

The Immediate Effect of Discrimination on Mental Health: A Meta-Analytic Review of the Causal Evidence

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Abstract

This meta-analysis synthesizes experimental studies on the immediate effects of discrimination on mental health, exploring the effects of different paradigms and discrimination types on diverse facets of mental health. We analyzed data from a systematic literature search (73 studies; 12,097 participants; 245 effect sizes) for randomized controlled trials with manipulation of discrimination as a predictor and mental health as an outcome using a three-level random-effects model. Experimentally manipulated discrimination led to poorer mental health ($g = -0.30$), also after controlling for publication year, region, education level, and methodological quality. Moderator analyses revealed stronger effects for pervasive ($g = -0.55$) compared to single-event manipulations ($g = -0.25$) and a trend toward weaker effects for samples with nonmarginalized ($g = -0.16$) compared to marginalized identities ($g = -0.34$). Gender and age did not moderate the effect. Discrimination had the largest effects on externalizing ($g = -0.66$) and distress-related outcomes ($g = -0.41$); heterosexism ($g = -0.66$), racism ($g = -0.32$), and sexism ($g = -0.30$) had the largest effects on mental health. Convenience sampling compromised generalizability to subgroups and the general population, downgrading methodological quality for all included studies. When interpreting the findings, selective samples (mostly young female adults with higher education), often limited ecological validity, and ethical restrictions of lab-induced discrimination need to be considered. These constraints likely led to conservative estimates of the mental health effects of discrimination in this meta-analysis. Future research should investigate more diverse samples, further explain the heterogeneity of findings, and explore protective factors of the effects of discrimination on mental health.

Keywords: discrimination, stigma, mental health, well-being, meta-analysis

Public Significance Statement: This meta-analysis shows that discrimination can directly and immediately cause poor mental health, with the largest effects on externalizing outcomes such as anger and hostility. Heterosexism more strongly diminished mental health than racism or sexism. More recent studies found a considerably stronger effect of discrimination on mental health. The small to moderate negative effects of discrimination on mental health likely accumulate over time and can significantly deteriorate public health.

The Immediate Effect of Discrimination on Mental Health: A Meta-Analytic Review of the Causal Evidence

More than 70 years ago, the Universal Declaration of Human Rights established the essential premise that all people should be valued equally and treated fairly. Yet today, millions of people globally face situations of discrimination in their daily lives (Office of the United Nations High Commissioner for Human Rights, n.d.). U.S. adolescents self-identifying as African American or Black have reported experiencing an average of more than five instances of racial discrimination per day (English et al., 2020). Women in the workforce continue to be impeded by gender stereotypes (Heilman, 2012), and people with overweight suffer from being stigmatized and socially rejected (Emmer et al., 2020). The mistreatment and disadvantages resulting from different types of discrimination represent a threat to the fundamental human rights of equality and psychological well-being (e.g., Schmitt et al., 2014). Meta-analytic reviews have yielded consistent findings of the negative associations between self-reported experiences of discrimination and various mental health indicators (e.g., Pascoe & Smart Richman, 2009; Schmitt et al., 2014), based on correlational evidence. A synthesis of experimental evidence is essential to quantify the causal effect of discrimination on mental health and to examine the factors influencing this causal effect. The first meta-analysis on causal effects, published about 10 years ago (Schmitt et al., 2014), showed a negative effect on mental health for pervasive experimental manipulations of discrimination (i.e., perceived systemic discrimination that occurs frequently or repeatedly over time and across multiple contexts), not for single-event studies (i.e., isolated single instances of perceived discrimination) that are commonly used in experimental research. In the current meta-analysis, we considered a wider range of experimental manipulations that allowed us to examine a larger set of potential moderators and to perform more detailed analyses. This was possible in part because we set broader inclusion criteria but also because

there have been advancements in meta-analytical methods as well as numerous new relevant experimental studies published in the last decade.

Levels of Discrimination

Discrimination describes the unfair or prejudicial treatment of people based on their actual or perceived membership in groups or social categories such as ethnicity, gender, age, or sexual orientation (American Psychological Association, 2019). Discrimination and prejudice are key aspects of *stigma*. Stigma relies on social, economic, and political power structures and describes a negative attribute or characteristic that associates an individual with undesirable traits (Link & Phelan, 2001). These negative attributes or characteristics convey a social group identity that is devalued, discriminated against, and marginalized in certain social contexts (Crocker et al., 1998), often also called *marginalized identity*. Hence, most of the experimental psychological research has focused on discrimination against historically relatively disadvantaged, marginalized groups such as women (sexism) and ethnic minorities (racism; Schmitt et al., 2014). Nonetheless, in experimental settings also more privileged, non-marginalized groups are frequently included. These studies operationalize discrimination solely as unfair treatment based on non-marginalized identities that lacks the foundation of stigma and power imbalances (e.g., unfair treatment based on academic identities such as specific study majors or men who encounter unfair treatment based on gender in a laboratory setting).

The extensive impact of social discrimination occurs at the individual, institutional, structural, and cultural level. On the individual level, *interpersonal discrimination* describes directly discriminatory interactions between individuals either in their institutional roles (e.g., employer/employee) or as private individuals (Krieger, 2014). Individual discrimination encompasses both overt and explicit unfair treatment based on social identity and more frequent subtle and unconscious forms that are difficult to identify owing to their ambiguous

and often unintentional nature (Jones et al., 2016; Williams et al., 2021). *Institutional discrimination* refers to mesolevel discriminatory policies and practices carried out by state or nonstate institutions, for example, criminal justice policy or approaches to education or health care (Krieger, 2014). *Structural discrimination* refers to mutually reinforcing systems of discrimination in various areas on the mesolevel that reinforce discriminatory beliefs, values, and distribution of resources (Krieger, 2014). In the current literature, the terms institutional and structural discrimination are often used interchangeably and are considered to be closely linked (Reskin, 2012). For example, phenomena such as residential segregation or discrimination through the criminal justice system are influenced by both levels (Williams et al., 2019). Importantly, institutional and structural discrimination are independent of intent and actions of individuals, often remaining imperceptible to perpetrators because they act as agents of a system with discriminatory practices and policies that may predate them (Krieger, 2014). These forms of discrimination can impact health through multiple pathways, such as by limiting access to quality education and employment opportunities, reducing access to resources that enhance health or health behaviors, or increasing the prevalence and cooccurrence of chronic and psychosocial stressors (Williams et al., 2019).

The mental health effects of structural and institutional discrimination and their underlying mechanisms are difficult to research in laboratory contexts using conventional psychological research methods such as experiments. There are approaches from other disciplines that examine the relation of indicators of structural aspects with population measures, such as past structural racism (i.e., historic redlining scores) and current prevalence rates of poor mental and physical health (Lynch et al., 2021). Further studies have examined the relationship between neighborhood deprivation and indicators of health, such as the number of physical activity facilities or the density of tobacco, alcohol, and fast-food outlets (Schneider & Gruber, 2013; Schneider et al., 2015). Yet, the impact of structural factors on

individual mental health remains unexplored. The field of psychology is adopting a structural-psychological approach to examine the effects of structural factors on individual outcomes. This approach acknowledges that individuals are not isolated entities but rather embedded within complex webs of societal factors such as social norms, power dynamics, and historical contexts (Syed & McLean, 2023). Thus, a comprehensive understanding of human experiences requires considering both internal psychological processes and the external societal factors that shape those processes. This approach advocates integrating various research methods – for example, analyzing cultural products like media or historical documents, personal narratives, observing conversations, or evaluating responses to different narratives – to uncover how societal factors are internalized, negotiated, resisted, and even transformed by individuals (Syed & McLean, 2023).

The ideology of the inferiority of certain groups is embedded in several aspects of a given culture, such as values, norms, language, symbols, and unspoken assumptions (Williams et al., 2019). *Cultural prejudice* creates a larger ideological environment that favors both structural/institutional and individual discrimination, leading to widespread stereotypes and attitudes that are consciously or unconsciously adopted and internalized (Williams et al., 2019). The internalization of prejudice influences the mental health of affected individuals through processes such as self-stigmatization, stigma consciousness, and stereotype threat. *Self-stigmatization* refers to the acknowledgment that the negative stereotypes apply to oneself, leading to decreases in self-esteem and self-efficacy (Corrigan & Rao, 2012). *Stigma consciousness* describes the extent to which individuals expect to be stereotyped by others (Pinel, 1999), resulting in higher anticipatory stress, vigilance, and rumination (Williams, 2019). A related construct, *stereotype threat* (Steele, 1997), describes the disruptive negative state that arises when a person feels at risk of confirming or being judged or discriminated against on the basis of a negative stereotype (Spencer et al., 2016). In

addition to the extensively researched consequences for performance (e.g., Spencer et al., 2016), stereotype threat also affects sense of belonging (Walton & Cohen, 2007) and, in the long term, well-being and mental health through negative interpersonal interactions (Burgess et al., 2010; Veldman et al., 2021) and physiological stress responses (Blascovich et al., 2001; Derks et al., 2011). Importantly, interpersonal discrimination on the individual level, cultural prejudice as aspects of the broader societal context, and institutional and structural discrimination are mutually interdependent (Lattanner & Hatzenbuehler, 2023; Skinner-Dorkenoo et al., 2021; Williams et al., 2019).

Everyday Discrimination and Microaggressions

Everyday discrimination and *microaggression* are two chronic forms of discrimination that strongly overlap (Essed, 2008; Williams, 2020). Both include covert prejudice and are rooted in cultural prejudice, stigma, and historically determined power differences. The relevant difference between the two concepts is that everyday discrimination focuses on discrete discriminatory experiences and includes subtle and overt discrimination, whereas microaggression exclusively focuses on subtle forms (Williams, 2020). These subtle and chronic forms of daily social discrimination are prevalent in contemporary societies and linked to poor mental health (Schmitt et al., 2014). Despite the conceptual introduction of microaggression in the 1970s (Pierce, 1970, 1974), research on microaggression is relatively recent within the field of psychology. According to a citation analysis in the Social Science Citation Index using the search term "microaggress*," there has been a strong increase in publications and a marked upward trend related to this topic since 2015, with 89% of all articles on the topic published since 2015. The vast majority of this research has focused on ethnoracial microaggressions which may limit the generalizability to other groups. Each stigmatized group has a unique history that shapes aspects of cultural prejudice, the larger ideological environment, and power imbalances that determine the manifestation of

microaggressions and discrimination more broadly (Williams, 2020). Despite these differences, there are sufficient similarities in these experiences that go beyond social groupings. Therefore, research on microaggression and discrimination can be adapted and applied to other types of discrimination (Krieger, 2014; Lui & Quezada, 2019).

Sue et al. (2007) provided one of the earliest taxonomies for microaggressions. They defined microaggressions as “brief, everyday exchanges that send denigrating messages to people of color because they belong to a racial minority group” (p. 273). These exchanges are postulated to contain an implicit hidden hostile or aggressive message. Williams (2020) has built on and extended this definition and describes microaggressions as “deniable acts of racism that reinforce pathological stereotypes and inequitable social norms” (p. 4). Such acts do not require a person’s explicit intent or conscious perception of the target. Sue et al. suggested that microaggression consists of three subgroups: microinsults, microinvalidations, and microassaults. *Microinsults* refer to comments or actions that impart negative or even humiliating messages to victims and “convey rudeness and insensitivity” about individuals’ stigmatized social identities (p. 277). *Microinvalidations* “exclude, negate, or nullify the psychological thoughts, feelings, or experiential reality” of individuals with stigmatized social identities (p. 274). *Microassaults* represent the most blatant form of microaggression and include explicit verbal or nonverbal attacks, including name-calling or avoidant behaviors (Sue et al., 2007). Recent conceptualizations distinguish microassaults from microaggressions due to the former's more explicit and overt nature of discrimination (e.g., Wong et al., 2014). Notably, in the original taxonomy by Sue et al. (2007), microassaults were described as the only intentionally harmful form, whereas microinsults and microinvalidations were considered to be unintentionally harmful. Importantly, Williams (2020) has proposed a revision of the taxonomy by Sue et al. (2007), contending that all microaggressions are aimed to cause harm and are not limited to intentions on an individual

level but can be carried out through institutional and structural means within the larger ideological environment that reinforces power imbalances.

In recent years, there has been a lively debate concerning conceptual and methodological aspects of microaggressions. Lilienfeld (2017) criticized the lack of clarity regarding the operationalization of microaggression and expressed a need for an explicit list of the actions and statements that are said to be covered by the term. Further, he requested more methodological rigor, including assessments of reliability, assessments beyond self-report, the study of targets of microaggression and the people who express it, tests of a causal effect of microaggressions on mental health, and considerations of the role of negative emotionality as the driver of receiving or perceiving microaggressions. This criticism stimulated not only discussion but also new research to address the issues Lilienfeld raised. Williams (2020) argued that Lilienfeld's definition of microaggression lacked the social context (i.e., cultural prejudice and power imbalances). For example, several studies have shown that the likelihood of engaging in microaggressions across several common contexts was robustly correlated with all five measures of racial prejudice (e.g., Kanter et al., 2017; Mekawi & Todd, 2021). According to Williams, a clear conceptualization is only possible by considering context, because microaggressions are seen not as random behaviors but as expressions of an underlying assumption—racism—that reinforces social inequalities and hierarchies. In addition, Williams claimed that diversity researchers to date have largely agreed on the definition of microaggression.

Concerning methodological criticism on reliability, a recent meta-analysis on microaggression (Lui & Quezada, 2019) reported reliability for 21 scales measuring different domains or forms of microaggression. Of these 21 scales, 14 showed Cronbach's alpha values around .90, that is, excellent reliability, and another five scales values of .80 and higher, which is generally interpreted as good reliability (Tavakol & Dennick, 2011). The

findings of this review suggest that Lilienfeld's critique on the reliability of microaggression assessment has largely been addressed in current research. Moreover, Lui and Quezada (2019) showed in their meta-analysis on microaggression and adjustment outcomes that of the 72 studies included, 68 used widely known, reliable self-report scales to assess microaggression. With respect to the critique on using solely self-report measures, Williams (2020) pointed out that many widely accepted constructs in psychology are assessed exclusively with self-report, meaning self-report per se is not a limitation. At least one study assessed both potential targets and people who express microaggressions and showed that both groups have high agreement about what constitutes a microaggression across numerous categories and scenarios (Michaels et al., 2018). Further current conceptual work on microaggressions has integrated dimensions pertaining to both potential targets (e.g., perceived intentionality and ambiguity) and people who express microaggressions, including factors such as acceptability and motives (e.g., Mekawi & Todd, 2021).

Concerning validity, Williams (2020) pointed to numerous studies that show a relation between the construct "everyday racial discrimination"—that largely overlaps with the construct of microaggression—and (indicators of) mental health. Using a broader range of outcomes, Lui and Quezada (2019) in their review summarized several validity studies of different microaggression measures with adjustment outcomes including stress, negative affect, depression, somatic symptoms, and global psychological symptoms. The effect size, $r = -.20$, was robust across a variety of populations and study designs and comparable to that of other meta-analyses that linked perceived discrimination to health outcomes ($r = -.11$ to $-.20$ in the meta-analyses by Pascoe & Smart Richman, 2009 and $r = -.23$ in the meta-analysis by

Schmitt et al., 2014).¹ Notably, the meta-analytical evidence on microaggression shows correlative, not causal, evidence and further underlines the need for alternative research designs that allow one to draw causal conclusions.

The role of negative emotionality as a driver of receiving or perceiving microaggressions was examined in a longitudinal study (Ong et al., 2013). The researchers found that experiencing microaggressions predicted negative mental health outcomes, even after controlling for trait neuroticism. This is in line with other research assessing trait negative affectivity and mental health that found that although negative affectivity did not explain general ethnic discrimination stress, racial microaggressions explained more than half of the variance in negative affectivity and mental health (Williams et al., 2018). Moreover, West (2019) showed in an experimental study that recalling a microaggression situation reduced positive affect and increased negative affect compared to the recall of a neutral event. These are the first results suggesting that microaggressions could drive negative emotions and not the other way around. To better understand the directionality of this relation, further experimental and longitudinal research designs are warranted.

In sum, the field of microaggression has received much attention and numerous studies on the relevance of microaggressions to mental health and other adjusted outcomes have been published every year. Yet few studies have examined the effect of microaggressions on adjustment outcomes above and beyond the effects of overt

¹ We provide effect sizes from other meta-analyses in the introduction and discussion sections for comparative purposes. Please note that throughout the manuscript, all effect sizes mentioned were (re-)coded such that negative effect sizes indicate poorer adjustment outcomes with higher reported discrimination in correlational studies and poorer adjustment outcomes for the group exposed to the discrimination manipulation compared to the control group in experimental studies. Adjustment outcomes include mental health (e.g., decreased positive affect and increased negative affect), physical health (e.g., decreased physical well-being and increased symptom severity), or work-related outcomes (e.g., decreased work satisfaction and increased work stress).

discrimination and individual difference factors, and few have researched possible mechanisms explaining the relation between microaggressions and mental health (see Lui & Quezada, 2019, for an overview). Further, research on the causal effects of microaggressions is scarce: Of the 72 study samples included in the meta-analysis by Lui and Quezada (2019), only one used an experimental design. Although previous meta-analyses on microaggressions and adjustment outcomes (including aspects of mental health) showed a significant but small to moderate association, research designs that consider overt forms of discrimination, examine potential pathways, and allow for drawing causal conclusions are needed to further advance the understanding of how microaggressions are related to mental health.

The Impact of Discrimination on Mental Health

Discrimination can negatively impact mental and physical health, whether it is consciously recognized by the affected individual or not (Bailey et al., 2017). Encounters with social discrimination can cause harm in many ways. Discrimination can make it difficult to find a good job or housing or can limit a person's access to adequate health care. Being treated with less courtesy and respect than other people or being treated as less intelligent or less trustworthy can also cause harm—even if people do not perceive their experiences as discriminatory. There may be additional negative effects on mental health when unfair treatment and disadvantage are subjectively understood as social discrimination. Perceived discrimination threatens one's place and value in society and may have consequences for mental health that go beyond the consequences of the negative treatment itself (Schmitt et al., 2014). In the following, we review contemporary psychological theories that link discrimination to mental health. We consider biological, social, and behavioral factors relevant to that link.

Early Theories on the Effects of Discrimination on Mental Health

The impact of discrimination on well-being and mental health has been the subject of investigation for several decades. Allport's (1954) early studies on the Holocaust formed the basis for research on prejudice and discrimination and described their harmful effects on health and compensatory coping behaviors. In the symbolic interactionist approach, Goffman (1963) emphasized a more social approach (in contrast to the individualistic perspective prevalent today) and described how the self-concept is formed through social interactions and the internalization of the evaluation of others: Because discrimination represents a degradation of one's social group, the self-concept—and in consequence also psychological health—is threatened. With increasing relevance of cognitive processes in psychological research, stigma and discrimination have also been conceptualized as the result of cognitive categorization processes (Jones et al., 1984). More recent experimental research has shown that such cognitive categorization-based treatment, even when intentionally positive, can undermine well-being because it neglects individual preferences and characteristics (Barreto et al., 2010).

