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Daily agreeableness and acculturation processes in ethnic/racial minority freshmen: The role of inter-ethnic contact and perceived discrimination

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Abstract

Objectives: Having higher levels of mainstream cultural orientation (MCO), an important component of acculturation attitudes and behaviors, is beneficial for ethnic/racial minority students during the transitions into university. Scant research has investigated MCO at a micro daily timescale. This study examined how personality (agreeableness) functions in conjunction with interpersonal processes (inter-ethnic contact and perceived discrimination) to influence MCO as daily within-person processes.

Methods: Multi-level structural equation modeling were used to analyze month-long daily diary data from 209 ethnic/racial minority freshmen (69% female).

Results: There was a positive indirect association between agreeableness and MCO through inter-ethnic contact at both within- and between-person levels. At the within-person level, on days with lower (vs. higher) levels of ethnic/racial discrimination, higher levels of agreeableness were associated with higher levels of MCO.

Conclusions: These findings highlight the contributions of intensive longitudinal data in elucidating ethnic/racial minority students' personality and acculturation processes in daily life involving protective and risk factors on micro timescales.

KEYWORDS
acculturation, agreeableness, daily diary data, inter-ethnic contact, mainstream cultural orientation, perceived ethnic/racial discrimination

1 | INTRODUCTION

Acculturation, more specifically the adoption of a mainstream cultural orientation (MCO) (Berry, 2007), has positive implications for ethnic/racial minority students during the transition to university (Nishina et al., 2019). The significant increase in ethnic/racial diversity in North American university students over the recent years renders acculturation attitudes and behaviors important concerns for both

university students and policymakers. It is pivotal to identify both individual characteristics (e.g., personality) and interpersonal factors (e.g., inter-ethnic contact and discrimination) that promote or hinder MCO among ethnic/racial minority students to ensure them a smooth transition to university.

The school context provides numerous opportunities for students to meet with peers from other cultures or races/ethnicities, through which acculturation processes

can emerge (Nishina et al., 2019). Research on immigrant students has established the link between personality traits and acculturation attitudes, particularly highlighting the positive role of agreeableness (e.g., Schmitz & Berry, 2011). Although other personality traits (e.g., openness, extraversion) might also promote MCO, extant literature has most consistently shown that agreeableness is most closely linked with MCO (Schmitz, 1992; Schmitz & Berry, 2011; Ward et al., 2004). Daily inter-ethnic contact may partly explain the link between agreeableness and MCO (Turner et al., 2014). Those who are more agreeable are more likely to adapt into the mainstream culture through more frequent daily inter-ethnic contact. Despite its benefits in facilitating MCO, interacting with members of other cultures or races/ethnicities could also potentially serve as a double-edged sword by exposing ethnic minority students to discrimination (Nishina et al., 2019). Numerous studies have shown the adverse effects of discrimination on ethnic/racial minority students' adjustment (e.g., Benner et al., 2018; Wang & Yip, 2020). However, much less is known regarding the micro-level dynamics of personality and acculturation processes via daily diary studies (Fleeson, 2007; Schwartz et al., 2020). Using a month-long daily diary design, we examined how agreeableness functions in conjunction with both positive (i.e., inter-ethnic contact) and negative (i.e., discrimination) interpersonal processes to influence MCO. Specifically, we tested two mechanisms to investigate whether (1) daily inter-ethnic contact can partly mediate the link between agreeableness and MCO, and (2) daily perceived discrimination can moderate the link between agreeableness and MCO.

1.1 | Daily personality and acculturation processes

Scarce studies have investigated personality traits and acculturation as dynamic daily processes. Although personalities are conventionally viewed as traits that remain stable across time, an increasing volume of research has begun to consider personalities as states and examine them on a daily level (Larsen et al., 2009). Fleeson and Jayawickreme (2015) proposed that social-cognitive factors shape personalities in specific situations, which result in momentary manifestation of personality traits as states. For example, some college students increased their extraversion expression (e.g., become more talkative) when situations become more anonymous (Fleeson, 2007). Particularly, as state personality is more relevant to situational events and behaviors, it possibly is more related to daily experiences. For instance, on days when US college students reported higher levels of agreeableness, they also reported fewer negative social events, suggesting a

potential protective role of daily agreeableness against daily negative events (Hadden et al., 2017). Moreover, those who are more agreeable and open to new experience also report more positive emotions, with agreeableness showing stronger links than openness to daily well-being (Howell et al., 2017).

Acculturation is conventionally conceptualized as slow changing, and the majority of the past research has only focused on macro-level acculturation processes (Schwartz et al., 2020). Examining MCO as a micro-level process through a daily lens could potentially offer novel knowledge and reveal more nuanced patterns. Daily experiences shape daily MCO, which sets the stage for changes at the higher (i.e., long-term) level. For instance, cultural affiliation of Canadian international students fluctuates within the same day, and the persistent orientation toward a culture could change an individual's overall attitudes toward that culture (Doucerain et al., 2013). Among U.S. Hispanic college students, daily fluctuations in seeing oneself as successfully adopting an integrated cultural orientation is closely related to the fluctuations in the perception of the two cultures' compatibility (Schwartz et al., 2019). Emotional acculturation—minorities' emotional fit with the mainstream culture—among ethnic/racial minority adolescents in Belgium changes in response to the daily evaluations of their interactions with the majority members (Jasini et al., 2018). Taken together, personality may affect MCO through daily dynamic interactions between people and their surrounding social-cultural contexts. Consequently, the associations among these processes must be understood within the context of various experiences and relationships that university students encounter in daily life, yet currently, there is a lack of research linking daily interpersonal processes to MCO.

1.2 | Agreeableness, inter-ethnic contact, and mainstream cultural orientation

Although the literature suggests a link between agreeableness and MCO, less is known regarding the mechanisms underlying this association, especially on a daily basis. Trait agreeableness as encompassed in the five-factor personality model (McCrae & Costa, 1997) has been consistently linked with MCO. Specifically, high agreeableness is related to assimilation into the mainstream culture (Schmitz & Berry, 2011). Agreeableness can facilitate inter-cultural interactions and deter conflicts in interpersonal relationships (e.g., Berry et al., 2000; Ward et al., 2004). Hence, agreeable individuals are more likely to successfully adapt into the mainstream society through building interpersonal

connections. On the one hand, agreeableness can promote inter-ethnic/racial contact. It is related to more positive intergroup attitudes (Diehl, 2020), and is a key determinant of inter-ethnic contact quality among high school students (Vezzali et al., 2018). Among university ethnic/racial minority students, agreeableness is associated with having more positive and fewer negative close inter-racial relationships (Diehl, 2020). University students who are more agreeable are more likely to experience higher quality intergroup contacts (Jackson & Poulsen, 2005), although Antonoplis and John (2022) did not find agreeableness to promote more inter-ethnic friendships among university students.

