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Psychological Consequences of Chronic Ethnic Discrimination in Male Turkish Immigrants Living in Austria: A 30-Day Ambulatory Assessment Study

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Abstract

Background Chronic ethnic discrimination may be associated with negative psychological consequences in ethnic minority groups. However, little is known about the impact of acute discriminatory events on people who experience chronic ethnic discrimination.

Purpose We examined the impact of chronic and acute ethnic discrimination on the daily lives of Turkish immigrants in Austria, a population often overlooked in discrimination research.

Methods Ninety male Turkish immigrants living in Austria (60 experiencing chronic and 30 infrequent ethnic discrimination) reported discriminatory events in real time for 30 days. Additionally, subjective stress, reactivity to daily hassles, affect, and maladaptive coping were assessed daily.

Results Participants experiencing chronic ethnic discrimination indicated higher daily values for stress, negative affect, reactivity to daily hassles, and anticipation and avoidance coping. Negative psychological states increased for all participants on days when discriminatory events occurred, but participants with chronic ethnic discrimination showed significantly stronger increases in maladaptive coping and reactivity to daily hassles, with the latter effect persisting until the next day.

Conclusions Our study is the first to demonstrate interaction effects of chronic and acute ethnic discrimination on psychological factors in daily life. The results may advance the understanding of the mechanisms that lead to health disparities in ethnic minority populations and may inform the development of targeted interventions.

Lay summary

This study investigated the impact of chronic and acute ethnic discrimination on the daily lives of Turkish immigrants in Austria, a population often overlooked in discrimination research. While it is established that experiences of ethnic discrimination are related to worse mental and physical health, the "how," that is, the underlying psychological mechanisms, remain incompletely understood. Ninety male Turkish immigrants took part in this study, with 60 experiencing ethnic discrimination on a regular basis. Over a 30-day period, we tracked their experiences of discrimination and their daily stress, emotional reactions, and coping strategies. We found that the participants with regular experiences of ethnic discrimination had higher stress levels and more negative emotions than the participants with fewer experiences of discrimination. In addition, they more strongly reacted to acute discriminatory events in their daily lives and had more problems coping with such events. They even were more stressed by daily hassles, which continued into the following day. These findings advance the understanding of the negative impact of ethnic discrimination on health disparities in ethnic minority populations and may inform the development of targeted interventions.

Keywords Ethnic discrimination · Psychological stress · Ambulatory assessment · Affect

Introduction

Ethnic discrimination has adverse effects on mental and physical health [1, 2]. If ethnic discrimination events are encountered in day-to-day life, they may be perceived as threatening and require the mobilization of internal resources [3]. Accordingly, chronic exposure to discriminatory events may constitute a persistent (chronic) social stressor for ethnic minority groups, resulting in negative psychobiological consequences and a higher risk of mental disorders in immigrants and ethnic minority populations [4–7]. However, most research in this field is cross-sectional in nature and was conducted in the USA. Longer assessment times and time-contingent reports of discrimination in daily life would provide insights into the processes underlying the association between ethnic discrimination, stress, and stress-related outcomes. Moreover, more studies focusing on stigmatized groups in a European context are needed. The present study, therefore, extends previous research by investigating the effects of chronic ethnic

discrimination on psychological factors among Turkish immigrants living in Austria using a 30-day ambulatory assessment design. Moreover, the ambulatory assessment data will be connected to subjective and biological data (salivary cortisol to assess the activity of the hypothalamic–pituitary–adrenal [HPA] axis) assessed in a laboratory study [8].

Within a stress and coping framework [9], individuals expend cognitive and behavioral efforts to manage stressful situations. However, it has been suggested that frequent or chronic exposure to stressors such as discriminatory events eventually depletes the capability to cope with the stress elicited by these potentially threatening and harmful events [10]. Over time, the combination of frequent stress exposure and the burdensome use of coping resources may lead to negative emotional and psychological consequences in daily life [4]. Accordingly, individuals who experience chronic discrimination may show a higher reactivity to discriminatory events compared to those who infrequently experience discrimination, but this association has not yet been investigated in detail.

Previous research has illustrated several associations between the frequency of ethnic discrimination and psychological factors (e.g., [11, 12]) as well as biological variables. For instance, a higher frequency of ethnic discrimination has been related to higher negative affect [4] as well as lower positive affect, both cross-sectional [13] and longitudinal [14, 15]. Frequent exposure to ethnic discrimination was also associated with dysregulation of the HPA axis, typically manifesting as attenuated cortisol responses to acute stressors—regardless of the nature of the stressor (see [16]). In a meta-analytic review, exposure to discrimination was consistently found to lead to higher perceived stress [2]. Moreover, the experience of chronic discrimination might also contribute to an accumulation or spillover of perceived stress into other domains such as daily hassles, described as adverse events that are potentially stressful, that is, financial issues or traffic jams [17]. Studies have shown that different sources of stress might interact: For example, chronic exposure to ethnic discrimination may increase both the reported frequency of, and the individual's reactivity to, daily hassles [18].

Another important factor regarding the adverse impact of chronic ethnic discrimination might be the anticipation of future discriminatory events [19]. Several researchers have emphasized that anticipatory and heightened vigilance may constitute a coping strategy that leads to intrusive thoughts or images, and could play an essential role in determining the adverse effects of stressors on health [20]. Further maladaptive coping strategies in this context are avoidance behavior and rumination. Avoidance behavior, which might occur after a discriminatory event, encompasses behaviors such as not thinking about the discriminatory event and reducing social contact due to fear of renewed discrimination [21]. Rumination refers to the tendency to perseverate on negative feelings and problems, and has been found to increase negative affect and symptoms of depression [22]. Ruminating about negative experiences (e.g., after a discriminatory event) potentially exacerbates and prolongs existing emotions, leading to heightened stress.

In summary, research has demonstrated multiple adverse effects of ethnic discrimination. Experiencing chronic ethnic discrimination leads to higher stress and may negatively impact affect and biological stress systems. Moreover, it may spill over into other domains and affect proximal outcomes such as the use of maladaptive coping strategies and rumination. The chronicity of ethnic discrimination—measured retrospectively—has also been shown to be associated with the magnitude of the psychological stress response to acute discrimination in laboratory studies (e.g., [8]). However, these studies were limited to single discriminatory events and did not assess immediate psychological responses in a natural setting. The effects of acute ethnic discrimination in daily life, that is, the psychological responses following a discriminatory event, have not yet been investigated in detail. The longitudinal or daily diary studies in this area are also limited, as they did not distinguish between the effects of the chronicity of ethnic discrimination and acute discriminatory events. Critically, moreover, the majority of research included a limited sampling time, ranging from 24 hr to 14 days, with only a small number of studies sampling for 20 days or more (e.g., [3, 23]). Furthermore, to the best of our knowledge, no previous research has used data from an ambulatory assessment study and directly associated them with data from a laboratory study in the same individuals.

