# Temporal Orientation and the Association Between Adverse Life Events and Internalizing Symptoms in Vietnamese American and European American Adolescents

By



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## Abstract

Adverse life events predict varying negative outcomes, including internalizing symptoms. However, research finds cross-cultural variation in whether and to what degree factors amplify or buffer the impact of these stressors. Cultural congruence may be an important explanation of this cross-cultural variation in adaptive responses. Broadly defined as the tendency to focus on past, present, or future events, temporal orientation is a dispositional factor that is culturally influenced and may explain variance in internalizing symptoms following adverse life events. The current study examines how culturally congruent temporal orientation differentially impacts the relationship between adverse life events and internalizing symptoms in a longitudinal sample of 676 10$^{th}$ and 11$^{th}$ grade Vietnamese American and European American adolescents. Results indicated that Vietnamese American adolescents endorsed significantly higher levels of past and present temporal orientation than European American adolescents. However, no significant mean ethnic group differences were found for future temporal orientation. In both the Vietnamese and European American subsamples, past temporal orientation was positively associated with internalizing symptoms and adverse life events. However, temporal orientations did not moderate the relationship between adverse life events and internalizing symptoms in the overall sample, and the influences of temporal orientation on this relationship were not further moderated by ethnicity. Interactions between present temporal orientation and internalizing symptoms were significant, such that present temporal orientation may be beneficial for European American adolescents. These data highlight the importance of measuring and testing specific dimensions of culturally relevant processes when considering responses to adversity.


*Keywords:* Vietnamese American adolescents, adverse life events, temporal orientation, internalizing symptoms, cultural values

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# Temporal Orientation and the Association Between Adverse Life Events and Internalizing Symptoms in Vietnamese American and European American Adolescents

Research demonstrates that adverse life events predict a wide range of negative outcomes, including internalizing symptoms (Bentall et al., 2014; Duke, Pettingell, McMorris, & Borowsky, 2010; Kessler, 1997; Koenen, Moffitt, Poulton, Martin, & Caspi, 2007; Lansford et al., 2002; Margolin, Vickerman, Oliver, & Gordis, 2010; Miloyan, Bienvenu, Brilot, & Eaton, 2018; Phillips, Hammen, Brennan, Najman, & Bor, 2005; Robinson & Alloy, 2008; Shonkoff et al., 2012; Watkins, 2008; Youngstrom, Weist, & Albus, 2003). Despite this well-established relationship, cross-cultural findings suggest that there is variation in whether and to what extent factors increase risk or buffer the impact of adverse life events (Tsai, Weiss, Kim, & Lau, 2019). Evidence also demonstrates cross-cultural variation in the level of internalizing symptoms (i.e., anxiety, depression, and low self-esteem) endorsed by Asian Americans compared to their white peers (Chang, 2002; Twenge & Crocker, 2002; Lau, Fung, Wang, & Kang, 2009; Okazaki, 1997; Okazaki, Liu, Longworth, & Minn, 2002). Cultural congruence, the degree to which a factor is considered normative to an individual's culture, may be an important determinant of cross-cultural variation in adaptive responses. In the current study, we examine how culturally congruent temporal orientation (i.e., the relative emphasis one places on the past, present, or future; Raynor & Entin, 1982; Strathman, Boninger, Gleicher, & Baker, 1994) may differentially impact the relationship between adverse life events and internalizing symptoms. Studies suggest that temporal orientation differs based on culture and may even explain heterogeneity in outcomes; thus, the relationship between adverse experiences and internalizing problems may differ across groups as a function of culturally congruent temporal orientation (Gao, 2016).

Adverse life events - defined here as any stressor related to family, romantic relationships, school, discrimination, friendships, and neighborhood/safety - are associated with varying negative outcomes. Specifically, early exposure to stress is highly associated with later anxiety symptoms (Margolin, Vickerman, Oliver, & Gordis, 2010; Miloyan, Bienvenu, Brilot, & Eaton, 2018; Phillips, Hammen, Brennan, Najman, & Bor, 2005) and depression (Kessler, 1997). A study by Miloyan and colleagues (2018) demonstrated that adverse life events were associated with increased risk of anxiety over a three-year follow-up period across adversity subtypes (though injury, illness, and death of a loved one exhibited the strongest associations with anxiety disorder onset; Miloyan, Bienvenu, Brilot, & Eaton, 2018). Further, research suggests that adverse life events may increase self-focused repetitive thoughts, thereby increasing internalizing symptoms (Robinson & Alloy, 2008; Watkins, 2008). These examples highlight that adverse life events increase perceptions of stress and may ultimately lead to mental health problems, including internalizing symptoms. Given its high prevalence and association with negative outcomes, childhood adversity is an important clinical and public health issue.

In line with the notion of multifinality, adverse life events do not confer the same risk for all individuals. While childhood stressors may increase risk for negative outcomes for some children, others demonstrate resilience. These divergent pathways can often be accounted for by individual differences that moderate pathways between early stressors and differential outcomes. Like individual differences, culture may also mitigate the level of risk following an adverse life event. Cultural congruence, or the degree to which a factor is considered normative within an individual's cultural reference group, may determine whether it amplifies or buffers stress for that individual. For example, recent findings suggest that emotional suppression (i.e., effortful control to lessen the expression of affect following its arousal; Gross and John, 2003) is adaptive

in Vietnamese American adolescents but leads to increased depressive symptoms in European American adolescents. The authors argue that this association may be due to the fact that emotional suppression is culturally valued among Vietnamese Americans (Tsai, Weiss, Kim, & Lau, 2019). These results demonstrate that culture, specifically, may influence outcomes - that is, culture shapes perspective, thereby impacting the severity of a stressor. It is important to also note, however, that while cross-cultural differences are likely to impact outcomes, individual differences in valuation of culture within cultural groups (i.e., European American and Vietnamese American adolescents) may also account for differences.

