THE ROLE OF SOCIODEMOGRAPHIC, PERSONALITY-RELATED, GENETIC AND ENVIRONMENTAL FACTORS IN PHENOMENA OF SOCIAL EXCLUSION AND ISOLATION

Dissertation

Zur Erlangung des akademischen Grades eines

Doktors der Philosophie

der Fakultät HW

Bereich Empirische Humanwissenschaften

der Universität des Saarlandes

vorgelegt von

Christoph H. Klatzka

aus Saarbrücken

Saarbrücken, 2025

Dekan: Prof. Dr. Axel Mecklinger, Universität des Saarlandes

1. Berichterstatter: Prof. Dr. Frank M. Spinath, Universität des Saarlandes

2. Berichterstatterin: Prof. Dr. Monika Equit, Universität des Saarlandes

Tag der Disputation: 05.05.2025

TABLE OF CONTENTS

LIST OF ABBREVIATIONS

A	Additive genetic effects
AIC	Akaike information criterion
BIC	Bayesian information criterion
BMI	Body-Mass-Index
BSI	Burden due to social isolation
C	Shared (or common) environmental effects
COV1	First COVID-19 supplement survey of the TwinLife study
COV2	Second COVID-19 supplement survey of the TwinLife study
DZ	Dizygotic
D	Genetic dominance effects
E	Non-shared environmental effects
F2F	Face-to-face interview
MZ	Monozygotic
QCA	Qualitative comparative analysis

ZUSAMMENFASSUNG

Diese Dissertation beschäftigt sich mit der Frage, inwieweit soziodemografische, persönlichkeitsbezogene, genetische und umweltbedingte Faktoren mit Erfahrungen in Zusammenhang stehen, die im weitesten Sinne die Verbindung zu anderen Personen einschränken oder die Ablehnung bzw. Isolation in zwischenmenschlichen Beziehungen beinhalten. Um dies zu erforschen, werden drei Phänomene als Beispiele herangezogen: Erfahrungen von Diskriminierung, Mobbingerfahrungen und die Belastung durch soziale Isolation während der COVID-19-Pandemie. Vergangene Studien fanden Korrelationen zwischen diesen Phänomenen und soziodemografischen oder persönlichkeitsbezogenen Merkmalen und zeigten, dass Individuen unterschiedliche Vulnerabilitäten für diese sozialen Prozesse aufweisen. Die hier vorgestellten Untersuchungen zielten vor allem darauf ab, im Detail zu untersuchen, ob Persönlichkeitsmerkmale tatsächliche Ursachen oder Folgen der sozialen Ausgrenzungsphänomene sind. Verschiedene Modelle und Methoden wurden eingesetzt, um zu erörtern, ob die Beziehungen zwischen soziodemografischen oder persönlichkeitsbezogenen Merkmalen und den sozialen Phänomenen über bloße Assoziationen hinausgehen oder ob Drittvariablen die beobachteten Assoziationen vornehmlich beeinflussen. Weiterhin wurde für zwei der Phänomene (Mobbingviktimisierung und soziale Isolation) die Ätiologie der sozialen Prozesse mittels genetisch informierter Analysen beleuchtet. Daten aus TwinLife, einer deutschen Zwillingsfamilien-Panelstudie, dienten als Grundlage für alle Untersuchungen. Um die Mechanismen, die soziodemografische, genetische, umweltbezogene und persönlichkeitsbezogene Merkmale mit Erfahrungen von Ausgrenzung oder Isolation verbinden, besser zu verstehen, wurden verschiedene Methoden eingesetzt, darunter twin difference designs, cross-lagged Modelle, genetisch informative Analysen, Regressionsanalysen und ACE-Dekompositionen. Die Untersuchungen replizierten das Ergebnis, dass bestimmte soziale Gruppen, wie Personen mit Migrationshintergrund und Frauen, anfälliger für Ausgrenzung oder Isolation sind. Mehrere Assoziationen zwischen Persönlichkeitsmerkmalen (wie z.B. Extraversion, Gewissenhaftigkeit oder Neurotizismus) und Phänomenen sozialer Ausgrenzung wurden ebenfalls repliziert, obwohl die angewandten Methoden keine eindeutigen Belege für (quasi)kausale oder zeitliche Mechanismen lieferten, mit der Ausnahme von Self-Esteem. Verhaltensgenetische Analysen zeigten, dass knapp ein Drittel der Variation der Strichprobe in Viktimisierungserfahrungen oder sozialer Isolation durch genetische

Faktoren erklärt werden kann, während der Rest der Variation durch nicht geteilte Umwelteinflüsse erklärt werden kann. Die genetisch informierten Ergebnisse deuteten auf mögliche Prozesse hin, darunter Selektionsprozesse oder Gen-Umwelt-Korrelationen. Diese Dissertation skizziert neue Hypothesen und Forschungsansätze für zukünftige Studien und betont die Notwendigkeit eines differenzierten Verständnisses davon, wie soziodemografische, genetische, umweltbedingte und persönlichkeitsbezogene Faktoren interagieren, um verschiedene soziale Erfahrungen in unterschiedlichen Kontexten zu beeinflussen.

ABSTRACT

This dissertation addresses the question of the extent to which sociodemographic, personality-related, genetic and environmental factors are associated with experiences that, in the broadest sense, restrict connections with others or involve rejection or isolation in interpersonal relationships. To explore this, three phenomena are used as examples: experiences of discrimination, bullying victimization, and the burden of social isolation during the COVID-19 pandemic. Previous studies found correlations between these phenomena and sociodemographic or personality-related characteristics, showing that individuals exhibit different vulnerabilities to these social processes. The investigations presented here primarily aimed to examine in detail whether personality traits are actual antecedents or consequences of social exclusion phenomena. Various models and methods were employed to explore whether the relationships between sociodemographic or personality-related characteristics on one hand and social phenomena on the other go beyond mere associations or whether third variables primarily influence the observed associations. Furthermore, the etiology of social processes for two of the phenomena (bullying victimization and social isolation) was investigated using genetically informed analyses. Data from TwinLife, a German twin-family panel study, served as the basis for all investigations. To better understand the mechanisms connecting sociodemographic, genetic, environmental, and personality-related traits with experiences of exclusion or isolation, various methods were employed, including twin difference designs, cross-lagged models, genetically informative analyses, regression analyses, and ACE decompositions. The studies replicated the finding that certain social groups, such as individuals with a migration background and women, are more susceptible to exclusion or isolation. Several associations between personality traits (such as extraversion, conscientiousness, or neuroticism) and phenomena of social exclusion were also replicated, although the methods applied did not provide clear evidence for (quasi)causal or temporal mechanisms, except for self-esteem. Behavioral genetic analyses indicated that nearly one-third of the variation in the sample's victimization experiences or social isolation can be explained by genetic factors, while the remainder of the variation can be accounted for by non-shared environmental influences. The genetically informed results suggested possible processes, including selection processes or gene-environment correlations. This dissertation outlines new hypotheses and research approaches for future studies and emphasizes the need for a

differentiated understanding of how sociodemographic, genetic, environmental, and personality-related factors interact to influence various social experiences in different contexts.

RELEVANT STUDIES

This dissertation consists of three articles that primarily explore which factors contribute to experiences of social rejection or isolation.

All the underlying articles have been published in peer-reviewed journals. I made a significant contribution to the planning, execution, and writing of these publications. At the same time, other authors also made substantial contributions to the articles, and I would like to take this opportunity to thank them. The articles are included in their original form in the appendix of this dissertation, and excerpts from the publications are also integrated into the main body of the dissertation.

Study 1: **Klatzka, C. H.**, Hahn, E., & Spinath, F. M. (2024). Differences in experiences of discrimination: an investigation of personality and person based characteristics in a twin difference design. *Current Psychology, 43,* 17105–17117. https://doi.org/10.1007/s12144-023-05597-8

Study 2: **Klatzka, C.H.**, Raufeisen, O., Hahn, E. & Spinath, F. M. (2025). Personality as consequence and antecedent of bullying victimization in adolescence: A cross-lagged panel and genetically informed investigation. *Personality and Individual Differences,* 112842. https://doi.org/10.1016/j.paid.2024.112842

Study 3: Kottwitz, A., Mönkediek, B., **Klatzka, C.H.**, Hufer-Thamm, A., & Hildebrandt, J. (2023). Genetic and environmental contributions to the subjective burden of social isolation during the COVID-19 pandemic. *BMC Psychology*, *11*(1), 134. https://doi.org/10.1186/s40359-023-01174-7

1 INTRODUCTION

The need for social belonging, i.e., the subjective feeling of being an integral part of the social systems in one's environment (Hagerty et al., 1992), appears to be a fundamental human need (Allen et al., 2021). Some authors even argue that a sense of social belonging may be just as important as food, shelter, and safety from physical dangers in ensuring people's long-term health and survival (Maslow & Frager, 1987). This is supported by a recent meta-analysis, which shows that the general mortality risk (as well as the mortality risk for specific diseases, e.g., cancer) increases when people experience greater loneliness, a lack of connections, or social isolation (Wang et al., 2023).

When it comes to a lack of connection or even the explicit exclusion and devaluation of individuals, there are several terms and phenomena that have been researched and named in the literature. Social exclusion can be used as an umbrella term when people are denied connection. When individuals perceive that they do not belong to a specific group or relationship, they experience social exclusion (DeWall & Richman, 2011). Social exclusion is a multifaceted concept that involves individuals being physically or emotionally separated from others (Riva & Eck, 2016) or feeling undervalued compared to their peers (Smart Richman & Leary, 2009). Researchers have proposed two primary categories of social exclusion experiences (Riva & Eck, 2016): ostracism, which entails being ignored (Williams, 2007), and rejection, which involves refusal to engage with someone or deliberate acts of aggression. These categories describe how individuals are kept apart from others but do not delve into the reasons behind their exclusion. To address the reasons for exclusion, terms such as discrimination (actively attributing social exclusion to belonging to a specific social group, Benner & Graham, 2013) or bullying (a distinct form of recurring, intentional negative behavior stemming from an imbalance of power, Olweus, 1993) shed light on the underlying social processes. These two phenomena, discrimination and bullying victimization, are especially relevant for this synopsis.

Loneliness can accompany experiences of exclusion or devaluation. Studies have shown that individuals from various social backgrounds who have experienced discrimination also report higher levels of loneliness (Fang et al., 2008; Jackson et al., 2019; Kim & Lee, 2020). The same holds true for bullying victimization: Victims of bullying tend to report higher levels of loneliness (Atik & Güneri, 2013; Matthews et al., 2020). Loneliness can be defined as the uncomfortable feeling that arises when there is a gap

between the social connections someone desires and the ones they feel they actually have (Peplau & Perlman, 1982). This definition was adapted for the concept of the "burden of social isolation" (BIS). Social isolation can be seen as a more objective term referring to the factual absence or lack of social connections and relationships (De Jong Gierveld & Van Tilburg, 2006).

All these phenomena can have negative implications for the individuals affected. For example, experiences of discrimination are linked to poorer health outcomes (e.g., Pascoe & Richman, 2009; Schmitt et al., 2014). The effects can manifest both mentally or physically and discrimination experiences can lead to a higher stress response (Pascoe & Richman, 2009). These findings have been replicated in other meta-analyses, demonstrating this negative link between discrimination and health across different social groups that experience discrimination for various reasons (e.g., Lee & Ahn, 2011; Logie & Gadalla, 2009; Carter et al., 2017).

In a similar manner, bullying victimization is linked to poorer academic achievement and impairment of social life, as well as a higher prevalence of suicidal tendencies, depression, and susceptibility to psychosomatic complaints (Arseneault, 2017; Moore et al., 2017). An international meta-analysis showed that experiences of bullying were associated with suicidal thoughts or behavior (Holt et al., 2015). Furthermore, the consequences of experiencing victimization can still be felt later in life (Takizawa et al., 2014; Menesini & Salmivalli, 2017; Wolke et al., 2013). Children who were bullied regularly during their school years faced a higher risk of poorer socio-economic and health outcomes 40 years later (Takizawa et al., 2014). Not surprisingly, bullying is considered one of the strongest risk factors for mental illness globally (Stanaway et al., 2018).