To overcome the shortcomings of previous studies, we investigated the distinct psychological effects of chronic ethnic discrimination in terms of their interaction with acute discriminatory events in a time-coupled fashion (i.e., as they occur in daily life). The sample comprised Turkish immigrants, who constitute one of the largest groups of immigrants in Europe as a whole and the greatest proportion of non-EU citizens in Austria and several other European countries. Discrimination against Turkish immigrants is widespread, and male Turkish immigrants report more experiences of discrimination than females (e.g., [24]). Moreover, the present study is part of a broader research project investigating biological correlates of ethnic discrimination (using endocrine and physiological outcomes, see [8]), and females show greater variability in hormone levels depending on the menstrual cycle phase or the use of hormonal contraceptives. For these reasons, we chose to focus on male participants in the project.

The present ambulatory assessment study focused on the daily life of male Turkish immigrants who experience chronic ethnic discrimination and a comparison group of male Turkish immigrants who infrequently experience ethnic discrimination. Specifically, we aimed to measure the direct and time-lagged psychological consequences of ethnic discrimination over a period of 30 days, investigating the following hypotheses (for more information, see the study protocol [25]):

1) Male Turkish immigrants who experience chronic ethnic discrimination (chronic group) will report higher perceived stress, lower positive affect, higher negative affect, higher stress reactivity to daily hassles, higher anticipation of discriminatory events, and higher avoidance behavior regarding discriminatory events than male Turkish immigrants who experience ethnic discrimination infrequently (infrequent group).
2) On days when acute discriminatory events occur, the chronic group will report higher perceived stress, lower positive affect, higher negative affect, higher stress reactivity to daily hassles, higher anticipation of discriminatory events, and stronger rumination than the infrequent group.
3) Immediately after acute discriminatory events occur, the chronic group will report higher perceived stress than the infrequent group.

4) On the day after the occurrence of acute discriminatory events, the chronic group will report higher perceived stress, lower positive affect, higher negative affect, and higher stress reactivity to daily hassles than on days when no acute discriminatory events occurred on the previous day.
5) On days when discriminatory events occur, the chronic group will report higher anticipation of discriminatory events and higher avoidance behavior with regard to discriminatory events than on days when no acute discriminatory events occur.

A summary of all assumed associations is provided in Fig. 1.

Additionally, we conducted exploratory analyses, wherein we linked subjective stress assessed in the ambulatory assessment study to subjective stress and cortisol response to a standardized discriminatory event in the laboratory as well as hair cortisol concentrations (see [8]). The current ambulatory assessment study and the laboratory study published in [8] were parts of an overarching project. A proportion of participants were included in both studies—thus allowing us to explore how these participants responded to discriminatory events with high external (i.e., the current ambulatory assessment study) and internal validity (i.e., a standardized discriminatory event in the laboratory).

Open Practices Statement

The protocol paper for the ambulatory assessment study (including design, hypotheses, and analysis plans) can be accessed at https://doi.org/10.1136/bmjopen-2020-046697 (or see [25]). All data are obtainable from the corresponding author upon request.

Method

This study was approved by the institutional review board of the University of Vienna, Austria (reference number 00358) and conducted in accordance with the Declaration of Helsinki.

Participants

Ninety male Turkish immigrants participated in this study between September 2020 and June 2022. The study was conducted after the onset of the COVID-19 pandemic, and the assessment period for all participants was outside of government-mandated public shutdowns in Austria. We recruited twice as many participants in the chronic ethnic discrimination group than in the infrequent ethnic discrimination group in order to achieve a sample size that is sufficiently powered to compare the two groups over time (Hypotheses 1–3) and to detect event-based effects in the chronic ethnic discrimination group alone (Hypotheses 4 and 5). Our sample size was determined via simulation-based power analyses, as described in [25].

Thirty-two male Turkish immigrants, 20 in the chronic group and 12 in the infrequent group, participated in both the ambulatory assessment study and the laboratory study.

Procedure

Participants were recruited through advertisements in public places (e.g., local shops) and on social media platforms. Persons interested in participating underwent a telephone interview and were screened regarding our eligibility criteria. To be considered an immigrant, the participants themselves or at least one of their parents had to have been born