Attributional Ambiguity Perspective

Attributional ambiguity is concerned with the uncertainty of whether negative experiences or outcomes should be blamed on the self (e.g., incapacity) or an external cause (e.g., discrimination by others). The first version of the attributional ambiguity theory (Crocker & Major, 1989) made the opposite assumption of the early theories reviewed above. It suggested that when individuals perceive frequent and pervasive discrimination, they are more likely to attribute negative events to discrimination rather than to their own abilities and skills. This attributional pattern was assumed to lead to higher self-esteem and more positive self-directed mental health outcomes. Importantly, this strong assumption—that the attribution to discrimination would lead to improved self-directed mental health outcomes—was not

empirically supported and is explicitly refuted in the current attributional ambiguity perspective. The current perspective assumes that attributions of negative events and unfair treatment to discrimination can be self-protective because blame and negative outcomes can, at least in the short-term and for single negative events, be externalized and not attributed to personal failure and deservingness (Barreto & Ellemers, 2015; Major et al., 2002). However, the externalization of blame in response to discrimination is not an automatic default but rather depends on various personal and contextual moderators, such as optimism (Kaiser et al., 2004) or social group identification (McCoy & Major, 2003). Further, the extent to which discrimination is perceived as obvious, unjust, rare, and isolated influences the ease of recognition and externalization of discrimination (Barreto & Ellemers, 2015). In the case of subtle and especially ambiguous forms of discrimination such as microaggressions, externalization is less likely than internalization of negative outcomes. This internalization of negative outcomes makes ambiguous forms of discrimination more harmful to mental health than blatant discrimination (Barreto & Ellemers, 2005a, 2005b; Salomon et al., 2015). Barreto and Ellemers (2015) reported that from an attributional ambiguity perspective, the more discrimination is perceived as pervasive, the greater the threat to just-world beliefs, resulting in adverse well-being and mental health outcomes (e.g., Kaiser et al., 2006). Nonetheless, external attribution to less pervasive forms of discrimination is not necessarily self-protective (Barreto & Ellemers, 2015). Meta-analytical evidence shows no support for the protective function for mental health when single events are attributed to discrimination compared to personal attribution (Schmitt et al., 2014). Thus, given that empirical research on the attributional ambiguity perspective is inconclusive, it is important to understand the underlying mechanisms that explain when and how discrimination harms mental health. In the following, we present two approaches that describe such potential mechanisms, threat to basic needs and psychosocial stressors.

Discrimination as Needs Threat

Discrimination as needs threat is prevalent in theories of social group identification. These theories generally assume that people possess social group identities to fulfill essential psychological needs. These needs are threatened by discrimination as a form of social rejection with negative effects on mental health. Most theories view people as active defenders of their social identities and propose several strategies to protect or restore social identity. We chronologically review these theories in the following paragraphs.

The *social identity theory* (Tajfel & Turner, 1979) focuses on the need for esteem; that is, the theory posits that people are motivated by the desire to have their social identities valued and accepted in society at large. When social group identification is high, these identities can even be part of the self-concept, and thus when they are threatened, there can be an adverse impact on a person's self-concept and in consequence, mental health. The social identity framework and its extensions understand human beings as active. It suggests strategies including collective action and self-group distancing for dealing with poor group status as the result of negative intergroup behavior such as discrimination.

Extending the social identity theory, the *social identity model of collective action* (van Zomeren et al., 2008) describes confrontation on the individual level and collective action on the group level as one response to discrimination. Such active responses have social costs and require high self- and group efficacy but improve individual well-being (Cronin et al., 2012; Sohi & Singh, 2015) and can lead to social change (Louis, 2009; Tajfel & Turner, 1979). Whether confrontation and collective action are employed to deal with discrimination depends on the nature of discrimination: For example, if structural disadvantage is pervasive or discrimination is perceived as legitimized and subtle by affected individuals, active and efficacious ways of dealing with discrimination are less often displayed (Tajfel & Turner, 1979). Pervasive discrimination is less likely to elicit action-oriented emotional responses,

such as anger (van Zomeren et al., 2008), and is difficult to change via active response (Sidanius et al., 2004).

A very different strategy to cope with a disadvantaged group status is *self-group distancing* (van Veelen et al., 2020), where individuals try to pass as members of another group and shed their own group identity to avoid potential discrimination threats. Self-group distancing can reduce immediate psychological stress responses to discrimination such as negative emotions (Schmader & Sedikides, 2018) and provide a sense of control (Le Forestier et al., 2020). Still, in the long term, distancing oneself from a stigmatized social ingroup identity can have negative effects on mental health, as it undermines identity-specific motives, such as esteem and belonging and negatively impacts perceived authenticity (Crabtree & Pillow, 2020; Schmader & Sedikides, 2018).

In contrast to self-group distancing, the rejection identification model posits that discrimination leads to increased group identification (Branscombe et al., 1999). According to the *rejection identification model* (Branscombe et al., 1999), group identification can serve as a resource to buffer the negative effects of discrimination that is no longer accessible when one is distanced from one's ingroup (Van Laar et al., 2014). For instance, Fleischmann et al. (2019) demonstrated that ethnic discrimination by the majority population led to reduced identification with the majority but increased ethnic identification. Nonetheless, increased levels of group identification might also increase vulnerability and even enhance the adverse effects of negative group-based treatment because one's social group identity becomes more relevant to the self (Sellers et al., 2006; Sellers & Shelton, 2003).

Empirical research suggests that identity formation is driven not solely by self-esteem but rather by a complex set of motives (Vignoles et al., 2006). The *multimotive theory of rejection* (Smart Richman & Leary, 2009) depicts discrimination as a threat to the need to belong (Baumeister & Leary, 1995), resulting in numerous adverse mental health effects:

Immediate mental health effects include negative affect and lowered self-esteem. In the long-term, people are motivated to restore the need to belong. Possible motivated responses proposed by the multimotive theory of rejection are antisocial responses leading to anger and hostility, withdrawal and avoidance leading to shame, anxiety, and depression, and prosocial responses that are helpful for maintaining relationships but lead to distress and vigilance and thus negative mental health outcomes. These motivated responses are influenced by situational and person-related characteristics such as the perceived pervasiveness, unfairness, or injustice and the agreeableness of the person.

Stress and Coping in the Context of Discrimination and Mental Health

In contrast to the social identity theories reviewed above, current empirical research on the mental health effects of discrimination is primarily based on stress and coping approaches, which have a more individualistic perspective. They are grounded in the theory of social stress (Pearlin, 1999; Pearlin et al., 1981) and the transactional model of stress and coping (Lazarus & Folkman, 1984). Here, discrimination is thought to be a psychosocial stressor that activates biopsychosocial and behavioral stress responses, leading to reduced mental health (Pascoe & Smart Richman, 2009; Williams & Mohammed, 2009). The stress process involves primary appraisals of the demands of a stressor and secondary appraisals evaluating the available resources to cope with it (e.g., Lazarus & Folkman, 1984).

Discrimination is deemed particularly harmful to mental health because of its uncontrollability and unpredictability and its often pervasive and chronic nature, all of which increase the vulnerability to mental disorders (Williams & Mohammed, 2009, 2013).

A stress and coping approach to discrimination was first applied using the biopsychosocial model by Clark and colleagues (1999). Everyday subtle forms of discrimination were assumed to signal a dangerous environment that leads to biopsychosocial stress responses. Following more current *identity threat models* (Berjot & Gillet, 2011; Major

& O'Brien, 2005), identity threat results from the appraisal that the demands imposed by a discrimination-relevant stressor are potentially harmful to social identity and the self and exceed available coping resources. Coping strategies can be active and approaching (engagement coping), aimed at changing the stressful situation or one's emotional reaction to it, or passive and avoiding (disengagement coping), aimed at avoiding the stressor or related emotions (Carver & Connor-Smith, 2010). Active engagement coping strategies, such as positive reappraisal or seeking social support, might reduce discrimination's adverse effects on mental health. In contrast, disengagement coping strategies, such as avoidance or denial, could reduce the immediate negative effects of perceived discrimination on mental health in the short term. In the long term, frequent engagement in disengagement coping behaviors could cause negative health problems, such as obesity (e.g., Brown et al., 2021) or increased substance use (e.g., Gerrad et al., 2012), and might lead to a higher stress load on the biological and psychological level (Perez-Tejada et al., 2019). In a meta-analysis, about 80% of the 26 correlative effect sizes showed no influence of coping on the relation between perceived discrimination and mental health (Pascoe & Smart Richman, 2009). Also, another, later meta-analysis found only weak evidence for the buffering effect of engagement coping and the exacerbating effect of disengagement coping (Schmitt et al., 2014). Importantly, these studies are generally correlative; experimental research is scarce. To date it remains largely unclear what type of coping strategy is most effective in buffering the adverse effect of discrimination on mental health.

The *minority stress theory* (Meyer, 2003) posits that individuals with marginalized identities experience not only general stressors, but also unique distal and proximal stigma-related stressors. Distal stressors refer to prejudice-based events, including discrimination and violence; proximal stressors are associated with marginalized identities and vary in terms of their social and personal forms, such as self-stigmatization, stigma consciousness,

concealment, and vigilance. These stigma-related stressors create an additional burden and result in additive exposure to stress and might explain group disparities in mental health. As a result, individuals with marginalized identities require more effort to adapt to the additional unique and chronic stigma-related stressors compared to similar individuals without marginalized identities. The minority stress theory underscores the differentiation between personal and group-level resources for coping. Alongside personal resilience and fortitude to endure stressful experiences, group-level factors can serve as protective coping factors for mental health. As per the theory, minority status or group identification not only brings about stress but also confers vital resources, such as group solidarity and cohesiveness, that protect mental health from discrimination-induced stress (Branscombe et al., 1999; Postmes & Branscombe, 2002). According to Meyer (2003), social support from other ingroup members in the face of discrimination, along with reappraisal that validates deviant discriminatory experiences and feelings of minority individuals (Thoits, 2013), are crucial coping resources at the group level.

The *psychological mediation framework* (Hatzenbuehler, 2009) builds on the minority stress theory (Meyer, 2003) but also emphasizes the common vulnerabilities in psychological and social processes that can lead to mental health impairments. Specifically, Hatzenbuehler (2009) reviewed the empirical evidence for affective, social, and cognitive risk factors that contribute to adverse mental health outcomes. Affective factors include coping and emotion regulation processes that can be impaired by chronic life stressors (Kim et al., 2013) and contribute to depression (Berking et al., 2014), anxiety disorders (Cisler et al., 2009), and internalizing and externalizing mental health outcomes (Aldao et al., 2016). Maladaptive emotion regulation strategies resulting from discrimination-related stressors, especially ambiguous ones, such as rumination (Kaufman et al., 2017; Hatzenbuehler et al., 2009), are associated with depressive and anxiety symptoms and predict the onset and maintenance of

depressive and anxiety disorders (McLaughlin et al., 2011). Stigma-related stressors can also alter social processes and might lead to isolation and a lack of social support, increasing vulnerability to internalizing psychopathology (Hatzenbuehler, 2009; Lattanner et al., 2022). Furthermore, discrimination, especially when perceived as pervasive and uncontrollable, can alter cognitive processes such as hopelessness and pessimism as well as deficits in self-mastery and negative self-schemas that in turn can predict internalizing mental health outcomes (Hatzenbuehler, 2009, for a review).

Physiological, Social, and Behavioral Pathways Between Stress Responses, Mental Health, and Discrimination

Exposures to discrimination, like other stressors, can trigger negative emotional states and activate *physiological stress responses* in cardiovascular (e.g., increased blood pressure; Dolezsar et al., 2014), neuroendocrine (e.g., increased cortisol output; Korous et al., 2017), and immune systems (i.e., inflammation; Cuevas et al., 2020), and alterations in stress-related gene expression (Goosby et al., 2018). Notably, everyday experiences of discrimination and microaggressions lead to negative emotions and physiological stress—above and beyond general daily stress—that over time might have long-term effects through brain-regulated allostatic mechanisms (Cheadle et al., 2020). Similarly, repeated exposure to discrimination leads to greater diastolic blood pressure reactivity that is assumed to prepare the body to be more physically reactive in stressful or potentially stressful social situations (Gyull et al., 2001).

One well-researched physiological mechanism is increased inflammation that has been discussed as one major physiological pathway by which discrimination-related and other stressors can harm health (Cuevas et al., 2020). When inflammation becomes chronic through continuously experienced discrimination, it can cause significant physical and mental health impairments. For example, increased inflammation has been linked to depression

(Berk et al., 2013) and cardiovascular disease (Golia et al., 2014). Increased inflammation can also alter brain circuits, resulting in a heightened sensitivity to potential negative social experiences such as rejection and discrimination, resulting in a noxious cycle that consequently might increase the risk of poor mental health (Eisenberger et al., 2017). Social support and higher social integration seem to be able to buffer discriminatory stress and have been linked to lower inflammation (Uchino et al., 2018).

At the same time, these protective social factors can be negatively affected by discrimination. Discrimination hinders access to various types of *social relationships* leading to a loss of social capital and social support (Doyle & Barreto, 2023). This not only reduces stress buffering and coping but also directly diminishes life opportunities and mental health and can even lead to increased mortality risk (Holt-Lunstad et al., 2010; Thoits, 2011). Moreover, stigma itself can shape interpersonal social relationships and can impact various forms of relationship functioning, such as affect and conflict, relationship quality, and support (Doyle & Barreto, 2023). Doyle and Molix (2014) focused on physiological and psychological pathways for the adverse impacts of discrimination on relationship quality and showed that the effect was mediated by increased emotion dysregulation and chronic inflammation. Further psychological pathways may include decreased trust (Zhang et al., 2020), a reduced sense of belonging (Froehlich et al., 2023), or loss of control that can lead to aggression and controlling behavior (Kazmierski et al., 2023; Petsnik & Vorauer, 2023). Furthermore, discrimination can manifest within relationships, for instance in the form of friendly teasing, making discrimination more ambiguous and thus more challenging to cope with (Douglass et al., 2016; Yampolsky et al., 2023). Discrimination's impact on social relationships is thus complex and multifaceted, necessitating further research and a nuanced understanding of its various effects.

Like other psychosocial stressors, discrimination also affects mental health via the *behavioral pathway*. Pascoe and Smart Richman (2009) showed in their meta-analysis that experienced discrimination is related to less healthy behaviors. A possible mechanism might be institutional discrimination in health care (Cook et al., 2014) or structural environmental factors such as segregation (Schneider & Gruber, 2013; Schneider et al., 2015). Another explanation provided by Pascoe and Smart Richman is decreased availability of self-control resources due to ego depletion produced by stress. The effect of ego depletion on self-control is controversial, however (Frieze et al., 2019; Hagger et al., 2016; Job et al., 2010). Further, health behaviors are negatively affected by stress beyond assumptions about ego depletion, self-control, or self-regulatory goals. For example, stress-induced or emotional eating in response to stress is a reason for overconsumption (Jacquier et al., 2012) or can be used as an unhealthy coping strategy (Dallman, 2010). General psychosocial stress longitudinally predicts less leisure-time physical activity (Mouchacca et al., 2013) and impaired sleep (Åkerstedt, 2006). Substance use, or self-medication, is another coping strategy to manage the adverse impact of discrimination. For example, in a 5-year longitudinal study, Gibbons and colleagues (2010) showed that experienced racism led to more externalizing mental health outcomes that in turn predicted increased substance use. Further, efforts to restore the need to belong may also drive heightened substance use (see also the multimotive theory by Smart Richman & Leary, 2009).

Appraisal of Discrimination-Related Stressors and Their Effect on Mental Health

Other potential factors that influence how discrimination is appraised include dimensions of stigma, aspects of discrimination and the social context, and situational and person-related characteristics (Berjot & Gillet, 2011; Major & O'Brien, 2005). These factors may help explain why different types of discrimination, such as racism or sexism, differ in how strongly they affect mental health. Different stigma dimensions influence appraisal and

determine resilience and vulnerability to the adverse effects of discrimination (Crocker et al., 1998), namely, cultural prejudice and the subsequent understanding of marginalized *group status* and the *pervasiveness of discrimination*, and perceived *controllability* and *concealability* of a marginalized identity. Subsequent aspects of discrimination and the social context that influence appraisal include the *legitimacy* and *severity of discrimination*. Further, psychological aspects such as *stigma sensitivity and consciousness* and *person-related demographics* such as age and gender are central to how individuals appraise and cope with discrimination-related stressors. These different factors are described in detail below.

Group Status and Pervasiveness of Discrimination. Based on cultural prejudice, certain groups within a society have a historically relatively disadvantaged and marginalized status. These groups are particularly vulnerable to enduring discrimination based on their actual or presumed marginalized identity, including but not limited to gender identity, age, ethnicity, religion, disability, sexual orientation, educational level, and geographical location (see e.g., United Nations, 2017). A correlative meta-analysis showed stronger associations between discrimination and mental health against marginalized compared to non-marginalized groups, but note that group status showed no effect in experimental studies (Schmitt et al., 2014). Marginalized groups are more likely to experience discrimination as more pervasive compared to non-marginalized groups. This could make discrimination especially harmful to marginalized groups (Schmitt & Branscombe, 2002). Because discrimination is less avoidable when it is pervasive across time and contexts, perceptions of pervasive discrimination should be more likely to be experienced as uncontrollable, as rejection by society at large; consequently, pervasive discrimination is more likely to undermine feelings of control (Verkuyten, 1998) compared to discrimination resulting from an isolated, single event. Also, self-protecting functions of attributions to discrimination as discussed in terms of attributional ambiguity are not feasible in the case of pervasive discrimination (Stroebe et al., 2011).

The meta-analysis by Schmitt et al. (2014) showed that manipulation type was a significant moderator: Studies that used pervasive discrimination manipulations showed a stronger mental health effect than studies that manipulated attributions of a single negative event to discrimination versus to a personal reason.