Furthermore, similar associations have been found for loneliness. Loneliness shows moderate correlations with depression (Erzen & Çikrikci, 2018) and is associated with adverse mental and physical health outcomes (Solmi et al., 2020). It is also a significant risk factor for all-cause mortality (Rico-Uribe et al., 2018). Similarly, social isolation (the more objective term referring to a lack of connections) is associated with an increased risk of early mortality (Holt-Lunstad et al., 2015). During the pandemic, prolonged isolation and experienced loneliness were linked to an increased risk of dementia in vulnerable groups (Lazzari & Rabottin, 2021).

From these studies, it becomes apparent that all three phenomena can be seen as pressing issues that produce high costs, on the one hand for individuals themselves

and, on the other hand, for societies in the form of higher healthcare costs or a lower economic productivity (Fibbi et al., 2021; Jantzer et al., 2018; Mihalopoulos et al., 2019).

There are numerous studies providing evidence that the probability of experiencing discrimination is not randomly distributed and that certain individuals or social groups are more likely to experience social exclusion. For several sociodemographic factors, it has been shown that they increase the likelihood of becoming a victim of discrimination: gender identity (e.g., Liu et al., 2019; European Parliament, 2020; Ortiz-Ospina & Roser, 2018), sexual identity (Aparicio-García et al., 2022), migration background (e.g., OECD, 2013; Goebel & Krause, 2021; Ingwersen & Thomsen, 2021), and physical appearance, such as being overweight (Spahlholz et al., 2016), among others. However, not all individuals from stigmatized or marginalized groups report experiences of discrimination to the same extent (Beigang et al., 2017). Discrimination can also be seen as a systematic disadvantage for certain social groups that is ingrained in social systems and structures, stemming from historical events, in-group-out-group processes, or other social processes (Dovidio & Ikizer, 2019). For this synopsis, however, the focus lies on experiences of discrimination as singular events that are reportable and quantifiable by individuals.

The COVID-19 pandemic can be seen as an event that severely disrupted personal relationships and connectedness with others. Especially during the first lockdowns of the pandemic, increases in loneliness compared to the pre-pandemic period were observed (Ernst et al., 2022). However, these experiences were not evenly distributed among social groups. Again, sociodemographic features seemed to influence the vulnerability of individuals, with younger people and females being particularly affected by loneliness during this initial phase of the pandemic (Beutel et al., 2021; Entringer & Gosling, 2021).

It has been shown that personality variables are associated with discrimination experiences and bullying victimization, with most associations appearing consistent across phenomena. Extraversion, for instance, has been linked to both experiences of discrimination (Sutin et al., 2016) and bullying victimization (Tani et al., 2003) in the literature. Furthermore, consistent associations have been found for Conscientiousness, which demonstrated negative correlations with both experiences of discrimination and bullying victimization (Adamopoulou et al., 2020; Cawvey et al., 2017). Similarly, Agreeableness has been negatively related to the experience of each phenomena, as reflected in several studies (Adamopoulou et al., 2020; Cawvey et al.,

2017; McClendon et al., 2019). Lastly, Neuroticism has frequently been identified as being positively related to both experiences of discrimination and bullying victimization (Cawvey et al., 2017; McClendon et al., 2019; Sutin et al., 2016; Tilindiene et al., 2021). Openness to experience has been positively associated with the likelihood of reporting discrimination (Cawvey et al., 2017) and with bullying victimization in a workplace setting (Nielsen & Knardahl, 2015). However, little is known about the exact mechanisms by which personality is connected to phenomena of social exclusion and whether personality acts as an actual antecedent or consequence of experiences of social exclusion. Whether personality has a direct connection to phenomena of exclusion (i.e., discrimination and bullying victimization) that goes beyond the correlative nature of relationships is the subject of two publications in this dissertation, which employ two distinct approaches to ideas of causality (Klatzka, Hahn et al., 2024; Klatzka, Raufeisen et al., 2024).

It has been shown that experiences of discrimination, bullying, and loneliness have a genetic component (Cuevas et al., 2021; Das, 2019; Matthews et al., 2016; Veldkamp et al., 2019). For example, Veldkamp et al. (2019) showed that bullying victimization has substantial heritability (A), emphasizing the role of personal factors in victimization processes. Environmental features common to both twins (C) only contributed to explaining the variance to a minor extent. The authors hypothesized that this heritability could be attributed to other (personality) traits known to increase victimization risk, such as self-esteem. Focusing on research on loneliness, pre-pandemic data and behavioral genetic research, Matthews et al. (2016) found that 40% of the variation in feelings of isolation and 38% of the variation in feelings of loneliness among young adults could be explained by genetic variation, while the rest of the variance was accounted for by non-shared environmental influences. At the time of the study, however, it was unknown whether the etiology of loneliness shifted during the pandemic. Due to the strong environmental influence of contact restrictions, genetic predispositions may have been less prominent. This possibility was investigated in the third paper by Kottwitz et al. (2023).

All studies were conducted using TwinLife data (Hahn et al., 2016). This twin family study will be introduced after giving a summary of behavioral genetic methods. This is followed by a summary of this dissertation's studies and a final integration of the research findings into the existing research context.

TWIN STUDIES

Twin studies have emerged as a powerful tool to decompose the relative contributions of genes and environments in a given phenotype (McAdams et al., 2020; Sahu & Prasuna, 2016). There are two types of twins: identical (or monozygotic; MZ) twins, who carry the same genetic makeup, and fraternal (or dizygotic; DZ) twins, who share, on average, 50% of their genetic makeup. When twins are reared together, they also share features of the environment; they may live in the same household and have access to similar socioeconomic resources. However, as twins remain individual persons, they have unique life experiences.

By comparing MZ and DZ twins in their similarity, it is possible to estimate the extent to which certain traits are influenced by genetic factors that increase similarity between twins (usually depicted with the letter A for additive genetic effects or the letter D when dominance effects are calculated), common environmental factors that also enhance the twins' similarity (e.g., certain family characteristics, usually abbreviated as C), and environmental factors that are not shared by the twins and are unique to each twin (e.g., individual experiences and differing perceptions of parenting practices, usually abbreviated as E; Hagemann et al., 2022), making the twins more dissimilar.

The classical twin design can be extended to the bivariate case. Just as the variation of a single trait can be decomposed into its genetic and environmental components, the covariation between two traits can also be decomposed into their respective genetic and environmental components (Plomin et al., 2013). By studying the covariation between two traits and estimating bivariate heritability, insights can be gained into the genetic and environmental factors that serve as common influences on these traits (de Vries et al., 2021).

Because twins are matched for a number of factors, they can be treated to some extent as repeated measurements or "quasi-experimental" designs (McAdams et al., 2020). By comparing the twins, it is possible to control for genetic confounders (completely for MZ twins; for DZ twins, some confounding remains) and for environmental factors shared by the twins (Sahu & Prasuna, 2016). To capitalize on these advantages, twin difference models have emerged, allowing for "quasi-causal" inferences that provide more insight into causal links than traditional regression designs. These designs partition the total variance in a predictor into a between-twin pair component (i.e., the mean of the twin pair) and a within-twin pair component (i.e., each twin's difference from the twins' mean). If the twin with a higher expression of a trait also

shows higher levels of the outcome, this could suggest quasi-causal links between the predictor and the outcome, as genetics and common environmental factors are controlled for by design, while unique environmental factors remain the main source of variation (Johnson et al., 2009).

TWINLIFE

All of the studies presented in this dissertation utilized the TwinLife data (Diewald et al., 2024). The twin family study "TwinLife" is a DFG-funded long-term project on the development of social inequalities that began collecting data in 2014 and initially surveyed a total of 4,000 twin pairs and their family members (Hahn et al., 2016). For each of four specific age cohorts, one thousand twin pairs were recruited. The youngest twins were, on average, five years old at the start of the survey, while the subsequent twin cohorts were, on average, 11, 17, and 23 years old. The sample is divided into two sub-samples, A and B. Sample A began the survey, on average, one year earlier than sample B but was also, on average, one year younger at the first survey date, making the average age comparable for both subsamples. This approach was chosen because, otherwise, there would not have been enough twins in a consistent age range. In total, there were nine planned data collections, five of which took place as so-called face-to-face interviews (F2F) in the twins' households at two-year intervals (although a hybrid telephone-online format was also offered from the onset of the COVID-19 pandemic onwards; Rohm et al., 2023). In the years in between, a telephone interview or, later in the course of the panel, an alternative short online survey was conducted. The TwinLife surveys covered a wide range of topics, including information on education and employment, personality, mental and physical health, experiences of discrimination and bullying, delinquent behavior, social networks, political or social participation, and more (Krell et al., 2024).

Additional surveys were also conducted starting with the onset of the COVID-19 pandemic, and pandemic-related questionnaires were added to the regular survey afterward. In total, these questionnaires were surveyed four times (Rohm et al., 2023).

2 DIFFERENCES IN EXPERIENCES OF DISCRIMINATION

AN INVESTIGATION OF PERSONALITY AND PERSON BASED CHARACTERISTICS IN A TWIN DIFFERENCE DESIGN

Experiences of discrimination remain omnipresent. More than 50% of respondents in a survey conducted in the EU stated that there is widespread discrimination based on ethnic origin or skin color in their resident country (European Union, 2023). One-fifth of all participants reported being discriminated against in the past 12 months. In another representative study, 40% of individuals with a migration background reported experiencing discrimination in the last five years (European Union Agency for Fundamental Rights, 2019). However, these figures also indicate that not all individuals from at-risk groups experience discrimination to the same extent; inter-individual differences in vulnerability appear to exist.

Discrimination experiences arise from a complex interaction of personal traits and situational factors (Major & Dover, 2016). Focusing on the characteristics of individuals who experience discrimination, several studies have demonstrated that personal, personality-related, physical and socio-demographic factors are associated with these experiences (European Union, 2023; McClendon et al., 2019; Sutin et al., 2016; Spahlholz et al., 2016). For instance, obesity increases discrimination rates, with individuals suffering from severe obesity exhibiting the highest rates (Spahlholz et al., 2016). Additionally, differences in attractiveness are related to differential treatment in the labor market (Kukkonen et al., 2023). Personality traits such as low agreeableness, high neuroticism, and low conscientiousness are associated with increased discrimination experiences (McClendon et al., 2019; Sutin et al., 2016). Furthermore, discrimination was linked to both internalizing and externalizing symptoms (Bennett et al., 2020; De Freitas et al., 2018). Other personal factors, such as intelligence and locus of control, show mixed associations with discrimination experiences (Diehl & Liebau, 2017; Kirkegaard, 2017; Lanier & Barnett, 1996). However, it remains unclear whether discrimination is indeed a "consequence" of personality or if both discrimination and personality are influenced by other mechanisms, such as the shared influence of third variables.

Twins can be viewed as a naturally occurring form of repeated measurements: Identical twins share 100% of their genetic makeup and typically grow up in the same family environment (McAdams et al., 2020). Fraternal twins also grow up in the same

family setting but share, on average, only 50% of their genes. This makes twins an intriguing population for discrimination research, as they are naturally matched on various characteristics known to increase the risk of experiencing discrimination (e.g., socio-cultural background and family migration history). Additionally, twins often share similar physical features.

These circumstances can be taken advantage of in twin-difference models by separating the variance in a predictor into differences within a twin pair and differences between twin pairs (McAdams et al., 2020). If the differences within a twin pair correlate with a criterion, so-called "quasi-causal" conclusions can be drawn (Schwartz, 2017). Specifically, this means that if one twin exhibits a stronger expression of a predictor and simultaneously shows a stronger expression of the criterion, this provides evidence suggesting that the predictor may have a (unspecified) quasi-causal relationship with the outcome. Given that the precise nature of the relationship between personality variables and experiences of discrimination remains unclear, the aims of this study were: a) to identify which variables contribute independently to the prediction of discrimination experiences, and b) to investigate whether employing a twin-difference design provides evidence of quasi-causal relationships (Klatzka, Hahn et al., 2024).

To achieve these goals, the TwinLife sample was used. Twin data from the two oldest age cohorts (born in 1997/98 and 1990–1993, approximately 17 and 23 years old at the time of the first survey) were analyzed. The analyses were conducted both cross-sectionally and longitudinally, utilizing the first F2F (N = 4078) and second F2F survey (N = 2298) waves of the study, which took place in 2014/15 and 2016/17 (hereafter referred to as T1 and T2, respectively). The following predictors were included; however, not all predictors were available at all time points: migration background, attractiveness (self-, twin-, and interviewer-rated; available at T2), gender, BMI (available for T1 and T2), Big Five personality traits (available at T1), self-esteem (available at T1 and T2), internal/external locus of control (available at T2), internalizing symptoms (emotional symptoms, peer problems; available at T1), externalizing symptoms (hyperactivity, conduct problems; available at T1), and cognitive abilities (available at T1). For more information on the items used, please consult the TwinLife data documentation (https://www.twin-life.de/documentation/) or Klatzka et al. (2023).