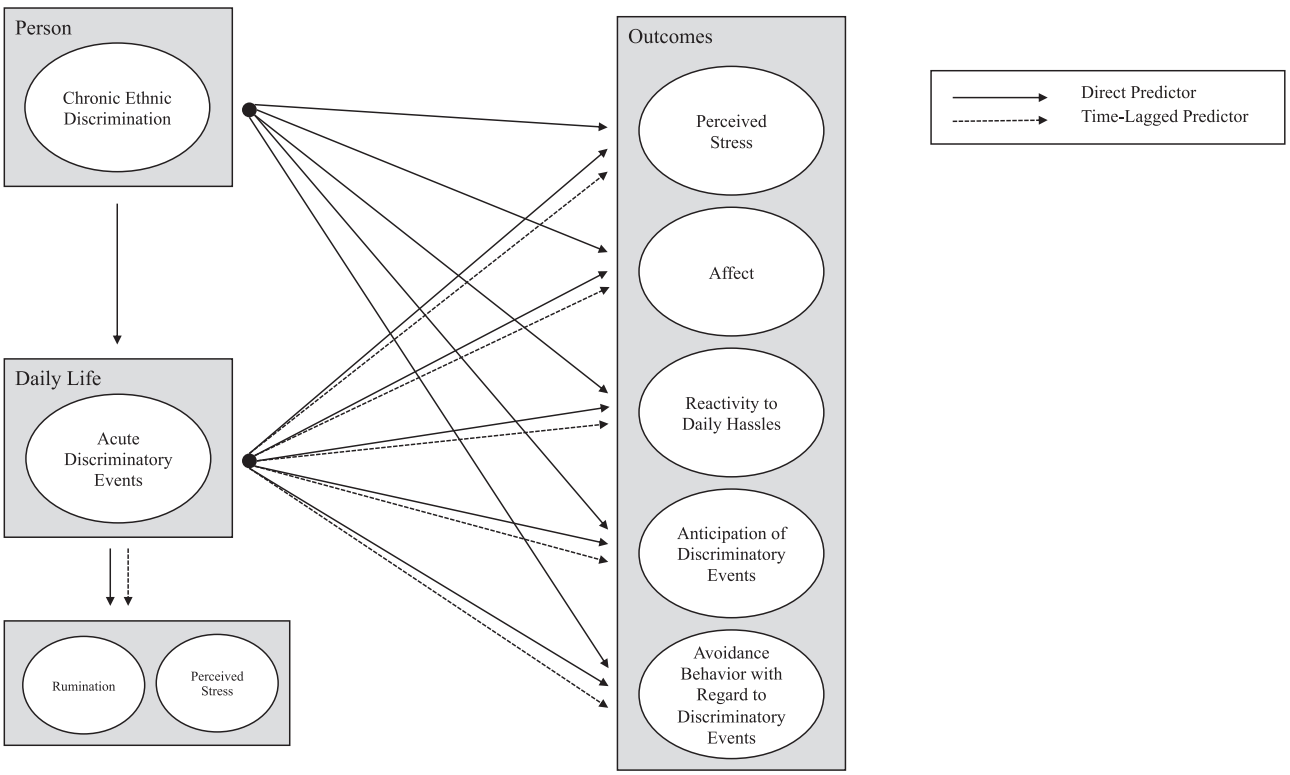

Fig. 1. Model of the effects of chronic ethnic discrimination and acute discriminatory events investigated in the study.

in Turkey (i.e., first or second generation). Further inclusion criteria were male sex, age between 18 and 65 years, sufficient command of the German language, no alcohol or drug abuse, no medical illnesses, no mental disorders, and a body mass index between 18 and 30 kg/m^2.

The absence of a mental disorder was determined using individual items from the German version of the Structured Interview for DSM-IV Axis I Disorders (SCID-I [26]) and the Patient Health Questionnaire (PHQ [27]). Furthermore, given our focus on Turkish immigrants who experience chronic ethnic discrimination, during the telephone interview, participants were asked to complete a 10-item version of the Everyday Discrimination Scale (EDS [28]) in a German translation [29]. The EDS is one of the most widely used measures of perceived discrimination, and captures aspects of interpersonal discrimination in daily life. Participants were asked to report how often they were treated unfairly because of their Turkish background. Items included everyday experiences such as being treated with less respect, being treated with less courtesy, and people acting as if they think that one is not smart, and were rated on a 6-point Likert-type scale (1—never, 6—almost every day). The EDS scores were coded according to an approach proposed by Michaels et al. [30], which provides a more nuanced assessment of exposure to discrimination than traditional frequency scores, thus allowing for a comparison of two extreme value groups (i.e., chronic and infrequent exposure). Using this approach, responses were adjusted to the number of days with discriminatory events per year, resulting in the following anchors: 1 (never) = 0; 2 (less than once a year) = 0.5; 3 (a few times a year) = 3; 4 (a few times a month) = 36; 5 (at least once a week) = 104; 6 (almost every day) = 260. A summed value was then calculated (i.e., annual chronicity), with a potential range from 0 to 2,600. Michaels et al. [30] provided evidence for the robustness and sensitivity of this scale-coding approach and proposed cutoffs, with scores <25 indicating infrequent exposure to ethnic discrimination and >481 indicating chronic exposure. We used a slightly adapted cutoff score for chronic exposure (>500) and retained <25 as a cutoff for infrequent exposure. Participants were only included in the study if they fell above or below these cutoff values.

Ambulatory assessment study

After the screening procedure, participants were invited to the Outpatient Unit of the Faculty of Psychology at the University of Vienna, Vienna, Austria, for an introductory session. During this introductory session, participants provided written informed consent, completed the baseline measures, and were trained to handle the daily diary questionnaire and a preprogrammed iPod touch (iDialogPad, G. Mutz, Cologne, Germany) to report discriminatory events. The definition of discriminatory events (i.e., any event perceived as discriminatory based on the person's ethnic background) was explained and examples of different forms of discriminatory events (e.g., overt, subtle, or institutional) were provided and discussed. Participants were instructed to report discriminatory events immediately after experiencing them throughout the assessment period of 30 days using the iPod touch. Additionally, they were asked to complete the daily diary questionnaire every day, which was provided on an internet survey platform (Unipark EFS Survey, Globalpark, Cologne, Germany). Emails containing a link to each day's questionnaire were sent every evening at 8 p.m., and participants could complete the questionnaire on a personal computer, smartphone, or the provided iPod touch. To match repeated assessments on the daily diary questionnaire, all participants were provided with a unique code, which they had to enter at every study assessment. Furthermore, participants were given a manual containing detailed step-by-step descriptions of the procedure, instructions on handling the iPod touch and responding to the different items, and contact information of the study team in case of technical difficulties or any inquiries. After completing the study, participants were again invited to our laboratories to return the iPods and for a post-participation interview. Irrespective of response rates, each participant received 100 € as compensation.

Laboratory study

In the laboratory study [8], Turkish immigrants underwent a validated 10-min ethnic discrimination paradigm (a physician's consultation with verbal and nonverbal discriminatory cues), and perceived stress and salivary cortisol were measured in response to the discrimination paradigm. Additionally, we assessed cortisol concentrations in hair (a measure of retrospective cortisol output (see [31]).

Measures

Baseline

Participants completed the baseline measures during the introductory session. First, participants provided information on their age and education, and then completed questionnaires to assess perceived stress and mental and physical health (see below).

Perceived stress

The Perceived Stress Scale (PSS-10) by Cohen et al. [32] was used to measure perceived stress in the last month (e.g., "In the last month, how often have you felt that you were unable to control the important things in your life?"). All items were rated on a 5-point scale (0 = never, 4 = always).

Depressive symptoms

The depression module (PHQ-9) of the PHQ [27] was used to examine depressive symptoms. The PHQ-9 is one of the most widely used instruments to assess depressive symptoms, and contains nine items covering impairment by depressive symptoms in the last 2 weeks.