Controllability and Concealability of Stigma. Higher levels of alleged control over the onset, removal, and maintenance of a marginalized identity make discrimination more harmful to mental health (Schmitt et al., 2014). For instance, the onset, removal, and maintenance of overweight and obesity are perceived to be highly controllable, even though these perceptions do not align with the actual level of controllability associated with these conditions (Puhl & Brownell, 2003). Further, individuals living with HIV or other sexually transmitted infections are often perceived to have high levels of stigma onset controllability but relatively low control over stigma removal (Seacat et al., 2007). When discrimination is seen as legitimate and deserved by the affected individual because the underlying marginalized identity is appraised as controllable, discrimination is likely to be internalized (e.g., Pearl & Lebowitz, 2014). In consequence, self-protective functions of attributional ambiguity are undermined, and discrimination becomes more harmful (Nestler & Egloff, 2013). Moreover, the alleged control over a marginalized identity might instead lead to the aspiration to remove the marginalized identity and self-group distancing rather than develop a protective group identity. For less visible marginalized identities, concealability might even enhance the likelihood of self-group distancing to prevent negative short-term effects in relatively new interpersonal contexts and relationships or severe instances of discrimination (for instance not wearing a headscarf for work interviews or not revealing sexual orientation in a high threat situation; Clair et al., 2005). Nevertheless, the positive functions of a concealed marginalized identity are only short term—in the long term, active suppression can lead to internalization of discrimination and, in turn, to negative mental health and

relationship outcomes (Barreto et al., 2006; Quinn et al., 2014). At the same time, concealing a marginalized identity also reduces opportunities for protective factors such as social support (see Chaudoir et al., 2013, for a narrative review). Meta-analytical evidence suggests a stronger association with negative mental health outcomes for more concealable than less concealable marginalized identities (Schmitt et al., 2014). The cognitive-affective model of psychological effects of concealing a stigma (Pachankis, 2007) emphasizes the role of vigilance and suspiciousness/threat of discovery as potential pathways through which disclosure creates additional stress, leading to affective implications such as anxiety, depression, hostility, guilt, and shame, as well as negative self-evaluative effects such as a negative view of self, decreased self-efficacy, and a lack of group-based self-protective attributions. Pachankis (2007) described social avoidance and isolation and, thus, impaired social functioning as outcomes of concealing a marginalized identity that in turn further exacerbates the negative effects of discrimination on mental health.

Legitimacy and Severity of Discrimination. Discrimination against marginalized identities perceived to be more controllable is deemed as more deserved and legitimate (e.g., weight discrimination), both by the stigmatized individual themselves and the wider society. When discrimination is appraised as legitimate and accepted by the wider society, it occurs more frequently and becomes more pervasive for marginalized individuals. Following social identity theory (Tajfel & Turner, 1979), legitimacy appraisals by the affected individual or perceptions of justifiability of negative group-based treatment are more harmful for well-being as it prevents collective action (Jetten et al., 2011) and can lead to self-stigmatization (Herek, 2007). Moreover, the notion of legitimacy may shed light on the inconsistent findings regarding group identification as both a protective and exacerbating factor in the face of discrimination. Specifically, when discrimination is appraised as legitimate by the affected person, group identification exacerbates the detrimental effects on mental health, whereas

group identification has a buffering effect when discrimination is perceived as illegitimate (Hansen & Sassenberg, 2011).

Subtle forms of discrimination are more frequent and chronic, they are considered socially acceptable and more legitimate by affected individuals and broader society compared to more overt forms of discrimination (Salomon et al., 2015). Thus, subtle forms of discrimination might have stronger effects on mental health than overt discrimination. Further, their ambiguous nature makes it more difficult to cope with subtle discrimination stressors, eventually leading to more rumination and a prolonged stress response (Williams et al., 2003). A meta-analysis by Jones and colleagues (2016) found comparable associations for overt and subtle discrimination in the work context with adjustment outcomes, namely, mental health ($r = -.31$ for subtle and $r = -.28$ for overt discrimination), physiological health ($r = -.17$ for subtle and $r = -.16$ for overt discrimination), and work-related outcomes ($r = -.25$ to $-.31$ for subtle and $r = -.22$ to $-.28$ for overt discrimination). Of note, these findings are based on a very small number of effect sizes and are limited to the work environment. A more recent meta-analysis showed a comparable effect size for the association of microaggressions as one form of subtle discrimination with mental health ($r = -.20$, Lui & Quezada, 2019). Importantly, both effect sizes for subtle discrimination are comparable to meta-analytical estimates of the association of perceived discrimination with general mental health ($r = -.20$ in Pascoe & Smart Richman, 2009, and $r = -.23$ in Schmitt et al., 2014). Following the affective forecasting theory (Wilson & Gilbert, 2003), it has been suggested that the anticipated adverse effects of overt and blatant discrimination are likely overestimated by individuals, whereas the anticipated effects of subtle and less severe discrimination are likely underestimated compared to the actual effects (Bosson et al., 2010). This discrepancy in forecasting and actual experience of discrimination might further

intensify the negative effects of subtle and less severe discrimination because targets of such discrimination are less prepared for counteraction, such as effective coping strategies.

Meta-analytical synthesis of evidence requires categorization of the factors influencing appraisal on the study level because of limited information being available in primary studies on how individuals subjectively perceive the different aspects of stigma and discrimination (e.g., Schmitt et al., 2014). This approach inevitably results in a high level of confounding between the factors and types of discrimination. Since the different types of discrimination vary across multiple dimensions of stigma and discrimination, the analyses of differential effects from discrimination types are exploratory and aim to test the generalizability of the mental health effect. Many reviews and meta-analyses focused exclusively on the relation between ethnic discrimination/racism and health (e.g., Carter et al., 2019; Paradies et al., 2015), but only two meta-analyses examined research on different types of discrimination. These either did not differentiate the effects for the different discrimination types (Pascoe & Smart Richman, 2009) or found mixed results (Schmitt et al., 2014). Specifically, Schmitt et al. (2014) showed that the correlative effect sizes for studies of racism ($r = -.21$) and sexism ($r = -.18$)—discrimination types that were also coded as less concealable and controllable—were smaller than those for studies of more concealable and controllable types of discrimination based on physical disability ($r = -.41$), HIV status ($r = -.33$), mental illness ($r = -.31$), sexual orientation ($r = -.28$), or weight ($r = -.28$). Due to a lack of primary studies, Schmitt et al. (2014) investigated causal effect sizes only for racism ($d = -.11$ for well-being; $-.13$ for self-directed affect), sexism ($d = -.04$ for well-being; $-.02$ for self-directed affect), and academic identity ($d = -.12$ for well-being; $-.11$ for self-directed affect) and found no significant differences between these types of discrimination. These findings are based on a small number of effect sizes and the correlational results indicate that

discrimination might have different consequences depending on the type of discrimination. Hence, such differences may also be found in experimental data.

Stigma Sensitivity and Consciousness. According to identity threat models (Berjot & Gillet, 2011; Major & O'Brien, 2005), stigma sensitivity and stigma consciousness influence the appraisals of discrimination-related stressors. Stigma sensitivity describes the ability to detect discrimination in the environment. For example, some individuals may be more alert toward rejection and therefore more sensitive to environmental cues that could indicate discrimination (Mendoza-Denton et al., 2002). Further, individuals differ in their level of stigma consciousness, that is, their expectations regarding how they will be judged and treated on the basis of negative stereotypes associated with their social identity (Pinel, 1999). Stigma sensitivity and stigma consciousness result in greater vigilance toward stigma-related threats and heightened likelihood of appraising stigma-relevant situations as threatening (Major & O'Brien, 2005). Because rejection sensitivity and stigma consciousness represent factors on the person level and are thus within-study variables, they cannot be adequately tested quantitatively in our meta-analytic synthesis. In this study, we focus on gender and age as important factors influencing the appraisal of and coping with discrimination-related stressors.

Demographics: Gender and Age. In prior research, discrimination was negatively associated with mental health for both women and men. Following the reasoning of Schmitt et al. (2014), discrimination may be more harmful to women than to men because most women are disadvantaged and marginalized in several areas of society (and generally in more areas than men) and thus might have fewer coping resources compared to men. Further, women are more likely to ruminate than men (see the meta-analysis by Johnson & Whisman, 2013). Rumination in turn is one of the key mechanisms assumed to reinforce the negative effects of subtle discrimination on mental health (see Sarno et al., 2020, for a longitudinal

study). Importantly, nonbinary and transgender identities challenge the traditional gender binarity, cultural norms, and expectations to a greater degree than binary gender identities and thus might even show more pervasive and severe intersectional effects of discrimination on mental health (e.g., Harrison et al., 2012). Nonetheless, empirical data regarding the influence of gender on the consequences of discrimination are currently still focused on a binary conception of gender, and findings from such studies show mixed and inconclusive results (Paradies et al., 2015). Most correlational meta-analyses found no moderating effect of gender (e.g., Pascoe & Smart Richman, 2009), or a minimal descriptive difference in effect (Carter et al., 2019; $r_{women} = -.21$, $r_{men} = -.20$). Furthermore, Schmitt et al. (2014) showed that discrimination was more strongly linked to mental health among marginalized groups ($r = -.24$) than among non-marginalized groups ($r = -.10$), with women belonging to more marginalized groups compared to men. Cohen et al. (2019) argued that women might be more sensitive to interpersonal stressful life events than men and the experience of discrimination might be considered such a stressful life event.

Although much of the early research on discrimination and health focused on adult populations, there is increasing attention to the effect of discrimination on mental health outcomes for children and adolescents. Two meta-analyses found that the negative relationship between perceived discrimination and psychological distress was larger for children than for adults ($r = -.25$ and $-.18$, respectively, in Lee & Ahn, 2013 and $r = -.32$ and $-.28$ in the correlative meta-analysis by Schmitt et al., 2014; age could not be tested as a moderator in the experimental meta-analysis by Schmitt et al. owing to a lack of data). Young people may be particularly emotionally vulnerable to discrimination because their self-identity and self-esteem are still developing (Marks et al., 2015), they show a heightened emphasis on social feedback and social influence (Douglass et al., 2016), and they are particularly vulnerable to effects of stress (Larson et al., 2002). In addition, with increasing

age, people may have more experience dealing with discrimination experiences and therefore may have developed more effective coping mechanisms (Kazmierski et al., 2023).

Importantly, when assessing discrimination, intersectionality should be considered because focusing on only one marginalized identity might underestimate the mental health effect of discrimination (Lewis & Van Dyke, 2018): Social identities are mutually related (Shields, 2008), which shapes and influences social positions and power relations (Hankivsky & Christoffersen, 2008). To adequately consider intersectionality, contextual examinations are necessary, as the goal is not simply to sum up social categories but to examine the convergence of experiences (Hankivsky & Christoffersen, 2008). Despite initial efforts to make intersectionality quantitatively measurable, such as the framework for developing measures of intersectional microaggressions by Singh et al. (2021), research on intersectional inequalities in mental health, particularly experimental research, is limited in both volume and methodological standardization (see, for example, the scoping review by Fagrell Trygg et al., 2021). Nevertheless, it is important that studies start to take intersectional perspectives, for instance, by examining the interactions of prominently assessed dimensions, such as gender and age, which is an important starting point.

Different Aspects of Mental Health

Mental health is a complex construct that has been defined as a state of mental well-being that enables people to cope with the stresses of life, to realize their abilities, to learn well and work well, and to contribute to their communities. Mental health is an integral component of health and well-being and is more than the absence of mental disorder (World Health Organization [WHO], 2022, p. 8).

There are good theoretical and empirical reasons for predicting that discrimination harms mental health in general, which means it affects all forms of indicators of mental

health and worsens symptoms of mental disorders as well as well-being outcomes (Pascoe & Smart Richman, 2009; Williams et al., 2003). Specific aspects of mental health might be differentially affected, including well-being-related positive mental health (e.g., positive affect, well-being, life satisfaction) and psychological-distress-related negative mental health (e.g., anxiety, psychological distress, negative affect), as well as other-directed (i.e., externalizing mental health outcomes including feelings of anger and hostility) and self-directed mental health outcomes (i.e. internalizing emotions such as self-worth, self-esteem, depressed affect, shame, guilt, self-directed anger).

Reviews of correlational evidence showed stronger adverse associations of discrimination with negative distress-related mental health outcomes than with those related to positive well-being ($r = -.23$ and $r = -.13$, respectively, in Paradies et al., 2015, and $r = -.26$ and $r = -.16$ in Schmitt et al., 2014). Other-directed mental health outcomes are important to facilitate confrontation and collective action but are less likely when discrimination is perceived as legitimate and pervasive by affected individuals (cf. social identity theory of collective action; van Zomeren et al., 2008). The effect of discrimination on self-directed outcomes possibly depends on attribution processes: The attributional ambiguity hypothesis (Crocker & Major, 1989) postulates that individuals who perceive themselves as stigmatized tend not to attribute adverse events and negative feedback to their self and personal deservingness but rather to externalize it to discrimination. Thus, self-directed affect might be particularly protected by externalizing blame to discrimination, away from the self. Importantly, previous research emphasized the strong dependence of attribution ambiguity on personal and contextual factors, underlining that the effect of attribution might not be inherently self-protective (Major et al., 2002). This is in line with results of the meta-analysis by Schmitt et al. (2014), which did not find differences between self-directed outcomes and general well-being in the face of discrimination.

Most theories on the effects of discrimination on mental health do not make precise assumptions for specific mental health outcomes and focus more on the long-term effects on mental health. The *multimotive theory of rejection* (Smart Richman & Leary, 2009) describes that immediate global responses to social rejection and discrimination are negative affect and lowered state self-esteem, an assumption in line with the empirical findings of the reviews by Schmitt et al. (2014) and Paradies et al. (2015) but contradicting the attributional ambiguity perspective that assumes protection of self-esteem. The longer term effects of discrimination are a motivation to restore the sense of belonging and can be other-directed or self-directed and can influence both positive well-being-related and negative distress-related outcomes (Smart Richman & Leary, 2009). In sum, whether discrimination has different effects on the different categories of mental health outcomes has yet to be determined. Further, subgroup analyses are needed to test the generalizability of discrimination effects.

Experimental Research on the Effects of Discrimination on Mental Health

Experimental Paradigms to Induce Feelings of Discrimination

To investigate how individual-level discrimination influences mental health, several experimental research designs have been applied. Generally, the different experimental paradigms are focused on different types of discrimination (e.g., sexism or racism) and are placed in different social contexts (e.g., education, health care) with different levels of pervasiveness (i.e., a rare and isolated single event such as a discrimination-related encounter in an experimental situation vs. information on pervasive discrimination of the ingroup over contexts and times).

Specifically, the experimental research paradigms used to induce or elicit discrimination can be differentiated as follows (see Table 1 for a description of commonly used experimental paradigms). Paradigms that are related to experiencing discrimination in real-life include the *direct experience of discrimination* in which the discriminating event is

experimentally induced (e.g., participants receive negative feedback or unfair treatment from an experimenter that can be attributed to discrimination) or in which participants are exposed to a *stereotype threat* (e.g., feeling at risk of confirming negative stereotypes about their ingroup such as gender or ethnicity) followed by having to *perform a task*. Paradigms that make experienced discrimination about one's group salient include *autobiographical recalls*, in which participants are asked to remember a situation in which they felt discriminated against, and *making general stereotypes about one's group salient*, which is usually enacted by asking participants to write or think about general stereotypes that (specific) others have expressed about their group. A third group of experimental research paradigms uses more vicarious discrimination experiences. This includes *imagination* of a situation in which a person of their ingroup is discriminated against or they were in the position of a person of the ingroup experiencing discrimination; *reading a text*, *viewing images/pictures*, *watching a video clip*, or *hearing an audio clip* about a situation that is discriminatory against their ingroup or contains information about pervasive discrimination against their ingroup. Vicarious discrimination experiences do not include bystander effects in which a participant witnesses discrimination against an outgroup identity – such paradigms were excluded from the current meta-analysis. Yet, bystander effects in which a participant witnesses discrimination against an ingroup identity were included. Future research might also rely on additional paradigms, such as virtual reality, to induce discrimination in experimentally controlled but even more externally valid ways (e.g., Lui et al., 2023).

Measuring Experimentally Induced Discrimination on Mental Health: Strengths and Limitations

The most important strength of experimental paradigms to induce discrimination is that they allow drawing causal conclusions because all potential confounding factors are controlled or balanced because of the experimental setup (i.e., high internal validity). Further,

using established research paradigms across different studies allows comparing and synthesizing findings to reach potentially more reliable or more general conclusions than would be possible based on a single study alone. In addition, experimental studies offer an opportunity to identify potential moderators that contribute to resilience or vulnerability. The fundamental aim of investigating how discrimination influences mental health—as with any social determinant of health—is not only to demonstrate the extent of its harmful effects, but to comprehend the factors that make individuals particularly vulnerable or resilient (Krieger, 2014).

At the same time, controlled laboratory experiments are generally limited in their external validity. In the case of the experimental manipulations of discrimination and their effects on mental health reviewed here, a specific limitation is the one-time artificial induction of discrimination in a laboratory setting. Even when this induction is manipulated as being pervasive, the mental health effects likely do not fully reflect the extent of chronic daily and more blatant discrimination encountered in real life. Experimental settings only allow the measurement of more acute and immediate mental health outcomes, that is, states such as affect or single symptoms of mental disorders, such as depressive mood or fear. Long-term effects on general mental health or specific mental disorders cannot be investigated as outcomes in such a design, as a diagnosis of mental disorders is characterized by the presence of a variety of symptoms over a longer time period (e.g., for major depression at least 2 weeks on most days; American Psychiatric Association, 2022). Acute mental health outcomes, however, are an important aspect of general mental health. For example, increased negative affect is one of the cardinal symptoms of depression and is also observable in experimental designs with populations at risk for major depression (e.g., Mata et al., 2013). Also, people at increased risk for depression show similar cognitive and

emotional patterns in experimental settings to those of people who have been diagnosed with depression (see Gotlib et al., 2014, for a review).

According to the life course approach (Reskin, 2012) and the weathering hypothesis (Geronimus et al., 2006), discrimination has a cumulative effect on mental health. This is particularly important as certain forms of discrimination can occur from a very young age (e.g., Waxman, 2021, showed that racial awareness starts in infancy), can even have an adverse health effect when experienced before birth (e.g., Scholaske et al., 2019, showed that perceived discrimination is associated with preterm birth), and may also be transmitted intergenerationally (Lugo-Candelas et al., 2021). Although the life course approach helps explain how discrimination develops and interacts at various stages of life, this perspective cannot be incorporated in experimental studies (yet). Additionally, stigma and discrimination are fundamental causes of health inequalities (Hatzenbuehler et al., 2013; Phelan & Link, 2015) and have an impact on the complex patterns of various life opportunities and outcomes. Therefore, when examining the mental health effects of discrimination in experimental settings, it is crucial to consider that these effects are likely underestimated, as it is difficult to map the complex patterns of outcomes in laboratory settings. Furthermore, as described above, taking an intersectionality perspective in experimental research is difficult; yet focusing solely on one stigmatized identity cannot fully capture the full impact of discrimination on mental health.

Ethical Considerations

Conducting experimental research on discrimination is a challenging and delicate matter that raises ethical concerns, owing to the induction of intense negative thoughts and emotional pain in participants. The scientific basis of such studies must be strong, and researchers have a responsibility to minimize potential risks of psychological harm (Hegtvedt, 2014). Experiencing discrimination can be compared to enduring physical pain.