In turn, inter-ethnic/racial contact could affect MCO. Meta-analysis of structured training programs for adolescents showed that the training approach focusing on direct intergroup contact has the strongest effect in fostering positive intergroup attitudes in adolescents (Beelmann & Heinemann, 2014). Therefore, it is plausible that inter-ethnic/racial contact also promotes MCO. Studies on expatriates' cross-cultural adjustment have revealed that engaging in more host national contact is beneficial for developing friendships with locals and becoming well-adjusted cross-culturally (e.g., Caligiuri, 2000). For students in diverse school settings, having intergroup connections could promote MCO through peer influence, whereby students begin to adopt their friends' values, beliefs, and behaviors (Kornienko & Rivas-Drake, 2021), which subsequently changes their cultural orientation. Additionally, forging inter-ethnic friendships—a special form of inter-ethnic contact—can promote U.S. Latino university students' well-being by decreasing their anxiety in daily intergroup settings (Page-Gould et al., 2008).

One remaining question in the literature is whether the link from personality traits, especially agreeableness, to MCO could be mediated by inter-ethnic contact. Agreeableness could foster acculturation partly through situational selection and evocation (Ickes et al., 1997; Turner et al., 2014), prompting adolescents to initiate favorable inter-ethnic contact opportunities and subsequently promoting MCO. Turner et al. (2014) nonetheless failed to reveal any indirect effect of agreeableness on outgroup attitudes through inter-ethnic friendship among British college students. Importantly, MCO changes and evolves in response to daily experiences and contextual factors. It is therefore necessary to capture these changes at micro timescales (e.g., daily; Umana-Taylor et al., 2014). Similarly, research should also investigate personality and acculturation processes over an extended, yet shorter period of time (i.e., daily or momentarily) compared to conventional multi-year longitudinal studies.

1.3 | Agreeableness, discrimination, and mainstream cultural orientation

Ethnic/racial discrimination is especially disturbing during adolescence and young adulthood as this is the period when peer relationships and interpersonal interactions become more salient (Bellmore et al., 2012). Research has demonstrated the detrimental effects of discrimination on ethnic/racial minority students' acculturation processes. In the face of discrimination and other unfair or unjust treatment, minority young immigrants from various ethnic/racial groups in the US are more likely to have increased endorsement of their heritage culture and decreased endorsement of the mainstream US culture (Rumbaut, 2008).

Several studies have taken a daily diary approach to assess discrimination (e.g., Chen et al., 2022; Torres & Ong, 2010). Examining daily discrimination offers a unique opportunity to understand MCO as a dynamic process resulting from daily person–environment interactions. Daily ethnic teasing and discrimination make adolescents who are high on trait anxiety experience higher daily anxiety, which can last for several days (Douglass et al., 2016). Moreover, when ethnic/racial minority high school students experience higher levels of daily discrimination, better and longer sleep on the previous night facilitates better coping and well-being on the next day (Wang & Yip, 2020). However, no research has examined the moderating role of discrimination in the link between agreeableness and MCO, let alone in daily contexts. Collectively, discrimination plays an important role in ethnic/racial minority students' daily life. Understanding how discrimination impacts individual characteristics and interpersonal processes during the transition to university, especially in daily life, is crucial for supporting the healthy development and well-being of university students.

Previous studies have identified cultural orientation as a protective factor against discrimination (Neblett Jr. et al., 2012), and looked at how they can moderate the negative impacts of discrimination on ethnic/racial minority adolescents' adjustment (Benner et al., 2018; Delgado et al., 2011; Deng et al., 2010). In this study, we focused on MCO as an outcome and examined whether discrimination can adversely condition the link between agreeableness and MCO. Although scant studies have directly explored this link, MCO has been found to moderate the association between perceived discrimination and adjustment outcomes. For instance, MCO buffers the negative impact of perceived discrimination on stress (e.g., Dawson, 2009; Torres et al., 2012). In addition, according to the rejection-disidentification model, perceived discrimination inhibits ethnic/racial minority members' identification with the national in-group,

resulting in an overall tendency to reject/deidentify with the mainstream culture (Jasinskaja-Lahti et al., 2009). Hence, considering the previous discussion on agreeableness and MCO, we speculate that high levels of discrimination can weaken the positive association between agreeableness and MCO. However, on days with lower discrimination, the promotive effect of agreeableness on MCO should remain intact.

1.4 | The current study

Daily diary studies have suggested that personality and acculturation processes can change in response to daily experiences and situational factors. However, scant research has directly investigated the daily links between agreeableness and MCO. There is even less work linking interpersonal processes that are either positive (i.e., inter-ethnic contact) or negative (i.e., discrimination) to the links between personality and MCO, especially on a micro, day-to-day basis. Moreover, scarce research has examined acculturation processes among Canadian university students. As the Canadian university population is getting more diverse, it presents a unique opportunity for study. Importantly, the multiculturalism policy in Canada aims for the mutual acceptance and participation of all cultures in the Canadian society. This differs from the "melting pot" approach taken by US, where different ethnocultural groups are expected to co-exist, but assimilate into the mainstream culture (Berry, 2006). Furthermore, Canadian immigration policy favors more on qualification and economic utility and is more flexible compared to the US. As such, despite many similarities to the US populations in multiple aspects, Canadian populations could provide unique insights given Canada's distinct population demographics, immigration, and multiculturalism policies (Noels & Berry, 2016). Aiming to fill these literature gaps, this study employed a daily diary design to assess Canadian first-year university students' agreeableness, MCO, inter-ethnic contact, and perceived discrimination over 30 consecutive days. Specifically, we aimed to elucidate how inter-ethnic contact may partly mediate and how discrimination can moderate the link between agreeableness and MCO. The diary design is well-suited to investigate both within-person fluctuations over time and stable between-person differences (Bolger et al., 2003). Based on the literature, we hypothesized that: (1) at the within-person level, daily inter-ethnic contact will partly mediate the link between agreeableness and MCO; (2) at the within-person level, daily discrimination will moderate the associations between daily agreeableness and MCO, such that only on days when students report lower perceived discrimination, is higher agreeableness related

to higher levels of MCO; and (3) given that relevant previous studies are mostly cross-sectional, which are based upon between-person observations, we also expected to observe the same mediation and moderation at the between-person level.