Somatoform symptoms

To assess somatoform symptoms, we used the somatoform module (PHQ-15) of the PHQ [27]. The module assesses how bothered respondents have felt by 15 common physical complaints in the last 4 weeks. As our sample only comprised male participants, the item "menstrual cramps or other problems with your periods" was excluded.

Daily diary

In the daily diary assessment, participants were first asked whether discriminatory events had occurred over the course of the day and, if so, to provide detailed descriptions of each event in a text box. Subsequently—and irrespective of the occurrence of acute discriminatory events—current perceived stress and perceived discrimination were assessed with two items (i.e., "How stressed do you feel right now?" and "How discriminated do you feel right now?"), both rated on

a 5-point Likert-type scale ranging from 0—not at all to 4—very much.

Affect

The 20-item Positive and Negative Affect Schedule (PANAS [33]) was used to assess daily positive and negative affect. The PANAS is one of the most widely used scales to assess affect and has been validated for the assessment of daily affect. Positive affect (e.g., excited, proud) and negative affect (e.g., upset, afraid) are each assessed with 10 items, rated on a 5-point Likert scale ranging from 0—not at all to 4—very much.

Daily hassles

Stress reactivity to daily hassles was assessed using 18 items from the Daily Hassles Scales revised [34]. The items covered negative events from six different domains of life: financial problems, time pressure, work hassles, environmental hassles, family hassles, and health hassles. Daily hassles may occur without being perceived as stressful. Therefore, all items were rated on a 5-point scale with the response options 0—did not occur, 1—occurred, not stressful, 2—occurred, somewhat stressful, 3—occurred, moderately stressful, and 4—occurred, very stressful.

Rumination

If participants reported a discriminatory event, three items measuring rumination following discriminatory events were presented ("I kept thinking about it," "I re-enacted the situation in my mind," and "I thought about the reasons why I was treated badly"). These items were adapted from the Anger Rumination Scale [35], and were rated on a 5-point scale ranging from 0—not at all to 4—very much.

Anticipation of discriminatory events

The anticipation of discriminatory events was assessed with three items (e.g., "I try to prepare for possible discriminatory events that may happen tomorrow") from the Racism-related Vigilance Scale [36]. The items were rated on a 5-point scale ranging from 0—not at all to 4—very much.

Avoidance behavior with regard to discriminatory events

Participants responded to four items assessing avoidance behavior with regard to discriminatory events, which were adapted from the avoidance subscale of the Coping Strategy Indicator [21]. The items (e.g., "Today, I avoided people or situations because I feared being discriminated against") were rated on a 5-point scale ranging from 0—not at all to 4—very much.

Discriminatory events

After experiencing an acute discriminatory event, participants started an assessment by activating the iPod touch. They were then asked, "Did you encounter a discriminatory event?," followed by "What exactly happened?," with a range of response options: "threatened," "called names or insulted," "attacked," "treated as if I knew little/taken for a fool," "offered advice and opinions I didn't want," "treated worse, received poorer service," "denied entry (e.g., nightclub)," and "other." These response options were derived from several literature sources on unfair treatment and ethnic discrimination (e.g., [37]) with the aim of accounting for different forms of discriminatory events (i.e., overt, subtle, and institutional).

Subsequently, participants were asked how many persons (from a list of 1–10 or more) had discriminated against them and who these persons were, with the response options "familiar person(s)," "unfamiliar person(s)," "the police," "medical personnel," "vendor/salesperson," "service personnel," "doorman," and "other." To facilitate nuanced responses, it was possible to select multiple options (e.g., both familiar person(s) and service personnel in order to report a waiter who was familiar to the participant). The next question asked about the specific area of life in which the event had happened, with the response options "work," "leisure time," "shopping," "restaurant/eating or drinking out," "dealing with government agencies," "doctor's visit/health care setting," "internet/online gaming," and "other." Finally, two items assessed perceived stress and perceived discrimination during the discriminatory event (i.e., "How stressed did you feel in this situation?" and "How discriminated did you feel in the situation?"), both rated on a 5-point scale ranging from 0—not at all to 4—very much.

Data Analysis

Analyses were conducted using the software IBM SPSS 26 and R 3.6. Descriptive statistics of baseline variables and discriminatory events are presented, and our hypotheses were analyzed using multilevel models. Repeated data entries at level 1 (i.e., stress, affect, reactivity to daily hassles, anticipation of discriminatory events, avoidance behavior with regard to discriminatory events, and rumination) were nested in participants (level 2, see our protocol paper [25] for a detailed account of our analyses).

For Hypothesis 1 (effects of chronic ethnic discrimination in daily life), we computed models with the time-invariant predictor *group* coded as 0/1 (infrequent/chronic; infrequent refers to infrequent exposure to ethnic discrimination, chronic refers to chronic exposure) as a fixed effect and the daily diary variables as outcomes.

For Hypothesis 2 (effects of acute discriminatory events on the same day), random slope models were computed. These models included the time-invariant predictor *group* as a fixed effect, the time-varying predictor *event* coded as 0/1 (acute discriminatory event occurred: no/yes, as indicated in the daily diary assessments) as a random slope, and the cross-level interaction group × event. The outcomes were the daily diary variables.

For Hypothesis 3 (immediate effects of acute discriminatory events in daily life), we computed one model with the time-invariant predictor *group* as a fixed effect and the outcome perceived stress immediately after the occurrence of acute discriminatory events.

For Hypothesis 4 (prolonged effects of acute discriminatory events), random slope models were computed. These models included the predictor *group* as a fixed effect and the time-varying predictor *event –1* coded as 0/1 (acute discriminatory event occurred on the previous day: no/yes, as indicated in the daily diary assessments), denoting the day after the discriminatory event as a random slope. The outcomes were the daily diary variables. If discriminatory events occurred on two (or more) consecutive days, only the day following the most recent discriminatory event was included in the analyses.

Finally, for Hypothesis 5 (anticipation of discriminatory events and avoidance behavior regarding discriminatory

events), two models were computed. These models included the time-invariant predictor *group* as a fixed effect, the time-varying predictor *event* coded as 0/1 (acute discriminatory event occurred: no/yes, as indicated in the daily diary assessments) as a random slope, and the cross-level interaction group × event. The outcomes were the anticipation and avoidance behavior variables from the daily diary questionnaire.