Therefore, the amount and intensity of pain caused by discrimination should be comparable to a level of physical pain that researchers deem acceptable in research. This includes that the extent of harm caused by a study should not exceed that caused by negative feelings experienced in daily life and that emotional distress should be temporary and not result in lasting harm to participants (Fiske & Hauser, 2014; Hegtvedt, 2014). Using established experimental paradigms to induce discrimination can help in adhering to these standards, because their effects on indicators of mental health are known and have been evaluated as acceptable. In contrast, asking participants to recall personal situations in which they felt discriminated against bears the risk of (in some participants) evoking pain that is stronger than would be deemed acceptable, and researchers must include measures to help participants cope with this pain and reach their emotional/mental state they had before taking part in the experiment. Other ways to reduce the extent of potential harm include providing participants with the opportunity to opt out of the study and informing them of the purpose of the study as well as potential risks before obtaining informed consent (Hegtvedt, 2014; Office for Human Research Protections, 2022). In discrimination research, the lack of informed consent raises significant ethical concerns, as researchers often use deception to enhance experimental control and experimental realism (e.g., Adams et al., 2006; Major et al., 2003; Rodriguez et al., 2016). Deception should be avoided unless it is essential and justified by a significant purpose, as it can impair participants' autonomy, self-determination, and decision-making abilities through the lack of full disclosure (Kelman, 1967). Moreover, deception can negatively affect public trust in scientific research (Hertwig & Ortmann, 2008). If deception cannot be avoided, the harm caused by deception needs to be minimized by debriefing participants about the true purpose of the study and the nature of the deception. This process should include “dehoaxing,” where researchers provide information about the study's true purpose, and desensitizing, which aims to remove any emotional harm caused by the study

and restore participants' positive well-being (Hegtvedt, 2014). Experimental research on the effects of discrimination on mental health needs to use paradigms that adhere to strict ethical standards. If new paradigms are used, their effects on indicators of mental health, such as affect, or threat to needs, such as control or belonging, need to be closely monitored, counteracted if necessary, and always critically evaluated.

Study Rationale

Several systematic reviews and meta-analyses (e.g., Pascoe & Smart Richman, 2009, Paradies et al., 2015; Schmitt et al., 2014; Williams et al., 2019) have shown an association between perceived discrimination and a wide range of mental health outcomes. To our knowledge, only Schmitt et al. (2014) have meta-analytically quantified the causal overall effect of experimentally induced discrimination on mental health. Cross-sectional and longitudinal data might provide evidence consistent with the assumption that perceived discrimination negatively affects mental health, but self-reported effects of perceived discrimination are confounded with actual negative consequences of discrimination. Therefore, it is not possible to tell how much of the relationship reflects the effect of subjective perceptions of discrimination and how much reflects the effect of existing discriminatory treatment. Even though many correlational and longitudinal studies controlled for potential confounders such as socioeconomic status or education level, a direct causal pathway between discrimination and mental health needs to be examined using experimental paradigms.

By randomly allocating participants to experimental (i.e., manipulated perception of discrimination) or control conditions and keeping life circumstances and prior experiences constant across conditions, experimental studies can provide evidence of a direct causal effect of social discrimination on mental health. The most recent meta-analysis providing an overview of the experimental effect of discrimination on mental health was conducted by

Schmitt et al. (2014) and found no overall effect of experimentally induced discrimination on psychological well-being. Schmitt et al. (2014) did not find a mental health effect in studies comparing attributions of a specific single event to discrimination compared to attributing it to personal characteristics. However, they did find a small, significantly negative effect on psychological well-being for studies that manipulated pervasive perceptions of discrimination against the ingroup (i.e., frequency of discrimination across time and contexts; $d = -.25$ for well-being, $d = -.21$ for self-directed affect). Nevertheless, the meta-analysis by Schmitt et al. (2014) focused on a limited number of available data sets and aggregated effect sizes on a sample level. Owing to a lack of primary studies (included up to the year 2012), several potential moderators could not be investigated. To address these issues in the current meta-analysis of experimental studies, we updated and extended the work of Schmitt et al. (2014), searching a broader spectrum of relevant databases and including more experimental effect sizes up to September 2022. Moreover, we analyzed all available effect sizes without aggregation using multilevel meta-analytic techniques (Assink & Wibbelink, 2016), and included potential moderators of the effect of social discrimination on mental health. The exploration of possible moderators can identify protective and risk factors regarding the effect of discrimination on mental health that are not yet sufficiently understood (Paradies et al., 2015). Furthermore, to advance future research on social discrimination, this meta-analysis expands the scope by including various types of single-event studies (in contrast to Schmitt et al., 2014, who focused on attributional ambiguity and on comparisons of attributions to discrimination vs. to personal characteristics) and provides an overview of experimental manipulation types and research paradigms.

In sum, in this meta-analysis we tested the overall effect of discrimination on mental health in a broad variety of experimental settings and explored whether the mental health effect of discrimination varies for different discrimination types, manipulation types and

pervasiveness of discrimination, or utilized research paradigms. We further tested whether the effect is moderated by characteristics of samples included, namely, group status (i.e., whether participants possess marginalized vs. non-marginalized identities related to the manipulated discrimination type, such as identifying as female vs. male when discrimination type is sexism), age, and gender of participants, and whether specific aspects of mental health are particularly affected by discrimination.

Hypotheses and Exploratory Analyses

Hypotheses

Given the research reviewed above, we proposed the following hypothesis:

1. Discrimination has a negative effect on mental health.

In addition, we aimed to identify potential sources of variation in effects. We hypothesized that the following factors moderate the effect of discrimination on mental health:

2. Manipulation type: The effect of discrimination on mental health is stronger for pervasive discrimination than for single-event discrimination.

3. Group status: The effect of discrimination on mental health is stronger in marginalized identities compared to non-marginalized identities.²

4. Gender: The effect of discrimination on mental health is stronger for individuals who identify as women than those who identify as men.

5. Age: The effect of discrimination on mental health is stronger for younger than for older individuals.

² This hypothesis was added during the revision process and was not preregistered as the preregistration was focused solely on discrimination against marginalized identities and excluded discrimination operationalized as unfair treatment based on non-marginalized identities.

Exploratory Analyses

The existing literature has yet to provide a clear understanding of the potential variations in the mental health effects of different types of discrimination and potential differences in the impact of discrimination on various mental health outcomes. Further, an exploration of experimental research is needed related to manipulation types and research paradigms, as well as samples with different group status. To explore the generalizability of the effect of discrimination across various forms of discrimination and their experimental manipulations, samples, and mental health outcomes, we conducted separate meta-analyses to answer the following exploratory research questions:

1. What are the differential effects of specific single-event and pervasive manipulation types of discrimination on mental health?
2. What are the differential mental health effects of discrimination in different research paradigms, namely direct experience, salience induction, and vicarious experience?
3. What are the differential mental health effects of discrimination against marginalized and non-marginalized identities?
4. Do different types of discrimination, namely, sexism, racism, heterosexism, body- and status-related discrimination, differ in the strength of their effect on mental health?
5. What are the differential effects of discrimination on different types of mental health outcomes, namely well-being-related, distress-related, self-directed, and other-directed mental health outcomes?

Control Variables

Although experimental studies are configured to limit the effects of potential confounders and to standardize many aspects of the environment (geographical region and publication year), the characteristics of the study (methodological quality) and sample (education level), these factors may still have an influence on a meta level. To ensure that

other factors such as cultural and economic contexts or changes in the research landscape over time did not confound the effect of discrimination on mental health and potential moderator effects, we included the publication year and the geographical location (i.e., region) as control variables. This is not only standard practice in meta-analytic research (Li et al., 2022) but also important for the interpretation of the findings, because levels of discrimination change over time and country (cf. Quillian & Lee, 2023). We also controlled for methodological study quality. This allowed us to include heterogeneous primary studies in the analyses and increases confidence in the findings and conclusions (Johnson et al., 2015; Valentine & Cooper, 2008). In addition, the education level of participants was included as a control variable because a higher education level is associated with enhanced stress-coping ability (Elo, 2009) that may buffer the adverse effect of discrimination on mental health and lead to an underestimation of the effect. Further, individuals with higher levels of education may have different experiences of discrimination and may be more likely to experience discrimination in certain contexts such as the workplace, whereas individuals with lower levels of education may experience discrimination in other contexts such as access to health care. Thus, education level has an impact on how and when discrimination is pervasive and in what contexts group status is disadvantaged.

Method

Transparency and Openness

The reporting of this meta-analysis is in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement (Moher et al., 2015). To minimize the risk of bias, we developed a research protocol and preregistered the meta-analysis as part of an Open Science project before data extraction and analysis. The preregistration, meta-analytic analysis code, and extracted data are available at <https://osf.io/5fqa2/>. Please note the following deviations of this meta-analysis from the

preregistration: During the revision process, Hypothesis 3—group status as moderator of the mental health effect of discrimination—was added. This hypothesis was not part of the preregistration because the preregistration was focused solely on discrimination against marginalized identities excluding discrimination operationalized as unfair treatment based on non-marginalized identities. Additionally, the preregistered exploratory analyses on coping strategies and ethnicity could not be conducted due to insufficient variability between samples. To enhance the stringency and clarity of our analyses, these exploratory analyses were excluded from the manuscript. Furthermore, the preregistered *p*-curve analysis could not be carried out because *p*-curve estimates are not robust in the presence of substantial heterogeneity as found in this meta-analysis and might produce biased results (Cooper et al., 2019). To date, there is yet no alternative selection model in the case of substantial between-study heterogeneity (see review by Rodgers & Pustejovsky, 2021).

Inclusion and Exclusion Criteria

To be included in the meta-analysis, studies had to have an experimental design (i.e., randomized controlled trials with experimental and control groups) with a manipulation of discrimination, report quantitative statistics or descriptions of the effect of discrimination using at least one indicator of mental health, and be written in English or German. The manipulation of discrimination was broadly defined in this study to include all forms of negative or unfair treatment, social rejection or exclusion experiences, and stereotype threat manipulations based on social identity and group membership. All neutral and stressful control conditions were included, whereas control conditions in favor of the ingroup were excluded, because effect sizes could represent effects of discrimination in favor of the ingroup that was not relevant to the investigation. Further, only effects of discrimination targeting the participants' self or social ingroups were included; effects of experiencing situations in which discrimina-

tion against individuals or social groups was based on social outgroup membership (i.e., perspective of a bystander) were excluded. This decision was guided by methodological considerations aimed at maintaining consistency and enhancing comparability with other included effects. Moreover, this choice aligns the theoretically expected pathways underlying the effects of discrimination on mental health: Although observing discrimination against individuals based on social outgroup identities does indeed carry the potential to act as a psychosocial stressor and negatively influence mental health, such experiences and their outcomes differ inherently from perceived or observed discrimination threatening one's own social identity as it threatens one's self-concept and place and value in society which goes beyond the consequences of the negative treatment itself (Schmitt et al., 2014).

Mental health was defined as a broad and multidimensional construct that includes a range of different indicators (WHO, 2022). Given the focus on experimental manipulations of discrimination, acute mental health indicators were more likely to be observed than chronic mental health conditions and disorders (which are characterized by a longer time frame of symptoms). Hence, acute indicators of mental health such as affect or specific types of anxiety (e.g., test or intergroup anxiety) were included. On the basis of described theoretical considerations and previous meta-analyses (e.g., Schmitt et al., 2014), mental health outcomes were categorized into well-being-related (i.e., well-being, life satisfaction, positive affect), distress-related (i.e., psychological distress, anxiety, negative affect), self-directed (i.e., self-esteem, depressed affect, other internally directed emotions such as shame and guilt), and other-directed (i.e., anger, hostility) outcomes. Self-reported and implicit measures were included. Observer-reported ratings of mental health indicators were excluded for consistency reasons. This resulted in the removal of three effect sizes from one manuscript (Désert et al., 2013), wherein assessors had rated participants' anxiety levels during a speech task. To ac-

count for variability between the broad variety of mental health outcome measures, methodological quality of assessment was considered in the analyses. Further, information on the type of outcome measure (i.e., acute vs. chronic measure of mental health) and the time elapsed between discrimination manipulations and mental health assessments were extracted from primary studies and coded.

Studies were excluded if they reported an unsuccessful manipulation of discrimination (i.e., nonsignificant manipulation check) or the reported statistical information was not sufficient to compute an effect size and the missing data could not be obtained from the authors. Published and unpublished manuscripts were considered without any restrictions on the publication year, participants, setting, or geographical location.

Search Strategy and Study Selection

Relevant keywords were identified and a search strategy was developed with the support of an independent research librarian; search strategies from prior meta-analyses (Pascoe & Smart Richman, 2009; Schmitt et al., 2014) and valuable input from the reviewers were also considered. First, systematic literature searches were conducted (on September 02, 2022) using the databases APA PsycInfo, PsycARTICLES, PSYINDEX, Sociological Abstracts, Web of Science, and Academic Search Premier to retrieve relevant published work, and ProQuest Dissertation and Theses Global, PsyArXiv, and SocArXiv to retrieve relevant unpublished work. Discrimination-related keywords were used in combination with mental-health-related keywords and keywords relating to experimental designs. Because both free and controlled vocabularies (e.g., Thesaurus in PsycINFO, Subjects in Sociological Abstracts) were used, the keywords were adapted to the different databases. For a detailed description of the search strategy including keywords, see Table S1. The search was cross-referenced using forward and backward searches. Forward searches on relevant studies found in the systematic literature search were performed using Web of Science to identify later

articles that cited them. Backward searches were performed on relevant meta-analyses (e.g., Pascoe & Smart Richman, 2009; Schmitt et al., 2014³) and reviews (e.g., Williams et al., 2019) by examining their reference lists.

All searches together identified a total of 3,719 records. After the removal of duplicates, the eligibility of the studies was assessed in two steps: First, titles and abstracts of the remaining 2,272 records were screened to exclude irrelevant studies (e.g., correlational studies). At the beginning of the screening process, two coders independently determined the inclusion of 200 randomly chosen studies. Because the agreement rate (92%) was high (Cooper et al., 2019), the remaining studies were screened by only one coder. Second, the 226 studies selected during the first step were screened in full for eligibility. If selected studies were neither electronically retrievable nor obtainable from the authors, they were excluded. Using the inclusion and exclusion criteria described above, 73 studies were finally included in the analysis, reporting data from 117 independent samples and 245 effect sizes. See Figure 1 for a PRISMA flow diagram depicting the screening and selection process.

Coding of Studies

For the data extraction, we developed a standardized coding manual, which a trained research assistant piloted using 10 randomly chosen eligible studies. We solved any discrepancies encountered by consensus and changed the manual accordingly (see Table S2 for the final coding manual). The information of each study was coded at four hierarchically linked levels: (a) study level, (b) experiment level, (c) sample level, and (d) effect-size level. Any

³ Nine records included in the meta-analysis of experimental studies on the mental health/well-being effect of discrimination by Schmitt et al. (2014) could not be included because of (a) unavailability of unpublished data or inability to retrace the calculation of effect sizes (seven records), (b) insufficient reporting of data that could not be obtained from the authors (one record, published in 1993), or (c) inability to retrieve the record (one record).

information not reported was treated as a missing value and omitted from the analyses. The data were extracted independently by two coders. To assess the intercoder reliability, Krippendorff's (2004) alpha and percentage agreement were calculated in R using the *irr* package (Gamer et al., 2019). Both reliability coefficients showed good intercoder reliability for all variables of interest (Krippendorff's alpha range: .70 to 1; percentage agreement range: 84.9 to 100%; see Table S3). All disagreements were reviewed, remarks for further refinement were added to the coding manual, and the coding entries were corrected using the respective primary study.

Study Quality and GRADE

The methodological quality of the experiments reported by the primary studies was assessed with an adapted version of the Study Design and Implementation Assessment Device (Study DIAD; Valentine & Cooper, 2008), including the fit between concepts and operations, clarity of causal inference, generality of findings, precision of outcome estimation, and statistical reporting (see Table S4). The results of the assessments were summed to obtain a quality score for each experiment. Please note that the grading of the study quality does not necessarily reflect the methodological quality of the primary study itself but rather pertains to the information and data relevant to this meta-analysis. To rate the overall quality of the body of evidence contributing to the meta-analysis, the grading of recommendations, assessment, development, and evaluation (GRADE) approach (Schünemann et al., 2013) was used. The quality (certainty in effect estimates) was determined by assessing the following criteria: (a) limitations of study design, execution, and sampling (risk of bias), (b) indirectness (poor applicability of treatment, comparators, and outcomes), (c) inconsistency of results (heterogeneity between effect sizes; defined as $I^2 > 50\%$), (d) imprecision of results ($N < 400$ participants), and (e) suspected publication bias and selective reporting.

Calculation of Effect Sizes

To determine effect sizes, the standardized mean difference (Cohen's d) was used. Negative effect sizes indicate poorer mental health (e.g., decreased positive and increased negative affect) for the group exposed to manipulation of discrimination compared to the control group. If statistics other than d were reported (e.g., means and standard deviations), the statistics were converted into d and the corresponding variance v_d by using the Campbell web-based calculator (Wilson, n.d.) with the formulas of Lipsey and Wilson (2001). Because regression coefficients differed fundamentally in the type of included control variables, they were not used for the analysis. If a study mentioned only that an effect was not significant, d was coded as zero (applied to 11 effect sizes; Lipsey & Wilson, 2001). When authors reported insufficient statistics to calculate d (e.g., incomplete data or regression coefficients), the authors were contacted and asked to provide the respective data. Finally, to account for the positive bias of Cohen's d in small samples, d and v_d were adjusted using the formula provided by Cooper et al. (2019, p. 213). These adjustments resulted in Hedges's g , an unbiased estimate of the effect size (Cooper et al., 2019).

Several included primary studies reported comparisons of more than two experimental groups with one control condition. For example, some studies used different forms of delivering discrimination in separate experimental groups, such as conveying negative stereotypes through drama or comedy films (Schmader et al., 2015), manipulating discrimination as legitimate or illegitimate (Hansen & Sassenberg, 2006), or inducing discrimination through racist tweets or retweets (Lee-Won et al., 2017). Additionally, some studies investigated benevolent and hostile discrimination in two separate experimental groups—which interestingly was observed solely in manipulations of sexism (e.g., Bradley-Geist et al., 2015; Major et al., 2003; Spaccatini & Roccato, 2021). To maintain independence assumptions and because the differences between the experimental groups were not the primary focus of this meta-analysis, we

calculated pooled effect sizes and variances by considering the variance between the two experimental groups to create a single pair-wise comparison (as recommended by the Cochrane Collaboration; Higgins et al., 2022). Overall, this approach affected 21 effect sizes from five studies for different forms of delivery and 28 effect sizes from seven studies for mean values across benevolent and hostile forms of sexism. In contrast, some studies reported pervasive and single-event manipulations as two experimental groups compared to one control condition or one experimental group with two control conditions, such as a neutral and a nondiscriminatory stress condition or personal and external attributions compared to discrimination attributions in the experimental group. The differences between these conditions and resulting effect sizes are qualitatively very different, have different theoretical implications, and are indeed the focus of this meta-analysis. Thus, these comparisons were included separately with shared experimental (or control) conditions divided out evenly among comparisons so that each pair-wise comparison could be investigated (based on the recommendations by Higgins et al., 2022). This affected eight effect sizes from two studies for single-event and pervasive experimental conditions (Lin, 2012; Schmitt et al., 2003), six effect sizes from two studies for neutral and nondiscriminatory stress (Shenton-Bewsh et al., 2016; Stepanova et al., 2019), and 24 effect sizes from three studies for personal and external attributions as control conditions (Hansen & Sassenberg, 2006; Major et al., 2003; Schmitt, 2002).