2 | METHOD

2.1 | Participants and procedure

Participants included 313 first-year students from a major western Canadian university. Approximately half of the participants (52.72%) self-identified as Asian, 29.71% as White, 5.43% as Black or African, 4.79% as Multiracial, 0.96% as Native, 0.96% as Latino or Hispanic, and 5.43% as Other. Given the focus of this study, only non-White participants who completed at least one daily survey were included in the analysis, leaving a final sample of 209 participants ($M_{age} = 18.14$, $SD = 1.32$, ranging between 17 and 29 years old, 69.38% female, 31.8% international students), which is generally representative of the composition of the ethnic/racial minority student population at the university where the current study was conducted. Twenty-four (11%) participants completed ≤ 7 daily reports (i.e., 1 week), 10 (5%) participants completed 8–14 daily reports, 42 (20%) participants completed 15–21 daily reports, and 133 (64%) participants completed at least 22 daily surveys (i.e., 3 weeks). On average, each participant provided 20.96 days of daily survey ($SD = 7.78$, ranging between 1 and 30, 75.60% ≥ 20 days).

Participants were recruited from October to November 2019 through posters, online advertisements, and short in-class presentations in their first semester of university. Interested participants who reached out to the research team provided consent online, and received an online baseline survey (approximately 40 min) followed by 30 consecutive days of daily surveys (approximately 15 min daily). The first daily survey was sent 3 days after completion of the baseline survey. The daily surveys were sent to the participants' emails at 7 pm each night, with instructions to complete the survey before they went to sleep that night. Participants were compensated with a $60 e-gift card for completing more than 20 daily surveys, and a $15 e-gift card if they completed the baseline survey but fewer than 20 days of daily surveys. The procedure and instruments for this study were approved by the research ethics committee at the University of Alberta. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

2.2 | Measures

2.2.1 | Daily agreeableness

Daily agreeableness was measured with three selected items from the Mini-International Personality Item Pool (Donnellan et al., 2006) adapted into daily contexts. However, preliminary multilevel confirmatory analysis revealed that one item, "Not interested in other people's problems," did not load on the between-level factor ($\lambda = 0.11$, $p = 0.080$). Additionally, this item was not correlated with the other two items at the within- (rs = 0.02 and 0.05, ps = 0.501 and 0.082, respectively) or between- (rs = 0.13 and 0.09, ps = 0.164 and 0.343, respectively) level. Thus, we removed it from both levels in subsequent analyses. Participants reported how well they identified with the two remaining items describing their daily agreeableness ("*sympathized with others' feelings*," "*felt others' emotions*") from *1* (not well at all) to *5* (very well). The two agreeableness items were positively correlated with each other at the within-person ($r = 0.51$, $p < 0.001$) and between-person ($r = 0.95$, $p < 0.001$) level. An average score of agreeableness was created, with higher scores representing higher levels of agreeableness.

2.2.2 | Daily mainstream cultural orientation

Daily MCO was measured with items adapted from the Acculturation Index Items (Ward & Rana-Deuba, 1999). We selected 12 items that could potentially demonstrate meaningful within-person daily fluctuations to adapt into daily context and removed some items to avoid a lengthy daily questionnaire due to time constrain. Participants rated how similar they felt their lifestyle was to that of local Canadians in various aspects on that day, including similarity in "*clothing*," "*food*," "*recreational activities*," "*self-identity*," "*values*," "*friendship*," "*communication styles*," "*cultural activities*," "*language*," "*world view*," "*social customs*," and "*political ideology*." Comparing to conventional acculturation measurements that tend to focus on a single aspect of acculturation, these selected items assess multiple aspects (e.g., language, identity, and behavior) of acculturation attitudes and behaviors toward the mainstream culture, thereby capturing a more comprehensive picture of the mainstream cultural orientation. Responses ranged from *0* (not at all) to *2* (a lot). An average score for acculturation was calculated by averaging all items, with higher scores indicating higher levels of acculturation. Following the guideline in Geldhof et al. (2014), ordinal ωs were 0.91 and 0.98 at the within- and between-person level, respectively.

2.2.3 | Daily inter-ethnic contact

Daily inter-ethnic contact was measured with five items modified from existing measures (Wang, 2019), where participants reported whether they engaged in activities ("*studied together*," "*had lunch/dinner together*", "*participated in extracurricular/club activities together*", "*exercised together*", and "*hung out together for fun [e.g., party]*") with peers who have different race/ethnicity on that day with *1* (Yes. I saw my inter-ethnic friends and interacted with them), *2* (No. I saw my inter-ethnic friends but did not interact with them), or *3* (Didn't see my friends/peers today). The latter two responses (*2* and *3*) were further collapsed and recoded into *0* (no) in subsequent analyses. It should be noted that students may have seen inter-ethnic friends without interacting with them, such as not engaging in specific activities we asked in the questions. However, not participating in such activities only implies the absence of inter-ethnic contact, but does not necessarily mean they interacted with same-ethnic peers. Daily interactions with cross-ethnic or same-ethnic friends are independent from each other and should be distinguished. Given our research focus, this coding operationalization primarily intends to contrast "having inter-ethnic contact" with "not having inter-ethnic contact". A composite score was created by summing all item scores after recoding, and a higher composite score indicated more inter-ethnic contact. The ordinal ωs were 0.87 and 0.91 at the within- and between-person level, respectively.

2.2.4 | Daily perceived discrimination

Daily perceived discrimination was measured with a 7-item ethnic discrimination scale modified from existing measures (Contrada et al., 2001; Landrine et al., 2006). Participants responded to statements indicating various perceived discrimination (e.g., "*Were you made fun of or picked on because of your race/ethnic group?*" "*Did people misunderstand your intentions and motives because of your race/ethnic group?*") on that day with *1* (no), *2* (not sure), or *3* (yes; see online supplementary materials for the full list of items). Consistent with the standard practice in the literature (Landrine et al., 2006), a "not sure" response is likely indicative of some discriminatory experience, as opposed to the clear "no" response. Thus, response *1* was recoded into *0* (no), and both responses *2* and *3* were collapsed and recoded into *1* (yes). A sum score was created over all recoded items. Participants with a sum score of 0 were further recoded as 0, suggesting no perceived discrimination at all, while those with a score ≥1 were recoded as 1, indicating that they perceived at least some discrimination on that day. The ordinal ωs were 0.97 and 0.98 at the within- and between-person level, respectively.

