research should look into the significance of this feature for the use of voice assistants, especially for information purposes. Considering the ambiguous quality of voice assistants' factual answers (e.g., Frehmann et al., 2022; Goh et al., 2021), there might be a risk that a natural human sounding voice masks flaws in factuality and reliability of the content. Future studies should determine specific motives to use voice assistants as an information source and investigate how users deal with answers, assess their credibility and whether they factcheck specific information which they received from an assistant.

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Question in informal everyday context	Formal answer	Colloquial answer
What will the weather be like tonight?	Tonight, the temperature will be 10°C and it will be raining heavily. Tomorrow the weather will be better with 22°C and sunshine.	Tonight, the temperature will be 10°C and it will be <u>raining buckets</u> . Tomorrow the weather will be better with 22°C and sunshine.
What is the name of Amelia Taylor's new album?	Amelia Taylor's new album is called "Keep my heart around". It is selling very well, about 5 million copies to date.	Amelia Taylor's new <u>record</u> is called "Keep my heart around". It is selling <u>like hot cakes</u> , about 5 million copies to date.
How old is Amelia Taylor?	Amelia Taylor is 36 years old. She was born on 01.02.1985 in London. She learned to play the piano at the age of 5.	Amelia Taylor has 36 <u>on her hump</u> . She was born on 01.02.1985 in London. She was already <u>jamming</u> on the piano at the age of 5.
Question in formal political context	Formal answer	Colloquial answer
What does the Green Party say about the speed limit on highways?	According to their election program, the Green Party wants to limit the speed on highways to 130 km/h in general. Faster driving would no longer be possible anywhere.	According to their election program, the Green Party wants to limit the speed on highways to 130 <u>“things”</u> in general. Driving <u>with more "Karacho"</u> would no longer be possible anywhere.
What does the SPD say about retirement?	In their election programme, the SPD demands that it be possible to enter retirement at 67. In the SPD's view, the Riester pension model is outdated in its current form.	In its election programme, the SPD demands that people be able <u>to retire</u> at 67. In the SPD's view, the Riester pension model <u>has had its day</u> .
Where can I find out more about the positions of the FDP?	More information on the positions of the FDP can be found at fdp.de. The most important points and further facts on politics can also be found at bpb.de.	More <u>info</u> on the positions of the FDP can be found at fdp.de. The most important <u>benchmarks</u> and other facts from the <u>world of politics</u> can also be found at bpb.de.

Table 1: Questions in informal everyday and formal political context and answers in formal and colloquial speech style (colloquial wordings underlined)

Die Wirkung von egoistischem, altruistischem und biosphärischem Framing der Plastikverschmutzung in der Umweltkommunikation

Tanja Habermeyer, Janine N. Blessing, Helena Bilandzic, Anna-Maria Baur

Institut für Medien, Wissen und Kommunikation, Universität Augsburg, Augsburg

Zusammenfassung

Die vorliegende Studie untersucht die Wirkung von Value-Based-Framing (egoistisch, altruistisch und biosphärisch) im Kontext einer Poster-Kampagne zum Thema Plastikverschmutzung. Die Norm-Activation Theory (Schwartz, 1977) dient als theoretischer Hintergrund zur Beschreibung des umweltrelevanten Verhaltensbildungsprozesses. Nach Schwartz' Theorie (1992; 1994) werden die verschiedenen Arten des Value-Based-Framings – egoistisches, altruistisches und biosphärisches Framing – miteinander verglichen und mit einer Version ohne Value-Based-Framing in der Wirkung auf den umweltbezogenen Verhaltensbildungsprozess analysiert. Zusätzlich wird die Relevanz einer Übereinstimmung des Werteframings und der bestehenden Wertorientierung der Rezipierenden untersucht. Die Studie zeigt, dass sich altruistisches Framing, verglichen mit einer Kommunikation ohne Werteframing, signifikant auf den umweltrelevanten Verhaltensbildungsprozess auswirkt: Die Wirkung des altruistischen Framings verglichen zu keinem Einsatz von Value-Based-Framing auf den Verhaltensbildungsprozess zeigt sich für alle Personen, unabhängig von bestehender Wertorientierung. Biosphärisches und altruistisches Framing zeigen sich hier als nicht relevant in der Wirkung auf den Verhaltensbildungsprozess. Die Ergebnisse sind konsistent mit den theoretischen Annahmen von Schwartz (1992; 1994) und werden in diesem Zusammenhang diskutiert. Nicht signifikante Ergebnisse werden auch in Bezug auf eine geringe Effektstärke diskutiert.

Keywords: Framing, Norm-Activation Theory, Wertorientierungen, Value-Based-Framing

Summary

This study examines the effect of Value-Based Framing (egoistic, altruistic, and biospheric) in the context of a poster campaign on plastic pollution. Norm-Activation Theory (Schwartz, 1977) serves as a theoretical background to describe the environmental behavior formation process. In line with Schwartz (1992; 1994), the different types of Value-Based Framing - egoistic, altruistic, and biospheric framing - are compared with each other and analyzed with a version without value-based framing regarding their effects on the environment-related behavior formation process. In addition, the relevance of a match between the value framing and the existing value orientation of the audience is investigated. The study shows that altruistic framing, compared to communication without value framing, has a significant effect on the environment-related behavior formation process: The effect of altruistic framing compared to no use of Value-Based Framing on the behavior formation process is effective for all individuals, regardless of existing value orientation. Biospheric and altruistic framing are shown here to be irrelevant in their effect on the behavior formation process. The results are consistent with the theoretical assumptions of Schwartz (1992; 1994) and are discussed in this context. Non-significant results are also discussed in terms of low effect size.

Keywords: Framing, Norm-Activation Theory, value orientations, Value-Based-Framing

Einleitung

Medien spielen eine bedeutende Rolle in der öffentlichen Wahrnehmung von Umweltverschmutzung und Klimawandel, denn sie sind nach den Ergebnissen zahlreicher Studien weltweit eine der relevantesten Informationsquellen, und in vielen Fällen auch die einzige Informationsquelle, zu wissenschaftlichen Erkenntnissen in diesem Kontext (z.B. Filho, 2019; Schäfer & Bonfadelli, 2017; Görke & Rhomberg, 2017; Schäfer & Schlichting, 2014; Whitmarsh, 2009; Boykoff & Rajan, 2007). Dementsprechend bedeutsam ist die Relevanz der Darstellung und Form der Aufbereitung von Informationen in den Medien in diesem Kontext und in Folge die Selektion und Nutzung durch Rezipierende, wie auch Wirkung auf diese (Pinto et al., 2019; Bonfadelli et al., 2017). Hiermit setzt sich der Forschungsbereich der Wissenschaftskommunikation auseinander (Bonfadelli et al., 2017): Wissenschaftskommunikation wird nach Schäfer et al. (2015, S. 13) definiert als „alle Formen von auf wissenschaftliches Wissen oder wissenschaftliche Arbeit fokussierte Kommunikation, sowohl innerhalb als auch außerhalb der institutionalisierten Wissenschaft, inklusive ihrer Produktion, Inhalte, Nutzung und Wirkungen“. Im Kontext dieser Studie wird insbesondere in den Fokus genommen, wie Rezipierende unterschiedliche Formen der Darstellung verarbeiten und inwiefern sich diese auf Rezipierende auswirken.

Ein entscheidender Bestandteil der weltweiten Umweltverschmutzung stellt die Verunreinigung der Umwelt durch Plastik dar (Umweltbundesamt, 2019). Jährlich werden 400 Millionen Tonnen an nicht-abbaubarem Plastik produziert. Ein großer Anteil davon endet in der Natur, häufig in den Ozeanen, was zum Tod von Millionen Meerestieren führt und zahlreiche negative gesundheitliche Folgen für den Menschen nach sich ziehen kann. (NABU, 2020) Verschiedene Kommunikator_innen wie das Bundesumweltministerium stellen der Öffentlichkeit in Kommunikationskampagnen – zum Beispiel über Plakate – Informationen zur Verfügung, unter anderem mit dem Ziel, die Problematik darzustellen und Handlungsalternativen aufzuzeigen. Der Einsatz von Plakatkampagnen zielt darauf ab, durch eine visuelle Ausgestaltung Aufmerksamkeit für unterschiedliche Themen zu erzeugen und verschiedene Zusammenhänge in verständlicher Weise darzustellen (Deiters, 2005; Hasanica et al., 2020). Plakate bieten außerdem die Möglichkeit, auch die Teile der

Bevölkerung mit wichtigen Informationen zu erreichen, die sich nicht aus eigenem Antrieb mit dem Themenkomplex auseinandersetzen. Durch eine wiederholte Rezeptionssituation werden Inhalte so mehrfach in das Gedächtnis gerufen (Ilic & Rowe, 2013; Brown, 2018).

Eine Herausforderung der Wissenschaftskommunikation zur Thematik der Plastikverschmutzung besteht darin, die Problematik an verschiedene Zielgruppen mit unterschiedlichen Voraussetzungen (z.B. Vorwissen) und Eigenschaften (z.B. Einstellungen zu Wissenschaft, Wertorientierungen) zu vermitteln (z.B. Hansla, 2010; Kaul et al., 2020). Im Kontext der umweltbezogenen Entscheidungsfindung sind dabei insbesondere die individuellen Wertorientierungen von Personen relevant (Schwartz, 1994; Stern et al., 1999). Die Herausforderung ist also, die Problematik Personen mit unterschiedlichen Wertorientierungen zu vermitteln. Die Kommunikationsstrategie des *Framings* (Entman, 1993; Matthes, 2014) ermöglicht das Hervorheben bestimmter Aspekte von Kommunikationsinhalten, um Rezipierenden Interpretationswege für die dargestellten Inhalte aufzuzeigen. Werteframing (auch Value-Based-Framing, z.B. Hansla, 2010; Schorn, 2021) kann hierzu die Ziele von umweltrelevanten Verhaltensweisen für unterschiedliche Wertorientierungen darstellen. Entsprechend Schwartz' (1992) Darstellung der Wertekategorien in biosphärisches, altruistisches und egoistisches Framing kann biosphärisches Framing also die Folgen umweltrelevanter Verhaltensweisen für die Umwelt darstellen, altruistisches Framing die Folgen umweltrelevanter Verhaltensweisen für andere Personen und egoistisches Framing für die eigene Person. Der Fokus der Argumentation hebt also verschiedene Ziele von umweltrelevanten Verhaltensweisen entsprechend unterschiedlicher Wertorientierungen hervor.

In dieser Studie wird im Kontext einer Plakatkampagne des Bundesumweltministeriums analysiert, wie sich Werteframes auf den umweltbezogenen Entscheidungsprozess von Rezipierenden auswirken. Für den umweltrelevanten Entscheidungsprozess spricht Schwartz (1994) dem altruistischen Framing eine besondere Relevanz zu, da Personen über ein grundsätzliches, intrinsisches Streben nach Erhalt der eigenen Art verfügen (vgl. auch Liu et al., 2018; Ojea & Loureiro, 2007). Nach der *Selective-Exposure-Theory* (Klapper, 1960; Williams et al., 2016) wären vor allem solche Werteframes effektiv, die mit der bestehenden

Wertorientierung übereinstimmen. Bisherige Studien liefern zur generellen Wirksamkeit – unabhängig von bestehender Wertorientierung (z.B. Hansla, 2010) – und zur Wirksamkeit von Werteframes vor dem Hintergrund bestehender Wertorientierung (z.B. Schorn, 2021; Nilsson et al., 2016; De Dominicis et al., 2017) teilweise widersprechende Ergebnisse. Hier setzt die Studie an, und möchte das Forschungsfeld im Kontext der Wissenschaftskommunikation weiter stärken. Zur Analyse der Wirkung des Value-Based-Framings auf den umweltbezogenen Entscheidungsprozess orientiert sich die Studie am Modell der Norm-Activation-Theory (NAM; Schwartz, 1977; Stern et al., 1999), welches den Prozess der Entscheidungsbildung bei umweltrelevanten oder auch prosozialen Themen beschreibt. Die Modelle wurden zur Erklärung von Verhaltensweisen in diesem Kontext entwickelt und gelten in der Forschung der prosozialen oder umweltbezogenen Wissenschaftskommunikation als etabliert.