Research reviewed above therefore suggests that while adverse life events increase overall risk for internalizing problems, individual and cultural factors likely shape relative risk for subgroups and individuals. Broadly defined as the tendency to focus on past, present, or future events (Raynor & Entin, 1982; Strathman, Boninger, Gleicher, & Baker, 1994), temporal orientation is a dispositional factor that (a) is culturally influenced and (b) may be key in explaining variance in internalizing symptoms following adverse life events. Further, it is believed that temporal orientation creates a cognitive bias that filters experiences into distinct temporal domains (i.e., past, present, or future), thereby influencing thoughts, behaviors, and feelings (Zimbardo, 1994). In a study by Park and colleagues (2017), main effects demonstrate that future-oriented individuals experience fewer depressive symptoms, are more conscientious, and experience greater life satisfaction, while present-oriented individuals exhibit opposite patterns (Park et. al, 2017). Further, past temporal orientation has been shown to moderate the relationship between adverse life events (i.e., combat-related trauma, sexual abuse, and natural disaster) and distress, such that it increases the likelihood of psychological distress (Holman & Silver, 1998). While these studies provide evidence of main and moderating effects of temporal

orientation, other evidence proposes that past and future temporal orientations are culturally congruent with Asian cultural values.

Research suggests that East Asians, in particular, tend to possess a holistic cognitive style, whereas North Americans are more likely to possess an analytical cognitive style (Gao, 2016; Nisbett, Peng, Choi, & Norenzayan, 2001). These stylistic differences influence the degree to which cultural groups attend to temporally distinct information; while holistic cognitive styles require increased attention on the past and future, analytical cognitive styles require increased attention on the present. Accordingly, research suggests that Asian communities hold stronger past temporal orientations compared to European Americans (Gao, 2016). In their review of the literature on cultural differences in temporal orientation, Gao (2016) notes that East Asians are more likely to take the past into account when they explain events (Ji, Guo, Zhang, & Messervey, 2009), evaluate their subjective well-beings (Kim et al., 2012), and convey moral messages (Wang & Conway, 2004). For example, in one study by Li-Jun, Guo, Zhang, and Messervey (2009), Chinese and Canadian participants were asked to read a description of a theft along with a list of behaviors that occurred in the past or present and were then told to rate which behaviors were more relevant to the theft. Chinese participants rated past behaviors as more relevant, recalled past events in greater detail, and perceived past events as being closer in time compared to Canadian participants (Li-Jun, Guo, Zhang, & Messervey, 2009). This study suggests that Chinese individuals are not only more likely to attune to details of the past, but that their past orientation can also shape their decision-making. Thus, it stands to reason that past temporal orientation may be subject to cultural influences.

In line with the holistic cognitive style, some evidence also suggests that East Asian individuals are also more likely to be future oriented; however, findings also reveal some

variation in results (Gao, 2016). In their literature review, Gao (2016) claims that East Asians place greater emphasis on future consequences (Lee, Lee, & Kern, 2011; Maddux & Yuki, 2006) and actually perceive the future as existing closer in time (Lee, Lee, & Kern, 2011). Given that much of the literature investigating cultural influences on temporal orientation are limited to East Asian, often Chinese, communities, the current study will look more closely at how past and future temporal orientation manifest in a sample of Vietnamese Americans.

Due to cultural congruence, we might expect past temporal orientation to differentially moderate the relationship between adverse life events and internalizing symptoms in Vietnamese Americans compared to European Americans. Past temporal orientation may be similar to rumination for European American individuals, but more normative for Asian individuals (or at least not an indicator for abnormality). Defined as a propensity to focus on an event, its causes, details, and meaning, rather than to actively problem-solve (Nolen-Hoeksema, 1991), rumination has been well-established as a risk factor for depressive symptoms (Abela, Brozina, & Haigh, 2002; Abela, Vanderbilt, & Rochon, 2004; Burwell, Shirk, 2007; Kuyken, Watkins, Holden, & Cook, 2006; Spasojević & Alloy, 2001). For European American children (or for those who do not endorse Asian cultural values), similar to ruminative tendencies, past temporal orientation may promote increased, harmful thinking about a past adverse life event. Namely, temporal orientation could function as a moderator by decreasing or increasing the level or appraisal of stress. For example, for European American youth, a past temporal orientation might represent an atypical cultural variation that indicates a maladaptive coping process or serves to amplify the impact of the stressor itself. Conversely, for Asian youth who experience a stressful event, a past temporal orientation may be more normative at baseline, and the focus on the past may serve to decrease the intensity of a stressor in the moment by invoking a sense of connection to family. In

the current study, we will explore the impact of past, present, and future orientation on the pathway between adverse life events and internalizing symptoms and determine whether cultural influences amplify or buffer their impact.

Vietnamese Americans have created cultural communities across the country and currently compose the largest refugee group in the United States (Pew Research Center, 2013; Zhou, 2001). Accordingly, Vietnamese Americans, even those who are second-generation, are more likely to endorse their culturally interdependent group values due to a strong adherence to these heritage norms in ethnic enclaves (Zhou and Bankston, 1998). Further, approximately 65% of Vietnamese Americans still have close family living in their country of origin, and 70% of Vietnamese Americans reported that they are very like to remit (i.e., send money back to their country of origin), suggesting that they maintain particularly close ties to their country of origin (Pew Research Center, 2013). Vietnamese Americans are also likely to embrace the following cultural values: strong familial connections (Tingvold, Hauff, Allen, & Middelthon, 2012), group goal prioritization (Nguyen and Williams, 1989), and familism (Phinney, Ong, & Madden, 2000). The current study examines the levels and impact of cultural influences on internalizing symptoms in this subgroup of Asian Americans. By examining group-level differences between Vietnamese and European American youth as well as heterogeneity within Vietnamese American youth, we aim to gain insight into the ways that underlying emotional, cognitive, and cultural mechanisms shape associations between adverse life events and internalizing symptoms.