For the exploratory analyses (association between immediate effects of acute discrimination in daily life and psychobiological stress responses in the laboratory as well as hair cortisol concentrations), three models were computed. These models contained the time-invariant predictor *group* and, as a fixed effect, perceived stress immediately after the occurrence of acute discriminatory events in daily life as a predictor. The models included three outcomes: (1) the delta-peak (Δ) of subjective stress, that is, the absolute change from baseline to peak stress in response to the laboratory paradigm, (2) the area under the curve with respect to increase (AUCi) for salivary cortisol using the trapezoid formula by [38], and (3) hair cortisol concentrations (in pg/mg).

Results

Our sample consisted of 90 Turkish immigrants, 60 of whom experienced ethnic discrimination frequently/chronically (chronic group) and 30 who experienced ethnic discrimination infrequently (infrequent group). The two groups did not differ significantly in terms of age, generational status, body mass index, or educational attainment (all *p*s > .268, see Table 1). Compared with the infrequent group, the chronic group reported more depressive symptoms ($p = .001$), more somatoform symptoms ($p = .001$), and higher perceived stress ($p < .001$). Compliance rates were excellent: 94% of all daily diary assessments were completed, and the mean duration of each assessment was 3.16 min.

In total, 158 acute discriminatory events were reported by $n = 52$ participants over the course of the 30-day assessment (141 events in the chronic group, 17 in the infrequent group). The most frequently reported form of ethnic discrimination was being called names or insults (35% of all events), followed by being treated worse/receiving poorer service (26%). In the majority of events (74%), one person discriminated against the participants; 20% of the events included two persons and 6% included three or more persons. The perpetrators were unfamiliar persons in 47% of all events and familiar to the participants in 26% of events. Regarding the area of life in which the discriminatory events occurred, 30% of events occurred in participants' leisure time, 22% at work, and 10% while shopping. See Table 2 for a detailed summary of the forms of discriminatory events.

Effects of Chronic Ethnic Discrimination in Daily Life (Hypothesis 1)

Participants in the chronic group consistently showed higher values on all outcomes—except for positive affect—than those in the infrequent group. Unstandardized coefficients of group were $b = 0.80$ for perceived stress, $b = 0.70$ for perceived discrimination, $b = 0.64$ for negative affect, $b = 0.58$ for daily hassles, $b = 0.78$ for anticipation, and $b = 0.70$ for avoidance (all *p*s < .001). Positive affect did not differ between the two groups ($b = -0.14$, $p = .387$). See Fig. 2 for descriptive summaries of all outcomes over the 30 days.

Effects of Discriminatory Events on the Same Day (Hypothesis 2)

On days when discriminatory events occurred, all participants—irrespective of their discrimination chronicity/group—reported higher amounts of perceived stress ($b = 0.97$, $p = .002$), perceived discrimination ($b = 1.44$, $p < .001$), negative affect ($b = 0.62$, $p < .001$), anticipation ($b = 0.46$, $p < .001$), and rumination ($b = 1.86$, $p < .001$). Discriminatory events also led to reports of lower positive affect ($b = -0.28$, $p = .040$). A significant interaction of group × event was found for reactivity to daily hassles ($b = 0.24$, $p = .016$) and avoidance

Table 1 Characteristics of the Participants in the Two Groups

	Chronic ethnic discrimination (chronic, $n = 60$)	Infrequent ethnic discrimination (infrequent, $n = 30$)	
	n (%)		χ^2 (*p*)
Migration background			
First generation	17 (28%)	10 (33%)	2.192 (.534)
Second generation	43 (62%)	20 (67%)	
High school diploma or above	48 (80%)	21 (70%)	0.629 (.428)
	M (*SD*)		*t* (*p*)
Age	26.73 (5.43)	28.87 (9.65)	1.125 (.268)
BMI	24.49 (3.00)	24.56 (2.76)	0.111 (.912)
Everyday discrimination (EDS)	799.01 (396.86)	8.93 (5.73)	**16.542 (<.001)**
Perceived stress (PSS-10)	19.83 (6.86)	14.53 (5.93)	**3.608 (<.001)**
Depressive symptoms (PHQ-9)	6.60 (5.33)	3.50 (3.42)	**3.335 (.001)**
Somatoform symptoms (PHQ-15)	5.93 (5.24)	2.97 (3.07)	**3.379 (.001)**

BMI body mass index.
Bold values indicate significant *p*-values.

Table 2 Descriptive Summary of Reported Discriminatory Events

	Frequency of events (%)
Discriminatory event category	
Called names/insulted	55 (35)
Treated worse/received poorer service	41 (26)
Treated as if they knew little/taken for a fool	27 (17)
Offered unwanted advice and opinions	10 (6)
Threatened	5 (3)
Attacked	2 (1)
Other/missing	18 (11)
Perpetrator category	
Unfamiliar person	74 (47)
Familiar person	41 (26)
Police	8 (5)
Medical personnel	6 (4)
Vendor/salesperson	5 (3)
Service personnel	5 (3)
Other/missing	19 (12)
Area of life category	
Leisure time	48 (30)
Work	34 (22)
Shopping	15 (10)
Restaurant/eating or drinking out	19 (12)
Health care setting	8 (5)
Dealing with government agencies	5 (3)
Internet/online gaming	4 (3)
Other/missing	25 (16)

Note. Percentages may not total 100 due to rounding.

(b = 0.31, p = .013), insofar as the chronic group reported a higher increase in reactivity to daily hassles and avoidance coping on days when discriminatory events occurred than did the infrequent group (simple slopes: daily hassles, b = 0.79, p < .001; avoidance, b = 0.95, p < .001). In addition, rumination was stronger in the chronic group than in the infrequent group (b = 0.86, p = .033). No significant main effects or interactions were found for any other variables.

Immediate Effects of Discriminatory Events on Perceived Stress (Hypothesis 3)

Participants in the chronic group reported significantly higher perceived stress, as assessed immediately after discriminatory events, than those in the infrequent group (M = 2.64, SD = 1.29 vs. M = 1.09, SD = 1.38, b = 1.52, p < .001).

Prolonged Effects of Discriminatory Events (Hypothesis 4)

A time-lagged effect of discriminatory events was only found on reactivity to daily hassles. A main effect of the time-lagged event on reactivity to daily hassles emerged (b = 0.16, p < .001), indicating that a spillover effect of discriminatory events into the next day existed in both groups. Furthermore, a group × time-lagged interaction (b = 0.20, p = .041) was found, indicating that this effect was larger for the chronic group than for the infrequent group (simple slope: b = 0.77, p < .001). No other time-lagged effects were identified. See Fig. 3 for a graphical depiction of time-lagged effects for all outcomes.