Since discrimination experiences were assessed as a dichotomous criterion (“During the last 12 months, have you felt that you were disadvantaged or discriminated against due to any personal characteristics (e.g., your ethnic or cultural background,

gender, religious beliefs)?"), binary logistic multi-level models were calculated, accounting for the nested structure of the twin data. In the first step, all demographic variables and personality variables identified as relevant in the literature were considered simultaneously. A backward elimination algorithm was employed to determine which variables made an independent contribution to the variance explained in discrimination experiences. After calculating the initial model, which included all variables, the variable with the highest p-value was removed, and the model was recalculated. This procedure was repeated until only significant predictors remained in the model. Four models were calculated: one cross-sectional model for each of the first and second measurement time points and two longitudinal models, one with and one without controlling for discrimination experiences from the first measurement time point.

An initial pre-selection of the variables at T1 revealed that physical appearance, gender, cognitive abilities, externalizing behavior, Conscientiousness, and Neuroticism lacked explanatory power. However, Neuroticism shared a large proportion of variance with the emotional symptoms scale (r = -.56), which may account for its non-significance. The significant predictive variables identified at T1 included migration history (Exp(b) = 2.20 to 6.50), self-esteem (Exp(b) = 0.86), emotional symptoms (Exp(b) = 1.30), Openness (Exp(b) = 1.38), Agreeableness (Exp(b) = 0.85), and Extraversion (Exp(b) = 1.16). At T2, the predictive variables identified cross-sectionally included gender (Exp(b) = 1.86), migration history (Exp(b) = 2.33 to 5.69), self-esteem (Exp(b) = 0.82), and external locus of control (Exp(b) = 1.34). The longitudinal analysis also highlighted cognitive abilities (Exp(b) = 0.80), Conscientiousness (Exp(b) = 0.77), peer problems (Exp(b) = 1.35), and external locus of control (Exp(b) = 1.26) as predictors, alongside gender (Exp(b) = 2.01), migration history (Exp(b) = 2.25 to 4.06), Openness (Exp(b) = 1.25), and Extraversion (Exp(b) = 1.22). After controlling prior discrimination experiences, migration history (Exp(b) = 1.80 to 2.75) remained significant, while cognitive abilities and Openness were no longer predictive.

These pre-selected variables were then used in twin-difference models, dissecting them into a "between twin pair" component (the mean value of the two twins) and a "within twin pair" component (the individual deviation of each twin from this mean value). Subsequently, they were entered into a binary logistic multi-level model. The mean values of the twins served as a second-level predictor, while the individual deviations served as first-level predictors. The regression weights of the "twin means" are to be interpreted similarly to those in a standard regression analysis, as these effects

are confounded with genetic and environmental factors. However, the individual deviations from the mean are adjusted for these confounders. For MZ twins, this adjustment accounts for 100% of genetic effects while for DZ twins, it accounts for, on average, 50% of genetic effects. For both MZ and DZ twins, the shared environmental influences are adjusted for. Therefore, the primary source of effects is derived from the non-shared environment of the twins. By including an interaction term "zygosity × deviation of the twin", genetic confounding can also be modeled.

At T1, in the cross-sectional twin difference models, migration background remained strongly associated with discrimination as a level-two predictor. For the twins' mean scores, higher levels of Openness (Exp(b) = 1.68), emotional symptoms (Exp(b) = 1.48), and Agreeableness (Exp(b) = 0.73) were linked to an increased risk of discrimination. Self-esteem was identified as the only significant within-twin pair difference predictor (Exp(b) = 0.59), with higher self-esteem being linked to a lower probability of experiencing discrimination. At T2, the cross-sectional results indicated that being female (Exp(b) = 1.63) and having a family migration background (Exp(b) = 3.97) heightened the risk of discrimination. Longitudinally, without controlling for prior discrimination experiences, female gender (Exp(b) = 2.06), Extraversion (Exp(b) = 1.47), Openness (Exp(b) = 1.35), Conscientiousness (Exp(b) = 0.69), and peer problems (Exp(b) = 1.43) were predictors at the twin mean level. After accounting for prior discrimination experiences (Exp(b) = 7.92), only Extraversion (Exp(b) = 1.58), being female (Exp(b) = 1.86), and peer problems (Exp(b) = 1.60) remained significant predictors. However, no twin difference scores were found to be significant predictors.

The only quasi-causal relationship identified was with self-esteem at T1, where the twin with lower self-esteem exhibited a higher risk of discrimination. This finding may suggest that low self-esteem influences the perception or attribution of discriminatory incidents (Li et al., 2012). However, it is also possible that low self-esteem is a consequence of discrimination. Nevertheless, given that twins share both genetics and family background, this effect provides strong evidence that self-esteem and discrimination may be indeed quasi-causally related in a certain way. Meta-analytic results from experimental designs did not show significant differences between rejected and neutral individuals in self-esteem (Blackhart et al., 2009). However, our study underscores the importance of field studies, as "real" discrimination experiences have different implications for individuals compared to experimental manipulations. The lack of other quasi-causal effects indicates that personality traits and discrimination might

be influenced by shared genetic or environmental factors rather than being directly or quasi-causally connected.

3 PERSONALITY AS CONSEQUENCE AND ANTECEDENT OF BULLYING VICTIMIZATION IN ADOLESCENCE

A CROSS-LAGGED PANEL AND GENETICALLY INFORMED INVESTIGATION

This paper begins with a similar premise: It examines the extent to which personality plays a temporal or directional role in bullying victimization experiences. However, the paper approaches the question differently by employing a longitudinal cross-lagged panel study design. The literature on bullying victimization has revealed findings consistent with those on experiences of discrimination: Individuals who are less neurotic, more extraverted, more conscientious, or more agreeable tend to report fewer experiences with bullying (Kulig et al., 2019; Mitsopoulou & Giovazolias, 2015).

However, there has been limited longitudinal research examining whether personality changes can result from bullying victimization or whether personality traits can serve as antecedent to bullying experiences. The few existing studies have primarily focused on adult populations, considering bullying in occupational contexts (Nielsen & Knardahl, 2015). Therefore, the aim of this study was to investigate the temporal interplay between bullying experiences and personality traits using a cross-lagged panel design in an adolescent population. This question is particularly intriguing in this sample, as adolescence is a critical phase of personality development that appears to be especially plastic and susceptible to external influences (Ferguson, 2010).

The TwinLife data (Diewald et al., 2024) were used to investigate this research question, focusing on the second cohort (born 2003/2004) and the data from the third (2016-2018) and fifth data collections (2018-2020). Participants were of compulsory school age at both time points (approximately 13 and 15 years old). The sample size comprised 1,597 individual twins for the first time point and 1,271 for the second. Bullying victimization was assessed using four questions related to teasing, rumors, social exclusion, and physical violence, adapted from the Gatehouse Bullying Scale (GBS; Bond et al., 2007). Personality was measured using the Big Five Inventory - Short (BFI-S; Gerlitz & Schupp, 2005). All constructs were available at both time points. A latent cross-lagged panel model was established to explore the research question. The item loadings and intercepts were fixed to be identical for specific items across both measurement times, ensuring measurement invariance. Additionally, standard errors were calculated using "cluster-robust standard errors" to account for the clustered nature of the twin data. Separate models were run for each of the personality factors:

Neuroticism, Agreeableness, and Conscientiousness. Extraversion and Openness to Experience were not investigated further, as they showed no correlation with the frequency of bullying victimization in the TwinLife sample. Before the analyses, age and gender effects were residualized from all variables.

As expected from the literature, we found latent cross-sectional correlations between Neuroticism (r = .39), Agreeableness (r = -.24), and Conscientiousness (r = -.17) with the reported frequency of bullying victimization, which is consistent with findings from Kulig et al. (2019) and Mitsopoulou & Giovazolias (2015). Additionally, a correlated change was observed for Agreeableness (r = -.18) and Neuroticism (r = .25). However, none of the cross-lagged paths were significant. Both bullying victimization and personality exhibited moderate stability over the two-year period, with correlations between bullying victimization at both time points being approximately r = .50. The stability rates varied from r = .58 for Neuroticism to r = .69 for Agreeableness for the personality traits.

As the cross-lagged panel models provided no evidence of temporal and directional associations, additional bivariate behavioral genetic models were calculated. The aim of these calculations was to explore whether the cross-sectional correlation could be explained by common genetic factors or whether certain environmental influences serve as a shared basis for both personality and bullying victimization. Previous studies have shown that both bullying victimization (Veldkamp et al., 2019) and the personality dimensions exhibit moderate to high heritabilities (Vukasović & Bratko, 2015). The analyses were conducted using bivariate Cholesky models (Loehlin, 1996), with 782 twin pairs providing sufficient information for analysis at both time points. Various configurations of genetic models are possible (e.g., due to the omission of certain components). Hence, the model with the best fit to the data was chosen based on the AIC and BIC criteria.

DE models (i.e., models assuming genetic dominance effects and non-shared environmental factors) showed the best fit. The analyses revealed a relatively consistent pattern: When examining personality factors and bullying victimization separately, they exhibited moderate heritability, while most of the variation in all traits was attributed to non-shared environmental influences. The magnitude of the genetic effects was slightly lower than in previous studies (Veldkamp et al., 2019; Vukasović & Bratko, 2015). Concerning the covariance between the personality traits and bullying victimization, it was found that at around 13 years of age, common genetic factors were the primary

drivers of the correlation. However, this genetic contribution diminished during adolescence; by around 15 years of age, unique environmental factors (or non-shared experiences) became the primary drivers of the correlation between personality variables and bullying victimization.

The moderate stability of victimization frequency indicated that bullying victimization processes are dynamic and might have not been a chronic experience in all individuals. This could possibly explain why personality changes due to bullying are limited or temporary. This supports the notion that personality is generally stable and resistant to dramatic changes from short-term stressors (Cobb-Clark & Schurer, 2012). The genetically informed analyses indicate that both genetic and unique environmental factors contribute to individual differences in personality traits and experiences of bullying.

Although this study suggests that the link between personality factors and victimization experiences exists, the association appears to be complex. In contrast to other studies (Nielsen & Knardahl, 2015), no evidence of temporal associations was found, at least in adolescence. Instead, the findings indicate that environmentally or genetically mediated third variables may influence both personality and victimization experiences.

4 GENETIC AND ENVIRONMENTAL CONTRIBUTIONS TO THE SUBJECTIVE BURDEN OF SOCIAL ISOLATION DURING THE COVID-19 PANDEMIC

The COVID-19 pandemic took the world by surprise and caused numerous economic and social disruptions (Delardas et al., 2022). It has also significantly impacted everyday life: Various lockdowns aimed at slowing the rate of infections (Ayouni et al., 2021) have resulted in strains on mental health (Prati & Mancini, 2021). Contact avoidance strategies have isolated individuals from their important relationships, leading to an increase in subjectively reported loneliness, particularly during the first lockdowns of the pandemic (Buecker & Horstmann, 2021). Several studies have explored how personal and socio-demographic factors, such as being younger or female, influence the burden of social isolation (BSI) during the pandemic (Bu et al., 2020; Lippke et al., 2021). However, at the time of this study, the extent to which pandemic experiences alter the relative contributions of genetic and environmental influences on the burden of social isolation had not been investigated. Existing literature on loneliness indicates that approximately 40 percent of the inter-individual variation in loneliness experiences is attributable to genetic factors, with the remainder attributed to non-shared environmental influences (Matthews et al., 2016). Therefore, it can also be inferred that similar experiences during the pandemic are substantially influenced by genetic factors.

However, it was conceivable that the pandemic, as a significant environmental influence, could lead to a more uniform phenotypic expression of the burden of social isolation (BSI), potentially resulting in a diminished genetic component. It is also possible that the genetic contribution to inter-individual differences could change over the course of the pandemic due to the various circumstances surrounding contact avoidance measures. This paper aimed to address three research questions (Kottwitz et al., 2023):

1. To what extent did genetic predispositions influence the burden of social isolation (BSI) during the pandemic?
2. How did the pattern of genetic and environmental effects evolve throughout the pandemic?
3. Are associations of previously identified factors related to BSI primarily driven by genetic effects?