2.3 | Analytic strategies

All analyses were performed in Mplus 8.3 (Muthén & Muthén, 1998–2017). Multilevel structural equation models (MSEM; see Figure 1, top) with Bayesian estimation were constructed to examine the hypothesized mediation associations (Preacher & Zyphur, 2010; Preacher et al., 2011). The exogenous variable (i.e., agreeableness) was treated as a latent variable and was decomposed into within- and between-person components by default. Person-centered lagged variables were created for the endogenous variables. Within-person level paths were specified to investigate the daily fluctuation of individuals' behaviors relative to (i.e., deviations from) their average level (i.e., the state-level variations). Specifically, autoregressive paths were estimated for inter-ethnic contact and MCO to control for previous days' effects. Cross-lagged paths were also estimated between inter-ethnic contact and MCO across days. To estimate the mediation associations, within the same day, the paths of agreeableness on inter-ethnic contact (aw), inter-ethnic contact on MCO (bw), and agreeableness on MCO (cw) were estimated. Between-person level associations investigated the rank order of individuals' behaviors relative to other people in the examined population (i.e., the trait-level differences)

using the between-person components (i.e., random intercepts). Specifically, at the between-person level, we estimated the contextual effects from agreeableness to inter-ethnic contact (ab), inter-ethnic contact to MCO (bb), and agreeableness to MCO (cb). Additionally, to capture the between-person differences in the within-person associations, random slope of each within-level path was estimated (denoted as black dots in Figure 1, top). The covariances across aw, bw, and cw were freely estimated to calculate the correct within-person level indirect effect (i.e., $aw \times bw + cov(aw, bw)$; Preacher et al., 2011). We followed the guideline in Preacher et al. (2011) to calculate the true between-person level estimates (e.g., $aw + ab$) and indirect effects (i.e., $(aw + ab) \times (bw + bb)$) in the case of random slopes at the within-person level. We examined the linear trends of all key variables (i.e., agreeableness, inter-ethnic contact, MCO), and preliminary analyses revealed that none of them had any significant linear trend. The mediation was deemed significant when the 95% credibility intervals (CIs) of the computed indirect effect did not contain 0.

Another set of MSEMs was estimated to examine the hypothesized moderation associations. Following Preacher and Zhang (2016), at both levels, latent variables were created for perceived discrimination, agreeableness, and MCO,
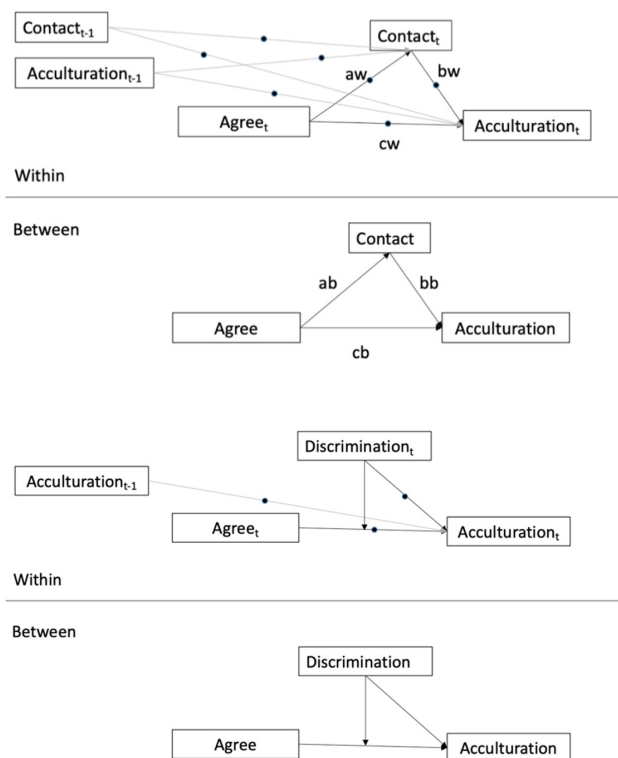

FIGURE 1 Conceptual multilevel mediation model (top) and multilevel moderation model (bottom). Black dots indicate random effects (i.e., random slopes) that were estimated at the between-person level. Autoregressive and cross-lagged paths across days were presented in gray lines. ab, bb, and cb represented contextual effects. Agree = agreeableness. Contact = inter-ethnic contact.

respectively (Figure 1, bottom). Interaction was formed by creating a latent interaction term between the latent predictor (i.e., agreeableness) and latent moderator (i.e., discrimination) at the respective level using the XWITH statement. The latent outcome variable was regressed on the latent predictor, the latent moderator, and the latent interaction term. Random effects were estimated for the autoregressive path of MCO, as well as the main effects of agreeableness and discrimination on MCO (denoted as black dots in Figure 1, bottom). When a significant interaction was found, region of significance was plotted (Roisman et al., 2012) to assess the association between the predictor (i.e., agreeableness) and outcome (i.e., MCO) at different levels of moderator (i.e., discrimination). Mplus default uninformed priors were used. Following the default setting in Mplus for Bayesian estimation, one-tailed significance test was used for all of our analyses. Potential Scale Reduction (PSR), trace plots, and autocorrelation plots were used to evaluate model convergence. Datasets are not publicly available due to ethics restriction but can be requested from the corresponding author upon request. Online supplementary materials provided codes and results for the mediation and moderation analyses.

3 | RESULTS

3.1 | Descriptive statistics

Within- and between-person level correlations were estimated for all key variables (Table 1). Participants reported some perceived discrimination on about 9% of all days. More significant correlations were observed at the within- than between-person level. Specifically, at both levels, agreeableness was positively correlated with MCO ($r_b = 0.25$, $r_w = 0.12$, ps < 0.001), while agreeableness was positively correlated with inter-ethnic contact at the within-person ($r_w = 0.07$, $p < 0.001$) but not between-person ($r_b = 0.13$, $p = 0.04$) level. Furthermore, at the within-person level, inter-ethnic contact was positively correlated with discrimination ($r_w = 0.10$, $p = 0.003$) and MCO ($r_w = 0.12$, $p < 0.001$). Lastly, inter-ethnic contact was positively correlated with MCO at the between-person level ($r_b = 0.19$, $p = 0.01$). Intra-class correlations (ICCs) suggested that 19–64% of the variances of the key variables were due to within-person variations.

3.2 | The mediating role of inter-ethnic contact

As shown in Table 2, at the within-person (i.e., state) level, there was significant cross-day stability for both inter-ethnic contact ($\beta = 0.09$, 95% CI [0.06, 0.12]) and MCO ($\beta = 0.19$, 95% CI [0.17, 0.22]). There was a positive association between agreeableness and inter-ethnic contact on the same day ($\beta_{aw} = 0.06$, 95% CI [0.02, 0.10]), such that students who perceived themselves as having higher than their average levels of agreeableness were also more likely to engage in higher than their average levels of inter-ethnic contact on the same day. In addition, students who had higher than their average levels of inter-ethnic contact also tended to have higher than their average levels of MCO on the same day ($\beta_{bw} = 0.11$, 95% CI [0.07, 0.15]). Students who perceived themselves as having higher than their average levels of agreeableness were also more likely to have higher than their average levels of MCO on that day ($\beta_{cw} = 0.08$, 95% CI [0.04, 0.12]). Notably, all these three paths showed significant between-person variations (i.e., random slopes; 0.06, 0.003, and 0.01, for aw, bw, and cw, respectively). The within-person level indirect effect from agreeableness to MCO through inter-ethnic contact was significant ($b = 0.007$, 95% CI [0.002, 0.012]).