Im Kontext einer der relevanten Aufgaben von Wissenschaftskommunikation, die Problematik der Umweltverschmutzung oder auch des Klimawandels an Personen mit unterschiedlichen Eigenschaften – hier: Wertorientierungen – zu vermitteln, leistet die vorliegende Studie einen ersten Beitrag: Value-Based-Framing stellt in der Forschung noch ein relativ junges Forschungsfeld dar, und die Studie möchte zur Wirkung der Darstellung von Verhaltensweisen an werterelevanten Zielen, hier anhand einer Plakatkampagne zur Plastikverschmutzung, weitere Erkenntnisse zur Wirkung von Value-Based-Framing auf Rezipierende liefern. Da bisherige Forschungsergebnisse in dem Feld unterschiedliche Ergebnisse zur Wirkung von Werteframes im Allgemeinen und vor dem Hintergrund der bestehenden Wertorientierung von Rezipierenden liefern (z.B. Hansla, 2010; Schorn, 2021; Nilsson et al., 2016; De Dominicis et al., 2017), ist die weiterführende Analyse der Wirkung des werterelevanten Framings unter verschiedenen Bedingungen weiterhin relevant.

Theoretischer Hintergrund

Die Relevanz von Wertorientierungen für den Entscheidungsprozess im Umweltkontext

Nach dem Wertesystem von Schwartz (1992; Stern et al., 1999) ist die individuelle Wertorientierung der Ausgangspunkt der prosozialen und umweltrelevanten Entscheidungsfindung von Personen. Diese Wertorientierungen können nach Schwartz (1992) in

drei Wertedimensionen unterteilt werden: Eine egoistische Wertorientierung legt den Fokus auf persönliches Wohlergehen und Gewinn, eine altruistische Wertorientierung auf den Schutz anderer Menschen und eine biosphärische Wertorientierung auf den Schutz anderer Arten und deren Lebensräume (Hohn, 2016). Nach Stern et al. (1999) sind Wertorientierungen bei jeder Person unterschiedlich stark ausgeprägt und fließen dementsprechend unterschiedlich in Entscheidungsprozesse ein. In verschiedenen Studien zeigen sich kontextabhängig positive Effekte einer stärker altruistisch (Knez, 2016; Prakash et al., 2019; Singh & Pandey, 2018; Liu et al., 2018; Ojea & Loureiro, 2007), biosphärisch (Bolderdijk et al., 2013; Birch et al., 2018; Radhakrishnan, 2016) oder egoistisch ausgeprägten Wertorientierung (Prakash et al., 2019; Yadav, 2016) auf Umweltverhalten. Insgesamt lässt sich jedoch in zahlreichen Vergleichsstudien feststellen, dass altruistische Gründe (Relevanz, andere Menschen zu schützen) Menschen häufiger als Entscheidungskriterien für Umweltverhalten dienen als biosphärische oder egoistische Gründe (z.B. Liu et al., 2018; Ojea & Loureiro, 2007). Schwartz (1994) erklärt dies mit einem grundsätzlichen, intrinsischen Streben nach Erhalt der eigenen Art, welches Menschen nach verschiedenen Erkenntnissen biologischer Forschung inhärent ist (z.B. Kay et al., 2020; Thompson et al., 2013; Reuter et al., 2011): Altruismus lässt sich nach Bierhoff (1990; Bierhoff et al., 1990) definieren als gezieltes, uneigennütziges Verhalten eines Individuums, für welches dieses Kosten (wie Zeit, Energie etc.) auf sich nimmt, um Chancen des Erhalts der eigenen Art zu erhöhen. Altruismus findet dementsprechend in erster Linie gegenüber eigenen Blutsverwandten statt, mit dem Ziel, den Fortbestand der direkten eigenen Gene in der Zukunft zu bewahren, wird aber auch mit dem Ziel ausgeübt, die eigene Art generell zu erhalten (z.B. Thompson et al., 2013). Wenn also eigene Verhaltensweisen einen Nachteil für die Allgemeinheit der eigenen Art darstellen oder den Fortbestand der eigenen Art gefährden, sind Individuen dementsprechend bereit, sich selbst einzuschränken und Verhaltensänderungen umzusetzen (z.B. Kay et al., 2020). Die Forschung der Biologie und Psychologie in diesem Kontext konnte die Relevanz von Altruismus für menschliche Entscheidungen (z.B. Kay et al., 2020; Thompson et al., 2013) wie auch für Entscheidungen unterschiedlicher Lebensweisen (ein Überblick in Gaudiya & Shukla, 2019) wiederholt nachweisen.

Zur Beschreibung des Entscheidungsprozesses bei prosozialem und umweltrelevantem Verhalten von

Personen orientiert sich die Studie am Modell der Norm-Activation-Theory (Schwartz, 1977; Stern et al., 1999). Das Modell ist eines der am häufigsten eingesetzten Modelle im Kontext der Erklärung von altruistischen und umweltrelevanten Verhaltens und gilt als etabliert in der Forschung der Umweltkommunikation, um die Wirkung von verschiedenen Kommunikationsinhalten auf den Verhaltensbildungsprozess zu untersuchen (Ostertag, 2016). So wurde das Modell zur Erklärung der Verhaltensbildung zahlreicher umweltrelevanter Verhaltensweisen (z.B. Hopper & Nielsen, 1991; Vining & Ebreo, 1992; Bratt, 1999; Gärling et al., 2003; Nilsson et al., 2004; Harland et al., 2007; Dalvi-Esfahani et al., 2017; Udo & Bagchi, 2019; Oh & Ki, 2022) herangezogen.

Entsprechend des Modells besteht der Entscheidungsprozess aus einer Abfolge verschiedener Entscheidungselemente, die die Bildung umweltrelevanter Verhaltensintentionen darstellen. Um eine umweltrelevante Verhaltensänderung anzustoßen, ist nach dem Modell das erste Element, dass sich Rezipierende über die Konsequenzen ihres Verhaltens für ein umweltrelevantes Problem bewusst werden (Konsequenzbewusstsein, *Awareness of consequences*). Wenn Rezipierende kein Bewusstsein über die Folgen ihres bisherigen (Nicht-)Verhaltens haben, sehen sie auch keine Notwendigkeit dieses Verhalten entsprechend des Modells anzupassen. Das Konsequenzbewusstsein kann entsprechend des Modells durch verschiedene Inputstimuli angestoßen oder verändert werden, so eben auch durch Medienstimuli. Da Werteframing die Ziele der eigenen Verhaltensweisen entsprechend verschiedener Wertorientierungen aufzeigen könnte, wird nach dem Modell insbesondere eine Wirkung auf den Verhaltensbildungsprozess erwartet. Daraufhin findet eine Zuschreibung von Verantwortung auf die eigene Person statt: Nicht nur wirtschaftliche Organisationen oder politische Institutionen sollen handeln, sondern auch das Individuum selbst (Zuschreibung der Verantwortung, *Ascription of responsibility*). Dies bildet in der Folge eine persönliche Norm (*Personal norm*) für das umweltfreundliche Verhalten: Eine persönliche Norm ist nach Schwartz (1977) eine Erwartung an sich selbst, in einer spezifischen Situation eine konkrete Handlung auszuführen, wahrgenommen als Gefühl einer moralischen Verpflichtung. Die persönliche Norm schließlich führt dann zu einer Verhaltensintention (*Behavioral intention*; Schwartz, 1977).

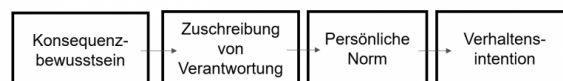


Abbildung 1: Norm-Activation Theory (Schwartz, 1977)

Value-Based-Framing

Wie dargelegt steht wissenschaftsbezogene Umweltkommunikation vor der Herausforderung, die Problematik der Umweltverschmutzung an Personen mit unterschiedlichen Wertorientierungen zu kommunizieren. Die Kommunikationsstrategie des *Framings* ermöglicht es, den Fokus auf verschiedene Aspekte der Kommunikationsinhalte zu legen. Gemeint ist damit der aktive Prozess des Hervorhebens spezifischer Elemente der Information oder Perspektiven in Kommunikationsinhalten (Entman, 1993; Matthes, 2014). Rezipierende verarbeiten die Information in Folge mit dem spezifischen Fokus und der Perspektive der Darstellung (Entman, 1993; Moser & Dilling, 2004). Als eine Form des Framings wird Value-Based-Framing (auch Werteframes, z.B. Hansla, 2010; Schorn, 2021) in der Umweltkommunikation eingesetzt. Werteframes sind also eine mögliche Kommunikationsstrategie, die Ziele von umweltrelevanten Verhaltensweisen in Kommunikationsinhalten aufzeigen können (z.B. Hansla, 2010; Schorn, 2021). Somit können Rezipierende auch entsprechend ihrer Wertorientierungen angesprochen werden. Unter Werteframes wird das Kommunizieren der Ziele umweltrelevanter Verhaltensweisen entsprechend unterschiedlicher Wertdimensionen verstanden. Die Studien zu Value-Based-Framing im Kontext der Umweltkommunikation zeigen bisher unterschiedliche Ergebnisse: Hansla (2010) untersucht Value-Based-Framing von Zielen umweltrelevanter Verhaltensweisen in Bezug auf die Bereitschaft, für ökologische Elektrizität mehr Geld auszugeben. In der Studie führte ein biosphärisches Framing der Umweltkonsequenzen zu einer höheren umweltrelevanten Verhaltensintention als altruistisches und egoistisches Framing – unabhängig von bestehender individueller Wertorientierung der Rezipierenden. In der Studie von Hansla (2010) zeigt sich kein signifikanter Unterschied zwischen

altruistischem und egoistischem Framing. Während diese Studien die Wirkung von Value-Based-Framing unabhängig von den individuellen bestehenden Werten einer Person betrachten, wurden auch Studien durchgeführt, die Value-Based-Framing vor dem Hintergrund der bestehenden Wertorientierung untersuchen. Nach der Selective-Exposure-Theory (z.B. Klapper, 1960; Sullivan, 2009; Hart et al., 2009; Williams et al., 2016) konzentrieren sich Personen insbesondere auf die Informationen, die mit ihren eigenen Voreinstellungen und Meinungen kongruent sind, um kognitive Dissonanz zu vermeiden oder zu reduzieren (Festinger, 1962). Nicht-kongruente Informationen werden nicht oder kaum verarbeitet oder auch leichter vergessen. Informationen, die den eigenen Wertorientierungen entsprechen, sollten deshalb besonders intensiv verarbeitet werden und sich entsprechend auf Entscheidungsprozesse auswirken. Studien, die Value-Based-Framing vor dem Hintergrund bestehender Wertorientierungen untersuchen, finden folgende Effekte: Nach Nilsson et al. (2016) und Schorn (2021) ist ein Framing entsprechend der eigenen Wertorientierung am effektivsten. De Dominicis et al. (2017) finden diesen Effekt nur für egoistische Wertorientierungen, während altruistisch orientierte Personen sich von jeglicher Framing-Art ansprechen lassen. Die Wirksamkeit eines Framings entsprechend bestehender Wertorientierung konnte nach aktuellem Forschungsstand folglich noch nicht abschließend beurteilt werden.

Darstellung des Forschungsdesigns und Herleitung der Hypothesen

Value-Based-Framing sollte sowohl in der direkten Wirkung auf Rezipierende als auch im Zusammenhang mit deren bestehender Wertorientierung untersucht werden. Die folgende Studie setzt hier an und analysiert die Wirkung von wertrelevantem Framing in Anlehnung an eine Plakatkampagne des Bundesumweltministeriums (4 Gruppen: biosphärisches, altruistisches, egoistisches Framing, kein Value-Based-Framing). Die Studie orientiert sich hierbei an den relevanten Konstrukten der Norm-Activation-Theory zur Ausbildung umweltrelevanten Verhaltens. In Anlehnung an Schwartz (1994) und Erkenntnissen von Liu et al. (2018) und Ojea und Loureiro (2007) wäre eine effektivere Wirkung von altruistischem Value-Based-Framing anstelle von egoistischem oder biosphärischem Framing oder auch keinem Value-Based-Framing auf den Entscheidungsprozess zu erwarten, unabhängig von

bestehender Wertorientierung. Nach der Selective-Exposure-Theory (z.B. Klapper, 1960) sollte insbesondere ein Value-Based-Framing, das kongruent zu bestehender Wertorientierung ist, sich effektiv auf den Entscheidungsprozess auswirken. Erste Studienergebnisse widersprechen sich hier teilweise: Hansla (2010) findet eine stärkere Wirkung von biosphärischem Value-Based-Framing verglichen zu anderen Value-Based-Framing Arten oder keinem Value-Based-Framing, unabhängig von bestehender Wertorientierung. Nilsson et al. (2016) und Schorn (2021) und De Dominicis et al. (2017) zeigen dagegen eine effektivere Wirkung eines Framings entsprechend der bestehenden Wertorientierung. Ein Vergleich der verschiedenen Framing-Arten vor dem Hintergrund der bestehenden Wertorientierungen ist folglich unerlässlich. Es wird die Wirkung auf den Verhaltensbildungsprozess untersucht, also auf die Steigerung von Konsequenzbewusstsein (primärer Mediator), in Folge Verantwortungszuschreibung (sekundärer Mediator), daraufhin Persönliche Norm (tertiärer Mediator) und letztendlich Verhaltensintention (abhängige Variable). Dementsprechend wird folgende offene Forschungsfrage 1 formuliert:

Forschungsfrage 1: Inwiefern wirken sich die Value-Based-Framing Arten altruistisches Framing, egoistisches und biosphärisches Framing verglichen miteinander und mit einer Variante ohne Value-Based-Framing auf den umweltrelevanten Verhaltensbildungsprozess aus?