Data from the TwinLife study were used to examine this set of questions. As previously mentioned, the TwinLife sample consists of twins from various age cohorts. For this study, data from twins born in 2003/2004, 1997/1998, and 1990–1993 were utilized. The data relevant for the study were collected during two data collection periods: the first COVID-19 supplement survey (COV1), conducted from July 2020 to November 2020, and the second COVID-19 supplement survey (COV2), conducted from December 2020 to July 2021. The sample size for the second survey was significantly larger (N = 2520) than that of the first supplementary survey (N = 798), as the second survey was part of the panel's regular data collection program while the first one was an independent additional survey. BSI was measured with three items: "To what extent do you currently feel burdened by the following things: a) social isolation and loneliness, b) being separated from important people, and c) lack of leisure activities?" These items were adapted from Witthöft et al. (n.d.) and demonstrated acceptable reliability, with Cronbach's alpha and McDonald's omega both around .70 for the two time points.

In the literature, age, gender (Wickens et al., 2021), urbanity of the residential area, and living alone (Bu et al., 2020) have been identified as important variables, and thus they were included as covariates in the analyses. Given the regional differences in the spread of the COVID-19 and its containment measures (Wachtler et al., 2020), a regional indicator for West-East Germany was added as an additional covariate. Pre-pandemic loneliness was also included. Since the relationship with socioeconomic status was not clearly defined in the literature, household income and maternal education were incorporated as indicators to further investigate the relationships. Additionally, the time point at which the survey was completed was controlled for.

The chosen method combined phenotypic and behavioral genetic models, as employed in previous studies (Mönkediek & Diewald, 2022). Initially, the covariates were used to explain variance in the burden of social isolation. The remaining variance was then decomposed into genetic and environmental effects in a second step. A total of four models were calculated, with two sets of analyses for each measurement time point (COV1, COV2): a reduced model (which included only age and gender as covariates) and a full model (which included all covariates). By comparing the unstandardized ACE components between the two model variants, this procedure enabled an estimation of which ACE components the covariates explained variance in. This allows us to infer whether certain covariates act as "mediators" for genetic or

environmental effects. Different configurations of genetic models are conceivable (e.g., due to the absence of one of the ACE components), which is why various models were tested against each other, and the model that best fitted the data was selected using the AIC and BIC.

There was a significant increase in the burden of social isolation (BSI) over the course of the pandemic (COV1: M = 4.58, SD = 2.15; COV2: M = 5.35, SD = 2.04). Women were significantly more affected than men at both time points. An age effect was also observed: Compared to individuals born in 2003/2004, older twins showed a significantly higher BSI. Additionally, pre-pandemic loneliness was a significant predictor of BSI during both pandemic time points. Socioeconomic factors, regional differences, urbanity, and living alone had no significant influence on BSI. This pattern was consistent at both pandemic time points.

In terms of the genetically informed analyses, the AE model (i.e., a model that assumes genetic and non-shared environmental factors but no common environmental factors) consistently provided the best fit for the data. This model showed standardized estimates for the genetic component (A) in the "reduced" models ranging from .37 to .39, with a corresponding environmental component (E) of .61 to .63. When the covariates were included, the genetic component in the full model primarily decreased compared to the "reduced" model.

In relation to the research questions, the study demonstrated that the relative proportion of explained variance by the variance components: a) aligns with existing literature on (pre-pandemic) loneliness (Matthews et al., 2016), and b) shows that the proportion of explained variance attributable to the genetic component remained relatively stable throughout the pandemic. Although the pandemic presented a "strong" situation that imposed relatively uniform restrictions on the population, it does not appear to have suppressed the genetic potentials associated with BSI.

Pre-pandemic loneliness was the only variable (besides age and gender) that could explain variance in the BSI. This association seems intuitive: Individuals already experiencing loneliness before the pandemic were at a higher risk of encountering similar distress during lockdowns. It is also possible that loneliness and BSI share a similar genetic etiology, as suggested by the reduction in the proportion of variance attributed to genetic factors (A) after including loneliness as a covariate. However, it is important to note that the proportion of variance explained by the covariates was small (1.2% - 2.8%). This suggests that sociodemographic factors, which previous research

has identified as significant contributors to BSI, have limited explanatory power in its etiology. The moderate genetic component indicates that personality tendencies could also play a role, as Neuroticism, for instance, is moderately correlated with loneliness (Buecker et al., 2020). Given that the (mostly shared) economic situation of the twins was of little importance, and the behavioral genetic models did not suggest a common environmental (C) component, individual environmental factors experienced by each twin independently (E) seem to be of greater significance. Although this study could not explain much variance through the covariates, it provides valuable insights into which variables could significantly contribute to BSI and experiences of loneliness, even during the pandemic.

5 DISCUSSION

Looking at the first two studies, multiple methods were employed, including twin difference designs (Klatzka, Hahn et al., 2024), cross-lagged models, and genetically informative analyses (Klatzka, Raufeisen et al., 2024) to gain a clearer understanding of the potential directional or quasi-causal relationships between personality traits and exclusion experiences. Across these models and papers, consistent correlations were observed, with effect sizes typically ranging from low to medium.

Neuroticism was positively associated with victimization in both studies. Elevated emotional reactivity is a proposed characteristic of Neuroticism, indicating that individuals with high Neuroticism tend to experience emotions more intensely than others (Kalokerinos et al., 2020). Consequently, those with high Neuroticism scores may be more likely to perceive circumstances as emotionally upsetting or threatening. Since strong negative emotions are linked to experiences of interpersonal rejection (Leary, 2015), these events may be more salient and frequently recalled by individuals who exhibit higher levels of Neuroticism, potentially resulting in a greater frequency of reported victimization experiences. The connection between Neuroticism and discrimination or bullying victimization has been extensively documented in the literature (Cawvey et al., 2017; McClendon et al., 2019; Sutin et al., 2016; Tilindiene et al., 2021).

Agreeableness was found to be negatively associated with experiences of discrimination and bullying victimization in several analyses across the papers, consistent with previous research on both phenomena (Adamopoulou et al., 2020; Cawvey et al., 2017; McClendon et al., 2019). According to Field et al. (2014), individuals who score highly on Agreeableness tend to avoid confrontations and disputes, favoring compromise and negotiation techniques to resolve interpersonal conflicts. This conflict-resolution style may reduce the likelihood of being excluded due to arguments or interpersonal disagreements. Additionally, their empathic disposition makes them potentially more attuned to the feelings and needs of those around them, which fosters healthy social relationships and could potentially decrease the risk of experiencing discrimination or bullying.

Furthermore, Conscientiousness showed negative cross-sectional associations with both discrimination experiences and bullying victimization, successfully replicating the results of other studies (e.g., Adamopoulou et al., 2020; Cawvey et al., 2017). High

levels of self-control are associated with higher Conscientiousness (Jensen-Campbell et al., 2006), while low levels of Conscientiousness predict dangerous and irresponsible behavior (Kowert & Hermann, 1997). Based on these associations, individuals with high Conscientiousness may be less likely to experience discrimination or bullying victimization (Cawvey et al., 2017), as they might search for safer environments.

For the remaining Big Five factors, the results were mixed. Openness to Experience was positively related to the risk of reporting experiences of discrimination, which aligned with Cawvey et al. (2017), but not with bullying victimization, contrary to findings in the literature (e.g., Nielsen & Knardahl, 2015). Individuals with high Openness scores tend to have a wider variety of interests, potentially prompting them to actively seek out diverse settings and participate in a broader range of activities (Matz, 2021). Consequently, there may be a higher baseline risk for discrimination experiences, as increased unpredictability in their environments and interactions could heighten their susceptibility to instances of exclusion (e.g., ostracism; Rudert et al., 2019). The discrepancy in findings between the phenomena may be attributed to the differing contexts in which these phenomena occur. Although discrimination experiences can also be classified as bullying experiences when specific bullying criteria are met, the range of contexts for discrimination is broader (Beigang et al., 2017). In contrast, bullying victimization typically occurs in more fixed contexts (Monks et al., 2009), where the influence of individuals affected on the social setting is more limited (e.g., workplace, school).

Concerning Extraversion, it only showed associations with discrimination experiences (Sutin et al., 2016), but not with the frequency of bullying victimization, despite some reports of an effect in the literature (Tani et al., 2003). Similar to Openness to Experience, individuals with higher levels of Extraversion may engage in more social activities, which could increase their baseline risk of experiencing discrimination.

The consistency of many results across related social phenomena of exclusion or rejection may indicate the robustness of the associations between these experiences and the Big Five personality factors. However, the observed differences suggest that distinct processes may also be involved.

While the mechanisms described seem intuitive, the research presented in this dissertation has cast doubt on an actual quasi-causal or temporal relationship between personality traits and experiences of discrimination (Klatzka, Hahn et al., 2024) or bullying victimization (Klatzka, Raufeisen et al., 2024). None of the models presented in

this dissertation provided conclusive evidence for relationships connecting personality to experiences of exclusion that qualify as actual antecedents or consequences, with the exception of self-esteem being quasi-causally linked to discrimination experiences. This highlights the complex interplay between individual traits and social experiences. Although some studies provide evidence of longitudinal effects (Nielsen & Knardahl, 2015), the effects indicating a causal connection between personality and social exclusion phenomena could not be replicated in the presented studies. If causal and directional effects are present, they appear to be small in magnitude.

Furthermore, the genetically informed analyses offered insights into the etiology of two of the phenomena. The analyses on bullying victimization and BSI demonstrated that genetic factors are involved in the etiology and explain variance in the inter-individual differences to a moderate degree (Klatzka, Raufeisen et al., 2024; Kottwitz et al., 2023). The overall pattern of results from the ACE analyses was comparable to the literature for BSI (Matthews et al., 2016), although the genetic component did not explain as much variance for bullying victimization compared to Veldkamp et al. (2019). This underscores that individuals possess vulnerabilities not only based on their personality or socio-demographic features but also due to their genetic makeup. Which (biological) processes are involved is yet to be determined. However, these analyses also demonstrate that each twin's individual life experiences play a pivotal role, as non-shared environmental factors (E) explained most of the variation.

Looking at the results from the bivariate Cholesky models for bullying victimization in young teenagers, evocative gene-environment correlations may be a possibility, as the association between personality and victimization was primarily driven by genetic factors. Some individuals may possess certain personality traits that are negatively perceived by their peers, potentially leading to victimization by these peers. However, as individuals grew older, environmental factors gained importance in explaining the association, which could indicate selection processes.

It has been shown that contextual factors can play an important role in discrimination, bullying experiences, or BSI (Bower et al., 2023; English et al., 2014; Saarento et al., 2014). One possible process could be that personality influences the selection of environments, with specific features of these environments (or their interactions with personality) predicting the risks of discrimination, victimization, and isolation. In other words, there could be hidden environmental mediators or moderators that complicate the "causal" relationship between personality and social outcomes. For

example, in childhood, it has been demonstrated that particularly Openness and Conscientiousness are meaningful predictors of the occupational environments chosen by the same participants as adults (Woods & Hampson, 2010), while features of the occupational environment (e.g., lack of support) can predict future bullying victimization (Björklund et al., 2020) in return. According to this selection hypothesis, personality may serve as a gatekeeper, influencing one's choice of surroundings and thus the probability of experiencing certain social outcomes. Further empirical research is urgently needed to test this theory extensively.

The presented studies replicate that individuals with certain sociodemographic features seem to be more vulnerable to experiencing phenomena that disrupt social connectedness. For example, individuals with a migration background are more prone to discrimination (e.g., OECD, 2013; Goebel & Krause, 2021; Ingwersen & Thomsen, 2021), while females exhibited higher rates of burden of social isolation during the pandemic (Bu et al., 2020; Lippke et al., 2021).

STRENGTHS, LIMITATIONS & FUTURE DIRECTIONS

It is important to note that all the results were based on the same sample: the TwinLife sample. As is common in many panel studies, the richness of diverse topics comes with trade-offs for the individual assessment of certain traits (Rammstedt & Beierlein, 2014). The economy-reliability tradeoff is a common issue faced by many panel studies, and this was also reflected in the reliabilities of some of the scales used in TwinLife. Although generally adequate for most purposes, a few scales exhibited lower reliabilities, highlighting an opportunity for improvement in future studies.