Asian Americans, in particular, disproportionately experience higher levels of internalizing symptoms and low self-esteem (Lau, Fung, Wang, & Kang, 2009; Okamura et al., 2016; Okazaki, 1997; Okazaki, Liu, Longworth, & Minn, 2002; Twenge & Crocker, 2002; Uri, Wu, Baker, & Munn-Chernoff, 2021). For example, findings by Okazaki and colleagues (2002)

demonstrate in a three-minute social performance task that Asian American college students reported higher levels of anxiety and depression compared to their white peers. This remains true even after controlling for generational status (Okazaki, Liu, Longworth, & Minn, 2002). In addition, Asian Americans exhibit greater depressive symptomology compared to individuals in Asia (Chang, 2002). Taken together, these results suggest that Asian Americans, in particular, experience greater internalizing symptoms compared to other cultural groups.

The current study has three primary aims. The first aim is to understand associations between indicators of culture and the primary study constructs of adverse life events, temporal orientation, and internalizing symptoms. That is, we explore associations between specific Asian cultural values (i.e., familism and interdependence), European American cultural values (i.e., independence), temporal orientations (i.e., past, present, and future), internalizing symptoms, and adverse life events. We predict that Vietnamese American adolescents who endorse strong heritage cultural values will be more likely to evidence past temporal orientation compared to their European American peers and that adverse life events will be associated with greater internalizing symptoms in both groups. The second aim examines the influences of temporal orientation in the relationship between adverse life events and internalizing symptoms among the overall sample. Specifically, we will test the moderating effects of specific temporal orientations (i.e., past, present, and future) on the relationship between adverse life events and internalizing symptoms. We predict that past and present temporal orientation will strengthen the relationship between adverse life events and internalizing symptoms, while future orientation will weaken the effects of adverse life events. Finally, the third aim focuses on understanding the extent to which culture shapes the adaptive nature of temporal orientation. More specifically, we will test whether culture moderates the association between adverse life events, temporal orientation, and

internalizing symptoms. Because past temporal orientation is more common and related to cultural values in Asian communities, it may be weakly associated with risk for Vietnamese American adolescents, but more strongly associated with risk for European American adolescents. However, we have no a priori hypotheses related to the effects of cultural influences on present or future orientation. Findings will inform a cross-cultural understanding of developmental pathways following adverse life events.

## Method

### Participants and Recruitment

Participants were 10th and 11th grade Vietnamese American and European American students from 10 public high schools in Los Angeles County. All students included in the sample were at least proficient English speakers. According to the U.S. Census Bureau (2011), high schools where data collection occurred were in metropolitan areas with the largest population of Vietnamese Americans in the United States. Across all 10 high schools, the student body was comprised of approximately 26% European American students and approximately 36.9% Vietnamese American students. Moreover, schools were located in and served low-income communities (between 12% and 77% of students qualified for free or reduced lunches). Participants were recruited in schools on a voluntary basis and assigned to groups based on racial self-identification.

Sampling and recruitment were completed over three unique stages. Participants were required to return completed consent packets (including assent) prior to participation. During the first stage of recruitment, 1,937 declined to participate and 3,098 expressed interest in participation. Of those, 896 participants were not able to participate due to ethnicity (only European American and Vietnamese American students were included in the current study),

leaving 2,202 total students eligible for participation. In order to balance gender and ethnicity, a stratified random sample was selected during the second stage of recruitment from those that provided parental consent during the first stage of recruitment. At Time 1,1,227 students ($M_{age}$ = 15.6 years; *SD* = 0.62) completed the online survey. Male students were less likely to return consent forms; therefore, all male adolescents were included in this sample (38.8% male, *n* = 476). Further, nearly all European American students were included in the sample (59.7% were Vietnamese American, *n* = 730; 40.3% were European American; *n* = 494) because fewer European American students comprised the 10 schools. Among the Time 1 sample, Vietnamese American adolescents were more likely to be first- or second-generation immigrants ($\chi 2(2) = 944.39$, $p < .001$) and to report lower levels of parental education ($\chi 2(4) = 34.48$, $p < .01$), compared to European American adolescents.

At Time 2, three months after Time 1, follow-up data was collected from 676 participants (third stage of recruitment). Again, gender and ethnicity were balanced (47.9% male, *n* = 324), and the sample was stratified by level of adversity in order to attain equal distribution across low, medium, and high levels of adversity. At Time 2, 55.0% of participants were Vietnamese American (*n* = 372) and 45.0% of participants were European American (*n* = 304). Again, Vietnamese American adolescents were more likely to be first- or second-generation immigrants ($\chi 2(2) = 502.52$, $p < .001$) and to report lower levels of parental education ($\chi 2(4) = 17.77$, $p < .01$). Finally, data were collected from these same participants at Time 3 (six months after Time 1). Because temporal orientation was only measured at Time 2 and Time 3, we will only be focusing on data collected during those time points. Therefore, Time 2 will be referred to as "Baseline" and Time 3 will be referred to as "Follow-up" in subsequent sections.

**Measures**

**Adverse Life Events.** Adverse life events were assessed at baseline and follow-up using the Adolescent Life Events Questionnaire (ALEQ; Hankin & Abramson, 2002). The ALEQ is an 82-item self-report checklist of stressful life events with subscales related to family, romantic relationships, school and stress, discrimination, friends and social activities, and neighborhood and safety. Some example items include, "Your parents criticized you or yelled at you for not doing well in school", "Your boyfriend or girlfriend hit you", and "You did poorly on a test or class project." Participants were asked to respond "yes" or "no" to having experienced each item in the last 3 months. Moreover, while each item yields a categorical response, scores are calculated by summing the number of yes items to produce a total continuous score. The measure demonstrates internal consistency of .94 and test-retest reliability of .65 (Hankin & Abramson, 2002). Further, the ALEQ has been used with this sample of Vietnamese American adolescents (Tsai, Nguyen, Weiss, Ngo, & Lau, 2017; Tsai, Weiss, Kim, & Lau, 2019). In the current sample, the internal consistency reliability for the total score was acceptable for both Vietnamese and European Americans (VA: $\alpha = 0.828$; EA: $\alpha = 0.803$).