Entsprechend der dargestellten theoretischen Zusammenhänge und erster Studien wird gemäß Nilsson et al. (2016; De Dominicis et al., 2017) erwartet, dass die Wertorientierungen von Personen moderierend auf die Wahrnehmung des Werteframings wirken. Eine Übereinstimmung von Werteframes mit der bestehenden Wertorientierung der Personen wird als besonders effektiv angenommen. Entsprechend werden folgende Hypothesen formuliert:

Die bestehende Wertorientierung beeinflusst die Wirkung des Value-Based-Framings auf den umweltrelevanten Entscheidungsprozess:

H1: Egoistisches Framing zeigt bei Personen mit einer hohen Egoismus-Wertorientierung eine stärkere Wirkung über Konsequenzbewusstsein auf den weiteren Verhaltensbildungsprozess als bei Personen mit einer geringen Egoismus-Ausprägung.

H2: Altruistisches Framing zeigt bei Personen mit einer hohen Altruismus-Wertorientierung eine stärkere Wirkung über Konsequenzbewusstsein auf den weiteren Verhaltensbildungsprozess als bei Personen mit einer geringen Altruismus-Ausprägung.

H3: Biosphärisches Framing zeigt bei Personen mit einer hohen biosphärischen Wertorientierung eine stärkere Wirkung über Konsequenzbewusstsein auf den weiteren Verhaltensbildungsprozess als bei Personen mit einer geringen biosphärischen Ausprägung.

Das Auswertungsmodell hierzu ist in Abbildung 2 dargestellt.

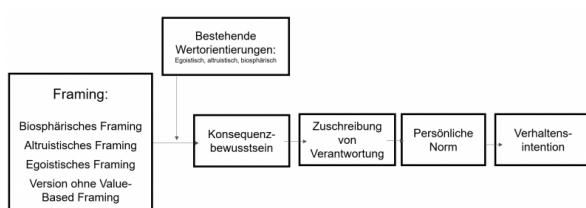


Abbildung 2: Entwicklung des Analysemodells aufbauend auf der Norm-Activation Theory (Schwartz, 1977)

Methode

Forschungsdesign und Stichprobe

In der vorliegenden Studie wurde ein einfaktorielles Between-Subjects-Online-Experiment zum Value-Based-Framing durchgeführt (4 Gruppen: biosphärisches, altruistisches, egoistisches Framing, kein Value-Based-Framing). Die Erhebung fand im Juli 2021 statt. Die Teilnehmenden beantworteten zuerst einen Vorab-Fragebogen zu ihrer bestehenden Wertorientierung. Im Anschluss wurden sie randomisiert einem von vier Versionen eines Plakats zugewiesen, das an eine Plakatkampagne des Bundesumweltministeriums angelehnt war. Nach der Rezeption des Plakats füllten die Teilnehmenden einen Fragebogen aus. Insgesamt nahmen 165 Personen an der Studie teil, die nach dem Schneeballverfahren rekrutiert wurden. Die Rekrutierung wurde im Kontext einer Abschlussarbeit über einen Weblink sowohl in den sozialen Medien als auch im eigenen Umfeld verteilt – mit der Bitte an die Teilnehmenden, weitere Proband_innen zu rekrutieren. Das Alter der Befragten lag zwischen 18 und 72 Jahren ($M = 37.3$; $SD = 14.1$).

Es waren 61,4 % der Teilnehmer_innen weiblich ($n = 102$), 36,1 % männlich ($n = 60$), 0,6 % ($n = 1$) divers und 0,6 % ($n = 1$) ohne Angabe. Die Verteilung des Bildungsabschlusses zeigte eine Mehrheit an Proband_innen, welche mindestens die (Fach-)Hochschulreife oder einen Hochschulabschluss besitzen (54,8 %), 24,1 % verfügen über eine abgeschlossene Berufsausbildung. Bezüglich der aktuellen Arbeitssituation gab die größte Gruppe der Teilnehmenden an (41,6 %), in einer Festanstellung auf Vollzeitbasis zu arbeiten. 13,9 % der Teilnehmer_innen arbeiten in einer Teilzeit-Festanstellung oder als Selbständige. 29 % gaben an, Schüler_innen oder Studierende zu sein.

Stimulusmaterial

Die im Experiment eingesetzten Plakate wurden in Anlehnung an eine Plakatkampagne des Bundesumweltministeriums entwickelt. Diese beinhalteten auf der rechten Seite einen Trinkbecher aus Plastik zur Einmalnutzung, der in Kaffeespuren ein trauriges Gesicht aufgemalt hatte. Auf dem Deckel des Bechers war ein rundes Textfeld mit Zacken angebracht, auf dem der inhaltliche Zusammenhang als Aufruf zur Handlungsänderung mit folgendem Text verdeutlicht wurde "Nein zu Wegwerf-Plastik, ja zu Mehrweg". Auf der linken Seite des Plakats waren in einem weiteren Textfeld zuerst die Konsequenzen der Reduktion des Plastikkonsums erklärt: "Wenn wir entschlossen auf Plastikverpackungen verzichten, werden wir die Plastikflut stoppen". Darunter war das Ziel, warum der Plastikkonsum reduziert werden sollte, in der größten Schriftart des Plakats angeführt. In diesem Slogan wurden die Experimentalbedingungen eingebaut. Das egoistische Framing enthielt als Ziel, warum man seinen Plastikkonsum reduzieren sollte, den Slogan "Für deine Zukunft!". Das altruistische Framing führte als Slogan an "Für die Zukunft der Menschheit!". Das biosphärische Framing gab als Ziel zur Reduktion des Plastikkonsums an "Für die Zukunft der Umwelt!". Die Version ohne Value-Based-Framing enthielt als Slogan nur als neutrale Formulierung "Kein Plastikmüll!", ohne sich auf ein konkretes Ziel zu beziehen. Das Value-Based-Framing der vorliegenden Studie orientiert sich hier an der Studie von Hansla (2010), die als Ziele von umweltrelevanten Verhaltensweisen im Kontext der Luftverschmutzung für egoistisches Framing „your health and wealth“ (S. 187), für altruistisches Framing „human health and wealth“ (S. 187) und für biosphärisches Framing „the balance of ecosystems“ (S. 187) einsetzte, und das Framing in der Darstellung des Stimulus ausschließlich

zweimal einsetzte. In dieser Studie unterschieden sich die Plakate bis auf den groß dargestellten Slogan nicht. Die Plakate sind in Abbildung 3 dargestellt.

Sowohl das Stimulusmaterial als auch der Fragebogen wurden in einem qualitativen Pre-Test mit fünf Teilnehmenden als Evaluationsverfahren vor der eigentlichen Befragung analysiert. Allen Pre-Test Teilnehmenden wurden alle Stimulus-Varianten und der Fragebogen vorgelegt und diese wurden zur wahrgenommenen Aussage der Plakate, zur Verständlichkeit, zu möglichen Fehlern und zu Optimierungsmöglichkeiten befragt. Die Stimulus-Varianten wurden entsprechend des Value-Based-Framings wahrgenommen.



Abbildung 3: Darstellung der Stimulus-Varianten der drei experimentellen Gruppen und der Version ohne Value-Based-Framing (egoistisches Framing, altruistisches Framing, biosphärisches Framing, kein Value-Based-Framing)

Operationalisierung

Sofern nicht anders ausgewiesen, wurden alle Items auf 7-stufigen Likert-Skalen gemessen, die von (1) „stimme überhaupt nicht zu“ bis (7) „stimme voll und ganz zu“ reichen.

Als Maß für das Konsequenzbewusstsein wurden die vier Items der Subskala von Jansson und Dorrepaal (2015), die sich auf das Konsequenzbewusstsein beziehen, an das Thema Plastikverschmutzung angepasst. Zu der Frage „Wie sehr stimmen Sie diesen vier Aussagen zu“ bewerteten die Teilnehmenden die Items „Die globale Plastikverschmutzung ist ein Problem für die Gesellschaft“, „Der Plastikmüll ist das größte Umweltproblem der Welt“, „Der Plastikmüll ist ein ernstes Problem für die gesamte Menschheit“ und

„Der Plastikmüll ist ein ernstes Problem für Tiere und Pflanzen“. Aus den vier Items wurde ein Mittelwertindex gebildet (Cronbach's $\alpha = .87$; $M = 5.54$, $SD = 1.15$).

Die Skala zur Zuschreibung von Verantwortung wurde nach Basil, Ridgway, und Basil (2006) mit drei Items aufgesetzt. Hier bewerteten die Proband_innen die folgenden Items: „Ich bin verpflichtet, meinen Teil zur Reduktion der Plastikverschmutzung beizutragen“, „Ich trage die Verantwortung, alles, was mir persönlich möglich ist, gegen die Plastikverschmutzung zu tun“, „Verhaltensweisen zu ändern, um die Plastikverschmutzung zu reduzieren ist das moralisch Richtige“. Die Skala ergab einen Reliabilitätswert von Cronbach's $\alpha = .78$ ($M = 4.70$, $SD = 1.15$).

Die persönliche Norm der Teilnehmenden wurde nach Jansson und Dorrepaal (2015) erhoben. Die Ursprungsskala zu Klimawandel wurde entsprechend für das Thema Plastikkonsum angepasst. Hier bewerteten die Teilnehmenden die folgenden Items: „Ich denke, dass es wichtig ist, bei meinem täglichen Kaufverhalten die Auswirkungen auf das Klima im Auge zu behalten“, „Ich habe eine moralische Verantwortung, die Plastikverschmutzung zu berücksichtigen“, „Ich habe eine moralische Verpflichtung, beim Einkaufen plastikfreie Produkte zu kaufen“, „Ich fühle mich persönlich für die Plastikflut verantwortlich“, „Nicht nur die Regierungen und die Industrie sind für die Plastikverschmutzung verantwortlich, auch ich bin es“, „Es tut dem Gewissen gut, klimafreundlich zu handeln“, „Ich bekomme ein schlechtes Gewissen, wenn ich mich nicht nach Zero Waste Richtlinien verhalte“. Die Skala mit sieben Items zeigte einen Reliabilitätswert von Cronbach's $\alpha = .93$ ($M = 4.85$, $SD = 1.33$).

Die Verhaltensintention wurde nach Mancha und Yoder (2015) erhoben und entsprechend der Thematik der Plastikverschmutzung (Verzicht auf Plastik- und Mikroplastikkonsum, alternative Verhaltensweisen) überarbeitet. Wie bei Mancha und Yoder ordneten sich die Teilnehmenden zur Aussage „Ich werde in den kommenden Monaten versuchen, [...]“ zu verschiedenen Verhaltensintentionen ein: „meinen Plastikverbrauch reduzieren“, „ein klimafreundliches Verhalten durch den Verzicht von Einwegplastik anzustreben“, „auf in Plastik verpackte Ware zu verzichten“, „bevorzugt unverpackte Lebensmittel von regionalen Herstellern zu kaufen“, „Lebensmittel möglichst in unverpackter Bio-Qualität zu konsumieren“, „beim Kauf von Obst und Gemüse auf

Einweg-Plastiktüten zu verzichten“, „meine eigene Tasche zum Einkaufen mitzubringen, anstatt eine Tüte zu kaufen“, „Lebensmittel in großen Vorratspackungen zu kaufen“, „in Unverpackt-Läden einzukaufen“, „der Umwelt zuliebe auf klimafreundliche Verpackungen zu achten“, „weniger in Plastik verpackte Kosmetikprodukte zu konsumieren“, „auf den Zusatz von Mikroplastik bei gekauften Produkten zu achten“. Die Skala bestand aus elf Items und verfügte über einen Reliabilitätswert von Cronbach's $\alpha = .94$ ($M = 4.98$, $SD = 1.23$).