The nested structure of the data itself could also pose a restriction. Although studies have shown that results obtained from twin family studies can be generalized to non-twin families (Mönkediek et al., 2020; Willemsen et al., 2021), living in a twin duo may alter experiences of exclusion or loneliness. Even though twins exhibit variance in the quality of their sibling relationships and show similar levels of positivity and negativity in their sibling communication as non-twin sibling pairs (Mark et al., 2016), having a twin sibling could — at least for some twins — serve as a valuable source of connection, comfort, and support. This limitation must be considered when interpreting the results of the studies. However, it is important to acknowledge that only a twin sample allowed for the elaborate analyses presented in this dissertation.

Furthermore, the cultural and temporal background of the studies must be kept in mind. While discrimination (based on racism, sexism, or other characteristics), bullying victimization, and loneliness are global issues (Mendy, 2023; Richardson & Hiu, 2018; Yanguas et al., 2018), there are notable differences between cultures and societies that must be acknowledged. When comparing research across countries, factors such as ethnic and cultural diversity should be considered. Gören (2013) compared 180 nations regarding cultural, religious, and linguistic diversity, combining these aspects into diversity indices. For instance, the United States demonstrated substantially higher diversity rates than Germany in all three aspects. Similarly, when studying bullying victimization in school contexts, according to the socio-ecological framework (Swearer & Espelage, 2004), individual, family, peer, school, and community contexts need to be considered to understand bullying holistically. This framework can likely be extended to the national level, as national systems (e.g., school systems; Esser, 2016) influence all these other contexts. Moreover, differences in loneliness rates across countries during the COVID-19 pandemic were notable (Lo Coco et al., 2021). These contextual

differences, along with variables such as the participants' age, could have moderated the relationships observed in the presented studies.

Deliberate and explicit actions of exclusion or aggression may not be the only ways in which stigmatized groups experience injustice. Some authors argue that sophisticated societal structures implicitly contribute to the inequality of different social groups, manifesting as a lack of political influence or limited access to wealth and other culturally valued goods (Mendy, 2023). These structures may not have been consciously designed, and members of society might not even be aware of their existence (Gunderson, 2021). As a result, some of the behaviors involved may be so implicit that they are not always recognized, which affects how these issues are reported, investigated, and framed.

Another key aspect worth exploring is the concept of intersectionality. Intersectionality is a theoretical framework that recognizes that many potentially stigmatizing social factors, affiliations, or other types of social identities can lead to different outcomes or challenges when considered in combination, rather than in isolation (Atewologun, 2018). This framework suggests that the effects of personality or socio-demographic factors or even genetic factors on phenomena threatening social connectedness might vary across different social groups or intersections of identities, a dimension that has not been thoroughly studied and could represent a promising direction for future research. Conventional regression methods may struggle to account for this complexity, as their additive nature contrasts with the idea that specific intersections of characteristics can trigger "unique" processes, which cannot be fully captured through such methods (Bowleg & Bauer, 2016). An alternative approach could be *qualitative comparative analysis* (QCA; Hancock, 2013). Advocates of QCA argue that it is particularly suited to address questions about the "causes of effects" rather than the "effects of causes," which is the focus of traditional regression analyses. QCA is also said to be more capable of uncovering complex, asymmetric, and interactionist relationships (Oana et al., 2021).

Reporting victimization experiences is a complex process that involves elaborate cognitive steps (Stangor et al., 2003). First, individuals must experience behavior that they interpret as unjust. Next, they must identify a name and a cause for this experience. When asked in a survey setting about their victimization, participants need to recall these events. If the events are framed within specific terms (e.g., asked specifically about discrimination experiences), participants must then categorize the event

accordingly. Finally, even after recalling the relevant social experiences, participants must be willing to report them. Each of these steps may be influenced by personality factors in different ways, complicating the task of untangling the underlying processes. Therefore, future studies must assess social experiences in a highly nuanced manner to explore the role of personality at each stage of this reporting process.

The subjectivity of retrospective self-reports of social phenomena presents a significant limitation for this field of study. The quantification and reporting of these occurrences rely heavily on individuals' perceptions and recollections, both of which may already be influenced by personality traits at the time of assessment. Additionally, negative experiences tend to be underreported in survey settings (Krumpal, 2013). To address this issue, more objective approaches are necessary to differentiate between the actual occurrence of relevant events, their interpretation, and the recollection processes involved. High-frequency data collection methods, such as Experience Sampling Methodology (ESM; Verhagen et al., 2016) or Ecological Momentary Assessment (EMA; Shiffman et al., 2007), could serve as valuable tools to mitigate these challenges.

In addition, both studies on social exclusion experiences placed emphasis on the victim, neglecting the role of the perpetrators. By focusing primarily on the victim's perspective, the dynamic nature of social interactions is overlooked when trying to explain these processes. Research has shown that perpetration is also linked to various personality traits (Parkins et al., 2006; Pascual-Sánchez et al., 2021; Volk et al., 2018), suggesting that the inclusion of the perpetrator’s role could offer a more comprehensive understanding of social exclusion and its underlying mechanisms.

Furthermore, the research presented in this dissertation is not intended to downplay the experiences that certain individuals endure. Many people are systematically subjected to injustices beyond their control (e.g., migrants; Gallagher, 2015). Just as the ability to change socio-demographic characteristics such as gender, social background, or migration history is limited or impossible, the same can be said to some extent about personality. While some studies have shown that personality traits can be altered through intense interventions (Hudson et al., 2018), personality tends to be inherently stable, particularly in adulthood (Ferguson, 2010). This stability suggests that changing one's personality traits may not be easy. Coupled with the finding that victimization experiences are influenced by genetic factors, this should not imply that these experiences are predetermined (Veldkamp et al., 2019). Instead, these findings

highlight the fact that individuals bring different vulnerabilities when facing certain social experiences (Veldkamp et al., 2019) that need to be acknowledged.

CONCLUSION

In summary, this dissertation enhances our understanding of how sociodemographic, genetic, environmental, and personality-related factors shape experiences of social exclusion and isolation. By focusing on discrimination, bullying victimization, and social isolation during the COVID-19 pandemic, this research highlights the complex, multifaceted nature of these social experiences. This dissertation replicates the finding that certain social groups, such as individuals with a migration background or females, are more vulnerable to social exclusion and isolation. Personality traits, such as extraversion, conscientiousness, and neuroticism, also showed consistent associations with social exclusion experiences.

To better understand the nature of these associations, methods were employed that could potentially offer clues about causal effects. However, aside from self-esteem, emerging as a potential quasi-causally linked factor, these models did not provide conclusive evidence. Consequently, the exact mechanisms connecting social exclusion to personality traits remain unclear. However, the results underscore the importance of distinguishing between mere associations and potential causal pathways.

Genetically informed analyses revealed that genetic factors account for nearly a third of the variability in experiences of victimization and isolation, while non-shared environmental influences explain the remaining variance. These insights imply that genetic predispositions contribute also to the vulnerability to certain social experiences. The behavioral genetic analyses shed light on potential underlying processes, such as selection effects, genetic and environmental factors as third variables influencing both social phenomena and personality, or evocative gene-environment correlations (where the environment responds to certain personality traits).

References

Adamopoulou, P., Koukia, E., & Penny, A. (2020). The effect of personality traits on the roles of traditional bully-victim and cyberbully–cybervictim among Greek adolescents. *International Journal of Caring Sciences, 13*(3), 13.

Allen, K., Kern, M. L., Rozek, C. S., McInerney, D. M., & Slavich, G. M. (2021). Belonging: a review of conceptual issues, an integrative framework, and directions for future research. *Australian Journal of Psychology*, *73*(1), 87–102. https://doi.org/10.1080/00049530.2021.1883409

Aparicio-García, M. E., Díaz-Ramiro, E. M., Rubio-Valdehita, S., López-Núñez, M. I., & García-Nieto, I. (2022). Protective factors, risk of violence and discrimination and mental health indicators of young LGB people. *International Journal of Environmental Research and Public Health*, *19*(21), 14401. https://doi.org/10.3390/ijerph192114401

Arseneault, L. (2017). The long-term impact of bullying victimization on mental health. *World Psychiatry*, *16*(1), 27–28. https://doi.org/10.1002/wps.20399

Atewologun, D. (2018). Intersectionality theory and practice. In R. A. Scott & S. M. Kosslyn (Eds.), *Oxford research encyclopedia of business and management*. Oxford University Press. https://doi.org/10.1093/acrefore/9780190224851.013.48

Atik, G., & Güneri, O. (2013). Bullying and victimization: Predictive role of individual, parental, and academic factors. *School Psychology International*, 34, 658–673. https://doi.org/10.1177/0143034313479699

Ayouni, I., Maatoug, J., Dhouib, W., Zammit, N., Fredj, S. B., Ghammam, R., & Ghannem, H. (2021). Effective public health measures to mitigate the spread of COVID-19: a systematic review. *BMC Public Health*, *21*(1). https://doi.org/10.1186/s12889-021-11111-1

Beigang, S., Fetz, K., Kalkum, D., & Otto, M. (2017). *Diskriminierungserfahrungen in Deutschland: Ergebnisse einer Repräsentativ- und einer Betroffenenbefragung [Experiences of discrimination in Germany: Results of a representative and an affected person survey]*. Nomos.

Benner, A. D., & Graham, S. (2013). The antecedents and consequences of racial/ethnic discrimination during adolescence: Does the source of discrimination matter? *Developmental Psychology, 49*(8), 1602–1613. https://doi.org/10.1037/a0030557

Bennett, M., Roche, K. M., Huebner, D. M., & Lambert, S. F. (2020). School discrimination and changes in Latinx adolescents' internalizing and externalizing symptoms. *Journal of Youth and Adolescence*, *49*(10), 2020–2033. https://doi.org/10.1007/s10964-020-01256-4

Beutel, M. E., Hettich, N., Ernst, M., Schmutzer, G., Tibubos, A. N., & Braehler, E. (2021). Mental health and loneliness in the German general population during the COVID-19 pandemic compared to a representative pre-pandemic assessment. *Scientific Reports*, *11*(1). https://doi.org/10.1038/s41598-021-94434-8

Björklund, C., Vaez, M., & Jensen, I. (2020). Early work-environmental indicators of bullying in an academic setting: a longitudinal study of staff in a medical university. *Studies in Higher Education*, *46*(12), 2556–2567. https://doi.org/10.1080/03075079.2020.1729114

Blackhart, G. C., Nelson, B. C., Knowles, M. L., & Baumeister, R. F. (2009). Rejection elicits emotional reactions but neither causes immediate distress nor lowers self-esteem: A meta-analytic review of 192 studies on social exclusion. *Personality and Social Psychology Review*, *13*(4), 269-309. https://doi.org/10.1177/1088868309346065

Bond, L., Wolfe, S., Tollit, M., Butler, H., & Patton, G. (2007). A comparison of the Gatehouse Bullying Scale and the Peer Relations Questionnaire for students in secondary school. *Journal of School Health, 77*(2), 75–79. https://doi.org/10.1111/j.1746-1561.2007.00170.x

Bower, M., Kent, J., Patulny, R., Green, O., McGrath, L., Teesson, L., Jamalishahni, T., Sandison, H., & Rugel, E. (2023). The impact of the built environment on loneliness: A systematic review and narrative synthesis. *Health & Place*, *79*, 102962. https://doi.org/10.1016/j.healthplace.2022.102962

Bowleg, L., & Bauer, G. (2016). Invited reflection: Quantifying intersectionality. *Psychology of Women Quarterly, 40*(3), 337–341. https://doi.org/10.1177/0361684316654282

Bu, F., Steptoe, A., & Fancourt, D. (2020). Who is lonely in lockdown? Cross-cohort analyses of predictors of loneliness before and during the COVID-19 pandemic. *Public Health*, *186*, 31–34. https://doi.org/10.1016/j.puhe.2020.06.036

Buecker, S., & Horstmann, K. T. (2021). Loneliness and social isolation during the COVID-19 pandemic. *European Psychologist*, *26*(4), 272–284. https://doi.org/10.1027/1016-9040/a000453

Buecker, S., Maes, M., Denissen, J. J. A., & Luhmann, M. (2020). Loneliness and the Big Five personality traits: A meta-analysis. *European Journal of Personality, 34*(1), 8–28. https://doi.org/10.1002/per.2229

Carter, R. T., Lau, M. Y., Johnson, V., & Kirkinis, K. (2017). Racial discrimination and health outcomes among racial/ethnic minorities: A meta- analytic review. *Journal of Multicultural Counseling and Development, 45*(4), 232-259. https://doi.org/10.1002/jmcd.12076