The true between-person (i.e., trait) level effects were calculated following Preacher et al. (2011). At the between-person level, there was a positive association between agreeableness and inter-ethnic contact ($b_{ab} = 0.24$, 95% CI [0.04, 0.44]). Thus, at the trait level, relative to peers who have lower levels of agreeableness, students with higher levels of agreeableness also tended to have higher levels of inter-ethnic contact in general. Similarly, relative to peers who have lower levels of inter-ethnic contact, students with higher levels of inter-ethnic contact also tended to have higher levels of MCO in general ($b_{bb} = 0.13$, 95% CI [0.04, 0.22]), and students with higher levels of agreeableness were likely to have higher levels of MCO relative to peers with lower levels of agreeableness in general ($b_{cb} = 0.21$, 95% CI [0.10, 0.31]). There

TABLE 1 Descriptive statistics and correlations at within- and between-person level.

	1	2	3[a]	4
1. Agreeableness	–	0.07***	0.06	0.12***
2. Inter-ethnic contact	0.13	–	0.10**	0.12***
3. Perceived discrimination[a]	−0.03	0.02	–	0.01
4. Mainstream cultural orientation	0.25***	0.19*	−0.10	–
M (%)	3.26	1.06	9.05%	1.12
SD	1.00	1.39	–	0.58
ICC	0.49	0.36	0.64	0.81

Note: Correlations above the diagonal represented the within-person level correlations. Correlations below the diagonal represent the between-person level correlations. ICC = intra-class correlation.

One-tailed p value based on Bayes estimator was presented, *$p \leq 0.025$; **$p \leq 0.005$; ***$p \leq 0.001$.

[a]Polychoric correlations were presented.

TABLE 2 Associations between agreeableness and mainstream cultural orientation (MCO) mediated by inter-ethnic contact.

	b	95% CI	β	95% CI
Within-person level				
Contact $(t-1) \rightarrow$ contact (t)	**0.12**	**[0.06, 0.17]**	**0.09**	**[0.06, 0.12]**
MCO $(t-1) \rightarrow$ MCO (t)	**0.25**	**[0.20, 0.31]**	**0.19**	**[0.17, 0.22]**
MCO $(t-1) \rightarrow$ contact (t)	0.09	[−0.10, 0.30]	0.01	[−0.02, 0.04]
Contact $(t-1) \rightarrow$ MCO (t)	−0.01	[−0.02, 0.004]	−0.02	[−0.05, 0.01]
aw: Agreeableness $(t) \rightarrow$ contact (t)	**0.09**	**[0.02 0.17]**	**0.06**	**[0.02, 0.10]**
bw: Contact $(t) \rightarrow$ MCO (t)	**0.02**	**[0.01, 0.04]**	**0.11**	**[0.07, 0.15]**
cw: Agreeableness $(t) \rightarrow$ MCO (t)	**0.03**	**[0.01, 0.05]**	**0.08**	**[0.04, 0.12]**
Indirect effect[b]	**0.007**	**[0.002, 0.012]**	–	–
Between-person level				
ab[a]: Agreeableness $\rightarrow$ contact	0.15	[−0.03, 0.34]	0.13	[−0.03, 0.27]
bb[a]: Contact $\rightarrow$ MCO	**0.11**	**[0.02, 0.20]**	**0.18**	**[0.03, 0.32]**
cb[a]: Agreeableness $\rightarrow$ MCO	**0.18**	**[0.08, 0.29]**	**0.25**	**[0.11, 0.38]**
ab + aw[b]	**0.24**	**[0.04, 0.44]**	–	–
bb + bw[b]	**0.13**	**[0.04, 0.22]**	–	–
cb + cw[b]	**0.21**	**[0.10, 0.31]**	–	–
Indirect effect[b]	**0.03**	**[0.003, 0.07]**	–	–
Variance				
Contact $(t-1) \rightarrow$ contact (t)	**0.06**	**[0.04, 0.09]**	–	–
MCO $(t-1) \rightarrow$ MCO (t)	**0.06**	**[0.04, 0.09]**	–	–
MCO $(t-1) \rightarrow$ contact (t)	**0.14**	**[0.02, 0.46]**	–	–
Contact $(t-1) \rightarrow$ MCO (t)	**0.001**	**[0.001, 0.002]**	–	–
aw: Agreeableness $(t) \rightarrow$ contact (t)	**0.06**	**[0.03, 0.12]**	–	–
bw: Contact $(t) \rightarrow$ MCO (t)	**0.003**	**[0.002, 0.004]**	–	–
cw: Agreeableness $(t) \rightarrow$ MCO (t)	**0.01**	**[0.05, 0.01]**	–	–

Note: Unstandardized (b) and standardized (β) coefficients and 95% credible intervals (CIs) were presented. Standardized results for the true between-person level effects and indirect within- and between-person level effects were not provided because Mplus does not provide standardized estimates for these paths. Significant coefficients were bolded.

[a]Contextual effects were presented.

[b]Estimates were hand-calculated based on equations from Preacher et al. (2011).

was a significant indirect effect between agreeableness and MCO through inter-ethnic contact ($b = 0.03$, 95% CI [0.003, 0.07]; Figure 2).

3.3 | The moderating role of perceived discrimination

As shown in Table 3, at the within-person (i.e., state) level, after controlling for the cross-day stability of MCO ($\beta = 0.19$, 95% CI [0.16, 0.22]), agreeableness was positively linked to MCO on the same day ($\beta = 0.10$, 95% CI [0.06, 0.14]). Further, there was a significant interaction between daily agreeableness and daily discrimination ($\beta = -0.06$, 95% CI [−0.10, −0.02]). The association between daily discrimination and daily MCO ($\beta = -0.04$, 95% CI [−0.10, 0.03]) was not significant. Plots of the region of significance