**Internalizing Symptoms.** Internalizing symptoms were assessed at baseline and follow-up using the Youth Self Report (YSR; Achenbach, 1991). The YSR is a 112-item self-report measure of emotional and behavioral problems. The measure utilizes a 3-point Likert scale that ranges from "Not True" to "Very True or Often True" for functioning over the past three months. The following subscales are produced by the YSR: Anxious/Depressed, Withdrawn/Depressed, Somatic Complaints, Social Problems, Thought Problems, Attention Problems, Rule-Breaking Behavior, and Aggressive Behavior. For the purpose of this study, we used the internalizing broadband scale, which is comprised of the Anxious/Depressed, Withdrawn/Depressed, and Somatic Complaints subscales. In the current sample, the internal consistency reliability for the

internalizing broadband score was acceptable for both Vietnamese and European Americans (VA: $\alpha = 0.879$; EA: $\alpha = 0.894$). Further, the YSR has been validated across cultures (e.g., De Groot, Koot, & Verhulst, 1996) and has been used with this sample of Vietnamese American adolescents, in particular (Lau, et al., 2016; Nguyen, Kim, Weiss, Ngo, & Lau, 2018; Tsai, Nguyen, Weiss, Ngo, & Lau, 2017; Weiss, Nguyen, Trung, Ngo, & Lau, 2019).

**Temporal Orientation.** Temporal Orientation was assessed at baseline and follow-up using the Temporal Orientation Scale (TOS; Jones, Banicky, Pomare, & Lasane, 1999). The TOS is a 26-item self-report measure of an individual's tendency to attend to the past, present, or future. The measure is composed of 6 future items, 5 present items, and 4 past items, rated on a Likert scale, ranging from 1 "not true" to 7 "very true." The scale is continuous, and a sum total score is computed for each subscale. Example items include, "I think about the past a lot", "I am able to resist temptation when there is work to be done", and "I try to live one day at a time" (see Table 1). The subscales demonstrated reliability with internal consistency coefficients ranging from .65 to .86 (Jones et al., 1999). In the current sample, internal consistency reliabilities for past (VA: $\alpha = 0.832$; EA: $\alpha = 0.892$), present (VA: $\alpha = 0.730$; EA: $\alpha = 0.747$), and future (VA: $\alpha = 0.771$; EA: $\alpha = 0.830$) orientations were acceptable for both Vietnamese and European Americans.

**Cultural Values.** Cultural Values were assessed at baseline and follow-up using the Self-Construal Scale (SCS; Singelis, 1994) and the Family Obligation Scale (FOS; Fuligni, Tseng, & Lam, 1999). The SCS is a 24-item self-report measure of independent versus interdependent self-construal (i.e., two dimensions of self-image). The SCS utilizes a 7-point Likert scale, ranging from 1 "strongly disagree" to 7 "strongly agree." The measure is continuous, and produces a sum total for each subscale. In the current sample, internal consistency reliabilities for independent

(VA: $\alpha$ = 0.675; EA: $\alpha$ = 0.609) and interdependent (VA: $\alpha$ = 0.736; EA: $\alpha$ = 0.721) self-construal were acceptable for both Vietnamese and European Americans. The FOS is a 24-item self-report measure, rated on a 5-point Likert scale, that assesses youths' views regarding the degree to which they provide current assistance to their family (the FOS Current Assistance subscale), respect their family (the FOS Respect subscale), and plan to provide future support to their family as adults (the FOS Future Support subscale). This scale is also continuous, and a sum total score or average is created for each subscale. In the current sample, internal consistency reliabilities for FOS Current Assistance (VA: $\alpha$ = 0.754; EA: $\alpha$ = 0.805), FOS Respect (VA: $\alpha$ = 0.758; EA: $\alpha$ = 0.785), and FOS Future Support (VA: $\alpha$ = 0.763; EA: $\alpha$ = 0.785) subscales were acceptable for both Vietnamese and European Americans.

**Procedure**

This study relies on secondary data analysis of the Adolescents Coping with Everyday Stress study (see Lau et al., 2016; Tsai et al., 2017). During the first stage of recruitment, research assistants provided a brief study overview and distributed IRB-approved consent packets to interested students, including consent forms for parents and assent forms for students themselves. Students were asked to take packets home for signed parental consent. For study eligibility, students were asked to return both the signed consent and assent forms. Students were rewarded with small incentives for returned consent packets, regardless of whether they were included or ultimately participated in the study. The three classrooms that returned the most consent forms were rewarded with a pizza party.

After returning completed consent packets, students completed the online survey in computer labs at school under observation by study personnel. Students were allowed one hour to complete the survey ($n$ = 2 students required additional time). Research assistants visited high

schools again for data collection three months later (i.e., "Baseline") and then six months later (i.e., "Follow-up"). All measures included in the online survey were self-report and in English. Students were compensated with a $25 retail gift card for survey completion at baseline and a $25 retail gift card for survey completion at follow-up.

**Data Analyses**

Data was analyzed using IBMs Statistical Package for Social Sciences (SPSS, Version 20). For Aim 1, we conducted descriptive statistics and bivariate correlations of the 676 adolescents who participated at baseline and follow-up to examine associations between self-construal (i.e., interdependent vs. independent self-construal), family obligation, internalizing symptoms, temporal orientation (i.e., past, present, and future), and adverse life events. To examine differences between cultural groups, we conducted group mean comparisons using independent samples t-tests. Additionally, we examined correlations in the overall sample and within subgroups.