Die Wertorientierung der Teilnehmenden wurde in Anlehnung an de Groot und Steg (2008) erhoben. Hier werden verschiedene Ziele von Verhaltensweisen nach dem Wertesystem von Schwartz (1992) entsprechend der persönlichen Relevanz auf einer 7-stufigen Skala von „überhaupt nicht wichtig“ bis „sehr wichtig“ bewertet. Die biosphärische Wertorientierung wurde mit vier Items analysiert. Zu der Frage „Wie wichtig sind Ihnen folgende Punkte bezüglich der Bedeutsamkeit in Ihrem Leben?“ ordneten sich die Teilnehmenden in Bezug auf die Items „Natürliche Ressourcen schützen“, „In Harmonie mit anderen Spezies zu leben“, „Sich in die Natur fügen“ und „Die Natur erhalten“ ein. Der Reliabilitätswert liegt bei Cronbach's $\alpha = .87$ ($M = 5.90$, $SD = 0.90$). Die Skala der altruistischen Wertorientierung bestand aus vier Items mit einem Reliabilitätswert von Cronbach's $\alpha = .82$ ($M = 5.99$, $SD = 0.97$). Die Items hierzu lauteten: „Chancengleichheit für alle“, „Freiheit von Krieg und Konflikten“, „Wiedergutmachung von Unrecht und die Sorge für Schwache“ und „Das Wohlergehen anderer“. Die egoistische Wertorientierung wurde mit vier Items erfasst mit einem Cronbach's α von $.80$ ($M = 3.51$, $SD = 1.13$). Die Items der Subskala waren: „Materielle Besitztümer, wie beispielsweise Geld“, „Das Recht, zu führen oder zu befehlen“, „Einen Einfluss auf Menschen und Ereignisse zu haben“ und „Kontrolle und Dominanz über andere Menschen“.

Ergebnisse

Eine Korrelationstabelle der erhobenen Variablen ist in Anhang A in Tabelle 1 dargestellt. Der Wirkungszusammenhang wird in Folge nach den theoretischen Annahmen der Value-Belief-Norm Theory ausgewertet. Es wurde ein seriell Mediationsmodell mit dem IBM SPSS PROCESS-Makro von Hayes (2021) berechnet, um den Wirkungsprozess des Value-Based-Framings entsprechend der postulierten Hypothesen über das Entscheidungsmodell nach der Norm-Activation

Theory (Schwartz, 1977; Stern et al., 1999) zu analysieren. Hierzu wurde das PROCESS-Makro von Hayes für die Berechnung von seriellen Mediationen angewendet. Bei einer seriellen Mediation wird davon ausgegangen, dass eine unabhängige Variable in der Wirkung über mehrere in Folge angeordnete vermittelnde Variablen eine abhängige Variable beeinflusst. Im Modell von Hayes wird hier sowohl der Wirkungszusammenhang zwischen der unabhängigen Variablen und jeder Mediatorvariable in der Wirkung auf die abhängige Variable untersucht als auch das Modell im Ganzen geprüft. Um die Gruppen des Value-Based-Framings (egoistisches, altruistisches und biosphärisches Framing sowie die Version ohne Value-Based-Framing) entsprechend der Hypothesen miteinander zu vergleichen, wurden Indikator-codierte Gruppenvergleiche gerechnet. Die Framing-Arten wurden dementsprechend in der Wirkung gegenübergestellt analysiert, und in der Wirkung auf Verhaltensintention, vermittelt über in Folge Konsequenzbewusstsein, Verantwortungszuschreibung und persönliche Norm, betrachtet.

Zur Analyse der Wirkung der bestehenden Wertorientierungen auf die Wahrnehmung des Value-Based-Framings wurden im Anschluss moderierte serielle Mediationsanalysen gerechnet, die Berechnungen der Gruppenvergleiche in der Wirkung auf die seriellen Modelle also um jeden der drei potenziellen Moderatoren altruistische Wertorientierung, egoistische Wertorientierung und biosphärische Wertorientierung erweitert. Für die Durchführung der moderierten seriellen Mediationsanalysen wurde wieder das PROCESS-Makro von Hayes herangezogen. Das serielle Mediationsmodell wird hier nun noch durch einen Moderator ergänzt.

Die Wirkung des Value-Based-Framings über den umweltbezogenen Entscheidungsprozess

Das serielle Mediationsmodell mit Indikator-codierten Gruppenvergleichen des Value-Based-Framings zeigte sich als signifikant für den Gruppenvergleich altruistisches Framing anstelle der Version ohne Value-Based-Framing über die seriell angeordneten Mediatoren Konsequenzbewusstsein, Zuschreibung von Verantwortung und persönliche Norm auf die abhängige Variable Verhaltensintention (siehe Abbildung 4). Der indirekte Effekt für das vollständige serielle Mediationsmodell für den Gruppenvergleich altruistisches Framing und kein Value-Based-Framing war signifikant (relativer indirekter Effekt $a_1b_1d_1e_1 =$

0.06; 95% KI [0.01; 0.14], vgl. Abbildung 4). Die Analyse zeigt, dass altruistisches Framing im Vergleich zur Kontrollbedingung den Entscheidungsprozess entsprechend des Norm-Activation Modells steigern konnte. Der Zusammenhang wird hier signifikant, es zeigt sich jedoch nur ein schwacher Effekt. Die einzelnen direkten Effekte werden in Abbildung 4 dargestellt. Sowohl die Wirkung des Gruppenvergleichs auf das vollständige NAM-Modell wird signifikant, wie gerade ausgeführt, wie auch die direkte Wirkung des Gruppenvergleichs auf die abhängige Variable Verhaltensintention, ohne Betrachtung der Mediatoren ($c = 0.58^*$).

Für die Analyse der Wirkung der weiteren Indikator-codierten Gruppenvergleiche (Vergleiche der Framing-Arten miteinander und mit der Gruppe ohne Value-Based-Framing) auf das serielle Wirkungsmodell zeigten sich keine weiteren signifikanten Effekte. Die direkten Effekte der Wirkung der verschiedenen Indikator-codierten Gruppenvergleiche auf die einzelnen abhängigen Variablen des Modells werden in Tabelle 2 dargestellt. Es wird also entsprechend angeführt, wie jeder Gruppenvergleich der unabhängigen Variablen auf die einzelnen Mediatorvariablen und die abhängige Variable des Modells wirkt.

Die Forschungsfrage 1 kann folgendermaßen beantwortet werden: Altruistisches Framing wirkt effektiver als die Version ohne Value-Based-Framing auf den umweltrelevanten Entscheidungsprozess. Weitere Gruppenvergleiche zwischen den anderen Value-Based-Framing Arten wie auch zwischen den Value-Based Framing Arten im Vergleich zur Kontrollgruppe zeigen keine signifikante Wirkung auf den umweltrelevanten Entscheidungsprozess.

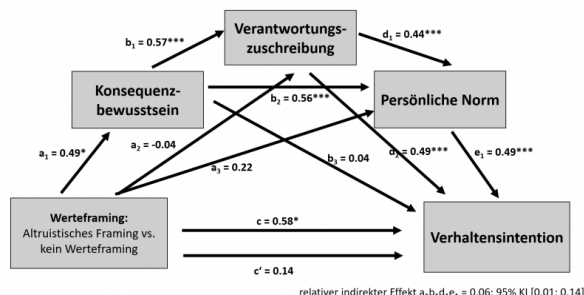


Abbildung 4: Darstellung des signifikanten Effekts des Altruistischen Framings anstelle der Version ohne Value-Based-Framing auf das Entscheidungsmodell der Norm-Activation Theory als serielles Mediationsmodell

Gruppen der unabhängigen Variable Value-Based Framing	Mögliche beeinflusste Variablen							
	Konsequenzbewusstsein		Verantwortungszuschreibung		Persönliche Norm		Verhaltensintention	
	M	SD	M	SD	M	SD	M	SD
Egoistisches Framing	5.50	1.10	4.82	0.84	4.85	1.39	4.99	1.17
Altruistisches Framing	5.87	0.92	4.83	1.00	5.25	1.12	5.35	1.00
Biosphärisches Framing	5.42	1.32	4.60	1.11	4.67	1.33	4.81	1.38
kein Value-Based Framing	5.35	1.19	4.59	1.18	4.65	1.42	4.76	1.29
Insgesamt	5.53	1.15	4.70	1.05	4.85	1.33	4.98	1.23

Tabelle 2: Darstellung der Mittelwerte und Standardabweichungen von jeder Gruppe der unabhängigen Variable Value-Based Framing für jede mögliche beeinflusste Variable

Der Einfluss der bestehenden egoistischen Wertorientierung auf die Wirkung des Value-Based-Framings über den umweltbezogenen Entscheidungsprozess

Zur Analyse des Einflusses der bestehenden egoistischen Wertorientierung auf die Wirkung des Value-Based-Framings über den umweltbezogenen Entscheidungsprozess wurde eine moderierte Mediation berechnet. Dafür wurde das serielle Mediationsmodell von PROCESS um den Moderator egoistische Wertorientierung erweitert.

Die Moderation der seriellen Mediation wurde nicht signifikant: Die Indizes der moderierten Mediation für jeden Gruppenvergleich werden alle nicht signifikant, die Werte werden in Anhang B in Tabelle 3 aufgeführt. Eine vorbestehende egoistische Wertorientierung hatte also keinen Einfluss auf die Wirkung des Value-Based-Framings. Hypothese H1 zur moderierenden Wirkung der bestehenden egoistischen Wertorientierung wird folglich abgelehnt.

Der Einfluss der bestehenden altruistischen Wertorientierung auf die Wirkung des Value-Based-Framings über den umweltbezogenen Entscheidungsprozess

Die moderierte serielle Mediationsanalyse für den Einfluss der bestehenden egoistischen Wertorientierung auf die Wirkung des Value-Based-Framings zeigte ebenfalls keine signifikanten Effekte. Die Indizes der moderierten Mediation für die einzelnen Gruppenvergleiche sind in Anhang B in Tabelle 4 aufgeführt. Die bestehende altruistische Wertorientierung zeigte folglich keine Wirkung auf die

Wirkung des Value-Based-Framings in der direkten Wirkung auf Konsequenzbewusstsein und den weiteren Verlauf des Modells. Hypothese H2 in Bezug auf die moderierende Wirkung einer bestehenden altruistischen Wertorientierung kann nicht bestätigt werden.

Der Einfluss der bestehenden biosphärischen Wertorientierung auf die Wirkung des Value-Based-Framings über den umweltbezogenen Entscheidungsprozess

Eine moderierte serielle Mediationsanalyse für den Einfluss der bestehenden biosphärischen Wertorientierung zur Wirkung von Value-Based-Framing zeigte ebenfalls keine signifikanten Effekte. Die Indizes der moderierten Mediation sind in Anhang B in Tabelle 5 dargestellt. Somit war die bestehende biosphärische Wertorientierung nicht relevant für die Wirkung des Value-Based-Framings. Hypothese H3 für eine moderierende Wirkung der bestehenden biosphärischen Wertorientierung wird abgelehnt.

Diskussion

Die vorliegende Studie analysierte das Framing der Ziele umweltrelevanter Verhaltensweisen bezogen auf die verschiedenen Wertdimensionen (Value-Based-Framing: biosphärisch, altruistisch, egoistisch, kein Value-Based-Framing). Value-Based-Framing wurde in einem Plakat zur Reduzierung des Plastikkonsums orientiert an der Plakatkampagne des Bundesumweltministeriums untersucht. Es zeigte sich in den Ergebnissen nur eine signifikante Wirkung des altruistischen Framings verglichen mit der Version ohne Value-Based-Framing auf die relevanten Variablen der Norm-Activation Theory der umweltrelevanten Entscheidungsbildung. Hier ließ sich auch nur ein sehr kleiner signifikanter Effekt finden. Die weiteren Vergleiche der Value-Based-Framing Arten untereinander und mit der Version ohne Value-Based-Framing wurden nicht signifikant. Die bestehenden Wertorientierungen der Personen beeinflussten außerdem nicht die Wirkung des Value-Based-Framings.

Die Wirksamkeit eines altruistischen Framings verglichen mit keinem Value-Based-Framing auf den umweltrelevanten Entscheidungsprozess lassen sich in Anlehnung an Schwartz's (1994) Theorie des Strebens nach Erhalt der eigenen Art und Erkenntnissen zur Relevanz von altruistischen Gründen für Umweltverhalten (z.B. Liu et al., 2018; Ojea &

Loureiro, 2007) erklären. Die Wirkung des altruistischen Framings zeigte sich hier über den Wirkungsprozess von umweltrelevanten Entscheidungen wie postuliert nach der Norm-Activation Theory (Schwartz, 1977). Altruistisches Framing anstelle der Version ohne Value-Based-Framing steigerte im Modell das Konsequenzbewusstsein der Rezipierenden, das erste Konstrukt des NAM-Wirkungsprozesses. Das Value-Based-Framing in der Plakatkampagne setzte an der Darstellung der Konsequenzen umweltrelevanter Verhaltensweisen in Bezug auf den Plastikkonsum an. Die Darstellung der Konsequenzen von Umweltverschmutzung für die eigene Person konnte entsprechend das Konsequenzbewusstsein steigern und über die Erhöhung von Konsequenzbewusstsein den weiteren Verhaltensbildungsprozess beeinflussen. Es ließ sich jedoch nur ein sehr geringer Effekt auf den Verhaltensbildungsprozess feststellen, was im Kontext der geringen Stichprobengröße und dementsprechend der geringen Power betrachtet werden muss. Auf diesen Punkt wird in Folge weiter eingegangen.