indicated that for students with a discrimination score approximately lower than 0.2 *SD* above the average score, higher-than-average levels of agreeableness was related to higher-than-average levels of MCO on the same day (Figure 3, top). Simple slopes were plotted to illustrate the daily association between agreeableness and MCO at high (i.e., +1.5 *SD*) and low (i.e., −1.5 *SD*) levels of discrimination (Figure 3, bottom). When students experienced high levels of daily discrimination, there was no association between daily agreeableness and MCO (linear slope non-significant). However, when students experienced low levels of daily discrimination, daily agreeableness was positively associated with daily MCO. Additionally, the cross-day stability of acculturation, the association between agreeableness and discrimination with MCO all demonstrated significant between-person differences (i.e., random slopes; 0.07, 0.006, and 0.09, respectively).
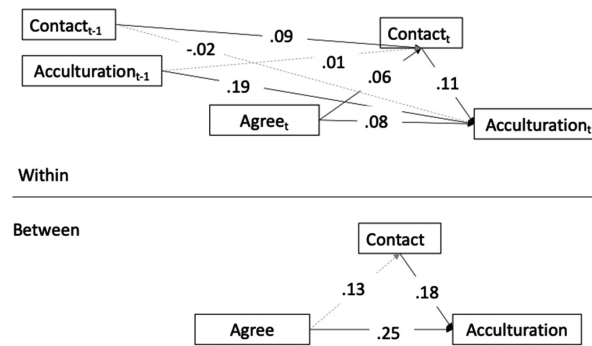
FIGURE 2 Inter-ethnic contact mediated the association between agreeableness and mainstream cultural acculturation. Standardized estimates were presented. Gray dotted lines represented non-significant paths, solid lines represented significant paths. The estimates at the between-person level represented contextual effects. Agree = agreeableness. Contact = inter-ethnic contact.

TABLE 3 Associations between agreeableness and mainstream cultural orientation (MCO) moderated by perceived discrimination.

	Mainstream cultural acculturation			
	b	95% CI	β	95% CI
Within-person level				
MCO $(t-1)$	**0.26**	**[0.19, 0.31]**	**0.19**	**[0.16, 0.22]**
Discrimination (t)	−0.05	[−0.12, 0.04]	−0.04	[−0.10, 0.03]
Agreeableness (t)	**0.03**	**[0.02, 0.05]**	**0.10**	**[0.06, 0.14]**
Interaction (t)	**−0.08**	**[−0.13, −0.02]**	**−0.06**	**[−0.10, −0.02]**
Between-person level				
Discrimination	−0.28	[−0.73, 0.18]	−0.10	[−0.26, 0.06]
Agreeableness	**0.21**	**[0.10, 0.31]**	**0.28**	**[0.13, 0.42]**
Interaction	0.04	[−0.75, 0.80]	0.01	[−0.19, 0.21]
Random slope variance				
MCO $(t-1)$	**0.07**	**[0.04, 0.10]**	–	–
Discrimination (t)	**0.09**	**[0.05, 0.16]**	–	–
Agreeableness (t)	**0.006**	**[0.004, 0.01]**	–	–

Note: Unstandardized (b) and standardized (β) coefficients and 95% credible intervals (CIs) were presented. Significant coefficients were bolded.

At the between-person, trait level, there was a significant association between agreeableness and MCO ($\beta = 0.28$, 95% CI [0.13, 0.42]), but not between discrimination and MCO ($\beta = -0.10$, 95% CI [−0.26, 0.06]), and no interaction between agreeableness and discrimination ($\beta = 0.01$, 95% CI [−0.19, 0.21]). The results remained the same when dropping the non-significant between-level interaction.

4 | DISCUSSION

Acculturation processes have important implications for ethnic/racial minority students (Nishina & Witkow, 2020). Individual (e.g., agreeableness) and interpersonal (e.g., inter-ethnic contact, ethnic/racial discrimination) factors play a vital role in daily cross-cultural encounters and can shape ethnic/racial minority students' acculturation attitudes and behaviors in their daily life. This study used a daily diary approach to extend the empirical literature and to examine how inter-ethnic contact may partly mediate and how discrimination may moderate the link between agreeableness and MCO, at both within- and between-person levels. Analyzing a month-long daily diary data from a large group of first-year ethnic/racial minority students in their first semester with multilevel mediation and moderation analyses, the results indicated a positive indirect effect between agreeableness and MCO through inter-ethnic contact at both within- and between-person levels. At the within-person level, daily perceived discrimination moderated the association between daily agreeableness and MCO, such that higher levels of agreeableness were related to higher levels of
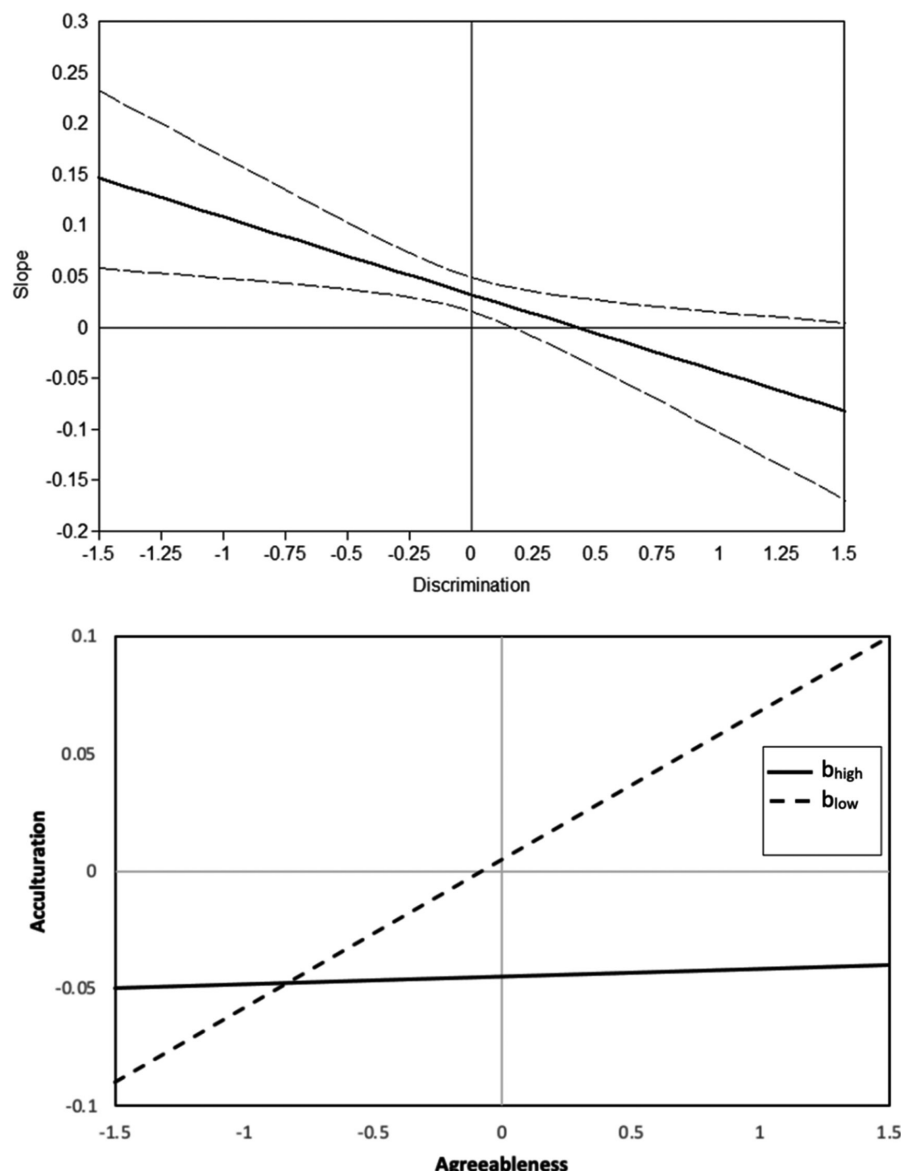
FIGURE 3 Region of significance (top) and simple slope (bottom) of discrimination moderating the association between agreeableness and mainstream cultural orientation at the within-person level. When both upper and lower bound of 95% credible intervals does not include 0, the relation between the predictor and the outcome is significant. In the top figure, *x*-axis represents daily discrimination. *y*-axis represented estimated slope regressing daily acculturation on daily agreeableness. In the bottom figure, b_{high} = the association between daily agreeableness and acculturation at high (i.e., 1.5 *SD*; solid line) levels of daily perceived discrimination; b_{low} = the association between daily agreeableness and acculturation at low (i.e., −1.5 *SD*; dashed line) levels of daily perceived discrimination.