Data Synthesis

As the primary studies differed in their manipulation design, settings, and measurement of mental health outcomes, there might be not just one true effect size but a distribution of true effect sizes. This potential heterogeneity between studies was considered with a random-effect assumption (Cooper et al., 2019). Most studies reported multiple effect sizes, leading to a hierarchical data structure in which effect sizes are nested within studies (Van den Noortgate et al., 2013). To account for this interdependence of effect sizes (i.e.,

sampling covariation) while preserving all information and maximizing the statistical power, a three-level meta-analytic model was fitted to the data (Assink & Wibbelink, 2016). The model considers three different sources of variance: sampling variance of the effect sizes (i.e., between participants) at Level 1, variance between effect sizes within the same primary study at Level 2, and variance between studies at Level 3 (Van den Noortgate et al., 2013). To estimate the model parameters, the restricted maximum likelihood method was applied. All model coefficients were tested using the Knapp and Hartung (2003) adjustment to decrease the probability of unjustified significant results (Assink & Wibbelink, 2016). For significance testing, an alpha level of 5% and 95% confidence intervals (CIs) were used. All analyses were conducted in R version 4.0.5 (R Core Team, 2020) using the *metafor* package (Viechtbauer, 2010).

Heterogeneity

Following the recommendations of the Cochrane Collaboration (Deeks et al., 2021), Cochran's Q test was used to assess homogeneity and I^2 to assess heterogeneity. Q tests were calculated to assess the null hypothesis of homogeneity among effect sizes. A nonsignificant result indicates that variance between effect sizes derives from random sampling error rather than systematic differences. I^2 statistics quantify the degree of heterogeneity by describing the percentage of systematic variability in effect estimates (Deeks et al., 2021). A multilevel adapted version of I^2 was used to evaluate the proportions of systematic variation for the estimated true effects within studies (σ^2_1 at Level 2) and between studies (σ^2_2 at Level 3). In determining the significance of the within- and between-study variance, two independent one-sided log-likelihood-ratio tests were performed, in which the deviance of the full model was compared with the deviance of the model without one of the two variance parameters. To calculate how much variance can be attributed to random sampling variance (Level 1) and how much to heterogeneity between effect sizes within studies (Level 2) and between studies

(Level 3), we followed the guideline from Assink and Wibbelink (2016). For the evaluation of the degree of heterogeneity, Deeks et al. (2022) suggested the following conventions: $I^2 < 40\%$ might not be important, $I^2 = 30\%$ to 60% may represent moderate, $I^2 = 50\%$ to 90% substantial, and $I^2 = 75\%$ to 100% considerable heterogeneity. The overlap between these categories highlights the importance of considering the magnitude of an effect size and the strength of evidence for heterogeneity.

Moderator and Subgroup Analyses

If heterogeneity assessment indicated significant variance on the within-study or between-study level, we conducted moderator analyses using three-level mixed-effects meta-regression to test the proposed moderator and control variables that might explain the heterogeneity. In the mixed-effects model, the effect sizes are considered random and potential moderators as fixed effects (e.g., Cooper et al., 2019). The significance of moderators was tested with omnibus F tests (Assink & Wibbelink, 2016). Prior to testing, continuous variables (gender proportions of the sample, mean age of the sample, study quality, publication year of study) were centered around their means and dichotomous dummy variables were created for all categorical variables (i.e., manipulation type, group status, region, education level of sample). Group status was classified as marginalized when the sample possessed a social identity that is historically marginalized and that was subject to the induced discrimination type within the respective study. For instance, when the discrimination type in a study was sexism, samples including participants identifying as men were categorized as non-marginalized, samples including participants identifying as women as marginalized, and samples including men and women as having a “mixed group status”. In the same study on sexism, in instances where a sample included participants identifying as men and a marginalized identity (e.g., being part of an ethnic minority), the classification of the sample remained non-marginalized. This determination is grounded in the premise that

the induced discrimination targets the non-marginalized identity of the participants. All samples from studies on discrimination targeting non-marginalized identities, such as specific university study majors, were consistently classified as non-marginalized, as this form of discrimination is not rooted in stigma, cultural prejudice, and power imbalances. Education level was classified according to the International Standard Classification of Education (UNESCO Institute for Statistics, 2012) and aggregated into low, medium, and high education according to the suggestions from Eurostat (Eurostat, 2018). To exploratively test overall effects for specific manipulation types, different types of research paradigms, samples with different group status, types of discrimination, and different mental health outcomes, we conducted separate three-level random-effects meta-analyses for all subgroups. As an additional exploratory sensitivity analysis, the subgroups for research paradigms and mental health outcome types were additionally explored in the different manipulation types. Moderator and subgroup analyses with variables assessed with less than 10 effect sizes per category should be interpreted with caution and thus are not reported in the text (Deeks et al., 2021). To ensure completeness and facilitate the use of the data in future meta-analyses, details on these tests are presented in the overview tables of results and supplements.

Publication Bias

A common issue in meta-analytic research is that nonsignificant or unfavorable results of primary studies are less likely to be published (*publication bias*) or reported (*reporting bias*) and are therefore difficult to locate. Not including these effect sizes in a meta-analysis may lead to an overestimation of the true effect size (Cooper et al., 2019). We assessed the risk of publication and reporting bias in several steps. First, the symmetry of a contour-enhanced funnel plot in which the effect sizes were plotted against their precision expressed in standard errors was inspected visually and statistically (Peters et al., 2008). For significance testing, Egger's regression test (Egger et al., 1997) was adapted to the multilevel

meta-analytic structure by performing a meta-regression with the standard errors as moderator variable.

Results

Study Characteristics

The present meta-analysis included 73 primary studies, reporting on 93 experiments and 117 independent samples, with a total of $N = 12,097$ (range: 22–694) participants. On average 3.36 (range: 1–14) effect sizes were extracted from each included study. The publication year of the studies ranged from 1975 to 2022 ($Mdn = 2012$); most experiments were conducted in North America ($n = 57$) and in Europe ($n = 28$), a few in Australia ($n = 2$) and Asia ($n = 4$); for the remaining two experiments no information on the region of data collection was reported. For detailed information about each included study, see Table S5. The mean age of the samples was 30.03 years ($SD = 16.69$, $Mdn = 22.84$, range: 6.50–76.50). The proportion of females was high at average 76% (range: 0%–100%). For a distribution of age and gender by number of effect sizes, see Figure S1. Regarding ethnicity, the mean proportion of individuals self-identifying as non-White was 66% (range: 0%–100%). Education level could not be classified for 21% of the samples; the remaining samples mostly (87%) consisted of university students or participants with an academic degree. The majority of samples (74%) were characterized by a marginalized identity, as indicated by the type of discrimination induced in the respective experiments. The remaining samples were associated with a non-marginalized (18%) or mixed group status that included individuals with both marginalized and non-marginalized group status (9%). These two groups—with non-marginalized and mixed group status—were combined into a single category for subsequent analyses describing samples with a non-marginalized group status.

The most used settings for the manipulation of discrimination were daily life (e.g., discrimination at the entrance to a nightclub or poor service at a restaurant; 36% of all effect

sizes) and education (e.g., discrimination in academic test evaluations; 31%), followed by employment (e.g., discrimination in applicant selection for internships or entry-level positions; 21%). Most effect sizes measured the impact of either racism (42%) or sexism (27%); only a few effect sizes represented the effect of body-related discrimination including overweight-based discrimination (7%), ageism (7%), heterosexism (7%), status-related discrimination based on university or study major affiliations (4%), and other forms of discrimination (6%), namely, religious discrimination ($k = 3$), mental illness stigma ($k = 3$), linguicism ($k = 1$), and other (random) group status ($k = 7$). Most studies were single-event manipulations (89%) consisting mostly of induction of discrimination as a psychosocial stressor compared with neutral control conditions (45% of all effect sizes). Regarding research paradigms, most effect sizes stemmed from vicarious (46%) and direct experience (38%) paradigms, with only 16% from salience induction paradigms. Vicarious experience and salience induction paradigms were mostly utilized by single-event studies, whereas vicarious experience paradigms were used in single-event and pervasive manipulations (details on research paradigms by manipulation type can be found in Table S6). Further information on disaggregated single-event and pervasive manipulation types and utilized research paradigms are summarized with other characteristics of all effect sizes by discrimination type in Table 2 and by each study in Table S5. Of the included 93 experiments, 61% reported significant manipulation checks; for the remaining 39% experiments, no manipulation check was reported (experiments with statistically not significant manipulation checks were excluded, see Inclusion and Exclusion Criteria section). Table S5 summarizes information on included studies and investigated samples (i.e., publication type, region of data collection, and group status), research paradigms and respective manipulation checks, and mental health outcomes.

For all effect sizes, mental health was assessed directly following the experimental procedures. Although most primary studies did not report exact information on the time elapsed between manipulation of discrimination and assessment of outcomes, the experimental design descriptions provided an indication. Despite the immediate assessment of outcomes, 27 effect sizes were based on more chronic measures of mental health outcomes (e.g., trait-based measures of self-esteem using the Rosenberg-Self-Esteem Scale by Rosenberg, 1979, or subjective perceptions of stress over the previous 10 days measured by the Perceived Stress Scale by Cohen et al., 1983), and the remaining 218 effect sizes were based on acute assessments of mental health (e.g., state-based measures of self-esteem using the State Self-Esteem Scale by Heatherton & Polivy, 1991, or acute affect measures such as the Multiple Affect Adjective Check List by Zuckerman & Lubin, 1985). Regarding the type of mental health outcome, 39% of effect sizes pertained to self-directed and 33% to distress-related mental health outcomes, with fewer effect sizes related to other-directed externalizing (16%) and well-being-related (13%) outcomes. We excluded one effect size on body dissatisfaction as it is not suited to be assigned to one of the specific mental health types and would result in incongruity with the other effect sizes. Further details on the distribution of specific mental health outcomes are provided in Figure S2.

Overall Effect Analysis and Heterogeneity

In line with Hypothesis 1 that stated that discrimination has a negative effect on mental health, the three-level random-effects meta-regression revealed a mean effect of $g = -0.30$ ($p < .001$, 95% CI [-0.40, -0.19]) for the effect of discrimination on mental health across all studies. The Q test of homogeneity showed significant variation between all effect sizes, $Q(244) = 2,183.58$, $p < .001$. The within-study variance component, $\sigma^2_1 = 0.16$, $\chi^2(1) = 269.71$, $p < .001$, and the between-study variance component, $\sigma^2_2 = 0.12$, $\chi^2(1) = 26.56$, $p < .001$, were significant. Of the total heterogeneity, $I^2 = 50\%$ could be attributed to within-study

variance at Level 2, $I^2 = 37\%$ to between-study variance at Level 3, and 13% to random sampling variance at Level 1.

Moderator Analyses

To explain the significant and substantial variance, we performed meta-regression analyses to test the moderator hypotheses (Hypotheses 2–5). Differences in the degrees of freedom of the significance tests occurred, because not all information on the respective moderator was available for all effect sizes. For all parameter estimates of the meta-regression models, see Table 3.

Supporting Hypothesis 2, postulating a stronger effect for pervasive than for single-event manipulations, the omnibus test for manipulation type with single-event discrimination as reference category was significant, $F(1, 243) = 4.68, p = .032$, with a stronger mental health effect in pervasive ($g = -0.55$) than in single-event manipulations ($g = -0.25$). The residual heterogeneity of the meta-regression model was significant, $Q(243) = 2,095.01, p < .001$.

Hypothesis 3 stated a stronger effect for discrimination against marginalized identities compared to non-marginalized identities. The omnibus test for group status with marginalized identity as reference category approached significance, $F(1, 243) = 3.57, p = .060$, suggesting a trend towards a weaker mental health effect in non-marginalized ($g = -0.16$) than in marginalized samples ($g = -0.34$). The residual heterogeneity was significant, $Q(243) = 2,097.70, p < .001$.

Hypothesis 4 postulating a stronger mental health effect of discrimination for women than for men was not supported: The omnibus test for gender was not significant; the residual heterogeneity was significant, $Q(236) = 2,125.62, p < .001$.

Inconsistent with Hypothesis 5, assuming a stronger effect of discrimination on mental health for younger than for older people, the omnibus test for age was not significant; the residual heterogeneity was significant, $Q(176) = 1,988.31$ $p = .340$.

Control Variables

Adding control variables separately to the meta-regression model did not change the significance and size of the mean effect of discrimination on mental health. Therefore, the mean effect remained robust when we controlled for publication year, region, education level of the samples, or methodological quality (see all estimates in Table 3). The omnibus test for the publication year was significant ($p = .027$); the regression coefficient ($\beta = -0.01$) indicates a slightly stronger effect of discrimination in more recently published studies. The omnibus tests for geographical region and methodological study quality were not statistically significant.

Exploratory Analyses

Subsets for the identified different types of manipulations, research paradigms, samples with different group status, discrimination types, and mental health outcome types were built to conduct separate three-level random-effects meta-analyses. All estimated parameters for the exploratory subgroup analyses can be obtained from Table 4. For funnel plots, see Figure S3.

Regarding single-event manipulation types, attributions to discrimination compared with personal attributions ($g = -0.02$, $p = .863$) or external attributions ($g = -0.27$, $p = .132$) showed no significant overall effect on mental health. Single-event studies comparing the induction of discrimination as a psychosocial stressor with a neutral control ($g = -0.33$, $p < .001$) or other nondiscriminatory stressors ($g = -0.32$, $p < .001$) showed a significant negative overall effect on mental health, descriptively comparable in size. Pervasive discrimination against the ingroup compared with a neutral control condition showed a significant overall

effect on mental health ($g = -0.58, p = .045$), which was larger than the effect in single-event manipulations. The other types of pervasive manipulation (compared to a single-event or pervasive discrimination against an outgroup) could not be tested because the number of effect sizes was smaller than 10.

The separate meta-analyses for subgroups of research paradigms and mental health outcomes showed an effect approaching significance for direct experience paradigms ($g = -0.12, p = .072$), the overall effects for salience induction paradigms ($g = -0.31, p < .001$) and vicarious experience paradigms ($g = -0.52, p = .009$) were descriptively larger and significant. Additional exploratory sensitivity analyses to assess potential confounding of research paradigms and manipulation types showed no significant overall effects for all research paradigms in single-event studies comparing attributions to discrimination with personal and external attributions (all $ps > .4$). Please note that the salience induction paradigms in this manipulation type produced fewer than 10 effect sizes and could not be tested adequately. In single-event studies comparing induction of discrimination as a psychosocial stressor with a neutral control or nondiscriminatory stressors, the overall effect was not significant for direct experience paradigms ($g = -0.16, p = .147$), but again, the overall effect was significant for salience induction ($g = -0.36, p < .001$) and vicarious experience ($g = -0.42, p = .006$) paradigms. In pervasive manipulations, the overall effect for vicarious experience paradigms was significant ($g = -0.52, p = .009$); the subsets for direct experiences and salience induction paradigms in pervasive manipulations consisted of fewer than 10 effect sizes each and thus could not be adequately tested. For detailed information and all estimated parameters for the exploratory sensitivity analyses, see Table S7.

The separate meta-analysis on subsets of samples with marginalized identities (relative to the type of induced discrimination) showed a highly significant negative

overall effect of discrimination on mental health ($g = -0.34, p < .001$), whereas the overall effect in the subset of non-marginalized samples was not significant ($g = -0.18, p = .113$).

Because there were fewer than 10 effect sizes for religious discrimination, mental illness stigma, linguicism, and other forms of discrimination based on (random) group status, these were combined as “other” to form a subgroup. The meta-analytic models for experimentally induced sexism ($g = -0.30, p = .003$), racism ($g = -0.32, p = .001$), and heterosexism ($g = -0.66, p = .043$) showed significant overall effects on mental health, with comparable effect sizes for sexism and racism, whereas heterosexism showed descriptively the strongest effect size. The effects of ageism ($g = -0.25, p = .099$) and the subgroup of other forms of discrimination ($g = -0.25, p = .070$) were comparable in size, but below our set significance level of $p < .05$. The separate meta-analyses for body-related ($g = -0.22, p = .176$) and status-related ($g = -0.13, p = .632$) forms of discrimination were not significant.

For the different categories of mental health outcomes, namely, well-being-related (well-being, life satisfaction, positive affect), distress-related (psychological distress, negative affect, anxiety), self-directed (self-esteem, depressed affect, other internally directed emotions such as shame or guilt), and other-directed (externally directed emotions such as hostility and anger) outcomes, four subsets were built. Note that a negative effect indicates poorer mental health, for example, decreased positive affect and increased negative affect. The separate three-level random-effects meta-analyses descriptively displayed the largest effects of discrimination on other-directed negative emotions ($g = -0.66, p < .001$) and distress-related mental health outcomes ($g = -0.41, p < .001$). For well-being-related ($g = -0.18, p = .104$.) and self-directed ($g = -0.08, p = .207$) outcomes, the overall effects were smaller and statistically not significant.

Additional exploratory analyses to assess whether the differences between mental health outcome types vary for single-event compared to pervasive discrimination showed

significant overall effects of single-event studies on distress-related ($g = -0.41, p < .001$) and other-directed ($g = -0.55, p < .001$) mental health outcomes, but no significant overall effect for well-being-related ($g = -0.17, p = .175$) or self-directed ($g = -0.05, p = .453$) mental health outcomes. In studies using pervasive discrimination manipulations, only self-directed outcomes provided more than 10 effect sizes and showed a significant overall effect ($g = -.47, p = .016$), in contrast to the subset of single-event studies. For detailed information and all estimated parameters for the additional exploratory analyses, see Table S6.

Publication Bias

The contour-enhanced funnel plot for the sizes of the effect of discrimination on mental health showed a slightly left-skewed distribution (see Figure 2). The adapted Egger's regression test was not significant, $F(1, 243) = 1.71, p = .192$, providing no strong evidence of asymmetry.

Quality Assessment

On average, the study quality was 3.33 out of 6 ($SD = 1.17$, range: 1–5). Importantly, none of the included samples were representative of the general population or the subgroups studied, leading to a downgrading of the generality of samples for all included studies. Our assessment of the representativeness of the samples was based on the sampling strategy: Studies using probability sampling or, in the case of nonprobability sampling, if the authors reported a comparable distribution of (at least one) relevant participant demographic such as gender or ethnic identity, or socioeconomic status to representative surveys of relevant subgroups. All included studies utilized convenience sampling or provided insufficient information on the sampling strategy. The primary reasons for a decreased quality rating was a downgrade in the adapted Study DIAD categories “precision of reporting” and “outcome estimation.” Specifically, 51 experiments were downgraded because of insufficient reporting of precise sample sizes of conditions, and 43 experiments received a lower rating because of

small sample sizes and also not reporting tests of statistical properties of the data (e.g., distributional and variance assumptions). Further, 36 experiments were downgraded owing to a lack of clarity in causal inference, primarily because they did not explicitly report on randomization, dropouts, or severe attrition overall. Fewer experiments were downgraded for low reliability of outcome measures (22 experiments) and because of possible disruption effects based on stark differences between experimental and control groups or unclear descriptions of study design and materials (three experiments).