Anticipation and Avoidance in the Chronic Group (Hypothesis 5)

In the chronic group, higher anticipation of discriminatory events was reported on days when discriminatory events occurred (b = 0.68, p < .001) than on days when no such events occurred. The same pattern was found for avoidance (b = 0.78, p < .001).

Exploratory Results: Associations Between Responses to Discriminatory Events in Daily Life and in the Laboratory and Relations to Hair Cortisol Concentrations

For our exploratory analyses, data was available for 32 male Turkish immigrants, 20 in the chronic group (M_{age} = 24.77) and 12 in the infrequent group (M_{age} = 23.80). For immediate effects of discriminatory events on perceived stress (both in real life and the laboratory), we found that ratings of stress after discriminatory events in daily life were positively associated with perceived stress after laboratory discrimination (b = 6.10, p = .034), indicating that the self-reported stress response to discrimination in daily life was congruent with the stress response in the laboratory. This association was higher for the chronic group (b = 9.03, see Fig. 4A for a graphical depiction). However, immediate subjective stress after discriminatory events in daily life was not associated with salivary cortisol output in the laboratory (AUCi; b = −0.03, p = .564). A trend may be observed for the chronic group (see Fig. 4B): higher immediate stress after discriminatory events seems to be associated with lower AUCi values in the laboratory. This trend, however, was not statistically significant. Hair cortisol concentrations were not associated with immediate stress after discriminatory events in daily life (b = 0.23, p = .742; see Fig. 4C).

Discussion

Guided by a stress and coping framework, the present study investigated the direct and indirect effects of chronic ethnic discrimination on male Turkish immigrants living in Austria. Using an ambulatory assessment design, we explored a multifaceted array of relevant psychological outcomes, such as stress, affect, and coping strategies, directly in the daily lives of Turkish immigrants. Furthermore, we examined exposure to discriminatory events and their immediate and prolonged psychological consequences. Finally, using data from a previously published study, we compared the subjective stress response to discriminatory events in daily life to psychobiological stress responses to a standardized laboratory discrimination paradigm (i.e., ethnic discrimination with high internal validity).

Reported discriminatory events in daily life were by no means rare and occurred mostly during the participants' leisure time or at work.

In line with Hypothesis 1 (effects of chronic ethnic discrimination in daily life), the chronic group indicated higher subjective stress, negative affect, and reactivity to daily hassles, as well as greater anticipation and avoidance coping, compared

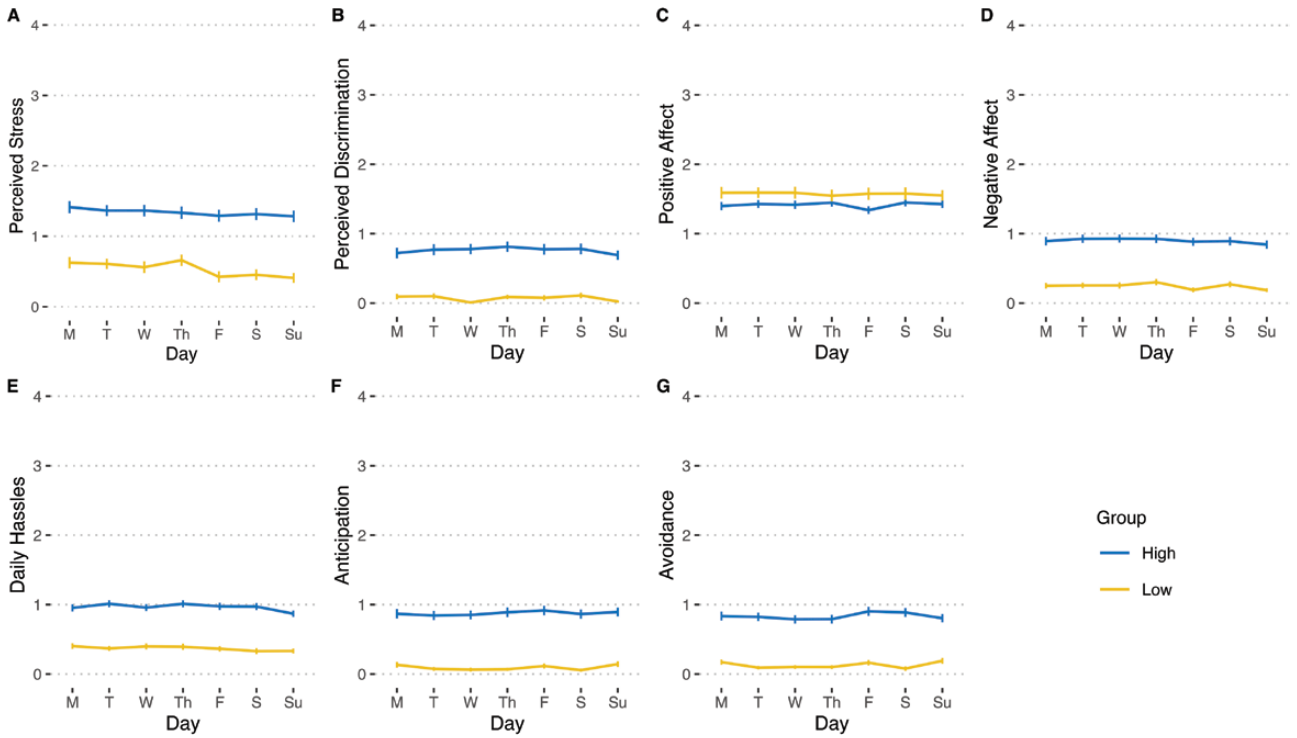

Fig. 2. Perceived Stress (A), Perceived Discrimination (B), Positive Affect (C), Negative Affect (D), Daily Hassles (E), Avoidance (F), and Anticipation (G) for both groups over the 30 days (*M* ± *SEM*).