Cawvey, M., Hayes, M., Canache, D., & Mondak, J. J. (2017). Personality and victimization in the Americas. *International Review of Victimology*, *24*(1), 123–139. https://doi.org/10.1177/0269758017727345

Cobb-Clark, D. A., & Schurer, S. (2012). The stability of big-five personality traits. *Economics Letters*, *115*(1), 11–15. https://doi.org/10.1016/j.econlet.2011.11.015

Cuevas, A. G., Mann, F. D., Williams, D. R., & Krueger, R. F. (2021). Discrimination and anxiety: Using multiple polygenic scores to control for genetic liability. *Proceedings of the National Academy of Sciences, 118*(1), e2017224118. https://doi.org/10.1073/pnas.2017224118

Das, A. (2019). Major discrimination experiences, education, and genes. *Journal of Aging and Health, 32*(7–8), 753–763. https://doi.org/10.1177/0898264319851661

De Freitas, D. F., Fernandes-Jesus, M., Ferreira, P. D., Coimbra, S., Teixeira, P. M., De Moura, A., Gato, J., Marques, S. C., & Fontaine, A. M. (2018). Psychological correlates of perceived ethnic discrimination in Europe: A meta-analysis. *Psychology of Violence*, *8*(6), 712–725. https://doi.org/10.1037/vio0000215

De Jong Gierveld, J., & Van Tilburg, T. (2006). A 6-Item scale for overall, emotional, and social loneliness. *Research on Aging*, *28*(5), 582–598. https://doi.org/10.1177/0164027506289723

de Vries, L. P., Van Beijsterveldt, T. C. E. M., Maes, H., Colodro-Conde, L., & Bartels, M. (2021). Genetic influences on the covariance and genetic correlations in a bivariate twin model: An application to well-being. *Behavior Genetics, 51*, 191–203. https://doi.org/10.1007/s10519-021-10046-y

Delardas, O., Kechagias, K. S., Pontikos, P. N., & Giannos, P. (2022). Socio-economic impacts and challenges of the coronavirus pandemic (COVID-19): An updated review. *Sustainability, 14*(15), 9699. https://doi.org/10.3390/su14159699

DeWall, C. N., & Richman, S. B. (2011). Social exclusion and the desire to reconnect: Social exclusion and the desire to reconnect. *Social and Personality Psychology Compass, 5*(11), 919–932. https://doi.org/10.1111/j.1751-9004.2011.00383.x

Diehl, C., & Liebau, E. (2017). Perceptions of discrimination: What do they measure and why do they matter? *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.3098793

Diewald, M., Kandler, C., Riemann, R., Spinath, F. M., Andreas, A., Baier, T., Bartling, A., Baum, M. A., Deppe, M., Eichhorn, H., Eifler, E. F., Gottschling, J., Hahn, E., Hildebrandt, J., Hufer, A., Instinske, J., Kaempfert, M., Klatzka, C. H., Kornadt, A. E., … Weigel, L. (2024). *TwinLife* (ZA6701 Datenfile Version 8.0.0). GESIS. https://doi.org/10.4232/1.14331

Dovidio, J., & Ikizer, E. (2019). Discrimination. *Psychology*. https://doi.org/10.1093/obo/9780199828340-0233

English, D., Lambert, S. F., Evans, M. K., & Zonderman, A. B. (2014). Neighborhood racial composition, racial discrimination, and depressive symptoms in African Americans. *American Journal of Community Psychology*, *54*(3–4), 219–228. https://doi.org/10.1007/s10464-014-9666-y

Entringer, T. M., & Gosling, S. D. (2021). Loneliness during a nationwide lockdown and the moderating effect of extroversion. *Social Psychological and Personality Science*, *13*(3), 769–780. https://doi.org/10.1177/19485506211037871

Ernst, M., Niederer, D., Werner, A. M., Czaja, S. J., Mikton, C., Ong, A. D., Rosen, T., Brähler, E., & Beutel, M. E. (2022). Loneliness before and during the COVID-19 pandemic: A systematic review with meta-analysis. *American Psychologist, 77*(5), 660–677. https://doi.org/10.1037/amp0001005

Erzen, E., & Çikrikci, Ö. (2018). The effect of loneliness on depression: A meta-analysis. *International Journal of Social Psychiatry*, *64*(5), 427–435. https://doi.org/10.1177/0020764018776349

Esser, H. (2016). The model of ability tracking – Theoretical expectations and empirical findings on how educational systems impact on educational success and inequality. In *Edward Elgar Publishing eBooks*. https://doi.org/10.4337/9781785367267.00009

European parliament. (2020, March 3). *Gender pay gap in Europe: facts and figures (infographic).* European parliament. https://www.europarl.europa.eu/news/en/headlines/society/20200227STO73519/gender-pay-gap-in-europe-facts-and-figures-infographic

European Union Agency for Fundamental Rights. (2019, September 12). *Second European Union Minorities and Discrimination Survey: Summary of main results.* European Union Agency for Fundamental Rights. https://fra.europa.eu/sites/default/files/fra_uploads/fra-2019-eu-midis-ii-summary-results-country-sheet-uk_en.pdf

European Union. (2023, December). *Discrimination in the European Union.* European Union. https://europa.eu/eurobarometer/surveys/detail/2972

Fang, X. Y., Fan, X. H., & Liu, Y. (2008). Perceived discrimination and loneliness: moderating effects of coping style among migrant children. *Psychological Development and Education*, *24*(4), 93-99.

Ferguson, C. J. (2010). A meta-analysis of normal and disordered personality across the life span. *Journal of Personality and Social Psychology*, *98*(4), 659–667. https://doi.org/10.1037/a0018770

Fibbi, R., Midtbøen, A. H., Simon, P. (2021). *Migration and Discrimination*. Springer, Cham. https://doi.org/10.1007/978-3-030-67281-2_6

Field, R. D., Tobin, R. M., & Reese-Weber, M. (2014). Agreeableness, social self-efficacy, and conflict resolution strategies. *Journal of Individual Differences, 35*(2), 95–102. https://doi.org/10.1027/1614-0001/a000131

Gallagher, A. T. (2015). Exploitation in migration: Unacceptable but inevitable. *Journal of International Affairs, 68*(2), 55–74.

Gerlitz, J. Y., & Schupp, J. (2005). Zur Erhebung der Big-Five-basierten Persönlichkeitsmerkmale im SOEP. Dokumentation der Instrumentenentwicklung BFI-S auf Basis des SOEP-Pretests 2005 [About the survey of the Big Five-based personality traits in SOEP. Documentation of the BFI-S instrument development based on the SOEP pretest 2005.]. *DIW Research Notes*, 4. https://www.diw.de/documents/publicationen/73/43490/rn4.pdf

Goebel, J. P. K., & Krause, P. (2021, March 10). *Einkommensunterschiede bei Personen mit Migrationshintergrund [Income differences among people with a migration background]*. Bundeszentrale für politische Bildung [Federal Agency for Civic Education]. https://www.bpb.de/kurz-knapp/zahlen-und-fakten/datenreport-2021/private-haushalte-einkommen-und-konsum/329950/einkommensunterschiede-bei-personen-mit-migrationshintergrund/

Gören, E. (2013). Economic effects of domestic and neighbouring countries' cultural diversity. *ZenTra Working Paper Series in Transnational Studies, No. 13*. https://hdl.handle.net/10419/105045

Gunderson, R. (2021). How do social structures become taken for granted? Social reproduction in calm and crisis. *Human Studies*, *44*(4), 741–762. https://doi.org/10.1007/s10746-021-09592-5

Hagemann, D., Spinath, F. M., & Mueller, E. M. (2022). *Differentielle Psychologie und Persönlichkeitsforschung [Differential psychology and personality research]*. Kohlhammer. https://doi.org/10.17433/978-3-17-039779-8

Hagerty, B. M., Lynch-Sauer, J., Patusky, K. L., Bouwsema, M., & Collier, P. (1992). Sense of belonging: A vital mental health concept. *Archives of Psychiatric Nursing*, *6*(3), 172–177. https://doi.org/10.1016/0883-9417(92)90028-h

Hahn, E., Gottschling, J., Bleidorn, W., Kandler, C., Spengler, M., Kornadt, A. E., Schulz, W., Schunck, R., Baier, T., Krell, K., Lang, V., Lenau, F., Peters, A.-L., Diewald, M., Riemann, R., & Spinath, F. M. (2016). What drives the development of social inequality over the life course? The German TwinLife Study. *Twin Research and Human Genetics, 19*(6), 659–672. https://doi.org/10.1017/thg.2016.76

Hancock, A. M. (2013). Empirical intersectionality: A tale of two approaches. In O. Hankivsky (Ed.), *The Palgrave handbook of intersectionality in public policy* (pp. 95–132). Palgrave Macmillan.

Holt, M. K., Vivolo-Kantor, A. M., Polanin, J. R., Holland, K. M., DeGue, S., Matjasko, J. L., Wolfe, M., & Reid, G. (2015). Bullying and suicidal ideation and behaviors: A meta-analysis. *Pediatrics*, *135*(2), 496–509. https://doi.org/10.1542/peds.2014-1864

Holt-Lunstad, J., Smith, T. B., Baker, M., Harris, T., & Stephenson, D. (2015). Loneliness and social isolation as risk factors for mortality. *Perspectives on Psychological Science*, *10*(2), 227–237. https://doi.org/10.1177/1745691614568352

Hudson, N. W., Briley, D. A., Chopik, W. J., & Derringer, J. (2018). You have to follow through: Attaining behavioral change goals predicts volitional personality change. *Journal of Personality and Social Psychology*, *117*(4), 839–857. https://doi.org/10.1037/pspp0000221

Ingwersen, K., & Thomsen, S. L. (2021). The immigrant-native wage gap in Germany revisited. *The Journal of Economic Inequality*, *19*(4), 825-854. https://doi.org/10.1007/s10888-021-09493-8

Jackson, S., Hackett, R., Grabovac, I., Smith, L., & Steptoe, A. (2019). Perceived discrimination, health and wellbeing among middle-aged and older lesbian, gay and bisexual people: A prospective study. *PLoS ONE*, 14. https://doi.org/10.1371/journal.pone.0216497

Jantzer, V., Schlander, M., Haffner, J., Parzer, P., Trick, S., Resch, F., & Kaess, M. (2018). The cost incurred by victims of bullying from a societal perspective: estimates based on a German online survey of adolescents. *European Child & Adolescent Psychiatry*, *28*(4), 585–594. https://doi.org/10.1007/s00787-018-1224-y

Jensen-Campbell, L. A., Knack, J. M., Waldrip, A. M., & Campbell, S. D. (2006). Do Big Five personality traits associated with self-control influence the regulation of anger and aggression? *Journal of Research in Personality*, *41*(2), 403–424. https://doi.org/10.1016/j.jrp.2006.05.001

Johnson, W., Turkheimer, E., Gottesman, I. I., & Bouchard, T. J. (2009). Beyond heritability. *Current Directions in Psychological Science*, *18*(4), 217–220. https://doi.org/10.1111/j.1467-8721.2009.01639.x

Kalokerinos, E. K., Murphy, S. C., Koval, P., Bailen, N. H., Crombez, G., Hollenstein, T., Gleeson, J., Thompson, R. J., Van Ryckeghem, D. M. L., Kuppens, P., & Bastian, B. (2020). Neuroticism may not reflect emotional variability. *Proceedings of the National Academy of Sciences*, *117*(17), 9270–9276. https://doi.org/10.1073/pnas.1919934117

Kim, D., & Lee, K. (2020). The moderating impact of attending services on the effect of older adults' discrimination experiences on loneliness. *Innovation in Aging*, *4*(Supplement_1), 323. https://doi.org/10.1093/geroni/igaa057.1035

Kirkegaard, E. O. W. (2017). Race, discrimination, cognitive ability and income: Analysis of the Add Health dataset [Preprint]. https://doi.org/10.31234/osf.io/yurbx

Klatzka, C. H., Baum, M. A., Paulus, L., Nikstat, A., Dang, E. T. T., Andreas, A., Iser, J., & Hahn, E. (2023). *TwinLife scales manual: All data collections (TwinLife Technical Report Series, 08) v3.0.1*. Project TwinLife "Genetic and social causes of life chances" (Universität Bielefeld / Universität Bremen / Universität des Saarlandes). https://www.twin-life.de/images/TwinLife/Series/TwinLife_TR_08_v3-0-1_final.pdf