Wie von Schwartz (1994) im Kontext der Theorie eines allgemeinen altruistischen Strebens nach Erhalt der eigenen Art diskutiert, konnte in dieser Studie ein effektiverer Einsatz von altruistischem Framing gegenübergestellt zu einer Version ohne Value-Based-Framing nachgewiesen werden, der Vergleich der verschiedenen Value-Based-Framing Arten untereinander zeigte jedoch keine signifikanten Unterschiede. Die Ergebnisse sprechen folglich im Kontext der Wissenschaftskommunikation dafür, Ziele von Umweltverhalten entsprechend altruistischer Beweggründe darzustellen. Altruistisches Framing zeigte sich aber nicht als effektiver als egoistisches oder biosphärisches Framing. Egoistisches und biosphärisches Framing war außerdem auch nicht effektiver als die Variante ohne Value-Based-Framing. Es kann diskutiert werden, ob Gedanken an altruistische Beweggründe auch bei den anderen beiden Framing-Arten ausgelöst wurden, wenn diese nach Schwartz (1994) und Liu et al. (2018; Ojea und Loureiro (2007) als entsprechend relevant zu erwarten sind. In Bezug auf die Aufsetzung des Value-Based-Framings in den Stimulus-Varianten wurde sich an der Konzeption der Wertorientierungen von Schwartz (1992) orientiert. Die Ziele von umweltrelevanten Verhaltensweisen wurden entsprechend einer Auswirkung von Verhaltensweisen auf die eigene Person (egoistisch), die Menschheit insgesamt (altruistisch) und die Umwelt (biosphärisch) aufgesetzt. Die realen Auswirkungen der Plastikverschmutzung

auf diese drei Wirkungsfelder stehen natürlich in einem sehr engen Zusammenhang und hier finden zahlreiche Überschneidungen und gegenseitige Beeinflussungen statt: Eine negative Beeinflussung der Umwelt hat auch wieder Folgen für die Menschheit insgesamt, und in diesem Kontext natürlich auch für die Einzelperson. Die Aufsetzung des Value-Based-Framings zielt grundsätzlich darauf ab, eine Auswirkung der Gesamtproblematik auf Wirkungsfelder zu zeigen, die nach den Wertdimensionen für Personen relevant sein könnten. Es lässt sich jedoch diskutieren, ob eine entscheidend große Relevanz altruistischer Beweggründe für Rezipierende dazu führen könnte, dass in diesem Kontext auch bei den anderen Framing-Arten teilweise Gedanken an altruistische Konsequenzen ausgelöst wurden, und sich deshalb keine signifikanten Unterschiede zwischen altruistischem Framing und den anderen beiden Framing-Arten ergaben.

Interessanterweise stellte Hansla (2010) die Effektivität eines Einsatzes von biosphärischem Framing fest, entgegengesetzt zu der Theorie von Schwartz (1994) zu einem Vorteil des altruistischen Framings. Altruistische Beweggründe könnten sich als gesteigert (diese Studie; Schwartz, 1994; auch Liu et al., 2018 etc.) oder abgeschwächt (Hansla, 2010) zeigen – in Abhängigkeit von der Komplexität der Thematik: Altruistische Ziele der Reduzierung von Plastikverschmutzung (diese Studie) könnten einfacher zu verstehen und nachzuvollziehen sein als direkte altruistische Konsequenzen des Kaufs von grünem Strom (Hansla, 2010). Bei Hansla könnten in der Bewertung altruistische Beweggründe an Relevanz verloren haben, und egoistische und biosphärische Beweggründe neu beurteilt worden sein.

Für die Entwicklung von Umweltkampagnen deuten die Befunde dieser Studie auf die Relevanz der Darstellung von Zielen umweltrelevanter Verhaltensweisen bezogen auf altruistische Folgen hin. Das Aufzeigen der Folgen, die eigene Verhaltensweisen für die Menschheit an sich haben, scheint für den Verhaltensbildungsprozess relevant zu sein. Der Einsatz von altruistischem Framing kann hier, unabhängig von der bestehenden Zielgruppe, das Wahrnehmen der grundsätzlichen Relevanz von umweltrelevanten Verhaltensweisen bei den Rezipierenden erhöhen. Schwartz' (1994) Theorie des Strebens nach Erhalt der eigenen Art, wie auch Befunde zu der Bedeutsamkeit von altruistischen Gründen für Umweltverhalten (z.B. Liu et al., 2018; Ojea & Loureiro, 2007) zeigten sich als relevant für

die Umsetzung von Umweltkampagnen.

In dieser Studie zeigten sich keine Effekte der bestehenden Wertorientierung der Rezipierenden auf die Wirkung von Value-Based-Framing. Die nach der Selective-Exposure-Theory angenommene Relevanz der bestehenden Voreinstellung für die Wirkung des Value-Based-Framings zeigte in diesem Kontext keine Relevanz. Es zeigte sich in der Studie, wie dargestellt, eine allgemeine Relevanz von altruistischem Framing unabhängig von bestehender Wertorientierung von Rezipierenden (wie auch nach Schwartz, 1994). Da sich für menschliche Beweggründe in biologischer wie sozialwissenschaftlicher Forschung häufig eine Relevanz von altruistischen Gründen für Entscheidungen finden lassen, scheint bei derartigen grundlegenden Entscheidungsprozessen für das Überleben der menschlichen Art die individuelle Voreinstellung eher in den Hintergrund zu treten. Bei De Dominicis et al. (2017) zeigte sich, dass Personen mit altruistischer Wertorientierung von jedem Framing gleich angesprochen werden. Im vorliegenden Fall scheint dies auch bei egoistischer sowie biosphärischer Wertorientierung der Fall zu sein. Hier könnte ebenfalls ein Zusammenhang der Thematik und der Wirkung von Wertorientierungen bestehen. Da seit dem EU-Urteil 2021 in Bezug auf die Nutzung von Plastik die Thematik (Bundesregierung, 2021) in der breiten Bevölkerung intensiv diskutiert wird, könnte eine Wirkung der Wertorientierungen einzelner Personen bei der Wirkung des Framings hier deshalb möglicherweise in den Hintergrund treten.

Künftige Studien sollten Value-Based-Framing zu allgemeinen Effekten des altruistischen Framings gemäß Schwartz (1994) weiter im Kontext der Wirkung dieser Kommunikationsstrategie in Wissenschaftskommunikation zu verschiedenen Themen und unter weiteren Konditionen analysieren. Value-Based-Framing sollte hierzu in Bezug auf eine direkte Wirkung von Value-Based-Framing wie im Zusammenhang mit einem potenziellen Einfluss bestehender Wertorientierung weiter analysiert werden.

Das Value-Based-Framing wurde im Kontext der Plakatkampagne in den Slogans der Plakate textuell eingebaut, und hier auch wie in Plakaten in Bezug auf die textuellen Inhalte üblich nur in wenigen Worten eingefügt. Für eine intensivere Beschäftigung mit allen Elementen der Wirkung des Value-Based-Framings könnten künftige Studien außerdem das Value-Based-Framing in visueller Form durch die bildliche Darstellung der betroffenen Entitäten oder auch z.B. in

Form einer längeren Geschichte entweder in stärker text-basierten Medieninhalten (z.B. journalistischer Artikel) oder auch in audiovisuellen Inhalten (z.B. Videokampagne) darstellen.

Es wurde im Kontext der nicht nachgewiesenen Wirkung des altruistischen Framings gegenübergestellt zu den anderen Framing-Arten diskutiert, ob durch die Formulierung der Ziele von Plastikkonsum in den dargestellten Plakatslogans möglicherweise auch bei den egoistischen und biosphärischen Framing-Versionen Gedanken an altruistische Beweggründe ausgelöst wurden, da zwischen den Wirkungsfeldern zahlreiche Überschneidungen und gegenseitige Wechselwirkungen relevant sind. Das Stimulusmaterial wurde in einem qualitativen Pretest analysiert und in diesem Kontext wie von uns intendiert wahrgenommen. Für künftige Studien empfiehlt sich ein ausgiebiger quantitativer Pretest (inkl. Manipulation Check). Follow-Up Studien könnten außerdem verschiedene Darstellungsformen des Value-Based-Framings, wie eine ausführliche Thematisierung der Ziele im Kontext der verschiedenen Wertdimensionen (also nicht ausschließlich in einem kurzen Slogan), in der Wirkung auf die ausgelösten Gedanken analysieren.

Die Studie wurde in Anlehnung an das Modell der Norm-Activation Theory mit den Konstrukten Konsequenzbewusstsein, Verantwortungszuschreibung und Persönliche Norm in der Wirkung auf Verhaltensintention aufgesetzt, und eine Wirkung des Value-Based-Framings auf das Modell zeigte sich. Da die Ziele von umweltrelevanten Verhaltensweisen in der Aufsetzung der Stimuli konkret angesprochen wurden und somit die Konsequenzen des eigenen Verhaltens vermitteln können, wurde die Wirkung über Konsequenzbewusstsein auf die weiteren Variablen des Modells untersucht. Eine Erweiterung des Modells zu der Value-Belief-Norm Theory (Stern et al., 1999) beinhaltet außerdem noch das Konstrukt Ökologisches Umweltbewusstsein (New Ecological Paradigm), das auf Konsequenzbewusstsein wirkt und Wissen und Einstellungen zu Umweltthemen in sich vereint. Künftige Studien könnten in Anlehnung am erweiterten Modell auch Wissen und Einstellungen in die Analyse aufnehmen und sowohl als mögliche beeinflussende als auch beeinflusste Variablen untersuchen.

Es muss insgesamt darauf hingewiesen werden, dass die Studie für die Berechnung der seriellen Mediationsanalysen und der moderierten seriellen Moderationsanalysen bei einer Stichprobe von 165

Teilnehmenden eine nur geringe Power für die Analyse aufweist. Künftige Studien sollten hier entsprechend der Poweranalyse mit einer größeren Stichprobe die Zusammenhänge analysieren.

Die Analyse der Wirkung der verschiedenen Poster-Versionen wurde in Bezug auf die mögliche Reduktion von Zeit- und Aufwandkapazitäten auf Teilnehmendenseite als Online-Experiment aufgesetzt. Rezipierende begegnen Posterkampagnen im Alltag in erster Linie in analoger Form, nicht im Online-Kontext. Eine Analyse der Wirkung von Poster-Inhalten für eine möglichst realitätsnahe Gestaltung der Rezeptionssituation wäre hierbei die Umsetzung von Experimenten in Präsenz. Eine Studienrekrutierung der 165 Teilnehmenden fand über das Schneeballverfahren statt. Die Rekrutierung einer Quotenstichprobe für Anschlussstudien ermöglicht hier den Ausgleich dieser Limitation dieser Studie.

Es zeigte sich folglich nur eine Art des Value-Based-Framing im Kontext einer Posterkampagne zu Plastikverschmutzung als relevant in der Wirkung auf den umweltbezogenen Entscheidungsprozess der Norm-Activation Theory: Eine Darstellung der Ziele von umweltrelevanten Verhaltensweisen entsprechend altruistischer Vorteile zeigte sich als effektiver als kein Einsatz von Value-Based-Framing für die Steigerung von Verhaltensintention, vermittelt durch die Erhöhung von Konsequenzbewusstsein, Verantwortungszuschreibung und persönliche Norm entsprechend der Norm-Activation Theory. Die weiteren Value-Based-Framing Arten hatten keine Relevanz in der Wirkung auf den Verhaltensbildungsprozess. Aus den Erkenntnissen der Studie lässt sich deshalb schlussfolgern, dass sich die Darstellung der Ziele von umweltrelevanten Verhaltensweisen auf den Verhaltensbildungsprozess von Individuen auswirken kann. Wissenschaftliche Erkenntnisse hierzu sollten deshalb in Entscheidungen für die Darstellung von Umweltkampagnen oder andere Formen der Wissenschaftskommunikation einfließen.