The overall quality of the evidence contributing to the meta-analysis was rated as moderate. The substantial heterogeneity and lack of representativeness of the sample led to a downgrading of the quality rating by one level in each case. See Figure S4 for the detailed GRADE rating.

Discussion

The current meta-analysis quantified the impact of experimentally manipulated discrimination on mental health, using data from over 12,000 participants across 73 studies. The results support our main hypothesis that discrimination significantly diminishes mental health. This small to moderate negative effect remained significant and comparable in size after controlling for different study and sample characteristics, namely, publication year, region, education level, and study quality. Publication year moderated the effect of discrimination on mental health, with a stronger overall effect in more recent studies. Of the hypothesized moderators, manipulation type and group status influenced the mental health effect of discrimination. Specifically, the effect of discrimination on mental health was stronger in pervasive discrimination compared to single-event manipulations and showed a trend towards being stronger against marginalized compared to non-marginalized identities. No differences in the effect of discrimination on mental health were found by gender or age.

This meta-analysis also examined several exploratory research questions concerning specific types of manipulations, the use of different experimental paradigms, discrimination types, and facets of mental health: Discrimination had effects on mental health in studies inducing pervasive discrimination against the ingroup or single-event studies manipulating discrimination as a psychosocial stressor compared to control conditions. Further, studies using salience induction and vicarious experience paradigms showed significant overall effects on mental health, whereas paradigms using direct experience of discrimination only approached significance. Examining different types of discrimination, we found that the effect on mental health was strongest for heterosexism, racism, and sexism. Less robust experimental evidence was found for ageism and body-related discrimination, no effect was found for status-related discrimination and the subgroup “other forms of discrimination” that subsumed religious discrimination, mental illness stigma, linguicism, and discrimination on other (random) group status. Subgroup analyses on different facets of mental health showed that discrimination increased negative facets of mental health, that is, other-directed negative emotions (e.g., anger, hostility) and distress-related outcomes (e.g., anxiety, negative affect), but did not affect positive well-being-related outcomes (e.g., positive affect, life satisfaction), nor did it impact self-directed outcomes (e.g., self-esteem, shame). This pattern of effects was also observed within the subgroup of single-event manipulations. Despite the limited number of effect sizes, the pattern persisted for pervasive forms of discrimination. Descriptively, there was one exception – pervasive discrimination showed a trend towards poorer self-directed mental health.

Interpretation of the Results

Overall Effect of Experimentally Induced Discrimination on Mental Health

This meta-analysis shows a small to moderate causal effect of discrimination on mental health, supporting Hypothesis 1. This effect did not change when controlling for

different study and sample characteristics. This meta-analysis builds on and extends the evidence from prior meta-analytic reviews that also found a small to moderate association between perceived discrimination and mental health in correlational studies (e.g., $r = -.20$ in Pascoe & Smart Richman, 2009, and $r = -.23$ in Schmitt et al., 2014) by showing that discrimination harms mental health directly and immediately. The overall negative impact of discrimination on mental health contrasts with the to date most current meta-analysis that includes experimental studies on discrimination and found no significant overall effect (Schmitt et al., 2014). This discrepancy is likely due to at least two aspects: first, the broader focus on various types of discrimination manipulations in our meta-analysis, and second—due to this broader focus and 10 more years of research included—a considerably larger number of studies for analysis. Whereas Schmitt et al. (2014) focused on pervasive discrimination manipulations and single-event studies comparing attributions to discrimination with personal attributions, the current meta-analysis disaggregated the different manipulation types and compared their differential effects on mental health. Importantly, across the single-event manipulation types examined by Schmitt et al. (2014; i.e., single-event studies comparing attributions to discrimination and personal attributions), we did replicate the nonsignificant overall effect also with the current and extended data. Further, since the meta-analysis by Schmitt et al., 2014, substantial advancements in methodological standards and techniques have emerged. Specifically, because of the multilevel structure, we were able to include multiple effect sizes from a single sample without aggregation, resulting in a considerable increase in the number of effect sizes analyzed. Therefore, this meta-analysis is an important extension and update to the previous meta-analysis (Schmitt et al., 2014) and the first to causally show that discrimination can diminish mental health.

Heterogeneity and Moderator Analyses

The heterogeneity analyses revealed a substantial amount of unexplained within- and between-study variance and we consequently examined potential moderators that could explain this variance. Identifying how moderators influence effect sizes is of both theoretical and practical relevance. Meta-analytic evidence for or against research hypotheses and theoretical frameworks could shape future research directions. Further, moderator analyses could identify protective and risk factors that might play an important role in practical interventions against the negative impact of discrimination on mental health. We discuss the findings from the moderator analyses in the following.

Manipulation Type: Single-Event and Pervasive Discrimination. Pervasive discrimination manipulations showed stronger effects on mental health than single-event manipulations, supporting Hypothesis 2. This effect is particularly noteworthy given that most effect sizes (89%) stemmed from single-event studies. These results are consistent with previous research (e.g., Schmitt et al., 2014), and might indicate that pervasive discrimination might be perceived as less avoidable and more uncontrollable than isolated single events of discrimination (Verkuyten, 1998). These findings are also in line with theoretical underpinnings about effects of discrimination on mental health: Pervasive discrimination implies a rejection by society at large and thus a threat to the belief in a just world (Barreto & Ellemers, 2015). This might alter cognitive processes, such as decreasing self-mastery or extending hopelessness and pessimism. In turn, this can increase acceptance and internalization of the discrimination experience, leading to more pronounced mental health effects (Hatzenbuehler, 2009).

In the current meta-analysis, we have also further explored the mental health effects of specific single-event and pervasive discrimination manipulations, using separate meta-analyses (Exploratory Research Question 1). Because of the limited number of effect sizes

from pervasive manipulations, a detailed exploration and interpretation of the mental health effects was possible only in the subgroup with a neutral control condition. In this subgroup, the separate meta-analysis showed a medium effect of pervasive discrimination compared to neutral control conditions on mental health—descriptively larger than the effects for all other manipulation types. To learn more about how specific pervasive manipulations of discrimination affect mental health, further research is needed on other types of control conditions, namely, control conditions that use pervasive discrimination against a nonrelevant outgroup, single-event manipulations, and external attributions.

Most of the identified effect sizes were from single-event manipulations that allowed for further specific exploration: For single-event studies manipulating discrimination as a psychosocial stressor—compared with neutral control groups or with other nondiscriminatory stressors—discrimination shows highly significant adverse mental health effects. These results are particularly noteworthy as they show that even inductions of discrimination in experimental settings that are limited by ethical and ecological constraints can have a stronger negative impact on mental health than other general stressors not related to discrimination. Single-event studies comparing attributions to discrimination with personal attributions showed no significant overall effect. This implies – in contrast to the predictions of the attributional ambiguity hypothesis – that attributions of single events to discrimination are not less harmful for mental health than personal attributions. This finding replicates previous research (Schmitt et al., 2014). As one of the key mechanisms suggested to explain the protective function of attributions to discrimination, attributional ambiguity describes externalization of negative events away from the self. Hence, this meta-analysis further extends the findings of Schmitt et al. (2014) and assesses the overall effect in studies comparing attributions of a single negative event to discrimination with external attributions. Although we did not find a stronger mental health effect for attributions to discrimination

than for external attributions, this was possibly due to a limited number of effect sizes and the assessment of primarily discrimination against non-marginalized identities.

Group Status. Hypothesis 3 approached statistical significance, suggesting that the mental health effects of discrimination against marginalized identities could be stronger compared to discrimination against non-marginalized identities. This finding is in line with our exploratory analyses (Exploratory Research Question 3). In separate meta-analyses, we found a significant mental health effect of discrimination against marginalized identities, whereas no effect on mental health was found for discrimination against non-marginalized identities. This is an interesting finding that underlines the importance of considering stigma as central component of the definition of discrimination. Discrimination, beyond its overt manifestation in unfair treatment based on social identity, is intrinsically tied to societal structures, cultural prejudice, and power dynamics. This perspective accentuates that discrimination does not merely consist of isolated events but rather operates within a broader framework of social hierarchies and systemic inequalities. However, given that our finding of a potentially stronger mental health effect of discrimination against marginalized compared to non-marginalized identities contrasts with Schmitt et al. (2014), who did not find a moderating effect of group status, the robustness of these findings needs to be examined in more diverse samples and settings. For example, the vast majority (84%) of the effect sizes described the effect of discrimination against marginalized identities. Further, experimental laboratory settings might create greater comparability of discrimination experiences against marginalized and non-marginalized identities (cf. Schmitt et al., 2014). In laboratory studies, participants without marginalized identities may experience pervasive discrimination that they would not encounter in real-world settings. Conversely, although single-event discrimination against marginalized identities might reflect widespread and frequent discrimination experiences leading to greater mental health effects than for participants

without respective marginalized identities, participants with marginalized identities may not perceive it as such in laboratory settings due to their inherently artificial nature. Moreover, whereas samples with marginalized identities were disadvantaged on the one dimension that was targeted by the discrimination manipulation (e.g., in studies inducing sexism, samples comprising individuals who self-identified as female were classified as having a marginalized identity, and those who self-identified as male as non-marginalized), they often had a more advantaged group status in other dimensions, such as education level or age.

Demographics: Gender and Age. Contrary to our hypotheses, we did not find a stronger effect of discrimination on mental health for individuals identifying as women compared to those who identify as men (Hypothesis 4) or for younger versus older people (Hypothesis 5). A methodological explanation might be that most of the extracted effect sizes came from samples that consisted predominately of individuals self-identifying as women in young adulthood (18 to 29 years). This could have resulted in too little statistical power to detect potential effects of gender and age on the impact of discrimination on mental health. The focus on women in young adulthood underscores the need for more diverse samples in experimental discrimination research (see Limitations below for further discussion).

Publication Year. We found a slightly stronger effect of discrimination on mental health in more recently published studies. How could this finding be explained? One explanation could be that researchers learned to design more potent discrimination manipulations over time. Yet, we do not see systematic differences in the utilization of pervasive versus single-event manipulations by publication year, except that those single-event manipulations that yield significant mental health effects (i.e., comparing discrimination as a psychosocial stressor with a neutral control or other nondiscriminatory stressors) are more commonly used in recent studies. Further, the frequency of using different discrimination types could potentially explain why mental health effects of discrimination became stronger over the years:

Studies on heterosexism – with comparably large effects – were only published from 2019 on, whereas studies with a focus on discrimination against non-marginalized academic identities – with no overall effects on mental health – were mostly published before 2011. Another explanation could be a heightened sensitivity of participants to discrimination over time. This is difficult to evaluate, but political efforts are actively engaging in enhancing awareness of discrimination (e.g., European Commission, n.d.), and the discussion on microaggressions and more subtle forms of discrimination has also reached the public through the media (Eschmann et al., 2020). A third possible explanation revolves around the increasing prominence of social media, leading to heightened visibility and pervasiveness of social injustices (see e.g., Hunt & Gruszczynski, 2021). This, in turn, could lead to more recent studies having higher impact on mental health.

Exploratory Findings

Research Paradigms. To explore potential differences in the impact of discrimination on mental health across various research paradigms, separate meta-analyses were conducted for the three categories of paradigms: direct experience, salience induction, and vicarious experience. Interestingly, discrimination manipulated by paradigms using direct experiences only approached statistical significance in influencing mental health. In contrast, paradigms using salience induction and vicarious experiences had a clear negative effect on mental health.

How can the different strength in effects be explained? The direct experience paradigms primarily involved laboratory situations in which a discriminatory event was experimentally induced (70%), including mostly situations in which participants completed tasks and got negative performance feedback that was attributable to discrimination because of situational cues, such as comments from confederates. The remaining effect sizes were obtained from stereotype threat situations before participants completed a task in a laboratory

setting. Given their ethical and ecological restrictions, such direct experiences of discrimination in the laboratory may be somewhat artificial and in consequence less strong than mental health effects elicited in other paradigms. In salience induction paradigms, most studies (67%) used material such as text, images, video, or audio clips, or writing and quiz tasks to make negative stereotypes related to a participant's social identity salient and autobiographical recalls of situations in which participants felt discriminated against. This salience induction and reflecting on discriminatory instances from the past had clear effects on mental health. The descriptively strongest overall effect was found in vicarious experience paradigms that primarily involved studies in which participants imagined themselves in the situation of a member of their ingroup who experienced discrimination (42%) or read a text that itself discriminated against their social identity or included information about (pervasive) discrimination against their social identity (41%). The causal effects of salience induction and vicarious experience paradigms are particularly important because of their considerably high ecological validity, a result of using actual experiences (e.g., autobiographical recall) or real-world examples (often used in the texts, videos, etc. employed in the experiments). These effects underscore the adverse causal impact of discrimination on mental health that likely generalize to the effects of many day-to-day discrimination experiences.

Importantly, specific manipulation types (single-event vs. pervasive discrimination) tend to utilize certain research paradigms (direct experience, vicarious experience, saliency) more frequently than other paradigms. For example, direct experiences of discrimination are usually induced in single-event manipulations, not in pervasive manipulations. The question was whether certain combinations of manipulation type and research paradigm are systematically more powerful in inducing negative mental health effects than others. We found that single-event studies inducing discrimination as a psychosocial stressor (compared to a neutral control or a nondiscriminatory stressor) showed mental health effects only when

using salience induction and vicarious experience paradigms, not when direct experience paradigms were used. In contrast, manipulations in studies comparing attributions of discrimination to personal and external factors may not have been strong enough to elicit mental health effects compared to respective control groups, regardless of the use of different research paradigms. Of note, given the small number of effect sizes per research paradigm for pervasive discrimination manipulations, we could only examine the effects of studies using a vicarious experience paradigm. Clearly, pervasive manipulations using a vicarious research paradigm can reliably induce negative effects on mental health indicators.

Discrimination Types. We explored the effects of different types of discrimination on mental health using separate meta-analyses. These analyses revealed the most robust experimental effects for the discrimination types with the greatest number of effect sizes, specifically sexism and racism, that accounted for 42% and 27% of all effect sizes, respectively. Moreover, a large overall effect was found for heterosexism. No clear effect on mental health indicators was shown for ageism, body-related discrimination, status-related discrimination, or other forms of discrimination (e.g., religious discrimination or mental illness stigma)—potentially because of the limited number of effect sizes available for analysis. Interestingly, group status likely also contributes to the variation in overall effects of different discrimination types on mental health. Discrimination types with the most robust experimental evidence, namely sexism, racism, and heterosexism, were predominantly investigated in samples with respective marginalized identities, although discrimination types with the least robust overall effects, specifically body-related and status-related discrimination, were mainly examined in non-marginalized identity samples.

The descriptively largest effect was observed for heterosexism, a form of discrimination characterized by concealment, controllability, and social legitimization, all of which may contribute to stronger adverse mental health effects. Concealment can lead to

additional stress and worse mental health outcomes owing to increased vigilance, threat of discovery, and impaired social relationships and support (Chaudoir et al., 2013; Pachankis, 2007). Additionally, heterosexist discrimination is often justified on the basis of controllability, leading to social legitimization of this form of discrimination, resulting in blame and internalization in affected individuals (Hansen & Sassenberg, 2011; Hatzenbuehler et al., 2009; Hegarty & Golden, 2008). This distinguishes heterosexism from other forms of discrimination, such as racism and sexism, that showed a robust but smaller overall mental health effect. Possible explanations include that racism and sexism might be less concealable and controllable, and racist and sexist discrimination is perceived as not as socially legitimized by the wider society (cf. Quinn & Earnshaw, 2013; Schmitt et al., 2014). A relevant limitation in interpreting these effect size differences is that there were substantially fewer effect sizes available for heterosexism (comprising 17 effect sizes from just two studies) compared to sexism (103 effect sizes from 38 studies) or racism (67 effect sizes from 26 studies). Yet, this trend of larger effect sizes for heterosexism ($r = -.28$) compared to sexism ($r = -.18$) and racism ($r = -.21$) was also observed in the correlational meta-analysis by Schmitt et al. (2014) that could include more effect sizes due to its focus on correlational evidence. Importantly, although the negative health effects of sexism and racism have received public attention, the negative effects of heterosexism on mental health might be underestimated. This is partially reflected in the notably fewer studies on this subject. To gain a better understanding of the gravity of heterosexism as a health problem, there is a pressing need for further research.

For ageism, which is also considered as not concealable and controllable but socially legitimized by the wider society, we found negative effects on mental health indicators that approached significance. Further research is needed to explore the robustness of this finding, especially using more age-diverse samples (most studies in this meta-analysis examined

young adults) and increasing power by synthesizing more research, once more studies become available over time. A similar argument can be made for body-related discrimination (in the included studies always operationalized as overweight-based discrimination). Body shape is less concealable but is considered highly controllable leading to the perception of body-related discrimination to be socially legitimized by the wider society and affected individuals (Puhl & Brownell, 2003). Nonetheless, the high proportion of non-marginalized participants (i.e., participants not affected by overweight) might have limited the power to detect potentially existing effects in the current meta-analysis. More diverse experimental research on these forms of discrimination is particularly relevant, given that correlational studies with diverse samples and a large number of available studies on age- or body-related stigma or discrimination show consistent negative findings for mental health (see, e.g., Emmer et al., 2020 and Chang et al., 2020, for systematic reviews) but the causal effects of these types of discrimination on mental health remain unclear.

Mental Health Outcomes. Interestingly, discrimination had medium to large effects in increasing other-directed externalizing (e.g., anger, hostility) and psychological-distress-related (e.g., psychological distress, negative affect) outcomes. Discrimination had no impact on positive well-being (e.g., positive affect, life satisfaction) or self-directed outcomes (e.g., self-esteem, shame). These causal findings are consistent with previous correlative evidence (Paradies et al., 2015; Schmitt et al., 2014). That discrimination immediately leads to other-related externalizing and psychological distress rather than internalizing responses (such as increased depression or low self-esteem) could hold important implications for social climate and society in general. When discrimination—including microaggressions—is considered as negative intergroup behavior, the link between aggressive behaviors as reaction to perceived discrimination potentially reinforces negative stereotypes associated with marginalized groups, inadvertently validating the perpetrators' discrimination. Such a reinforcement cycle

could lead to further marginalization and a deepening divide between groups. This can be seen on social media, where perceived discrimination can act as a catalyst for verbal aggression (English et al., 2020; Lewis et al., 2015) or political polarization (e.g., Yarchi et al., 2021). Addressing these patterns could be essential for fostering inclusivity, understanding, and positive social change.