Klatzka, C. H., Hahn, E., & Spinath, F. M. (2024). Differences in experiences of discrimination: an investigation of personality and person based characteristics in a twin difference design. *Current Psychology, 43,* 17105–17117. https://doi.org/10.1007/s12144-023-05597-8

Klatzka, C.H., Raufeisen, O., Hahn, E. & Spinath, F. M. (2025). Personality as consequence and antecedent of bullying victimization in adolescence: A cross-lagged panel and genetically informed investigation. *Personality and Individual Differences,* 112842. https://doi.org/10.1016/j.paid.2024.112842

Kottwitz, A., Mönkediek, B., Klatzka, C.H., Hufer-Thamm, A., & Hildebrandt, J. (2023). Genetic and environmental contributions to the subjective burden of social isolation during the COVID-19 pandemic. *BMC psychology*, *11*(1), 134. https://doi.org/10.1186/s40359-023-01174-7

Kowert, P. A., & Hermann, M. G. (1997). Who takes risks? *Journal of Conflict Resolution*, *41*(5), 611–637. https://doi.org/10.1177/0022002797041005001

Krell, K., Nikstat, A., Kottwitz, A., Baum, M. A., Eifler, E. F., Hufer-Thamm, A., Klatzka, C. H., Lang, V., Mönkediek, B., Ruks, M., Starr, A., & Weigel, L. (2024). *TwinLife ShortGuide (TwinLife Technical Report Series, 11) v1.4.0*. Project TwinLife – "Genetic and Social Causes of Life Chances" (Universität Bielefeld; Universität Bremen; Universität des Saarlandes). https://pub.uni-bielefeld.de/download/2990323/2990574/TwinLife_TR_11_v1.4.0.pdf

Krumpal, I. (2013). Determinants of social desirability bias in sensitive surveys: a literature review. *Quality & Quantity*, 47, 2025–2047. https://doi.org/10.1007/S11135-011-9640-9.

Kukkonen, I., Pajunen, T., Sarpila, O., & Åberg, E. (2023). Is beauty-based inequality gendered? A systematic review of gender differences in socioeconomic outcomes of physical attractiveness in labor markets. *European Societies*, *26*(1), 117–148. https://doi.org/10.1080/14616696.2023.2210202

Kulig, T. C., Cullen, F. T., Wilcox, P., & Chouhy, C. (2019). Personality and adolescent school-based victimization: Do the Big Five matter? *Journal of School Violence, 18*(2), 176–199. https://doi.org/10.1080/15388220.2018.1444495

Lanier, P. A., & Barnett, T. (1996). Locus of control and women's per-ceptions of sex discrimination. *Perceptual and Motor Skills*, *83*(3_suppl), 1256–1258. https://doi.org/10.2466/pms.1996.83.3f.1256

Lazzari, C., & Rabottini, M. (2021). COVID-19, loneliness, social isolation and risk of dementia in older people: a systematic review and meta-analysis of the relevant literature. *International Journal of Psychiatry in Clinical Practice*, *26*(2), 196–207. https://doi.org/10.1080/13651501.2021.1959616

Leary, M. R. (2015). Emotional responses to interpersonal rejection. *Dialogues in Clinical Neuroscience*, *17*(4), 435–441. https://doi.org/10.31887/dcns.2015.17.4/mleary

Lee, D. L., & Ahn, S. (2011). Racial discrimination and Asian mental health: A meta-analysis. *The Counseling Psychologist, 39*(3), 463-489. https://doi.org/10.1177/0011000010381791

Li, H., Zeigler-Hill, V., Luo, J., Ye, J., & Zhang, Q. (2012). Self-esteem modulates attentional responses to rejection: Evidence from event-related brain potentials. *Journal of Research in Personality*, *46*(5), 459–464. https://doi.org/10.1016/j.jrp.2012.02.010

Lippke, S., Keller, F., Derksen, C., Kötting, L., Ratz, T., & Fleig, L. (2021). Einsam(er) seit der Coronapandemie: Wer ist besonders betroffen? – psychologische Befunde aus Deutschland [Loneliness before and during the corona pandemic: Who is particularly affected? — Psychological findings from Germany]. *Prävention und Gesundheitsförderung [Prevention and Health Promotion], 17*(1), 84–95. https://doi.org/10.1007/s11553-021-00837-w

Liu, T., Yang, E., & Wang, Z. (2019). Income inequality: How do racial and gender differences influence the incomes in US. *Journal of Human Resource and Sustainability Studies*, *7*(2), 233–243. https://doi.org/10.4236/jhrss.2019.72014

Lo Coco, G., Gentile, A., Bosnar, K., Milovanović, I., Bianco, A., Drid, P., & Pišot, S. (2021). A cross-country examination of the fear of COVID-19 and the sense of loneliness during the first wave of COVID-19 outbreak. *International Journal of Environmental Research and Public Health, 18*(5), 2586. https://doi.org/10.3390/ijerph18052586

Loehlin, J. C. (1996). The Cholesky approach: A cautionary note. *Behavior Genetics*, *26*(1), 65-69. https://doi.org/10.1007/BF02361160

Logie, C., & Gadalla, T. M. (2009). Meta-analysis of health and demographic correlates of stigma towards people living with HIV. *AIDS Care*, *21*(6), 742-753. https://doi.org/10.1080/09540120802511877

Major, B., & Dover, T. L. (2016). Attributions to discrimination: Antecedents and consequences. In T. D. Nelson (Ed.), *Handbook of prejudice, stereotyping, and discrimination* (pp. 213–239). Psychology Press.

Mark, K. M., Pike, A., Latham, R. M., & Oliver, B. R. (2016). Using twins to better understand sibling relationships. *Behavior Genetics*, *47*(2), 202–214. https://doi.org/10.1007/s10519-016-9825-z

Maslow, A. H., & Frager, R. (1987). *Motivation and personality*. Pearson.

Matthews, T., Caspi, A., Danese, A., Fisher, H., Moffitt, T., & Arseneault, L. (2020). A longitudinal twin study of victimization and loneliness from childhood to young adulthood. *Development and Psychopathology*, 34, 367–377. https://doi.org/10.1017/S0954579420001005.

Matthews, T., Danese, A., Wertz, J., Odgers, C. L., Ambler, A., Moffitt, T. E., & Arseneault, L. (2016). Social isolation, loneliness and depression in young adulthood: a behavioural genetic analysis. *Social Psychiatry and Psychiatric Epidemiology*, *51*(3), 339–348. https://doi.org/10.1007/s00127-016-1178-7

Matz, S. C. (2021). Personal echo chambers: Openness-to-experience is linked to higher levels of psychological interest diversity in large-scale behavioral data. *Journal of Personality and Social Psychology*, *121*(6), 1284–1300. https://doi.org/10.1037/pspp0000324

McAdams, T. A., Rijsdijk, F. V., Zavos, H. M., & Pingault, J. (2020). Twins and Causal Inference: Leveraging Nature's experiment. *Cold Spring Harbor Perspectives in Medicine*, *11*(6), a039552. https://doi.org/10.1101/cshperspect.a039552

McClendon, J., Bogdan, R., Jackson, J. J., & Oltmanns, T. F. (2019). Mechanisms of Black– White disparities in health among older adults: Examining discrimination and personality. *Journal of Health Psychology*, *26*(7), 995-1011. https://doi.org/10.1177/1359105319860180

Mendy, O. (2023). Discrimination as a global paradigm: United Kingdom and United States of America in focus. *Lampung Journal of International Law*, *5*(2), 73–86. https://doi.org/10.25041/lajil.v5i2.3030

Menesini, E., & Salmivalli, C. (2017). Bullying in schools: The state of knowledge and effective interventions. *Psychology, Health & Medicine*, *22*(sup1), 240–253. https://doi.org/10.1080/13548506.2017.1279740

Mihalopoulos, C., Le, L. K., Chatterton, M. L., Bucholc, J., Holt-Lunstad, J., Lim, M. H., & Engel, L. (2019). The economic costs of loneliness: a review of cost-of-illness and economic evaluation studies. *Social Psychiatry and Psychiatric Epidemiology*, *55*(7), 823–836. https://doi.org/10.1007/s00127-019-01733-7

Mitsopoulou, E., & Giovazolias, T. (2015). Personality traits, empathy, and bullying behavior: A meta-analytic approach. *Aggression and Violent Behavior, 21*, 61–72. https://doi.org/10.1016/j.avb.2015.01.007

Mönkediek, B., & Diewald, M. (2022). Do academic ability and social background influence each other in shaping educational attainment? The case of the transition to secondary education in Germany. *Social Science Research*, *101*, 102625. https://doi.org/10.1016/j.ssresearch.2021.102625

Mönkediek, B., Schulz, W., Eichhorn, H., & Diewald, M. (2020). Is there something special about twin families? A comparison of parenting styles in twin and non-twin families. *Social Science Research*, *90*, 102441. https://doi.org/10.1016/j.ssresearch.2020.102441

Monks, C., Smith, P., Naylor, P., Barter, C., Ireland, J., & Coyne, I. (2009). Bullying in different contexts: Commonalities, differences and the role of theory. *Aggression and Violent Behavior*, 14, 146–156. https://doi.org/10.1016/J.AVB.2009.01.004.

Moore, S. E., Norman, R. E., Suetani, S., Thomas, H. J., Sly, P. D., & Scott, J. G. (2017). Consequences of bullying victimization in childhood and adolescence: A systematic review and meta-analysis. *World Journal of Psychiatry*, *7*(1), 60. https://doi.org/10.5498/wjp.v7.i1.60

Nielsen, M. B., & Knardahl, S. (2015). Is workplace bullying related to the personality traits of victims? A two-year prospective study. *Work & Stress*, *29*(2), 128–149. https://doi.org/10.1080/02678373.2015.1032383

Oana, I.-E., Schneider, C. Q., & Thomann, E. (2021). *Qualitative comparative analysis using R: A beginner's guide*. Cambridge University Press. https://doi.org/10.1017/9781009006781

OECD. (2013). Discrimination against immigrants: Measurement, incidence, and policy instruments. In *International Migration Outlook 2013* (pp. 105–142). OECD Publishing. https://www.oecd.org/els/mig/IMO-2013-chap4-discrimination-against-immigrants.pdf

Olweus, D. (1993). *Bullying at school: What we know and what we can do*. Oxford: Blackwell.

Ortiz-Ospina, E., & Roser, M. (2018, March 21). *Economic inequality by gender*. Our World in Data. https://ourworldindata.org/economic-inequality-by-gender

Parkins, I. S., Fishbein, H. D., & Ritchey, P. N. (2006). The influence of personality on workplace bullying and discrimination. *Journal of Applied Social Psychology*, *36*(10), 2554–2577. https://doi.org/10.1111/j.0021-9029.2006.00117.x

Pascoe, E. A., & Richman, L. (2009). Perceived discrimination and health: A meta-analytic review. *Psychological Bulletin*, *135*(4), 531–554. https://doi.org/10.1037/a0016059

Pascual-Sánchez, A., Hickey, N., Mateu, A., Martinez-Herves, M., Kramer, T., & Nicholls, D. (2021). Personality traits and self-esteem in traditional bullying and cyberbullying. *Personality and Individual Differences*, *177*, 110809. https://doi.org/10.1016/j.paid.2021.110809

Peplau, L. A., & Perlman, D. (1982). Perspectives on loneliness. In L. A. Peplau & D. Perlman (Eds.), *Loneliness: A sourcebook of current theory, research, and therapy* (pp. 1–18). John Wiley & Sons.

Plomin, R., DeFries, J. C., Knopik, V. S., & Neiderhiser, J. M. (2013). *Behavioral genetics* (6th ed.). Worth Publishers.