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Anhang

A.) Darstellung der Korrelationstabelle zu den Variablen

		Konsequenzbewusstsein	Verantwortungszuschreibung	Persönliche Norm	Verhaltensintention	Altruistische Wertvorstellung	Egoistische Wertvorstellung	Biosphärische Wertvorstellung
Konsequenzbewusstsein	Pearson N	1 165	.626** 161	.715** 163	.688** 164	.588** 165	-.342** 165	.638** 165
Verantwortungszuschreibung	Pearson N	.626** 161	1 161	.657** 159	.795** 160	.382** 161	-.244** 161	.490** 161
Persönliche Norm	Pearson N	.715** 163	.657** 159	1 163	.844** 162	.483** 163	-.322** 163	.639** 163
Verhaltensintention	Pearson N	.688** 164	.795** 160	.844** 162	1 164	.418** 164	-.310** 164	.613** 164
Altruistische Wertvorstellung	Pearson N	.588** 165	.382** 161	.483** 163	.418** 164	1 165	-.469** 165	.511** 165
Egoistische Wertvorstellung	Pearson N	-.342** 165	-.244** 161	-.322** 163	-.310** 164	-.469** 165	1 165	-.369** 165
Biosphärische Wertvorstellung	Pearson N	.638** 165	.490** 161	.639** 163	.613** 164	.511** 165	-.369** 165	1 165

Tabelle 1: Korrelationstabelle der potenziellen abhängigen, mediierenden und moderierenden Variablen.

Anmerkung. Variablen wurden auf einer 7-stufigen Likert Skala erhoben. Es werden zu allen korrelierten Variablen der Pearson-Korrelationskoeffizient mit Signifikanzwert (* = $p < .05$, ** = $p < .01$, *** = $p < .001$) und Personenanzahl (N) dargestellt.

B.) Darstellung der Wirkung der verschiedenen Arten der Werteeinstellung auf die Wahrnehmung des Value-Based Framings

Indikator-codierte Gruppenvergleiche	Indices der moderierten Mediation	95% Konfidenzintervalle der Indices
Egoistisches Framing vs. kein Value-Based-Framing	0.03	[-0.05; 0.10]
Altruistisches Framing vs. kein Value-Based-Framing	0.02	[-0.04; 0.08]
Biosphärisches Framing vs. kein Value-Based-Framing	-0.03	[-0.09; 0.03]
Egoistisches Framing vs. altruistisches Framing	<-0.01	[-0.07; 0.09]
Biosphärisches Framing vs. altruistisches Framing	-0.05	[-0.12; 0.01]
Egoistisches Framing vs. biosphärisches Framing	0.03	[-0.03; 0.10]

Tabelle 3: Darstellung der Wirkung einer egoistischen Werteeinstellung auf die Wahrnehmung des Value-Based-Framings für alle indikator-codierten Gruppenvergleiche: Indices der moderierten Mediation werden nicht signifikant, es besteht also keine Moderation.

Indikator-codierte Gruppenvergleiche	Indices der moderierten Mediation	95% Konfidenzintervalle
Egoistisches Framing vs. kein Value-Based-Framing	<-0.01	[-0.09; 0.08]
Altruistisches Framing vs. kein Value-Based-Framing	-0.06	[-0.15; 0.03]
Biosphärisches Framing vs. kein Value-Based-Framing	0.02	[-0.04; 0.11]
Egoistisches Framing vs. altruistisches Framing	0.05	[-0.03; 0.15]
Biosphärisches Framing vs. altruistisches Framing	0.06	[-0.03; 0.16]
Egoistisches Framing vs. biosphärisches Framing	-0.02	[-0.11; 0.04]

Tabelle 4: Darstellung der Wirkung einer altruistischen Werteeinstellung auf die Wahrnehmung des Value-Based-Framings für alle indikator-codierten Gruppenvergleiche: Indices der moderierten Mediation werden nicht signifikant, es besteht also keine Moderation.

Indikator-codierte Gruppenvergleiche	Indices der moderierten Mediation	95% Konfidenzintervalle
Egoistisches Framing vs. kein Value-Based-Framing	0.02	[-0.02; 0.08]
Altruistisches Framing vs. kein Value-Based-Framing	-0.05	[-0.12; 0.01]
Biosphärisches Framing vs. kein Value-Based-Framing	<-0.01	[-0.04; 0.06]
Egoistisches Framing vs. altruistisches Framing	0.07	[-0.02; 0.13]
Biosphärisches Framing vs. altruistisches Framing	0.06	[-0.01; 0.12]
Egoistisches Framing vs. biosphärisches Framing	0.01	[-0.02; 0.04]

Tabelle 5: Darstellung der Wirkung einer biosphärischen Werteeinstellung auf die Wahrnehmung des Value-Based-Framings für alle indikator-codierten Gruppenvergleiche: Indices der moderierten Mediation werden nicht signifikant, es besteht also keine Moderation.

Greater Confusion in the Voter Market in Germany: Differences Between Subjective and Value-Based Categorization on the Left-Right Axis

Olaf Jandura¹, Carina Weinmann²

¹Faculty of Business Studies at Hochschule Duesseldorf – University of Applied Sciences, ²Dep of Social Sciences, Heinrich Heine University Düsseldorf

Zusammenfassung

In den letzten Jahren war häufig von einem Rechtsruck in der Gesellschaft die Rede (O. Decker et al., 2016). Bevölkerungsrepräsentative Umfragedaten belegen diese These jedoch nicht. Weder die Allgemeine Bevölkerungsumfrage der Sozialwissenschaften (ALLBUS) noch der European Social Survey zeigen für die letzten Jahrzehnte signifikante Veränderungen in der Selbstpositionierung der Befragten auf der Links-Rechts-Skala. Dies wirft die Frage auf, ob es sich bei dem behaupteten gesellschaftlichen Rechtsruck um ein soziologisches Wahrnehmungsphänomen handelt, das durch die intensive öffentliche Debatte verstärkt wird, oder ob Zweifel an der Validität der politischen Selbstpositionierung auf der Links-Rechts-Skala angebracht sind. Der vorliegende Artikel befasst sich mit der letzteren Frage. Unsere Analysen ergaben, dass bei 31 % der Befragten in unserer Stichprobe eine Divergenz zwischen der subjektiven Positionierung auf der Links-Rechts-Skala und einer wertbezogenen Positionierung besteht. Wir erörtern, welche Variablen diese Divergenz erklären können und welche Konsequenzen daraus für die kommunikationswissenschaftliche Forschung gezogen werden können.

Keywords: Links-Rechts-Skala, subjektive Positionierung, wertbasierte Positionierung, politische Werte

Summary

In recent years, there has been frequent talk of a shift to the right in society (O. Decker et al., 2016). However, population-representative survey data do not substantiate this thesis, with neither the German General Social Survey (ALLBUS) nor the European Social Survey showing any significant changes in respondents' self-positioning on the left-right axis over the past decades. This raises the question of whether the purported societal shift to the right is a sociological perceptual phenomenon that is magnified due to intense public debate, or whether doubts about the validity of the question on political self-positioning on the left-right scale are warranted. The present article addresses the latter issue. Our analyses revealed a divergence between subjective positioning on the left-right axis and value-based positioning for 31% of respondents in our sample. We further discuss which variables may explain this divergence and what consequences can be drawn for research in communication science.

Keywords: left-right scale, subjective positioning, value-based positioning, political values

To express their basic political stance, people often describe themselves as “left-wing” versus “right-wing”, or “liberal” versus “conservative”, as is more common in the US American democratic system (Conover & Feldman, 1981; Kroh, 2007). For decades, this heuristic and its simple measurement in the form of a left-right scale has also been used in survey-based research to assess respondents’ political orientation or ideology. As one of the most commonly employed measures in political science and public opinion research, it has proven to be a robust predictor and guiding principle of people’s political attitudes and behavior (Barnes, 1971; Corbetta et al., 2009; Fuchs & Klingemann, 1990; Geser, 2008; Huber, 1989; Inglehart & Klingemann, 1976; Klingemann, 1972; Kroh, 2007; Lesschaeve, 2017). Accordingly, the left-right scale is applied in many national and cross-national large-scale surveys such as the *German General Social Survey (ALLBUS)*,^[1] the *World Values Survey*,^[2] or the *European Social Survey*^[3] (Zuelli & Scholz, 2019).

The measurement of political orientation/ideology based on the left-right scale is also used in political communication research, mainly to characterize different media publics and to shed light on fragmentation and polarization processes (e.g., Dvir-Gvirsman, 2017; Steppat et al., 2021; Tsfaty et al., 2014; Xu & Peterson, 2017). In a similar vein, the left-right scale is also part of large-scale surveys on the use of news and digital media such as the *Reuters Institute Digital News Report*^[4] or *News Media and Political Attitudes in Western Europe*, conducted by the Pew Research Center.^[5] In these and similar studies, different news media outlets are also located on the left-right spectrum.

Research that employs the left-right scale should be able to provide information about the distribution of the population on the political spectrum and to reveal changes in this regard, such as the widely discussed supposed shift to the right throughout European societies (O. Decker et al., 2016). However, studies that include the left-right scale (where the end points of the scale are “1” for left and “10” for right) have not supported this thesis. In the *European Social Survey*, for example, the mean value for left-right self-positioning remained at around 5 between 2002 and 2020, with a relatively constant standard deviation (European Social Survey). Moreover, data from the *ALLBUS* for the period between 1980 and 2021 (GESIS - Leibniz-Institut für Sozialwissenschaften, 2021, 2022) even suggest a shift to the left in society, with a significant change in the mean value from around 6 (5.89 in 1980 and 6.08 in 1982) to 5 (5.08 in 2016, 4.93 in 2018, and 4.86 in 2021). This contrary assumption of a shift to the left is supported by data indicating a global wave toward more liberal values (Pinker, 2018). Against this background, our study addresses the following question: To what extent do respondents’ subjective categorization and an external categorization based on political values coincide on the left-right axis?

In the following, we present arguments in favor of a correspondence between self-assessment and external assessment on the one hand, and arguments in favor of a divergence between the assessments on the other. This discussion highlights the need for empirical clarification. By analyzing survey data, we first investigate the extent to which respondents’ self-assessment and external assessment on the left-right scale match by examining the correlation between left-right scale self-positioning and value-based positioning. Various reasons for a lack of correspondence are then analyzed, which lie in political attitudes, sociological characteristics describing a person’s habitus, and characteristics of media exposure. Finally, we discuss the implications of our findings for political communication research.

Why We Should Not Rely on the Left-Right Scale

As argued above, the left-right scale still enjoys great popularity across different research areas and disciplines. Nevertheless, for some time, concerns about the limitations of the left-right scale have been raised, both from a content-related and a methodological perspective.

Content-Related Concerns

According to the seminal cleavage theory, voters' and parties' political interests can be divided based on different cleavages, which represent dominant social and cultural lines of conflict (Lipset & Rokkan, 1967). In this sense, the left-right dimension reflects the socio-economic cleavage within a society, which marks a divide between citizens over economic resources (Downs, 1957; Mair, 2009). However, it has long been argued that this one-dimensional view does not adequately reflect the reality of political conflicts (Giddens, 1994; Stokes, 1963), with some researchers arguing that it might at most be seen as a "superstructure" that comprises further cleavages within a society, for example, the religious cleavage (Arzheimer & Rudi, 2007; Niedermayer, 2009).

A far more popular viewpoint is that the left-right dimension must be complemented by other dimensions in order to fully cover the political attitudes and behavior of citizens as well as political parties. For example, Inglehart (1971, 1977) suggested adding the so-called postmaterialist cleavage in order to additionally encompass cultural values. The idea of a cleavage between the poles of GAL (Green-Alternative-Libertarian) and TAN (Traditional-Authoritarian-Nationalist) also reflects a second socio-cultural dimension (Marks et al., 2002). Other scholars proposed a reliance on a three-dimensional structure, and complementing the left-right dimension and the socio-cultural dimension with a cleavage that is linked to globalization: cosmopolitanism vs. communitarianism or integration vs. demarcation, respectively (Grande & Kriesi, 2012; Koopmans & Zürn, 2019). Thus, all positions that correspond to the positions of welfare state, liberalism, and internationalism of the three lines of conflict are summarized as cosmopolitan attitudes, and all positions that correspond to the positions of market liberalism, authoritarianism and nationality are categorized under communitarian attitudes. Nowadays, however, some political parties' positioning is at cross-purposes with this dichotomy. For instance, it has been demonstrated that the Freedom Party of Austria (FPÖ) as well as the newly founded Sahra Wagenknecht Alliance (BSW) in Germany, and their voters, simultaneously represent left-wing and right-wing positions, but categorize themselves as left-wing (BSW) or right-wing (FPÖ) (O. Decker et al.; Zaslove, 2004). Wagner (2023) sums up this positioning away from known attitude syndromes very well in an essay entitled "lechts oder rinks" (light or left). This new lack of clarity therefore also has an impact on voter categorization.