To address Aim 1, we also conducted a Hierarchical Linear Regression model to explore the relative contribution of adverse life events, temporal orientations (i.e., past, present, and future), and ethnicity on internalizing symptoms in the overall sample. We entered age and gender into the first block, and then ethnicity, adverse life events, temporal orientations (i.e., past, present, and future) into the second block, with internalizing symptoms as the criterion variable. Moreover, Fisher's r-to-z transformations were conducted to test for group differences in the strength of the association between temporal orientations and internalizing symptoms.

Aims 2 and 3 also used the longitudinal sample of 676 students who participated at both baseline and follow-up. For Aim 2, we tested the moderating effects of temporal orientation on the relationship between adverse life events reported at baseline and internalizing symptoms

reported at follow-up using three unique moderation models (i.e., past, present, and future). The effects of past, present, and future temporal orientation were examined in three separate Hierarchical Linear Regression models distinguished by temporal orientation type (i.e., one model exploring past temporal orientation, one model exploring present temporal orientation, and one model exploring future temporal orientation). Controls for age and gender were entered at Step 1 of each model, and adverse life events and temporal orientation were entered as predictors at Step 2. In Step 3 we included the relevant interaction term (e.g., adverse life events X past temporal orientation, adverse life events X present temporal orientation, or adverse life events X future temporal orientation). Variables of interest were centered before creating interactions by subtracting the respective mean from participant scores.

Aim 3 tested whether interactions between temporal orientation and adverse life events were further moderated by ethnicity, when predicting internalizing symptoms. These 3-way interactions were tested by extending the Hierarchical Linear Regression models used in Aim 2. As before, controls for age and gender were entered at Step 1 of the model, and adverse life events, ethnicity, and the relevant temporal orientation (either past, present, or future) were entered as predictors at Step 2. Step 3 of the model included all combinations of 2-way interactions between adverse life events, ethnicity, and the relevant temporal orientation for that model. Finally, we added a 3-way interaction (ethnicity X temporal orientation X adverse life events) in Step 4 of each model. The current moderation analyses did not control for baseline internalizing symptoms due to the strong association between baseline internalizing symptoms and follow-up internalizing symptoms ($r = 0.770$, $p < 0.01$). Further, our sample size (i.e., 676 participants) should be adequate, as research suggests that a minimum of 500 cases is necessary

to detect large, moderate, and even small effects in three-way interactions (Dawson & Richter, 2006).

## Results

### Preliminary Analyses

To determine whether Vietnamese American and European American adolescents differed in their use of past, present, or future temporal orientations, a series of independent samples t-tests were conducted (Table 2). Results indicated that Vietnamese American adolescents endorsed significantly higher levels of baseline past temporal orientation ($M$ = 48.2, $SD$ = 10.6) and baseline present temporal orientation ($M$ = 33.2, $SD$ = 6.45) than European American adolescents ($M$ = 42.5, $SD$ = 12.6; $M$ = 31.1, $SD$ = 6.77, respectively), [$t(601) = 5.83$, $p < 0.001$, $d = 0.485$; $t(605) = 3.91$, $p < 0.001$, $d = 0.322$, respectively]. However, no significant mean ethnic group differences were found for baseline future temporal orientation between Vietnamese American adolescents ($M$ = 42.4, $SD$ = 8.37) and European American adolescents ($M$ = 42.8, $SD$ = 9.47), $t(589) = 0.700$, $p = 0.484$, $d = 0.058$. Vietnamese American adolescents also reported significantly higher levels of baseline internalizing symptoms (VA: $M$ = 18.0, $SD$ = 10.0; EA: $M$ = 15.4, $SD$ = 10.1; $t(623) = 3.14$, $p < 0.05$, $d = 0.259$), internalizing symptoms at follow-up (VA: $M$ = 17.1, $SD$ = 10.5; EA: $M$ = 14.2, $SD$ = 10.2; $t(578) = 3.39$, $p < 0.001$, $d$ = 0.283), and baseline adverse life events (VA: $M$ = 13.5, $SD$ = 8.07; EA: $M$ = 11.1, $SD$ = 7.78; $t(627) = 3.79$, $p < 0.001$, $d = 0.303$) than European Americans adolescents.

In addition, we explored whether Vietnamese American and European adolescents differed on measures of culture (Table 2). Results indicated that Vietnamese American adolescents endorsed significantly higher levels of baseline FOS Future Support ($M$ = 3.17, $SD$ = 0.858) than European American adolescents ($M$ = 2.49, $SD$ = 0.80), $t(621) = 10.2$, $p < 0.001$, $d$ =

0.818). However, no significant mean ethnic group differences were found for baseline FOS Respect (VA: $M = 3.67$, $SD = 0.683$; EA: $M = 3.56$, $SD = 0.703$) or baseline FOS Current Assistance (VA: $M = 2.98$, $SD = 0.846$; EA: $M = 3.06$, $SD = 0.945$); [$t(622) = 1.82$, $p = 0.069$, $d = 0.147$; $t(621) = -1.18$, $p = 0.237$, $d = 0.095$, respectively]. Further, Vietnamese American adolescents ($M = 30.2$, $SD = 4.84$) endorsed significantly higher levels of baseline interdependent self-construal than European Americans ($M = 28.3$, $SD = 4.81$), $t(625) = 4.87$, $p < 0.001$, $d = 0.392$. No significant mean ethnic group differences, however, were found for baseline independent self-construal (VA: $M = 25.8$, $SD = 4.44$; EA: $M = 25.3$, $SD = 4.10$), $t(625) = 1.76$, $p = 0.078$, $d = 0.143$.