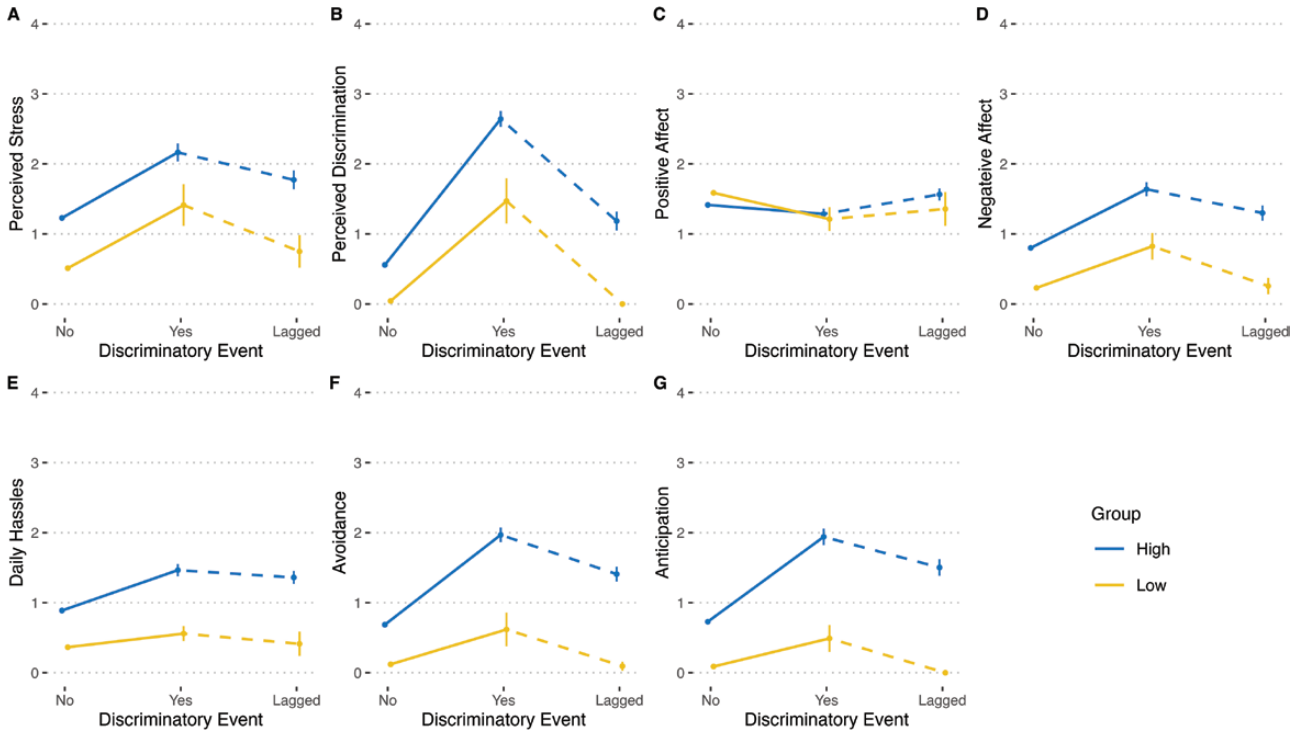

Fig. 3. ?Perceived stress (A), perceived discrimination (B), positive affect (C), negative affect (D), daily hassles (E), avoidance (F), and anticipation (G) for both groups on days when no discriminatory events had occurred ("No"), on days when an event had occurred ("Yes"), and on days when a discriminatory event had occurred on the previous day (time-lagged effects; "Lagged") (*M* ± *SEM*).

with the infrequent group. These findings confirm the results of previous research reporting a positive association between the frequency of ethnic discrimination and adverse psychological factors (e.g., [2, 11]). Moreover, our findings suggest that chronic exposure to ethnic discrimination leads to more frequent use of potentially taxing coping strategies—anticipation and avoidance. Indeed, participants in the chronic group were more often in a vigilant state of anticipation of

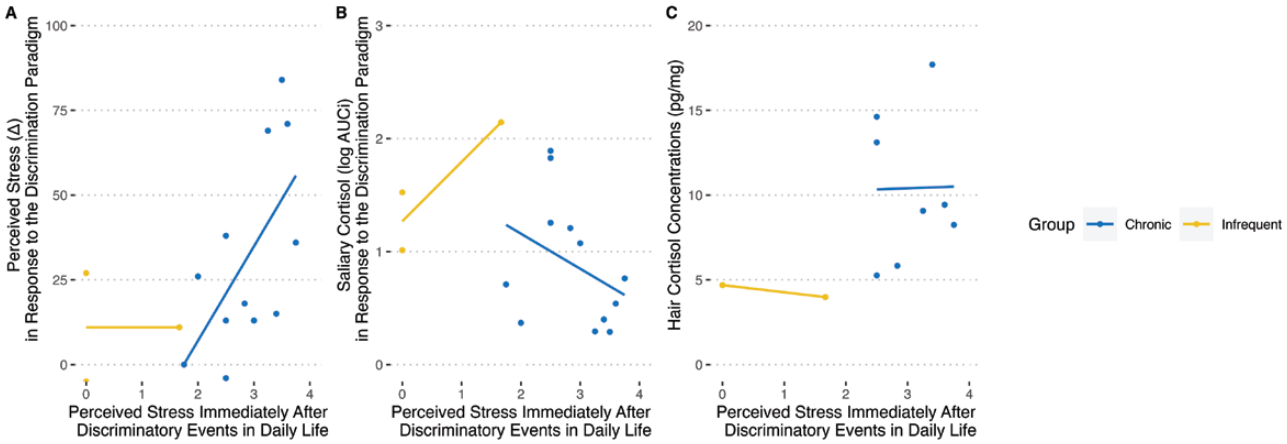

Fig. 4. Associations of perceived stress after discriminatory experiences in daily life and the perceived stress response to the laboratory paradigm (A), the Salivary Cortisol Area Under the Curve increase (AUCi) in response to the laboratory paradigm (B), and hair cortisol concentrations (C).

discriminatory events, expending cognitive-behavioral efforts to avoid situations where discrimination might occur or the emotions it elicits (see [39]). Critically, both avoidance and anticipation coping styles in response to ethnic discrimination have been linked to more depressive symptoms and worse cardiovascular health across the lifespan in Black American samples [36, 39].