Methodological Concerns

To date, the majority of research has used correlation analyses to assess whether self-classification on the left-right scale correlates with preferences for political parties or corresponds with political attitudes such as authoritarianism. In Germany, for instance, it was demonstrated that a right-wing position was associated with a party preference for the CDU/CSU and a left-wing position was associated with a party preference for the SPD or the Greens. Agreement with authoritarian values was also found to correlate with a right-wing positioning on the left-right axis (Breyer, 2015; Inglehart & Klingemann, 1976). Another study examined the measurement equivalence of the left-right scale in terms of its comparability across different groups of individuals, and found that the scale was equally applicable to people with different levels of political interest and education (Weber, 2011). However, a survey-based study examining the meanings that participants attach to the concepts of "left" and "right" concluded that people's self-placement on the left-right scale is dependent on their education and what they associate with "left" and "right" (Bauer et al., 2017). Further studies have investigated the scale's comparability across countries, concluding, overall, that the meaning of "left" and "right" is not uniform across countries but is rather country- and culture-specific (Jahn, 2011; Rudi, 2010; Zuell & Scholz, 2019). A similar conclusion can be drawn regarding the scale's comparability across time, with studies suggesting that people's understanding of "left" and "right" changes over time and appears to be influenced by the prominence of specific issues (Giebler et al., 2021; Jahn, 2011; Kitschelt & Hellemans, 1990; Vries et al., 2013). In summary, while some studies support the validity of the left-right scale, a larger number of studies cast doubt on its validity.

Overall, these studies suggest that a correspondence between subjective self-assessment and external assessment, measured via voting behavior, attitudes towards values such as authoritarianism, or political self-efficacy and trust in institutions, does not apply to all respondents. Indeed, correlation coefficients between self-assessment and external assessment range from .50 to .80 (e.g., Breyer, 2015).

Decline in Societal Co-Orientation

Another explanation for why people might have difficulty positioning themselves correctly on the left-right scale relates to the decreasing possibility of social co-orientation, which may itself be linked to the declining relevance of journalism. According to the normative performance expectations approach, journalism has a co-orientation function (Eurich, 2000), enabling citizens to perceive whether the positions they represent are in the majority or minority position, and whether they are to be classified as left-wing or right-wing. Against the backdrop of the transformation from a low-choice to a high-choice media environment (van Aelst et al., 2017), it is feared that a homogenization of the audience will occur and journalism will thus lose its co-orientation function, rendering it increasingly difficult for citizens to locate themselves politically (Jandura et al., 2022). This fear is reflected in discussions about possible filter bubbles and echo chambers, although an extensive overview of empirical findings revealed that these phenomena are overestimated with respect to the level of attention to media content (Stark et al., 2021). Habermas (2022) also addressed the phenomenon of echo chambers in his latest book, suggesting that the increased and primary use of social media is changing the perception of the political public sphere insofar as the separation between the private and public spheres is softening and positions are being reciprocally confirmed, bringing about a new structural change in the public sphere. Findings by Fletcher (2022) also suggest a homogenization of the audience: Based on data from the Reuters Institute Digital News Reports, he argued that the low degree of polarization in Germany can be explained by the high proportion of respondents who place themselves in the center of the political spectrum. However, the alternative explanation would be that the population places itself incorrectly on this scale.

Research Questions and Hypotheses

In view of the three areas of concern outlined above, i.e., content-related concerns, methodological concerns, and the decline in the possibility of societal co-orientation, the present study aimed to examine the validity of the left-right scale. We began by examining whether people are able to position themselves correctly on this scale, and thus posed the following research question:

RQ1: To what extent do people position themselves correctly on the left-right scale?

However, rather than limiting ourselves to a simple diagnosis, we further sought to uncover which determinants affect whether people position themselves correctly or incorrectly. Based on previous empirical findings, several hypotheses on determinants of correct or incorrect self-positioning on the left-right scale can be derived. First, research has shown that people's formal education affects how they interpret the concepts "left" and "right" (Bauer et al., 2017). Furthermore, formal education has been found to be the most important negative predictor of political knowledge (Delli Carpini & Keeter, 1996), which may also include the correct understanding of the concepts "left" and "right". Consequently, we assume that people's formal education also negatively predicts the ability to position oneself on the left-right scale, and therefore hypothesize that:

H1: The lower the level of formal education, the higher the probability of incorrect self-positioning.

There seems to be broad consensus among researchers that internal political efficacy and political knowledge are closely related to one another (e.g., Beaumont, 2011; McLeod et al., 1999). Accordingly, and based on the assumed relation between political knowledge and a correct interpretation of "left" and "right", we assume that internal political efficacy also affects the likelihood of an incorrect self-positioning on the left-right scale, and therefore hypothesize that:

H2: The lower the internal political efficacy, the higher the probability of incorrect self-positioning.

A further political variable that might determine an incorrect self-positioning on the left-right scale is an individual's belief in homogeneity of the people, which is one of the three dimensions of populist attitudes (Schulz et al., 2017). In our view, it is plausible that individuals with a strong belief in homogeneity of the people view people as being positioned not on the right or on the left but rather in the center. As a consequence, they might also see themselves as more in the political center than is actually the case. This assumption is supported by

Patzelt's (2015) findings on supporters of the PEGIDA[6] movement in Germany: Overall, respondents classified themselves as significantly less right-wing than should have been the case on the basis of their attitudes. Therefore, we hypothesize that:

H3: The higher the approval of the populism dimension belief in homogeneity of the people, the higher the probability of incorrect self-positioning.

People's understanding of the concepts "left" and "right" has also been found to be affected by their political socialization, that is, whether they were socialized in the former East or West Germany (Bauer et al., 2017). In our view, it is plausible that citizens who were socialized in West Germany should be more familiar with the concepts in their current meaning and thus be more able to position themselves correctly on the left-right scale. Accordingly, we hypothesize that:

H4: Political socialization in East Germany increases the probability of incorrect self-positioning.

Additionally, we assume that the ability to position oneself correctly on the left-right scale is not only affected by individual political attitudes, but that individuals' media diet also exerts an influence in this regard. Although the empirical evidence on this matter is unclear, research suggests that algorithmically curated media, such as social media, may lead to 'customized' information environments (e.g., Beam, 2013; Dylko et al., 2017a, 2017b; Zarouali et al., 2020). However, it can be assumed that social co-orientation is not as pronounced when using social media compared to the consumption of traditional journalistic media (Jandura et al., 2022). As a consequence, people who consume such media may have difficulties in correctly interpreting the concepts of "left" and "right, due to a lack of co-orientation. Furthermore, research suggests that the use of social media is negatively associated with political knowledge (Cacciatore et al., 2018; Lee & Xenos, 2019). As stated above, we assume that political knowledge includes knowledge of the concepts of "left" and "right". Against this background, we hypothesize that:

H5: The use of algorithmically curated media increases the probability of incorrect self-positioning.

Lastly, we assume that the consumption of public broadcasting contributes to a correct understanding of "left" and "right" because it allows for the very co-orientation that social media prevents (Jandura et al., 2022). This is mainly due to the Interstate Broadcasting Treaty, which obliges public broadcasters to be journalistically neutral and to cover the entire spectrum of political views (Eifert, 2002). A recent study of nearly 6,000 analog and digital contributions from public broadcasters and daily newspapers in Germany found that, overall, public broadcasters are doing a good job of fulfilling their mandate (Udris et al., 2023). The consumption of public broadcasting may thus result in a better understanding of the political spectrum, leading to fewer difficulties in positioning oneself on this spectrum. As our final hypothesis, we therefore propose that:

H6: The consumption of public broadcasting increases the probability of correct self-positioning.

Method

Sample

To test our research questions and hypotheses, we conducted a secondary data analysis of a dataset collected in the context of studies on political-communicative milieus and their communication practices (Kösters & Jandura, 2019; Weiß, 2009). As with any secondary analysis, the procedure begins with a comparison between the requirements for an "ideal" dataset based on the literature review (target) and the operationalizations available in the dataset (as-is). The available dataset is based on an online survey conducted by the market research institute Respondi in July 2020. Appropriate quotas were applied for age, sex, education, occupation, and federal state. After cleaning the data of speeders and straightliners (Jandura, 2018) and subsequent weighting to compensate for data-cleaning-related biases in the sample, the present analyses were based on $N = 2,801$ respondents.

Operationalizations

Dependent variable

For the self-positioning on the left-right scale (hereinafter: subjective positioning), we used the following question from the Reuters Institute Digital News Report (Newman et al., 2022): “Some people talk about ‘left’, ‘right’, and ‘centre’ to describe parties and politicians. With this in mind, where would you place yourself on the following scale?”, with the response options “1” strongly left, “2” fairly left, “3” slightly left of center, “4” center, “5” slightly right of center, “6” fairly right, “7” strongly right. The use of the scale from the RDNS had two advantages. First, it enabled us to compare the data from our sample with those from Reuters, in order to draw conclusions about sample quality, and second, the scale is frequently used in communication research. In the present study, the mean value on the 7-point scale was 3.87 ($SD = 1.15$, skewness = -0.04 , kurtosis = 0.17).

Independent variables

To determine correct or incorrect self-positioning, we measured respondents’ self-positioning based on approval of political values (hereinafter: value-based positioning). This value-based positioning was operationalized based on the three basic lines of societal conflict addressed in the literature review (see above). For the (1) socioeconomic conflict line, we measured participants’ agreement with three positions, each contrasting between the welfare state pole and the market liberal pole. The exact question wording can be found in Appendix A1. To circumvent the problem that respondents may have interpreted the response options differently, we decided to dichotomize the responses, and thus differentiated between agreement with the welfare-state vs. market liberal pole and agreement with the liberal vs. authoritarian pole of the first two lines of conflict. The responses were condensed into an index with a range of 0 (no market liberal position mentioned) and 3 (three market liberal positions mentioned). The mean value of the index was 1.27 market liberal positions ($SD = .99$). The (2) political-cultural conflict line was recorded in a similar way. Here, too, there were three positions contrasting between a liberal and an authoritarian pole. The mean value for liberal positions was 1.70 ($SD = .85$) (Kösters & Jandura, 2019). For both dimensions, high values indicate support for the values of the welfare state and liberalism, which are to be found on the left. The (3) globalization-related conflict line represents a question on group-based xenophobia from the Center Study (Achour et al., 2021). Here, we recorded participants’ agreement with nine items. An exploratory factor analysis ($KMO = .851$, varimax rotation, eigenvalue criterion, explained variance 61%) resulted in a two-factor solution comprising a variable depicting group-related xenophobia on the one hand and a variable representing the assessment of cultural diversity on the other. (4) Additionally, the following variables were included as determinants of a possible misperception of self-positioning on the left-right axis:

(1) Political efficacy (PE) was measured using the Political Efficacy Short Scale (Beierlein et al., 2012), which consists of the two subscales internal and external political efficacy, each containing two items rated on a scale ranging from 2 (very high) to 8 (very low). In the present study, internal political efficacy ($\alpha = .78$) showed a mean value of 4.21 ($SD = 1.39$) and external political efficacy ($\alpha = .83$) showed a mean value of 6.08 ($SD = 1.42$).

(2) Education, assessed using seven items, was aggregated into a three-item scale. The distribution was as follows: 26% low education (Hauptschulabschluss / Volksschulabschluss, lower-track school-leaving qualifications), 39% middle education (Realschule, medium-track school-leaving qualifications), 35% high education (Abitur, higher-track/grammar school-leaving qualifications).

(3) Respondents’ political socialization was determined by asking whether they had lived in East or West Germany prior to German reunification or, in the case of younger respondents, in which federal state they lived. From these two variables, a new variable with four categories was formed, which recorded geographic place of residence and socialization (124 respondents living in Berlin were excluded). 15% ($n = 403$) of the respondents lived in East Germany and were also socialized there, 3% ($n = 81$) lived in East Germany but were socialized in the West, 10% ($n = 264$) lived in West Germany but were socialized in the East, and 72% ($n = 1,972$) lived in West Germany and were also socialized there. For the analysis of the effects of political socialization, only the 2,375 respondents who lived in East or West and were also socialized in the same geographical area were

included.

(4) To assess participants' propensity to populism, we used two dimensions of populism, measured by six variables each: the sub-dimensions of the demand for popular sovereignty ($\alpha = .86$) and the belief in the homogeneity of the people ($\alpha = .84$), in line with Schulz et al. (2017).

(5) Respondents' media consumption was measured based on the following question regarding regular use of media brands from the Reuters Institute Digital News Report (Newman et al., 2022). "Thinking back over the past week, which of the following media titles did you use on three or more days to access news and information offline (i.e., television, print media, and other traditional media)?" For the purpose of the present study, the question was extended to include non-traditional/online media. The individual media brands were grouped into the media genres of public service media (reach: 71%), tabloid media (44%), algorithmically curated media, i.e. all specified social media offerings (e.g., Facebook, Instagram, Twitter), as well as news aggregators (e.g., gmx.de, t-online.de) (35%), local media (25%), international media (11%), right-wing media (5%), and left-wing media offerings (4%). Media consumption was recorded dichotomously.