Table 3 presents bivariate correlations between age, gender, and study variables separately for Vietnamese and European Americans. Results support the maladaptive nature of baseline past temporal orientation for both groups. In both the Vietnamese American and European American subsamples, baseline past temporal orientation was positively associated with baseline YSR internalizing symptoms ($r = 0.393$ and $0.594$, $p < 0.01$, respectively), follow-up YSR internalizing symptoms ($r = 0.322$ and $0.510$, $p < 0.01$, respectively) and baseline adverse life events ($r = 0.342$ and $0.353$, $p < 0.01$, respectively). Further, Fisher's r-to-z transformations demonstrated that the strength of the association between baseline past temporal orientation and baseline YSR internalizing symptoms was stronger for the European American subsample compared to the Vietnamese American subsample (*transformed* $r = 0.684$ and *transformed* $r = 0.415$, $p < 0.05$, respectively). In addition, within the Vietnamese American subsample, baseline interdependence was positively associated with past ($r = 0.262$, $p < 0.001$), present ($r = 0.130$, $p < 0.05$), and future ($r = 0.143$, $p < 0.001$) temporal orientations, while baseline independence was positively associated with present ($r = 0.429$, $p < 0.001$) and future ($r$

= 0.336, $p < 0.001$) temporal orientations. Within the European American subsample, baseline interdependence was positively associated only with past temporal orientation ($r = 0.128$, $p < 0.001$), while baseline independence was negatively associated with past temporal orientation ($r = -0.152$, $p < 0.001$), positively associated with present temporal orientation ($r = 0.189$, $p < 0.001$) and positively associated with future temporal orientation ($r = 0.180$, $p < 0.001$).

Moreover, we examined constructs related to family obligation within the Vietnamese American subsample: baseline FOS Respect was positively associated with past ($r = 0.109$, $p < 0.05$), present ($r = 0.137$, $p < 0.05$), and future ($r = 0.294$, $p < 0.001$) temporal orientations; baseline FOS Future Support was positively associated with past ($r = 0.129$, $p < 0.05$), present ($r = 0.148$, $p < 0.001$) and future ($r = 0.198$, $p < 0.001$) temporal orientations; and baseline FOS Current Assistance was positively associated only with future temporal orientations ($r = 0.163$, $p < 0.001$). We also examined constructs related to family obligation within the European American subsample: baseline FOS Respect was positively associated only with future temporal orientation ($r = 0.180$, $p < 0.001$); baseline FOS Future Support was positively associated with present temporal orientation ($r = 0.152$, $p < 0.001$) and negatively associated with past temporal orientation ($r = -0.143$, $p < 0.001$); and baseline FOS Current Assistance was positively associated with present ($r = 0.158$, $p < 0.001$) and future ($r = 0.222$, $p < 0.001$) temporal orientations.

**Aim 1: Relative contribution of adverse life events, temporal orientation, and ethnicity on internalizing symptoms**

To explore the influence of baseline adverse life events, temporal orientations (i.e., past, present, and future), and ethnicity on internalizing symptoms at follow-up, we conducted a Hierarchical Regression analysis (see Table 4). This model explained a significant amount of the

variance in internalizing symptoms ($F(7, 496) = 35.7$, $p < 0.001$ , $R^2_{Adjusted} = 0.326$), with gender ($\beta = 0.201$ , $p < 0.001$ ), adverse life events ($\beta = 0.294$ , $p < 0.001$ ), past temporal orientation ($\beta = 0.322$ , $p < 0.001$), and present temporal orientation ($\beta = -0.098$ , $p = 0.018$) demonstrating significant independent associations with internalizing symptoms. Future temporal orientation, however, did not significantly predict internalizing symptoms ($\beta = -0.067$, $p = 0.102$).

**Aim 2: Moderating effects of temporal orientations on the relationship between adverse life events and internalizing symptoms**

Using three unique moderation models (i.e., past, present, and future), Aim 2 explored the moderating effects of temporal orientation on the relationship between adverse life events reported at baseline and internalizing symptoms at follow-up (see Tables 4-6). The first model (i.e., adverse life events X past temporal orientation) assessed the role of past temporal orientation as a moderator in the relationship between adverse life events and internalizing symptoms (Table 5). Gender ($\beta = 0.202$, $p < 0.001$), adverse life events ($\beta = 0.294$, $p < 0.001$), and past temporal orientation ($\beta = 0.293$, $p < 0.001$) had significant main effects on internalizing symptoms at follow-up. Adverse life events X past temporal orientation ($\beta = 0.036$, $p = 0.336$), however, did not significantly predict internalizing symptoms at follow-up.

The second model (i.e., adverse life events X present temporal orientation) assessed the role of present temporal orientation as a moderator in the relationship between adverse life events and internalizing symptoms at follow-up (Table 6). Main effects of gender and adverse life events remained significant, but temporal orientation was not ($\beta = -0.054$, $p = 0.157$). The interaction between adverse life events and present temporal orientation ($\beta = -0.043$, $p = 0.251$) was not statistically significantly.

Finally, the third model (i.e., adverse life events X future temporal orientation) assessed the role of future temporal orientation as a moderator in the relationship between adverse life events and internalizing symptoms at follow-up (Table 7). Again, main effects of gender and adverse life events remained significant, but future temporal orientation ($\beta$ = -0.031, $p$ = 0.416) was not an independent predictor of internalizing symptoms. Future temporal orientation did not moderate the relationship between adverse life events and internalizing symptoms ($\beta$ = 0.013, $p$ = 0.741).

**Aim 3: Moderating effects of ethnicity on the interaction between adverse life events and temporal orientation**

Finally, to address Aim 3 we explored the moderating influences of temporal orientation on the relation between adverse life events and internalizing symptoms across cultural groups by testing the relevant three-way interactions. The results of these three separate regression analyses are presented in Tables 8-10. As can be seen from these tables, three-way interactions between ethnicity X adverse life events X temporal orientation were not significant in any model (past $\beta$ = 0.073, $p$ = 0.164; present $\beta$ = -0.001, $p$ = 0.976; future $\beta$ = 0.042, $p$ = 0.397). These findings suggest that ethnicity does not further moderate the interactive effects of temporal orientation (i.e., past, present, or future) and adverse life events when predicting internalizing symptoms.