MCO only on days when students reported lower levels of discrimination.

As expected, agreeableness was positively associated with MCO through inter-ethnic contact at the within-person level. This finding is consistent with previous research that highlights the potent role of agreeableness in influencing the quality of inter-ethnic contact (Vezzali et al., 2018), facilitating positive inter-ethnic interactions (Diehl, 2020), and promoting positive contact experiences (Jackson & Poulsen, 2005). In turn, more inter-ethnic contact leads to more positive intergroup attitudes and better cross-cultural adaptations (Beelmann &

Heinemann, 2014; Caligiuri, 2000). Consistent with previous daily diary findings (e.g., Schwartz et al., 2019, 2020), levels of MCO fluctuate substantially across days in this study, signifying the dynamic nature of acculturation processes and highlighting the necessity to investigate MCO and other related acculturation processes at a more refined timescale. The findings demonstrated that the interplays between personality, inter-ethnic contact, and MCO present a mixture of stability as well as variability at different timescales. When considering within-person daily experiences, while agreeableness fluctuates, inter-ethnic contact and MCO also fluctuate. The findings at the within-person

level are robust given that we controlled the cross-day stability of MCO and cross-lagged effect of inter-ethnic contact from the previous day. At the between-person level, when averaged across 30 days, the same positive indirect effect from agreeableness to MCO through inter-ethnic contact was also observed. Taken together, these findings supported the prominent role of agreeableness in promoting inter-ethnic contact and the subsequent MCO in daily contexts during the transition to university.

Consistent with our expectations, daily discrimination moderated the association between daily agreeableness and MCO, such that for students on days with lower levels of perceived discrimination, but not on days with higher levels of discrimination, higher agreeableness was related to higher MCO. On average, each participant reported 3 days of perceiving any discrimination over the 30-day study period (less than 1–2 days per week), which is consistent with the frequency previously observed in daily discrimination research (Chen et al., 2022). Previous studies have found that agreeableness helps students establish successful inter-racial friendships (Diehl, 2020), and guards against negative experiences (Hadden et al., 2017). However, as the simple slope analysis indicates, when facing higher levels of discrimination, the positive link between agreeableness and MCO was suppressed and became non-significant. This finding is consistent with our hypothesis that discrimination disrupts mechanisms of MCO by weakening the promotive effects of agreeableness on MCO.

Alternatively, reduced levels or quality of inter-ethnic contact could be a potential reason why agreeableness might not unfold its beneficial effects when perceived discrimination is high. Specifically, in the context of high levels of perceived discrimination, even agreeable people may not establish fruitful inter-ethnic contact or relationships as it will not lead to better inter-ethnic contact or relationship experiences, which consequently reduces the levels of mainstream culture orientation. Another plausible explanation is that when more agreeable people face high levels of perceived discrimination, their innate tendency to maintain positive interpersonal relationships and to avoid conflicts might lead them to downplay or hide their mainstream cultural orientation to prevent further confrontations or negative interactions. As a result, the link between agreeableness and MCO can become weaker. Notably, the findings also revealed mixed effects of inter-ethnic contact (Nishina et al., 2019), as evidenced by its modest but positive within-day correlation with perceived discrimination. Understandably, ethnic/racial minority students could be exposed to more discrimination experiences when they engage or get involved in more occasions of inter-ethnic contact. It should be noted that the first year is a stressful transitioning period, especially for ethnic/racial minority students in the first semester, which

might further intensify the effects of daily discrimination. Future work is sorely needed to further disentangle more nuanced mechanisms of discrimination in university students' peer processes in the face of different daily experiences and interpersonal interactions.

No interaction effect was found at the between-person level. Specifically, the negligible association between discrimination and MCO at the between-person level suggest that the effects of discrimination on acculturation attitudes and behaviors may be more immediate and consequently more evident in the short-term, at least in the current sample. Thus, we did not find any interaction when aggregating these measures across 30 days into the between-person level. On a similar note, the patterns found at different levels within a time intensive study might be different depending on the timescales we use (Keijsers et al., 2022). Therefore, the same interaction effect we observed at the daily level may not necessarily also manifest at the aggregated level due to different underlying mechanisms, which demonstrates the importance of multi-level investigation. The unmatched findings at the within- and between-person level reveal the different mechanisms between first-year university students' personality states/traits and social experiences at the daily and the aggregated level, respectively, and signify the contribution of intensive longitudinal assessment. Future studies are needed to further extend the time duration of the longitudinal design over multiple timescales, such as the use of measurement burst designs to examine long-term changes of short-term dynamics over longer timescales.

4.1 | Strengths, limitations, and future directions

Different from the conventional approach to examine personality and acculturation as more trait-like at a macro timescale, this study treats both personality and MCO as dynamic processes that could fluctuate within-person on a micro daily timescale. Using a month-long daily diary design that is noticeably longer than the majority of previous relevant diary studies, we observed the associations between agreeableness and MCO of ethnic/racial minority university students at both the within- and between-person level. In addition, Asians represent the majority of the ethnic/racial minority participants in the current sample, which is demographically comparable to the corresponding university and Canadian populations. The inclusion of interpersonal factors that are commonly addressed in cross-cultural research—inter-ethnic contact and perceived discrimination—into the study also offers unique insights into how these factors interact with personality to affect MCO at the daily level.