(6) The sociodemographic characteristics age and sex complete the list of available variables.

Results

The presentation of the results is structured according to the order of the research question and the hypotheses. To answer RQ1, regarding the extent to which people position themselves correctly on the left-right scale, we correlated the subjective positioning, measured on the 7-point scale ($M = 3.87$, $SD = 1.15$, skewness -0.04 , kurtosis 0.17), with the four indicators of the value-based positioning. Weak positive linear correlations emerged. In each case, the subjective positioning correlated weakly with the socioeconomic conflict line, in the expected direction ($r = -.32^{**}$). The more left-wing the respondents positioned themselves, the more strongly they favored welfare state redistribution. The correlation with the political-cultural conflict line was of a similar size ($r = -.37^{**}$). The more left-wing the respondents positioned themselves, the more strongly they advocated liberal positions. These correlations were also shown for the globalization-related basic conflict. The more left-wing the respondents positioned themselves, the more positively they rated cultural diversity ($r = .41^{**}$) and the more negatively they rated group-based xenophobia ($r = -.29^{**}$).

Overall, the weak to medium correlations point to divergences between subjective positioning and value-based positioning, which we therefore examined in greater detail in the next step. For this purpose, we formed terciles from each of the four metric scales for value-based positioning, which were aligned following data transformation. Respondents from the first tercile in each case (scale value 1) represent left-wing attitudes, while respondents from the third tercile in each case (scale value 3) represent right-wing attitudes. Subsequently, a point-sum index was formed, with a range from 4 (respondents are in the tercile representing the left positions for all scales) to 12 (respondents are in the tercile representing the right positions for all scales). Next, we compared this newly created index assessing value-based positioning with respondents' subjective positioning, defining three cases as reflecting correspondence between subjective and value-based positioning: (1) Respondents show both a value-based (value range 4 to 6) and subjective (value range 1–3) positioning on the left. (2) Respondents show both a value-based (value range 7–9) and subjective (value range 3–5) positioning in the center. (3) Respondents show both a value-based (value range 10–12) and subjective (value range 5–7) positioning on the right. Based on these criteria, 69% of the sample showed a match between subjective and value-based positioning. All other combinations (31%) were defined as incorrect self-positioning. It should be noted that these criteria can be described as rather soft, since a relatively large amount of deviation was allowed for a self-positioning to be described as correct.

To gain a deeper understanding of the 31% of the sample diagnosed with incorrect self-positioning, we looked at the direction of respondents' incorrect positioning, and found two tendencies, one toward the center and one toward the left. The tendency toward the center represents respondents who are positioned on the left (13%) or on

the right (9%) based on their values, but who subjectively position themselves in the center. The tendency toward the left represents respondents who are positioned in the center based on their values, but who subjectively position themselves on the left (9%).

A subsequent correlation analysis (see Table 1), differentiated according to whether subjective positioning was consistent or inconsistent with value-based positioning, revealed that among respondents with consistent self-positioning, the correlation coefficients increased from a medium to a strong positive linear relationship (socioeconomic conflict line: $r = .48^{**}$, political-cultural conflict line: $r = .56^{**}$, globalization-related conflict line: assessment of cultural diversity: $r = .56^{**}$, globalization-related conflict line: assessment of group-related xenophobia: $r = -.40^{**}$). In the case of inconsistent self-positioning, by contrast, no significant correlations emerged between self-positioning and the indicators representing political values (socio-economic conflict line: $r = -.05$, political-cultural conflict line: $r = -.07$, globalization-related conflict line: assessment of cultural diversity: $r = .05$, globalization-related conflict line: assessment of group-related xenophobia: $r = -.06$). We interpret this finding as an indication that our separation between respondents with correct and incorrect self-positioning was successful. We attribute the fact that the correlations between subjective positioning and value-based positioning were not higher among respondents with consistent self-positioning to our less stringent indicator for differentiation.

Table 1

Correlation Coefficients Between Self-Positioning and Political Values

Conflict line	All	Self-positioning	Self-positioning
		consistent with political values	inconsistent with political values
Socioeconomic	.32***	.48**	.05
Political-cultural	.37**	.56**	.07
Globalization-related: cultural diversity	.41**	.56**	.05
Globalization-related: group xenophobia	-.29**	-.40**	.06

Note. ** $p < .01$.

Based on these findings, we sought to clarify what determines correct or incorrect self-positioning. The hypotheses were tested using a logistic regression model, including all relevant variables and controlling for other relevant third variables as well as some additional sociodemographic characteristics. Overall, although the model only explained 9% of the variance, our findings support the following hypotheses (see Table 2):

H1: The lower the level of formal education, the higher the probability of incorrect self-positioning.

The regression model revealed a significant correlation between low formal education and a self-positioning that was inconsistent with respondents' political values. This supports the previous finding that a low formal education is associated with lower political knowledge (Delli Carpini & Keeter, 1996).

H2: The lower the internal political efficacy, the higher the probability of incorrect self-positioning.

This correlation was also confirmed for political self-efficacy. People who find it difficult to talk about political issues or to form an opinion, and people who talk about political issues comparatively rarely, show a lower tendency to position themselves on the left-right axis according to their own political values.

H3: The higher the approval of the populism dimension belief in homogeneity of the people, the higher the probability of incorrect self-positioning.

The regression model also revealed a significant positive correlation between approval of the populism dimension belief in homogeneity of the people and an incorrect self-positioning. This finding, along with the finding that people with incorrect self-positioning tend to locate themselves either more toward the center or more toward the left (see above), supports the assumption that people with a strong belief in homogeneity of the people locate both others and themselves more in the center than is actually the case.

H5: The use of algorithmically curated media increases the probability of incorrect self-positioning.

The significant positive correlation between the use of algorithmically curated media offerings and an incorrect self-positioning on the left-right scale supports assumptions of a lack of possibility for co-orientation in society due to a politically one-sided compilation of information.

The present findings did not support the following hypotheses:

H4: Political socialization in East Germany increases the probability of incorrect self-positioning.

Respondents' political socialization in either East or West Germany had no significant influence on a self-positioning on the left-right axis that diverges from their political values. Thus, the findings of Bauer et al. (2017) were not confirmed in the present study and we found no group-specific (East/West) divergent positioning. The relatively higher incidence of divergent self-positioning in Eastern Germany must be explained by the socio-structurally different composition of the population.

H6: The consumption of public broadcasting increases the probability of correct self-positioning.

Contrary to our assumption, the consumption of public broadcasting had no significant effect on a self-positioning on the left-right axis that was consistent with political values. This finding can be interpreted in line with Fuhse's (2004) argument that left-right as a heuristic for differentiating between governing and opposition parties is at least challenged by the three grand coalitions in Germany. Future research should conduct content analyses to examine the extent to which political value systems are represented by the various public broadcasters.

Table 2

Determinants of Incorrect Self-Positioning

Predictor	<i>B</i>	EXP (<i>B</i>)	<i>p</i>
Constant	.53	1.698	.379
Age	.00	.997	.538
Education	−.11	.898	.017
Gender	−.28	.756	.017
East/West	−.18	.833	.151
External political efficacy	.04	1.046	.286
Internal political efficacy	.12	1.132	.008
Belief in homogeneity of the people	−.06	.943	.000
Consumption of tabloid media offerings	.18	1.194	.126
Consumption of local media	−.09	.914	.525
Consumption of algorithmically curated media offerings	−.31	.732	.008
Consumption of left-wing media offerings	.35	1.420	.314
Consumption of right-wing media offerings	−.13	.874	.672
Consumption of public service media offerings	−.14	.871	.287
Consumption of international media offerings	.14	1.152	.485

Note. Coding of incorrect self-positioning: 0, coding of correct self-positioning: 1.

Discussion

The starting point of our study was the observation that the subjective left-right self-positioning is used both in studies from the field of structural audience description (Schweiger, 2007) and as an independent variable in the field of reception and impact research (e.g., Hölig et al., 2020). In the face of the “new confusion” of basic social conflicts that can be observed due to the increasing plurality and heterogenization of society (F. Decker, 2018; Habermas, 1985), it is relevant to ascertain whether subjective positioning on the left-right axis is still a valid measurement tool today, or whether other indicators of respondents’ political positioning need to be determined. The results can be summarized according to the following points:

(1) For just under seven in ten respondents (69%), a correspondence between subjective and value-based positioning on the left-right axis was established. These respondents correctly positioned themselves on this scale despite the new lack of clarity. This finding supports the assumption that the validity of the scale remains high (e.g., Corbetta et al., 2009; Lesschaeve, 2017).

(2) Just under a third (31%) of the sample were unable to subjectively locate themselves correctly on the left-right axis. Two different patterns can be discerned, insofar as respondents with left and right positions showed a tendency toward the center and respondents with attitudes that could rather be described as in the center showed a tendency toward the left.

(3) The variables established in the political science and political sociology literature, namely low formal education, low political self-efficacy, and high belief in homogeneity of the people, led to a lower degree of correct self-positioning, although only to a weak extent in view of the low explanation of variance. In contrast, no effect was found for political socialization.

(4) From a communication research perspective, we examined the extent to which consumption of various media offerings has an influence on incorrect self-positioning. The assumption that the use of public broadcasting is accompanied by more correct self-positioning, due to its internally plural reporting, was not confirmed. This finding can be explained by studies by Tsfaty and Cappella (2005), which concluded that exposure alone is not a sufficient indicator of content perception. In contrast, the assumption that consumption of algorithmically curated media offerings leads to incorrect self-positioning was confirmed, supporting the notion that this form of news selection leads to a loss of the co-orientation function of political journalism (Jandura et al., 2022). However, to obtain more nuanced results in terms of media use, it would be necessary to consider not only whether people consume one type of media or another, but also which they consume primarily. In other words, comparing different types of media repertoires would presumably yield more detailed results on the effects of media consumption on political self-positioning.

The present study is subject to some limitations, which are discussed in terms of methodological and theoretical considerations. From a methodological perspective, attention should be drawn to the coverage error resulting from the sampling (offliners & respondents over 69) and to the potentially error-prone recording of media consumption via self-report (Scharkow, 2019). Follow-up studies should therefore utilize other sampling approaches (e.g., population-representative) and other survey methods (e.g., tracking methods). With regard to indicators for capturing value-based positioning on the left-right axis, in addition to the migration dimension, the denationalization dimension that correlates with it should be taken into account in the case of the globalization-related conflict line (Wilde et al., 2019). In the secondary data analysis, this operationalization was not available. Furthermore, to differentiate between correct and incorrect self-positioning, different strict indicators would need to be tested.

From a theoretical perspective, our indicator of correct self-positioning evades an answer to the question of what left values actually are. There are two competing answers to this question, comprising an emphasis on a “newer left” and the insistence on “old leftist” values, which can have an influence on subjective self-positioning. While Kriesi et al. (2006) assume that the globalization-related line of conflict can be mapped on the one-dimensional left-right axis, the debate regarding the Old and New Left (e.g., Inglehart & Flanagan, 1987; Wagenknecht, 2021) demonstrates that being on the left does not necessarily imply that an individual is cosmopolitan. The criterion used in the present study takes this discussion into account inasmuch as holding a moderate position on the variables representing the basic globalization-related conflict, while holding a leftist position on the traditional lines of conflict, still leads to a correct self-positioning on the left spectrum. A further limitation of the present study lies in the use of the tercile criterion to determine the assignment to objective positions. The approach should be further validated by the use of flexible position measures (Jungmann et al., 2021) or by differentiation based on cut-off values collected in representative surveys.

Overall, our study shows that for the majority of the population, the established left-right scale is still a valid procedure for the assessment of political orientation. However, a considerable proportion of the population shows

difficulties in using this approach for their political self-positioning. While the left-right scale might still be seen as a simple measure to roughly classify people's political orientation, it is imperative that we take its limited validity into account. According to our findings, in order to accurately rank the population on the political spectrum, additional indicators are need. Otherwise, diagnoses such as the supposed shift to the right in society remain speculative, if not wrong.

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Endnotes

[1] <https://www.gesis.org/allbus/allbus>.

[2] <https://www.worldvaluessurvey.org>.

[3] <https://www.europeansocialsurvey.org>.

[4] <https://www.digitalnewsreport.org>.

[5] <https://www.pewresearch.org/global/collection/news-media-and-political-attitudes-in-western-europe>.

[6] The acronym PEGIDA stands for “Patriotische Europäer gegen die Islamisierung des Abendlandes” (Engl.: Patriotic Europeans Against the Islamization of the Occident”) and is an Islamophobic, xenophobic, ethnic, racist and far-right organization.