Though not the focus of the current analysis, the two-way interaction between present temporal orientation and ethnicity at Step 3 of the regression model (i.e., present temporal orientation X ethnicity) did significantly predict internalizing symptoms at follow-up ($\beta$ = -0.104, $p < 0.05$). We conducted post-hoc probing of the interaction effects following procedures recommended by Holmbeck, 2002. As seen in Figure 1, present temporal orientation was negatively associated with internalizing symptoms (i.e., had a protective effect) for European

Americans ($\beta$ = -0.215, $p < 0.01$), but was not associated with internalizing symptoms for Vietnamese Americans ($\beta$ = -0.091, $p = 0.129$).

## Discussion

The current study sought to consider pathways by which adverse life events give rise to internalizing symptoms, and the influences of cultural, emotional, and cognitive factors on this relationship. We began by first exploring associations between cultural indicators (i.e., family obligation, self-construal, interdependence) and our constructs of interest, including adverse life events, temporal orientation (i.e., past, present, and future), and internalizing symptoms. While our predictions for past temporal orientation were clear (i.e., that past temporal orientation would be associated with collectivist cultural values and maladaptive outcomes), our investigation of present and future temporal orientations was more exploratory. Results demonstrated that Vietnamese Americans endorsed higher levels of FOS Future Support, interdependent self-construal, and past temporal orientation compared to European American adolescents. These findings are consistent with the literature, suggesting that these particular constructs (i.e., FOS Future Support, interdependence, and past temporal orientation) are markers of Asian heritage culture (Phinney, Ong, & Madden, 2000; Tingvold, Hauff, Allen, & Middelthon, 2012). Vietnamese American adolescents also endorsed higher levels of present temporal orientation compared to European American adolescents; however, there were no differences in future temporal orientation between subsamples. These results are somewhat surprising given the literature suggesting that Asian individuals are more likely to possess holistic cognitive styles (i.e., placing more emphasis on the past and future; Gao, 2016; Nisbett, Peng, Choi, & Norenzayan, 2001). It is possible that present temporal orientation endorsed by Vietnamese Americans may be explained by mindfulness ingrained in teachings of Buddhism, commonly

practiced among individuals with Vietnamese heritage, which encourages one to focus their attention on the present (Hạnh & Hanh, 2001; Le & Trieu, 2014). In addition, factors like acculturation may influence the degree to which Vietnamese American adolescents exhibit holistic cognitive styles, as mainstream North American culture encourages an analytic, present-focused cognitive style (Gao, 2016; Nisbett, Peng, Choi, & Norenzayan, 2001). Taken together, these findings point to the variability in the expression of temporal orientations and to the importance of considering cultural factors in any investigation of cognition.

Results also revealed FOS Future Support and interdependent self-construal were positively associated with past temporal orientation for Vietnamese American adolescents, as well as for European American adolescents. FOS Respect was positively associated with past temporal orientation in the Vietnamese American adolescent subsample only. These findings suggest that future FOS Future Support and interdependent self-construal are positively associated with past temporal orientation regardless of ethnic group identity, speaking to the strong relationship between past temporal orientation and these particular collectivist cultural values. It should be noted that, on average, Vietnamese American adolescents also endorsed higher levels of FOS Future Support and interdependent self-construal compared to their European American peers, which may indicate that these constructs are better representations of heritage cultural values compared to other cultural constructs measured in the current study. Finally, in line with our hypothesis, results demonstrated that adverse life events were positively associated with internalizing symptoms in both subsamples.

To address our first aim, we also conducted a Hierarchical Linear Regression to examine the influences of adverse life events, temporal orientations (i.e., past, present, and future), and ethnicity on internalizing symptoms in the overall sample. Results demonstrated that adverse life

events, past temporal orientation, and present temporal orientation independently contributed to the prediction of internalizing symptoms six months later. Ethnicity and future temporal orientation, however, did not significantly predict internalizing symptoms. Bivariate correlations between past temporal orientation, present temporal orientation, and internalizing symptoms revealed that past temporal orientation is positively associated with internalizing symptoms, while present temporal orientation is negatively associated with internalizing symptoms. In line with our hypotheses, these results suggest that past temporal orientation may imitate a ruminative process, thereby increasing the likelihood that individuals might focus on past, negative events. Further, these findings are consistent with studies that demonstrate strong associations between past, negative temporal orientation and life satisfaction, such that folks who endorsed high levels of past, negative temporal orientation endorsed low levels of life satisfaction (Stolarski & Matthews, 2016; Zhang & Howell, 2011). In the current study, however, our measure of past temporal orientation measure was neither negative nor positive, rather it was a measure of past temporal orientation more generally. These results speak to the maladaptive nature of past temporal orientation, regardless of valence. Alternatively, present temporal orientation was negatively associated with internalizing symptoms, supporting the assertion that present orientation may be similar to mindfulness. Moreover, like evidence-based interventions for internalizing disorders that incorporate mindfulness strategies to reduce rumination (Carsley, Khoury, & Heath, 2018; Felver, Celis-de Hoyos, Tezanos, & Singh, 2016; Zack, Saekow, Kelly, & Radke, 2014; Zoogman, Goldberg, Hoyt, & Miller, 2015), present temporal orientation may operate similarly to reduce internalizing symptoms.