Further, we did find a similar pattern of findings when examining single-event or pervasive manipulation separately – with one exception: Based on a limited number of studies, there are first signs that self-directed mental health outcomes (most often self-esteem) might be threatened by pervasive manipulations of discrimination. This effect can only be found in separate subgroup analysis of pervasive discrimination manipulations and are probably not visible in the overall analyses described above because most effect sizes stem from single-event manipulations. These findings need to be replicated in additional studies, nevertheless, they are interesting to follow up on because they have important theoretical and practical implications. Theoretically, this finding underlines that the self-protective functions of attributing and externalizing negative outcomes to discrimination, as postulated by the attributional ambiguity perspective, do not apply when discrimination is perceived as pervasive. This also reinforces the notion that marginalized groups affected by pervasive discrimination exhibit distinct mental health outcomes compared to non-marginalized individuals who may encounter rare and isolated instances of unfair treatment based on social identity but not pervasive discrimination. Thus, these marginalized groups emerge as exceptionally vulnerable, with discrimination posing a significant threat to their self-concept, just-world beliefs, and place in society.

Importantly, all mental health outcomes were assessed immediately after the manipulation and consisted mainly of acute measures of mental health states. In contrast, most theories do not focus on immediate mental health effects of discrimination, for example,

the extensive psychological mediation framework by Hatzenbuehler (2009) focuses on long-term effects and mechanisms. The framework describes that a marginalized identity represents a source of unique stressors and thus contributes directly to negative factors of mental health, namely, psychological distress and negative affect. The multimotive theory of rejection (Smart Richman & Leary, 2009) also focuses on motivated longer-term effects of a threatened need to belong in the face of discrimination but also includes immediate responses such as rejection-specific emotions (“hurt feelings”), a decrease in state self-esteem, and an increase in negative affect. Our results are generally in line with the multimotive theory as we found a trend for decreased self-directed outcomes—at least for pervasive forms of discrimination—that were assessed mainly with state self-esteem measures and found robust immediate effects on distress-related negative affect.

Within the framework of the social identity theory of collective action (van Zomeren et al., 2008), anger and hostility are conceptualized as outcomes of discrimination and seen as motivators for confrontation and social action. The theory of collective action proposes that pervasive discrimination is less likely to elicit action-oriented emotional responses such as anger. Our findings contrast with this theory because they suggest that both, pervasive and single-event manipulations lead to externalizing other-directed mental health outcomes. Given the small number of studies available for the effects of pervasive discrimination and externalizing outcomes, this finding needs to be interpreted with caution and needs to be replicated once more studies are published. Importantly, to our knowledge no theory addresses the immediate effect of discrimination on well-being-related outcomes—their focus appears to be on long-term effects of discrimination, not immediate responses.

Directionality of Effects

Does the experience of discrimination deteriorate mental health or do people with poorer mental health—particularly affect-related conditions such as depression or anxiety—

perceive more discrimination (see, e.g., Lilienfeld, 2017)? Although this is an ongoing debate, there is currently no substantial experimental research on poor mental health causing elevated discrimination perceptions. Nevertheless, we want to highlight potential pathways that emphasize this causal possibility in the following.

Two experimental studies by Cihangir et al. (2010) experimentally manipulated state self-esteem and tested it as a protective moderator. The results show that experimentally increased state self-esteem buffered the negative emotional, behavioral, and performance effects of discrimination, highlighting mental health as a resource in the face of discrimination. Importantly, we could not identify a single study that specifically investigated the effect of mental health on discrimination perceptions in an experimental design. Still, we want to emphasize hypervigilance as one possible pathway. Hypervigilance describes a state of increased alertness to threat stimuli and is a symptom of mental health conditions such as posttraumatic stress disorder and various types of anxiety disorders (American Psychiatric Association, 2022). In this state of increased alertness and arousal, discrimination stimuli could be identified more easily, increasing their pervasiveness amplifying the effects of discrimination. Further, individuals with a history of childhood maltreatment and samples with higher rates of posttraumatic stress disorders show higher detection sensitivity, resulting in faster identification of negative facial expressions and a negative bias toward neutral facial expressions (e.g., Bérubé et al., 2023; Masten et al., 2008). Hence, increased detection sensitivity to threat due to poorer mental health might also lead to increased perceptions of discrimination, especially in ambiguous situations. This can result in further increased vigilance and more frequent experiences of discrimination. Moreover, Sechrist et al. (2003) examined the effect of mood and showed that individuals in a negative mood showed an increased likelihood of reporting discrimination compared to participants with positive mood. Nonetheless, the empirical evidence for a mental health effect on discrimination perceptions

is highly limited and the postulated pathways are purely speculative. Future research should investigate this direction of effect, as understanding the mechanisms by which mental health affects perceptions of discrimination is crucial in preventing possible vicious cycles and thus adverse health effects.

Strengths and Limitations

This meta-analysis has several strengths. First, the comprehensive and systematic literature search enabled us to test overall causal effects of discrimination on mental health using a considerable number of studies, to examine what paradigms and manipulations are used in this area of research, and how they affect different facets of mental health. For example, our results indicate that more ecologically valid paradigms also led to stronger effects on mental health. Coding of the initial phase of the study selection and all data extraction from studies was conducted by two independent coders and achieved high interrater reliability. Second, all our methods and analyses are highly transparent and easy to replicate given our adherence to open science standards (a preregistered research protocol, publicly available extracted data, reproducible analysis scripts, and publicly available coding manuals). Further, we used a multilevel approach to extract as much available data as possible and model them in the most suitable way. Third, strict study selection criteria and several systematic methods for assessing the risk of bias and quality of evidence were used to evaluate the accuracy of the overall effect estimation.

This meta-analysis also has some limitations. For one, the samples in the studies included are mostly convenience samples limited in their variability on relevant sociodemographic characteristics such as education, gender, and age. This hindered our efforts to explore indicators for intersectional effects of discrimination, because further potentially disadvantaged social group identities could not be examined. The focus solely on discrimination related to one social identity might lead to additional underestimation of the

mental health effects in this meta-analysis. Overall, most participants belong to rather privileged groups. This itself is an important result of this meta-analysis, as it underlines the strong need to include more diverse samples in experimental research on discrimination.

Second, despite a low risk of publication bias for the studies included in our meta-analysis and, thus, robust estimates, the overall quality of the studies included was rated as moderate. The moderate overall quality rating suggests that the true effect is likely close to the estimated effect, but the possibility remains that it is substantially different (Schünemann et al., 2013). The lowering of the overall quality rating was mostly due to a general downgrading of all studies due to selective samples—as discussed above—and high heterogeneity between effect sizes. On a similar note, although we contacted all authors who reported insufficient data in their studies to be included in the current meta-analysis, we only received 24% of the requested effect sizes and cannot assess whether the effect sizes we did not obtain systematically differ from the included effect sizes.

Third, experimental procedures always come with limitations. For instance, both ethical limitations as well as high control of lab-induced discrimination may not always accurately mirror real-world discrimination experiences. Our findings reflect this idea, because they indicate that the—arguably most controlled and artificial—discrimination induction, direct experience in the laboratory, was the least powerful in affecting mental health. Real autobiographical memories or real-world examples in text or image formats impacted mental health indicators much more strongly. Another experimental limitation is that some of the studies included did not check whether discrimination was successfully manipulated. Moreover, experimental studies manipulating discrimination are limited to assessing immediate effects. Hence, further research is needed to explore if experimental procedures can mimic how discriminatory experiences impact long-term mental health syndromes like depression or anxiety, using long-term follow-ups or experience sampling.

Experience sampling could be particularly relevant because many forms of discrimination take place in the context of day-to-day events (e.g., English et al., 2020).

Fourth, substantial heterogeneity between effect sizes could only partially be explained by the proposed moderators and control variables. What other factors may be contributing to the unexplained heterogeneity both between and within studies? Despite the focus on rather privileged groups, some studies examined highly specific samples, such as elderly persons of color with late-stage chronic kidney disease (Arriola et al., 2021) that differ significantly in various factors that influence the appraisal and coping with discrimination-related stressors. Heterogeneity within studies might arise from primary studies comparing discrimination effects among subsamples with contrasting levels of distinct psychological factors. Examples of these factors include self-efficacy (Hoyt & Blascovich, 2010), meritocracy beliefs (Major et al., 2007), or the intensity of exposure to discriminatory stimuli (Stroebe et al., 2010). By incorporating more diverse samples in primary studies, future meta-analyses could explore a broader variety of moderators, including participant demographics (age, gender, ethnic identity, education) and psychological factors (self-efficacy, worldviews, group identification). This could help elucidate the observed heterogeneity between and within studies and offer a fuller understanding of how individuals assess and manage discrimination-related stressors. Such insights could enhance the effectiveness of interventions.

Implications and Future Research

The findings of this meta-analysis have several theoretical implications. For one, further theoretical work is needed on specific mechanisms and outcomes within the attributional ambiguity perspective. In contrast to the attributional ambiguity perspective, we do not find attributions to discrimination less harmful to mental health than attributions to personal deservingness. Moreover, there is a need for theoretical and empirical research to investigate

the mechanisms underlying why discrimination exerts a more immediate influence on externalizing and distress-related than well-being-related and self-directed outcomes. Such experimental research is also crucial for developing effective coping strategies and just-in-time adaptive interventions that have been rather overlooked so far.

This review also highlights the necessity of addressing specific methodological aspects in future experimental research, including protective factors that might mitigate the impact of discrimination on mental health, encompassing broader sample diversity, diverse forms of discrimination, variable settings, and validated diagnostic ratings by trained experts for psychopathology indicators. Although a basic exploration of the interaction among various person-related factors does not necessarily examine intersectional effects of discrimination on mental health, it can serve as an initial foundation for future research in identifying particularly vulnerable groups.

Further, experiments could profit from investigating the effects of pervasive discrimination in new life contexts. Social media, for example, are playing an increasingly prominent role in many people's lives (Ortiz-Ospina & Roser, 2019) and have become one of the contexts in which people regularly experience (cyber-)discrimination (English et al., 2020; Lewis et al., 2015). In the current meta-analysis, we identified just one experimental study on the effects of online discrimination. Also, only few experimental studies have examined discrimination in health care, interpersonal relationships, and political communication – all important areas of life that can be severely affected by discrimination (Pascoe & Smart Richman, 2009).

Last, more research is needed on the impact of different types of discrimination, different facets of mental health, and potential underlying mechanisms. The little experimental research available to date suggests that heterosexism might have a substantially larger effect on mental health than other forms of discrimination, yet more evidence is direly

needed. To better understand how different forms of discrimination impact mental health, interindividual differences need to become a more central focus. In a recent meta-analysis (Emmer et al., 2020), weight self-stigma was more strongly related to mental health than public or structural weight stigma. This finding suggests that examining individual differences in internalization and other interindividual differences (e.g., appraisal of perceived discrimination) might be promising to better understand how discrimination affects mental health. Complementary to experimental research, systematic reviews—including of qualitative studies—might provide important insights on this matter. Importantly, the theoretical and methodological implications described here are not independent of each other but need to be considered together to expand and further improve current theoretical frameworks on discrimination and mental health.

The present meta-analysis holds significant implications for policy and society. Given the recurring nature of discriminatory experiences in marginalized individuals' daily lives (English et al., 2020), it underscores the cumulative impact of discrimination on mental health. This pattern of discrimination occurs across the life span (Reskin, 2012) and its effects on mental health can even be transmitted across generations (Hankerson et al., 2022; Lugo-Candelas et al., 2021). Cumulative effects of discrimination could be a major threat to mental health, especially given that even small effects can have a significant impact on public health (e.g., Reinehr et al., 2016). However, despite personal and political efforts, it might be too idealistic to hope that one day, no person will be exposed to discrimination in any life context. Therefore, people who are particularly vulnerable need to receive support in dealing with experiences of discrimination. Specifically, given that social discrimination seems to have a much stronger immediate impact on externalizing and distress-related mental health than on positive and self-directed mental health outcomes, interventions should particularly target these negative mental health outcomes. Promising approaches to buffer discrimination-

related stress might be values affirmation and sense of belonging interventions (see Lewis et al., 2015) or emotion regulation, which can mediate how discrimination impacts stress markers and psychopathology (Hatzenbuehler et al., 2009). This could be a promising target in empowerment and intervention programs. More generally, our results also highlight the importance of reducing cultural prejudice and, consequently, triggers and salience of stereotypes related to marginalized groups. One way to address this is by replacing stigmatizing with inclusive language that can lead to a greater cognitive representation of marginalized groups and eventually reduce cultural prejudice and stereotypes (e.g., Braun et al., 2005; Chellappa, 2023). Moreover, the strong overall effect of vicarious discrimination experience on mental health found in this meta-analysis highlights the potential impact of exposure to discrimination experienced by others (see also Cheadle et al., 2020; Wofford et al., 2019, for similar findings on how vicarious discrimination experiences affect mental health, physiological stress responses, and social relationships).

Conclusion

This meta-analysis is the first to find that experimentally induced discrimination leads to impairments in mental health. This effect is stronger when discrimination is perceived as pervasive compared to a single, isolated event and might be more pronounced in populations with marginalized identities. The current analysis shows that the immediate adverse impact is considerably larger for externalizing and distress-related than for well-being and self-directed mental health outcomes. A better understanding of the moderators and mechanisms influencing the impact of discrimination could further advance this research and be the basis for effective interventions. Although the identified overall impact was small to moderate in size, several subgroup analyses showed also moderate to large effects. For example, the effect of heterosexism on mental health was large, as was the effect of discrimination in general on externalizing other-directed mental health outcomes. Of note, due to methodological

limitations, the overall effect in this meta-analysis might be underestimated. The current findings reveal that discrimination harms mental health immediately and directly – and not only over the long-term and indirectly via disadvantages in various life domains such as employment or housing. Overall, the findings of this meta-analysis underscore the importance of considering the multiple ways in which discrimination can be experienced and induced in experimental settings and the potential differing effects on mental health outcomes. It highlights the need for interventions and policies that address not only direct experiences of discrimination but also the salience of stereotypes and the impact of vicarious experiences.

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Table 1
Possible Taxonomy of Research Paradigms

Name of research paradigm	Description	Example (studies)
Direct experience paradigms		
Experiencing an event	Participants experience a situation in which they or their ingroup are discriminated against	<ul style="list-style-type: none"> - Participants are in a room with two men disparaging a female colleague (who is out of the room) for refusing a dating request (Cunningham et al., 2012) - Participants receive sexist feedback regarding their score on a standardized test (i.e., remote associates test by Mendnick, 1968; Fisher, 2020) - Participants wear a “fat suit” (Rodriguez et al., 2016) - Participants receive social rejection feedback from a different-race evaluator (Mendes et al., 2008)
Task performance after induction of stereotype threat	Stereotype threat is induced and then participants perform a test/task	<ul style="list-style-type: none"> - Participants are asked to speak in front of a camera for a few minutes after reading a supposedly scientific abstract stating that women have more problems than men managing their anxiety (Désert et al., 2013) - Participants record their gender before they complete questionnaires about evaluations of a local automotive repair service (Lee et al., 2011) - Participants are asked questions about ethnicity immediately preceding a verbal ability test (Baysu & Phalet, 2019)
Salience induction paradigms		
Autobiographical recall	Participants remember a situation in which they felt discriminated against verbally or in writing	<ul style="list-style-type: none"> - Participants are asked to tell the instructor of a stressful event in their life for which they feel as though race played a part in the event (Arriola et al., 2021) - Participants are asked to recall and write at least three hundred words in 15 min. about a situation when they felt they were discriminated against (Stepanova et al., 2019)
Make general stereotypes about one’s group salient	Participants interact with materials that make general stereotypes about their social groups salient	<ul style="list-style-type: none"> - Participants are asked to write, from the perspective of a patient, how many negative impressions they think doctors have about their lifestyle, academic ability, personality, and so on. They are asked to describe these impressions with as many adjectives as possible (He et al., 2020) - Participants are asked to think about the negative impressions of women that a man might hold in terms of lifestyle, learning, and character and to try to write down some adjectives to describe them (Ma et al., 2022) - Participants are instructed to reflect on the negative impressions that native White British people hold of ethnic minorities in this society (Owuamalam & Zagefka, 2014)
Vicarious experience paradigms		
Imagination	Participants imagine a situation in which they feel discriminated against	<ul style="list-style-type: none"> - Participants are asked to imagine being in the position of a female student presenting a paper in class and receiving a bad grade because of her gender (Hansen & Sassenberg, 2006) - Participants imagine they are job applicants and are to complete a performance test as a basis for the hiring decision; statements are added reminding them about the common beliefs that in a workplace, women are easily disturbed by environmental factors because they are weaker than men and tend to exaggerate the difficulties they face and want to gain power over men (Eniç & Tosun, 2021)

Name of research paradigm	Description	Example (studies)
Reading text	Participants read a text about discriminatory content or single event	- Participants read a social interaction vignette in which a female is shopping at a mall and experiences weight-related teasing by two female peers (Aubie & Jarry, 2009) - Participants read negative statements about immigration (Chavez et al., 2019)
Viewing images/pictures	Participants view an image that is discriminatory	- Participants read anti-Asian tweets and retweets (Lee-Won et al., 2017) - Participants view a negative image about immigration (Chavez et al., 2019) - Participants are exposed to three political poster ads that explicitly portray Muslims in a negative and stereotypical way (Schmuck et al., 2017)
Watching video clip	Participants view a video clip that includes information about discrimination or describes discrimination-relevant situations	- Participants view a video clip that presents a diverse range of minority stress domains (e.g., family rejection, legal inequality, antigay advertisement; Van Dyk et al., 2021) - Participants view a short film about a negative event linked to depression in a stigmatizing way, that is, a pilot's clinical diagnosis of depression as a main reason for an incident; the film calls for more transparency and access to employees' medical records (Goepfert et al., 2019)
Hearing audio clip	Participants hear an audio clip with discrimination-relevant information	- Participants hear an audio clip read by confederates that includes indirect discrimination (Huyn et al., 2017)

Note. Stereotype threat before a test or task can be induced via recording group identity before the task, diagnosticity of the test (i.e., test result is diagnostic of ability and thus fulfills the stereotypes about intellectual ability, leading to stereotype threat; Steele & Aronson, 1995), or reading a text or instructions on differences between groups or worse outcomes in the ingroup. General stereotypes can be made salient using various specific procedures such as reading, writing, viewing images or video clips, or doing a quiz or task that includes stereotypical information. Some studies, such as Chavez et al. (2019), employ multiple research paradigms in combination to manipulate discrimination.