Prati, G., & Mancini, A. D. (2021). The psychological impact of COVID-19 pandemic lockdowns: a review and meta-analysis of longitudinal studies and natural experiments. *Psychological Medicine*, *51*(2), 201–211. https://doi.org/10.1017/s0033291721000015

Rammstedt, B., & Beierlein, C. (2014). Can't we make it any shorter? The limits of personality assessment and ways to overcome them. *Journal of Individual Differences, 35*(4), 212–220. https://doi.org/10.1027/1614-0001/a000141

Richardson, D., & Hiu, C. F. (2018). Developing a global indicator on bullying of school-aged children. *Innocenti Working Papers.* https://doi.org/10.18356/29fa3de5-en

Rico-Uribe, L. A., Caballero, F. F., Martín-María, N., Cabello, M., Ayuso-Mateos, J. L., & Miret, M. (2018). Association of loneliness with all-cause mortality: A meta-analysis. *PLoS ONE*, *13*(1), e0190033. https://doi.org/10.1371/journal.pone.0190033

Riva, P. & Eck, J. (Ed.) (2016). *Social exclusion: Psychological approaches to understanding and reducing its impact.* Springer. https://doi.org/10.1007/978-3-319-22022-4

Rohm, T., Andreas, A., Deppe, M., Eichhorn, H., Instinske, J., Klatzka, C. H., Kottwitz, A., Krell, K., Mönkediek, B., Paulus, L., Piesch, S., Ruks, M., Starr, A., Weigel, L., Diewald, M., Kandler, C., Riemann, R., & Spinath, F. M. (2023). Data from the German TwinLife Study: Genetic and social origins of educational predictors, processes, and outcomes. *Journal of Open Psychology Data, 11*(1), 4. https://doi.org/10.5334/jopd.78

Rudert, S. C., Keller, M. D., Hales, A. H., Walker, M., & Greifeneder, R. (2019). Who gets ostracized? A personality perspective on risk and protective factors of ostracism. *Journal of Personality and Social Psychology*, *118*(6), 1247–1268. https://doi.org/10.1037/pspp0000271

Saarento, S., Garandeau, C. F., & Salmivalli, C. (2014). Classroom- and school-level contributions to bullying and victimization: A review. *Journal of Community & Applied Social Psychology, 25*(3), 204–218. https://doi.org/10.1002/casp.2207

Sahu, M., & Prasuna, J. G. (2016). Twin studies: A unique epidemiological tool. *Indian Journal of Community Medicine*, *41*(3), 177. https://doi.org/10.4103/0970-0218.183593

Schmitt, M. T., Branscombe, N. R., Postmes, T., & Garcia, A. (2014). The consequences of perceived discrimination for psychological well-being: A meta-analytic review. *Psychological Bulletin*, *140*(4), 921-948. https://doi.org/10.1037/a0035754

Schwartz, J. A. (2017). Long-term physical health consequences of perceived inequality: Results from a twin comparison design. *Social Science & Medicine, 187*, 184–192. https://doi.org/10.1016/j.socscimed.2017.06.006

Shiffman, S., Stone, A. A., & Hufford, M. R. (2007). Ecological Momentary assessment. *Annual Review of Clinical Psychology*, *4*(1), 1–32. https://doi.org/10.1146/annurev.clinpsy.3.022806.091415

Smart Richman, L., & Leary, M. R. (2009). Reactions to discrimination, stigmatization, ostracism, and other forms of interpersonal rejection: A multimotive model. *Psychological Review, 116*(2), 365–383. https://doi.org/10.1037/a0015250

Solmi, M., Veronese, N., Galvano, D., Favaro, A., Ostinelli, E. G., Noventa, V., Favaretto, E., Tudor, F., Finessi, M., Shin, J. I., Smith, L., Koyanagi, A., Cester, A., Bolzetta, F., Cotroneo, A., Maggi, S., Demurtas, J., De Leo, D., & Trabucchi, M. (2020). Factors associated with loneliness: An umbrella review of observational studies. *Journal of Affective Disorders, 271,* 131–138. https://doi.org/10.1016/j.jad.2020.03.075

Spahlholz, J., Baer, N., König, H. H., Riedel-Heller, S. G., & Luck-Sikorski, C. (2016). Obesity and discrimination: A systematic review and meta-analysis of observational studies. *Obesity Reviews, 17*(1), 43–55. https://doi.org/10.1111/obr.12343

Stanaway, J. D., Afshin, A., Gakidou, E., Lim, S. S., Abate, D., Abate, K. H., Abbafati, C., Abbasi, N., Abbastabar, H., Abd-Allah, F., Abdela, J., Abdelalim, A., Abdollahpour, I., Abdulkader, R. S., Abebe, M., Abebe, Z., Abera, S. F., Abil, O. Z., Abraha, H. N., … Murray, C. J. L. (2018). Global, regional, and national comparative risk assessment of 84 behavioural, environmental and occupational, and metabolic risks or clusters of risks for 195 countries and territories, 1990–2017: A systematic analysis for the Global Burden of Disease Study 2017. *The Lancet*, *392*(10159), 1923–1994. https://doi.org/10.1016/S0140-6736(18)32225-6

Stangor, C., Swim, J. K., Sechrist, G. B., DeCoster, J., Van Allen, K. L., & Ottenbreit, A. (2003). Ask, Answer, and Announce: Three stages in perceiving and responding to discrimination. *European Review of Social Psychology*, *14*(1), 277–311. https://doi.org/10.1080/10463280340000090

Sutin, A. R., Stephan, Y., & Terracciano, A. (2016). Perceived discrimination and personality development in adulthood. *Developmental Psychology*, *52*(1), 155–163. https://doi.org/10.1037/dev0000069

Swearer, S. M., & Espelage, D. L. (2004). Introduction: a social-ecological framework of bullying among youth. In D. L. Espelage & S. M. Swearer (Eds.), *Bullying in American schools: A social-ecological perspective on prevention and intervention* (pp. 1–12). Lawrence Erlbaum Associates Publishers.

Takizawa, R., Maughan, B., & Arseneault, L. (2014). Adult health outcomes of childhood bullying victimization: Evidence from a five-decade longitudinal British birth cohort. *American Journal of Psychiatry*, *171*(7), 777–784. https://doi.org/10.1176/appi.ajp.2014.13101401

Tani, F., Greenman, P. S., Schneider, B. H., & Fregoso, M. (2003). Bullying and the Big Five. *School Psychology International*, *24*(2), 131–146. https://doi.org/10.1177/0143034303024002001

Tilindiene, I., Sukys, S., Zuoza, A., & Alekrinskis, A. (2021). Examining the relations among extraversion, neuroticism, and school bullying among Lithuanian adolescents. *European Journal of Contemporary Education, 10*(2), 476–484. https://doi.org/10.13187/ejced.2021.2.476

Veldkamp, S. a. M., Boomsma, D. I., De Zeeuw, E. L., Van Beijsterveldt, C. E. M., Bartels, M., Dolan, C. V., & Van Bergen, E. (2019). Genetic and environmental influences on different forms of bullying perpetration, bullying victimization, and their co-occurrence. *Behavior Genetics*, *49*(5), 432–443. https://doi.org/10.1007/s10519-019-09968-5

Verhagen, S. J. W., Hasmi, L., Drukker, M., Van Os, J., & Delespaul, P. a. E. G. (2016). Use of the experience sampling method in the context of clinical trials. *Evidence-Based Mental Health*, *19*(3), 86–89. https://doi.org/10.1136/ebmental-2016-102418

Volk, A. A., Schiralli, K., Xia, X., Zhao, J., & Dane, A. V. (2018). Adolescent bullying and personality: A cross-cultural approach. *Personality and Individual Differences*, *125*, 126–132. https://doi.org/10.1016/j.paid.2018.01.012

Vukasović, T., & Bratko, D. (2015). Heritability of personality: A meta-analysis of behavior genetic studies. *Psychological Bulletin*, 141(4), 769–785. https://doi.org/10.1037/bul0000017

Wachtler, B., Michalski, N., Nowossadeck, E., Diercke, M., Wahrendorf, M., Santos-Hövener, C., Lampert, T., & Hoebel, J. (2020). Sozioökonomische Ungleichheit im Infektionsrisiko mit SARS-CoV-2 – Erste Ergebnisse einer Analyse der Meldedaten für Deutschland [Socioeconomic inequality in the infection risk of SARS-CoV-2 – Initial results of an analysis of reporting data for Germany]. *Journal of Health Monitoring, 5,* 19–31. https://doi.org/10.25646/7056

Wang, F., Gao, Y., Han, Z., Yu, Y., Long, Z., Jiang, X., Wu, Y., Pei, B., Cao, Y., Ye, J., Wang, M., & Zhao, Y. (2023). A systematic review and meta-analysis of 90 cohort studies of social isolation, loneliness and mortality. *Nature Human Behaviour*, *7*(8), 1307–1319. https://doi.org/10.1038/s41562-023-01617-6

Wickens, C. M., McDonald, A. J., Elton-Marshall, T., Wells, S., Nigatu, Y. T., Jankowicz, D., & Hamilton, H. A. (2021). Loneliness in the COVID-19 pandemic: Associations with age, gender and their interaction. *Journal of Psychiatric Research*, *136*, 103–108. https://doi.org/10.1016/j.jpsychires.2021.01.047

Willemsen, G., Odintsova, V., de Geus, E., & Boomsma, D. I. (2021). Twin-singleton comparisons across multiple domains of life. In A. Khalil, L. Lewi, & E. Lopriore (Eds.), *Twin and higher-order pregnancies* (pp. 51–71). Springer Nature. https://doi.org/10.1007/978-3-030-47652-6_4

Williams, K. D. (2007). Ostracism: The kiss of social death. *Social and Personality Psychology Compass, 1*(1), 236–247. https://doi.org/10.1111/j.1751-9004.2007.00004.x

Witthöft, M., Jungmann, S. M., Germer, S., & Braescher, A.-K. (n.d.). Early adverse effects of behavioral preventive strategies during the COVID-19 pandemic in Germany: An online general population survey. University of Mainz.

Wolke, D., Copeland, W. E., Angold, A., & Costello, E. J. (2013). Impact of bullying in childhood on adult health, wealth, crime, and social outcomes. *Psychological Science*, *24*(10), 1958–1970. https://doi.org/10.1177/0956797613481608

Woods, S. A., & Hampson, S. E. (2010). Predicting adult occupational environments from gender and childhood personality traits. *Journal of Applied Psychology*, *95*(6), 1045–1057. https://doi.org/10.1037/a0020600

Yanguas, J., Pinazo-Henandis, S., & Tarazona-Santabalbina, F. J. (2018). The complexity of loneliness. *PubMed*, *89*(2), 302–314. https://doi.org/10.23750/abm.v89i2.7404

ACKNOWLEDGEMENTS

I would like to thank everyone who has accompanied and supported me along the way. I am deeply grateful to Prof. Dr. Frank Spinath, who provided me with a great deal of research freedom while offering valuable guidance in pursuing my research ideas. I also extend my heartfelt thanks to Dr. Elisabeth Hahn for her active support and thorough feedback. I have learned a great deal from both of you.

I would like to thank the TwinLife team and my collaborators. I have gained so much from working with you and from being a part of this project.

To my dear colleagues, thank you for your practical and emotional support. In particular, I want to express my gratitude to Myriam, Julie, Marco, and Lena for their continuous support throughout this journey. I am truly thankful for all your help!

A special thanks to Patrick for tolerating me during the time of my dissertation. There were many moments of frustration, and I am grateful for your patience in listening to my rants, cooking delicious dinners, and encouraging me not to give up. Your practical support in everyday life made things easier for me, and you definitely helped soothe my soul during those tough times.

I also want to thank my dear friend Ayşenur. Thank you for all the emotional support, encouragement, body doubling sessions, and overall companionship. Talking to you has always been so valuable and inspiring for me!

Jenny, without you, I would never have begun to truly understand who I am, what my strengths are, and where my weaknesses lie. Thank you for being part of my journey in becoming the person I am today. I deeply appreciate your friendship over all these years, your kind words, encouragement, time, and unwavering support.

Finally, I dedicate this dissertation to my family, particularly to my late grandparents, who always encouraged me to pursue an academic path.

APPENDIX

Study 1: **Klatzka, C. H.**, Hahn, E., & Spinath, F. M. (2024). Differences in experiences of discrimination: an investigation of personality and person based characteristics in a twin difference design. *Current Psychology, 43,* 17105–17117. https://doi.org/10.1007/s12144-023-05597-8

Study 2: **Klatzka, C.H.**, Raufeisen, O., Hahn, E. & Spinath, F. M. (2025). Personality as consequence and antecedent of bullying victimization in adolescence: A cross-lagged panel and genetically informed investigation. *Personality and Individual Differences,* 112842. https://doi.org/10.1016/j.paid.2024.112842

Study 3: Kottwitz, A., Mönkediek, B., **Klatzka, C.H.**, Hufer-Thamm, A., & Hildebrandt, J. (2023). Genetic and environmental contributions to the subjective burden of social isolation during the COVID-19 pandemic. *BMC psychology*, *11*(1), 134. https://doi.org/10.1186/s40359-023-01174-7