Despite these strengths, a few limitations should be noted. First, we did not assess participants' nativity/immigration status, although a third of the current sample self-reported as international students. Given that the main outcome is MCO, students of different immigration statuses (e.g., generations) may have different experiences and attitudes toward the main culture. Second, although this study focused on MCO, which represents a core feature of acculturation, this conceptualization is only one of many acculturation processes (Schwartz et al., 2020). Other ways of measuring micro-level acculturation (e.g., language use) as well as heritage culture enculturation should also be considered. Furthermore, acculturation is only one of several pathways to positive cross-cultural adjustment. Other factors such as ethnic pride also has beneficial effects for ethnic/racial minority members (e.g., self-esteem; Hernández et al., 2017), and should be considered in future research. Third, we only used two items to assess daily agreeableness (the 3rd item demonstrated modest inter-item correlations), which tap more onto empathy. Future studies should assess agreeableness more comprehensively with more items suitable in daily contexts and evaluate their psychometric properties. Studies that assess other big-five personality factors (e.g., openness to experience; Antonoplis & John, 2022) are also needed to replicate and extend our findings.

Fourth, the current measure of cross-ethnic interactions primarily distinguishes having the investigated cross-ethnic activities from not having these activities, the latter of which may also have contained the possibility of having same-ethnic interactions and having no social interactions at all. While the current operationalization is reasonable and practical given the current study focuses on inter-ethnic contact and that examined activities cover the primary daily activities experienced by university students, it remains a limitation as we cannot clearly tease out the effects of having same-ethnic interactions and having no peer interactions. Future research should develop and implement more specific daily assessments of peer interactions among university students to further delineate these nuanced links.

Fifth, the current inter-ethnic contact measure could not differentiate between inter-ethnic contacts with other ethnic/racial minority groups and with members of the mainstream culture. In the current sample, however, contact should be mostly with the majority group members (i.e., White Canadian), as Asians are the predominant ethnic/racial minority student groups in the university (more than 80% of the ethnic/racial minority population). Future studies should differentiate between inter-ethnic/racial contact with members of the mainstream culture and with other minority groups, and examine whether

both kinds of contact would contribute to MCO. Sixth, the analyses only investigated within-day, rather than cross-day associations. It remains unknown whether and how personality characteristics such as agreeableness may contribute to MCO on the following day through inter-ethnic contact. However, some of these examined associations likely manifest on a more proximal timescale (i.e., inter-ethnic contact may have an immediate, momentary effect on people's acculturation attitudes and behaviors). To observe momentary or more refined situational fluctuations, future studies should consider employing methods at a more fine-grained timescale, such as ecological momentary assessment (Larsen et al., 2009). Lastly, a growing body of research has begun to consider how acculturation and other individual characteristics and interpersonal processes are affected by the ecological context (Ward & Geeraert, 2016). Familial factors such as parent–child acculturation gap, intergenerational conflict, as well as societal factors such as the recent surge of anti-Asian racism during the COVID-19 pandemic are among the key factors to consider in future research.

4.2 | Implications

Our focus on university students' daily personality and acculturation processes built upon existing research and illuminated an important area that has been largely understudied. The intensive longitudinal data leveraged in this study demonstrated that it may be worthwhile to continue utilizing the multilevel approach in future research on university students' personality and acculturation processes at a micro timescale. The findings offer several important implications for universities and communities to enhance ethnic/racial minority students' acculturation experiences during the transition to university. Given that inter-ethnic contact is generally beneficial, whereas discrimination experiences could be detrimental, to ethnic/racial minority students' cross-cultural adaption into the host society's mainstream culture, universities should offer educational talks and workshops that touch on these topics to first-year students. Specifically, we should encourage students to engage in inter-ethnic contact, but also inform them the potential discrimination experiences that may occur along the way, in which case they should learn how to protect themselves from its detrimental effects.

Moreover, those low on agreeableness are likely to have low levels of inter-ethnic contact, and we should be mindful of these individuals and situations when individuals feel low on agreeableness. Since the first year in university is an important transition period,

especially for ethnic/racial minority students who may feel less connected, notably among those who relocate to attend universities, close attention toward these students' cross-cultural interactions and facilitating beneficial cross-ethnic contact with good interaction quality could foster cross-cultural understanding and learning, hence promoting their well-being and cultural adaptation. Lastly, it should be noted that the current sample is primarily Asian. Asian students' cross-cultural experiences might be different from other ethnic/racial groups such as Black or Latinx due to various sociocultural and historical factors. As such, the current findings might not generalize to other ethnic/racial groups and should be interpreted as a first step to understanding the daily personality and acculturation processes among ethnic/racial minority students.

5 | CONCLUSION

MCO generates valuable benefits for ethnic/racial minority students, facilitating their successful transitions into university. Daily exposure to peers of different ethnicity/race opens up opportunities to engage in inter-ethnic contact, but also to experience potential discrimination. Daily inter-ethnic contact could partly explain the positive associations between daily agreeableness and MCO at both the within- and between-person levels. Further, on days when students perceive lower levels of discrimination, higher agreeableness is associated with higher MCO; this link nonetheless is suppressed on days with higher levels of discrimination. Agreeableness, inter-ethnic contact, and racial/ethnic discrimination jointly contribute to the dynamic acculturation process at different timescales, with inter-ethnic contact serving as a promotive factor while discrimination as a risk factor. Moreover, more daily inter-ethnic contact could inadvertently lead to more daily discrimination experience at the within-person level. These interactions happen continuously in university students' daily lives and could render profound developmental (mal)adaption through long-term cumulative effects. Future research should further elucidate these dynamic acculturation processes on various domains with other pertinent factors through intensive longitudinal data collection on multiple timescales.

AUTHOR CONTRIBUTIONS

YW contributed to the study design, the interpretation of the data, and drafted the manuscript. JX performed the statistical analysis, interpreted the data, and drafted the manuscript. YS and JW contributed to the interpretation of the data and made critical revisions to the manuscript. YZ contributed to the study design, the interpretation of the data, and revised the manuscript critically for important intellectual content. All authors read and approved the final manuscript.

CONFLICT OF INTEREST STATEMENT

The authors declare that they have no conflict of interest.

DATA AVAILABILITY STATEMENT

The datasets generated and/or analyzed during the current study are not publicly available but are available from the corresponding author on reasonable request.

ETHICS STATEMENT

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

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SUPPORTING INFORMATION

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