Table 2
Effect Size Characteristics by Discrimination Type

Variable and category	Total (<i>k</i> = 245)	Sexism (<i>k</i> = 103)	Racism (<i>k</i> = 67)	Body related (<i>k</i> = 16)	Status related (<i>k</i> = 11)	Ageism (<i>k</i> = 17)	Hetero- sexism (<i>k</i> = 17)	Other (<i>k</i> = 14)
Geographical region								
North America	166	26	55	8	4	11	58	4
Europe	56	16	18	0	0	0	21	1
Australia	6	2	4	0	0	0	0	0
Asia	11	8	0	1	0	0	2	0
Setting								
Employment	52	28	10	3	8	3	0	0
Education	77	47	27	0	3	0	0	0
Health care	9	0	0	0	0	8	0	1
Interpersonal	4	1	1	0	0	0	0	2
(Social) Media	11	0	8	0	0	0	0	3
Daily life	87	27	17	13	0	6	17	7
Political advertisement	5	0	4	0	0	0	0	1
Manipulation type								
Single event	211	92	53	13	10	15	14	14
vs. personal attribution	57	34	16	0	2	3	0	2
vs. external attribution	19	13	0	0	6	0	0	0
vs. neutral control	111	37	30	12	2	11	9	10
vs. nondiscriminatory stress	19	3	4	1	0	1	8	2
other single event ^a	8	5	3	0	0	0	0	0
Pervasive	31	11	14	3	1	2	0	0
vs. single-event	6	2	4	0	0	0	0	0
vs. pervasive against	7	3	3	0	1	0	0	0
outgroup								
vs. neutral control	16	4	7	3	0	2	0	0
vs. external attribution	2	2	0	0	0	0	0	0
Research paradigm								
Direct experiences ^b	94	50	30	9	0	1	0	4
Saliency inductions ^c	39	9	11	0	0	13	0	6
Vicarious experiences ^d	112	44	26	7	11	3	17	4
Group status^e								
Marginalized	181	81	57	5	0	13	17	8
Non-marginalized	64	22	10	11	11	4	0	6
Manipulation check								
Significant	154	41	43	0	3	11	51	5
Not reported	91	11	34	9	1	0	36	0
Mental health outcome								
Well-being-related ^f	32	9	8	4	0	2	7	2
Distress related ^g	80	11	26	5	2	1	33	2
Self-directed ^h	95	22	31	0	2	6	33	1
Other-directed ⁱ	38	10	12	0	0	2	14	0

Note. *k* represents the number of effect sizes.

^a Includes single-event manipulations compared to a mean of neutral and nondiscriminatory stressor conditions (*k* = 3 from one experiment where data was not sufficient to include pairwise comparisons) and compared to a control condition with a lower level of discrimination than that in the experimental groups (*k* = 5 from one experiment).

^b Experiencing an event, stereotype threat followed by performing a task.

^c Autobiographical recall, making general stereotypes about one's group salient.

^d Imagination, study material (text, images, video, audio) that included discrimination-related information.

^e Group status was classified as marginalized when the sample possessed a social identity that was historically marginalized and subject to the induced discrimination type in the study. For example, when discrimination type was sexism, samples including participants identifying as men were categorized as non-marginalized, samples including participants identifying as women as marginalized, and samples including men and women as “mixed”; when samples included participants identifying as men and a marginalized identity (e.g., being part of an ethnic minority), the classification of the sample was non-marginalized. All samples from studies on discrimination targeting non-marginalized identities, such as specific university study majors, were classified as non-marginalized.

^f Well-being, life satisfaction, positive affect.

^g Psychological distress, negative affect, anxiety.

^h Self-esteem, depressed affect, other internally directed emotions such as shame or guilt.

ⁱ Externally directed negative emotions such as hostility and anger.

Table 3*Overview of Moderator Analyses for the Effect of Perceived Discrimination on Mental Health*

Moderator variable	<i>k</i>	Intercept/mean <i>g</i> [95% CI]	β [95% CI]	<i>F</i> ^a	<i>df</i>	<i>p</i> ^b	σ^2_1	σ^2_2
Manipulation type				4.68	1, 243	.032	0.16	0.12
Single event (ref.)	218	-0.25 [-0.37, -0.14]						
Pervasive	27	-0.55 [-0.80, -0.30]	-0.29 [-0.56, -0.03]					
Group status ^c				3.57	1, 243	.060	0.16	0.11
Marginalized (ref.)	181	-0.34 [-0.46, -0.23]						
Non-marginalized	64	-0.16 [-0.33, 0.02]	0.19 [-0.01, 0.38]					
Gender	238	-0.29 [-0.39, -0.18]	-0.00 [-0.01, 0.00]	0.68	1, 236	.411	0.16	0.11
Age	178	-0.31 [-0.44, -0.17]	-0.00 [-0.01, 0.00]	0.91	1, 176	.340	0.19	0.14
Publication year ^d	245	-0.29 [-0.39, -0.19]	-0.01 [-0.03, -0.00]	4.94	1, 243	.027	0.16	0.10
Region ^d				1.54	1, 235	.205	0.16	0.12
North America (ref.)	166	-0.22 [-0.35, -0.09]						
Europe	56	-0.43 [-0.64, -0.22]	-0.21 [-0.46, 0.04]					
Asia	11	-0.61 [-1.11, -0.11]	-0.39 [-0.90, 0.13]					
Australia	6	-0.14 [-0.78, 0.49]	0.08 [-0.57; 0.72]					
Education ^d				180	3, 180	.308	0.17	0.02
University students (ref.)	154	-0.19 [-0.28, -0.09]						
Pupils	11	0.04 [-0.29, 0.38]	0.23 [-0.12; 0.58]					
High education	18	.02 [-0.24, 0.28]	0.20 [-0.07, 0.48]					
Medium	2	0.03 [-0.89, 0.95]	0.21 [-0.71, 1.14]					
Quality ^d	245	-0.29 [-0.40, -0.19]	-0.03 [-0.11, 0.06]	0.45	1, 243	.505	0.16	0.12

Note. Negative effect sizes indicate poorer mental health (e.g., decreased positive and increased negative affect) for the group exposed to manipulation of discrimination compared to the control group. All continuous variables are centered around their means. Ref. = reference category of dummy-coded categorical variables; *k* = number of effect sizes; *g* = Hedges's *g*; β = regression coefficient; CI = confidence interval; σ^2_1 = variance within studies (Level 2); σ^2_2 = variance between studies (Level 3).

^a Omnibus test of all regression coefficients in the model.

^b *p* value of the omnibus test.

^c Group status was classified as marginalized when the sample possessed a social identity that was historically marginalized and subject to the induced discrimination type in the study. For example, when discrimination type was sexism, samples including participants identifying as men were categorized as non-marginalized, samples including participants identifying as women as marginalized, and samples including men and women as “mixed”; when samples included participants identifying as men and a marginalized identity (e.g., being part of an ethnic minority), the classification of the sample was non-marginalized. All samples from studies on discrimination targeting non-marginalized identities, such as specific university study majors, were classified as non-marginalized.

^d Control variable.

Table 4
Exploratory Subgroup Analyses

Variable	<i>k</i>	<i>g</i>	95% CI	σ^2_1	σ^2_2	Residual heterogeneity
Manipulation type						
Single-event discrimination: negative outcome with attribution to discrimination compared to						
personal attribution	57	-0.02	[-0.20, 0.16]	0.40	0.00	$Q(56) = 289.87^{***}$
external attribution	19	-0.27	[-0.62, 0.09]	0.10	0.10	$Q(18) = 64.53^{***}$
Single-event discrimination: discrimination stressor compared to						
neutral control	111	-0.33 ^{***}	[-0.51, -0.17]	0.12	0.18	$Q(110) = 1,073.89^{***}$
nondiscriminatory stressor	19	-0.32 ^{***}	[-0.42, -0.21]	0.00	0.00	$Q(18) = 25.55$
other single event	8	-0.21 [*]	[-0.41, -0.00]	0.00	0.01	$Q(7) = 7.91$
Pervasive discrimination against the ingroup compared to						
neutral control	16	-0.58 [*]	[-1.15, -0.02]	0.18	0.38	$Q(15) = 494.99^{***}$
single-event against ingroup	6	-0.25	[-0.74, 0.25]	0.14	0.00	$Q(5) = 12.50^*$
pervasive against outgroup	7	-0.48 ^{**}	[-0.73, -0.23]	0.01	0.00	$Q(6) = 8.60$
external attribution	2	-0.72	[-4.34, -2.90]	0.00	0.00	$Q(1) = 0.79$
Research paradigm						
Direct experiences ^a	94	-0.12 [†]	[-0.26, 0.01]	0.04	0.09	$Q(93) = 271.96^{***}$
Saliency inductions ^b	39	-0.31 ^{***}	[-0.48, -0.15]	0.17	0.01	$Q(38) = 159.12^{***}$
Vicarious experiences ^c	112	-0.40 ^{***}	[-0.58, -0.22]	0.26	0.17	$Q(111) = 1,498.45^{***}$
Group status ^d						
Marginalized	181	-0.34 ^{***}	[-0.46, -0.22]	0.16	0.12	$Q(180) = 1826.40^{***}$
Non-marginalized	40	-0.18	[-0.40, 0.04]	0.23	0.05	$Q(39) = 196.23^{***}$
Discrimination type						
Sexism	103	-0.30 ^{**}	[-0.49, -0.11]	0.21	0.17	$Q(102) = 1,170.20^{***}$
Racism	67	-0.32 ^{**}	[-0.50, -0.13]	0.12	0.13	$Q(66) = 398.75^{***}$
Ageism	17	-0.25 [†]	[-0.54, 0.05]	0.01	0.08	$Q(16) = 39.74^{***}$
Heterosexism	17	-0.66 [*]	[-1.30, -0.03]	0.18	0.16	$Q(16) = 189.40^{***}$
Body-related	16	-0.22	[-0.55, 0.11]	0.00	0.11	$Q(15) = 39.60^{***}$
Status-related	11	0.13	[-0.46, 0.72]	0.70	0.00	$Q(10) = 82.87^{***}$
Other forms ^e	14	-0.25 [†]	[-0.53, 0.02]	0.17	0.00	$Q(13) = 62.85^{***}$
Mental health outcome type						
Well-being-related ^f	32	-0.18	[-0.39, 0.04]	0.03	0.14	$Q(31) = 110.15^{***}$
Distress-related ^g	80	-0.41 ^{***}	[-0.54, -0.28]	0.10	0.08	$Q(79) = 546.12^{***}$
Self-directed ^h	95	-0.08	[-0.21, -0.05]	0.13	0.07	$Q(94) = 532.41^{***}$
Other-directed ⁱ	38	-0.66 ^{***}	[-0.93, -0.39]	0.38	0.11	$Q(37) = 590.81^{***}$

Note. For exploratory subgroup analyses, separate meta-analyses under random effects assumption were conducted for the different types of manipulation, research paradigms, sample-group status, discrimination, and mental health outcomes. Separate meta-analyses with fewer than 10 effect sizes are displayed for completeness and should only be interpreted

with caution. Negative effect sizes indicate poorer mental health (e.g., decreased positive and increased negative affect) for the group exposed to manipulation of discrimination compared to the control group. k = Number of effect sizes; g = Hedges's g ; CI = confidence interval; σ^2_1 = variance within studies (Level 2); σ^2_2 = variance between studies (Level 3).

^a Experiencing an event, stereotype threat followed by performing a task.

^b Autobiographical recall, making general stereotypes about one's group salient.

^c Imagination, study material (text, images, video, audio) that included discrimination-related information.

^d Group status was classified as marginalized when the sample possessed a social identity that was historically marginalized and subject to the induced discrimination type in the study. For example, when discrimination type was sexism, samples including participants identifying as men were categorized as non-marginalized, samples including participants identifying as women as marginalized, and samples including men and women as "mixed"; when samples included participants identifying as men and a marginalized identity (e.g., being part of an ethnic minority), the classification of the sample was non-marginalized. All samples from studies on discrimination targeting non-marginalized identities, such as specific university study majors, were classified as non-marginalized.

^e Religious discrimination, mental illness stigma, linguicism, and other (random) group status.

^f Well-being, life satisfaction, positive affect.

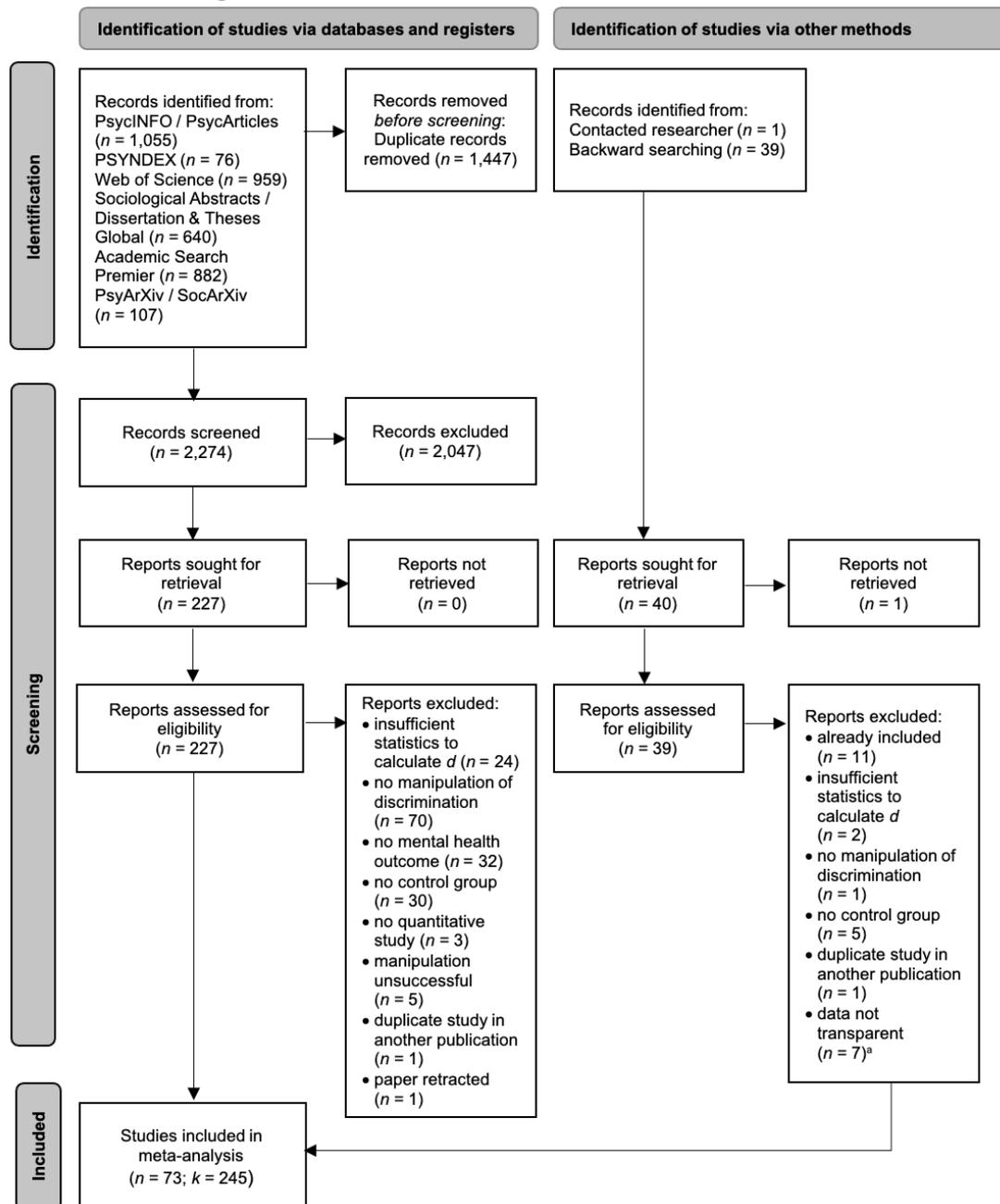
^g Psychological distress, negative affect, anxiety.

^h Self-esteem, depressed affect, other internally directed emotions such as shame or guilt.

ⁱ Externally directed negative emotions such as hostility and anger.

[†] $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$.

Figure 1
PRISMA Flow Diagram

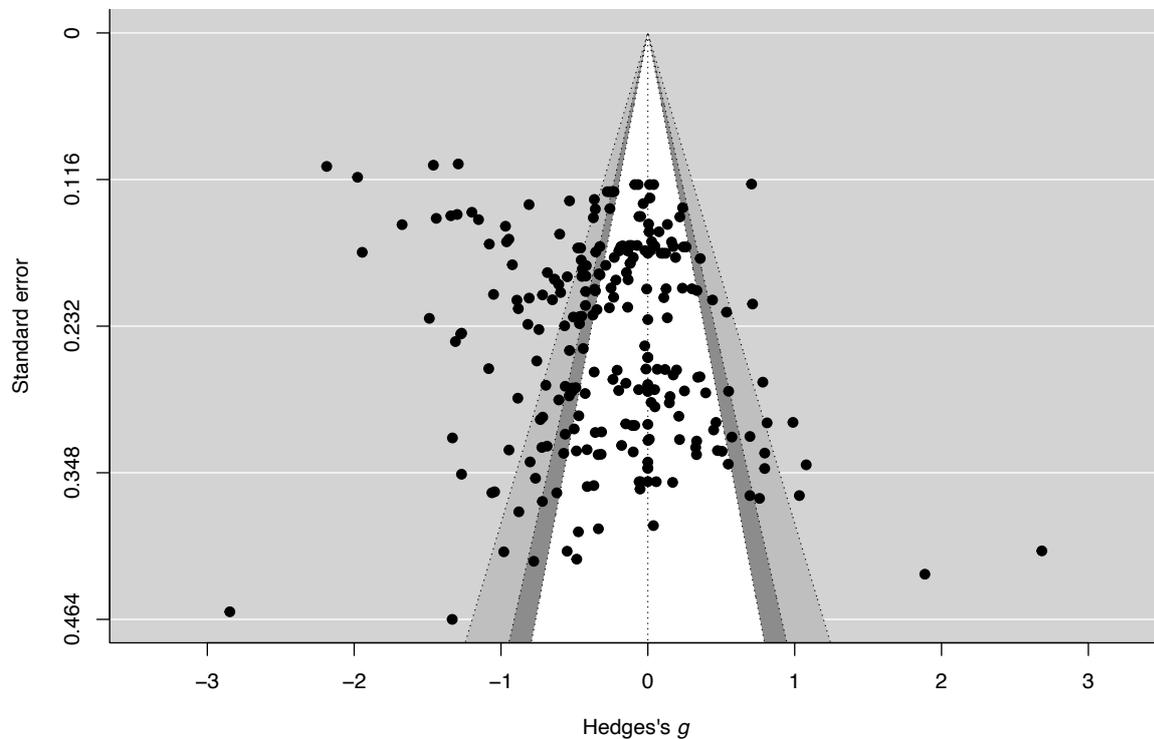


Note. PRISMA = Preferred Reporting Items for Systematic Reviews and Meta-Analyses. The flow diagram depicts how studies were identified for the meta-analysis (Page et al., 2021). n indicates the number of primary studies, k the number of effect sizes.

^a Unpublished data from the meta-analysis by Schmitt et al. (2014) received via mail that were excluded because it was not possible to retrace the calculation of effect sizes.

Figure 2

Contour-Enhanced Funnel Plot for the Overall Effect of Discrimination on Mental Health



Note. The diagonal lines represent confidence intervals of the probability that effect sizes differ from zero: white region $p > .10$, light-gray region $p = .10$ to $.05$, dark-gray region $p = .05$ to $.01$., region outside of the funnel plot $p < .01$. Please note that the funnel is centered not at the model estimate, but at zero (i.e., at the value under the null hypothesis of no effect). Negative effect sizes indicate poorer mental health (e.g., decreased positive and increased negative affect) for the group exposed to manipulation of discrimination compared to the control group.