Furthermore, our study revealed that acute ethnic discrimination led to a higher reactivity to daily hassles in individuals who experienced chronic discrimination than in those experiencing infrequent discrimination (Hypothesis 2). This finding points to a spillover effect, in that the existence of one stressor (the acute discriminatory event) may create and potentially exacerbate the impact of other stressors (i.e., daily hassles) in individuals who experience chronic ethnic discrimination. Furthermore, this effect on daily hassles persisted until the following day (Hypothesis 4). Corresponding mechanisms of stress proliferation are also known from domains such as caregiving (e.g., [40]) and may mirror the adverse effects of chronic ethnic discrimination reported here. Contrary to our expectation, this higher reactivity to discriminatory events in persons experiencing chronic discrimination was not found for any other outcome except for daily hassles, avoidance coping, and rumination. In line with our findings, a recent daily life study with African Americans reported that in participants with more past discrimination experience, discriminatory events led to lower momentary coping resources but not to lower negative affect [41].

Additionally, and as proposed in Hypothesis 3, in our sample of male Turkish immigrants, the group experiencing chronic discrimination reported higher perceived stress immediately after acute discrimination. This suggests that chronic discrimination may deplete psychological resources, leading individuals to evaluate discriminatory events (as they continue to happen) as more stressful. Indeed, maladaptive coping resources were higher overall in the chronic group (Hypothesis 1) and increased even more when acute discrimination occurred (Hypothesis 5). This difference in immediately perceived stress between the two groups corresponds well to another study conducted within the same research project, which reported different stress response patterns when exposed to laboratory discrimination while controlling for past discrimination exposure [8].

On an emotional level, however, chronic ethnic discrimination did not exacerbate the impact of discriminatory events on affect—in line with previous research on chronic and daily racial discrimination with a high temporal resolution [5]. One possible explanation for this lack of interaction effect might be found in a study by Bolger et al. [42], who reported that people experiencing chronic stress showed emotional plateaus that were not easily affected by additional stressors. Accordingly, individuals affected by chronic ethnic discrimination may show signs of affective habituation with respect to acute discriminatory events. While findings on whether the interaction of chronic discrimination and acute events potentially exacerbates negative psychological or biological outcomes are still mixed (see [43], for a review), the present study demonstrated that chronic ethnic discrimination indeed depleted psychological resources—primarily those pertaining to stress and stress-related coping—in male Turkish immigrants.

Further, we attempted to explore the psychobiological effects of chronic ethnic discrimination by conducting exploratory analyses that connected daily life data with psychobiological outcomes in a controlled laboratory context, utilizing data previously published in [8]. We found a positive association between immediate subjective stress responses to real-life and laboratory-based discriminatory events, indicating that the findings on subjective stress from laboratory studies may be generalizable to the ambulatory context. However, we found no association between immediate subjective stress responses to real-life discriminatory events and cortisol response to ethnic discrimination in the laboratory or hair cortisol concentrations. While we did not find statistically significant associations, we note that we detected the pattern that cortisol output during the laboratory session was lower in the chronic group and was also negatively related to higher immediate stress in response to real-life discrimination. This possibly fits the notion that the HPA axis shows signs of dysregulation when the discrimination chronicity increases. Further research is warranted to isolate the consequences of chronic and acute discrimination on biological markers of the HPA axis. While our results on psychobiological associations of ethnic discrimination suggest relevant links, we note that the sample size for these analyses was relatively small. Further, these analyses were not part of the protocol for this project.

Our study also has other limitations. As we only included male, healthy, nonobese participants, it is unclear whether

the findings can be generalized to the population of Turkish immigrants as a whole. For example, other factors that can additionally negatively affect the health of immigrant populations, such as the use of alcohol or drugs as stress coping mechanisms (see, e.g., [44]), were not assessed in the present sample. Moreover, the inclusion criterion of an adequate command of German might have contributed to a selection bias. Furthermore, our participants were relatively highly educated (77% had attained at least a high school diploma, compared with 42% of Turkish immigrants in Austria). Interestingly, other researchers (e.g., [45]) have reported a positive association between educational attainment of Turkish immigrants in Europe and discrimination frequency. Thus, while not fully representative, our sample may have been appropriate to study the effects of perceived ethnic discrimination in Turkish immigrants. Moreover, further factors that were not accounted for might have influenced the exposure to discriminatory events, such as participants' work contexts or the specific neighborhoods in which they lived.

In conclusion, the relatively long sampling period and the real-time assessment of acute discrimination in our study allowed us to demonstrate the deleterious effects of chronic and acute ethnic discrimination in terms of psychological consequences. The design of our intensive ambulatory assessment, with repeated entries over 30 days and time-invariant reports of discriminatory events, emerged as highly feasible, as the response rates and compliance were excellent. Our findings foster the understanding of the mechanisms that lead to reduced well-being and health disparities in ethnic minority populations. Furthermore, the interplay between chronic and acute ethnic discrimination seems to exert a strong impact on stress and stress-related outcomes. Interventions that target coping with discrimination-related stress may therefore be an effective option to reduce the burden of chronic ethnic discrimination and subsequently improve psychological well-being (see, e.g., [46]. Future research could also employ momentary interventions targeted to relieve stress or other psychological states as they occur, which could be delivered, for example, through digital means [47].

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Compliance with Ethical Standards

Authors' Statement of Conflict of Interest and Adherence to Ethical Standards Andreas Goreis, Urs M. Nater, and Ricarda Mewes declare that they have no conflict of interest.

Authors' Contributions Andreas Goreis (Conceptualization [equal], Data curation [lead], Formal analysis [lead], Investigation [lead], Visualization [lead], Writing – original draft [lead], Writing – review & editing [equal]), Urs M. Nater (Conceptualization [equal], Methodology [equal], Resources [equal], Supervision [equal], Writing – review & editing [equal]), and Ricarda Mewes (Conceptualization [equal], Methodology [equal], Resources [equal], Writing – original draft [supporting], Writing – review & editing [equal])

Transparency Statements (1) *Study registration*: The study was preregistered in a published study protocol (see Goreis et al., 2021, *BMJ Open*, http://dx.doi.org/10.1136/bmjopen-2020-046697). (2) *Analytic plan preregistration*: The analysis plan was registered prior to beginning data collection in a published study protocol (see Goreis et al., 2021, *BMJ Open*, http://dx.doi.org/10.1136/bmjopen-2020-046697). (3) *Analytic code availability*: Analytic code used to conduct the analyses presented in this study are not available in a public archive. They may be available by emailing the corresponding author. (4) *Materials availability*: All materials used to conduct the study may be available by emailing the corresponding author.

Data Availability

Deidentified data from this study are not available in a public archive. Deidentified data from this study will be made available (as allowable according to institutional IRB standards) by emailing the corresponding author.

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