The moderating effects of specific temporal orientations (i.e., past, present, and future) on the relationship between adverse life events and internalizing symptoms were also tested. Here,

we predicted that past and present temporal orientation would amplify the effects of adverse life events (i.e., past temporal orientation X adverse life events and present orientation X adverse life events) and future temporal orientation would weaken the effects of adverse life effects (i.e., future temporal orientation X adverse life events). However, contrary to our hypotheses, temporal orientations (i.e., past, present, and future) did not amplify or buffer the effects of adverse life events.

Finally, our third aim focused on understanding the extent to which culture influences the adaptive nature of temporal orientation. More specifically, we tested whether the moderating effects of temporal orientations (i.e., past, present and future) on the relationship between adverse life events and internalizing symptoms were further moderated by ethnicity. We predicted that because past temporal orientation is more common and related to cultural values in Asian communities, it would be weakly associated with risk for Vietnamese American adolescents, but more strongly associated with risk for European American adolescents. We had no *a priori* hypotheses related to the effects of cultural influences on present or future orientation. Preliminary correlational analyses and comparisons using Fischer's r-to-z transformation provided some evidence that the strength of the relationship between past temporal orientation and internalizing symptoms is significantly stronger for European American adolescents than for Vietnamese American adolescents. However, this moderating effect was not borne out in the formal test of moderation. Thus, there was only limited evidence to support our hypothesis that past temporal orientation is less harmful for Vietnamese American than for European American adolescents.

In addition, findings demonstrated that the two-way interaction between present temporal orientation X ethnicity was significantly associated with internalizing symptoms. This suggests

that the relationship between present temporal orientation and internalizing symptoms is influenced by ethnicity, such that present temporal orientation may be beneficial for European American adolescents. Present temporal orientation was neither beneficial nor maladaptive for Vietnamese American adolescents. According to the literature, North Americans are more likely to possess an analytical cognitive style (i.e., they tend to place greater emphasis on the present; Gao, 2016; Nisbett, Peng, Choi, & Norenzayan, 2001). Therefore, it stands to reason that present temporal orientation is beneficial for European American adolescents in the United States, as it is a culturally congruent construct for this particular subsample. In other words, increased attention to the present moment aligns with European American cultural values, thereby decreasing risk for negative outcomes, like internalizing symptoms. Further research is needed to detect differences in Vietnamese Americans based on level of acculturation – that is, how exposure to specific cognitive styles (i.e., an analytic versus a holistic cognitive style) might influence the adaptive nature of temporal orientations.

This study generally adds to the literature by examining temporal orientation through a multicultural lens. While research suggests that there are associations between temporal orientation and culture (i.e., holistic cognitive style versus analytic cognitive style; Gao, 2016; Nisbett, Peng, Choi, & Norenzayan, 2001), little is known about how culture might influence the relationship between temporal orientation and mental health outcomes. In line with the notion that cultural developmental science allows us to understand the rich complexity of human psychology and behavior, the current study expands our understanding of how culture may influence the effects of certain cognitive constructs (e.g., temporal orientation; Wang, 2018).

This study has several limitations. First, the current measure of temporal orientation (i.e., past temporal orientation, specifically) does not assess the degree to which an individual places

emphasis on negative, neutral, or positive past events – that is, it assesses only whether individuals place emphasis on past events generally. It may be the case that some individuals place emphasis on positive past events, which may actually be adaptive in nature (or at least not maladaptive). This could also explain why past temporal orientation is less maladaptive for Vietnamese Americans; however, the current data cannot speak to this research question. Other measures of temporal orientation distinguish between the degree to which emphasis placed on the past is negative in nature (e.g., the Zimbardo Time Perspective Inventory; Carelli, Wiberg, & Wiberg, 2011). In addition, although the longitudinal nature of these data is an advantage, the relatively short timeframe (i.e., six months) may have obscured important associations that would have been evident over a longer timeframe. This short timeframe also prevented conducting analyses that control for baseline symptoms, given the strong association between baseline and follow-up internalizing symptoms within this timeframe. Future research should investigate these relationships in a truly longitudinal manner.

The current study may have specific implications for developmental pathways associated with risk factors for internalizing symptoms. For example, past temporal orientation was associated with maladaptive outcomes (i.e., internalizing symptoms) across both subsamples, suggesting that individuals who devote more attention to events in the past may be at greater risk for long-term negative outcomes regardless of ethnicity or cultural values. However, bivariate correlations also suggest that the relationship between past temporal orientation and internalizing symptoms may be slightly stronger for the European American subsample. Further, moderation analyses suggest that present temporal orientation may be adaptive for European American adolescents, but not for Vietnamese American adolescents. These data highlight the importance of considering cultural influences in any analysis of risk factors for mental health symptomology.

By testing dimensions of culture, we are able to identify specific processes that are influenced by culture, rather than making broad generalizations. Moreover, factors like cultural congruence may influence the degree to which specific interventions may differentially impact individuals. These findings are particularly important for Vietnamese American and Asian American youth, more generally, as research demonstrates that individuals from these communities endorse higher rates of internalizing symptoms compared to European American youth (Lau, Fung, Wang, & Kang, 2009; Okazaki, 1997; Okazaki, Liu, Longworth, & Minn, 2002; Twenge & Crocker, 2002).

In addition, the current study may have clinical implications. Interventions designed to reduce risk for internalizing symptoms should consider targeting excessive concern with past events and ruminative thoughts. Further, the finding that present temporal orientation may be adaptive for European Americans in the relationship between adverse life events and internalizing symptoms, but not for Vietnamese Americans, suggests that mindfulness strategies may have less of an impact for Vietnamese American adolescents than for European American adolescents. These findings are consistent with recent studies that demonstrate the potential promise of personalized depression interventions (Hankin, 2020; Young et al., 2020; Hankin, Young, Gallop, & Garber, 2018). In an attempt to develop risk profiles that would allow youth to be matched to evidence-based interventions, Hankin et al. (2018) found that cognitive vulnerability was one of three latent factors that best represented risk factors for depression (interpersonal support and interpersonal conflict were the other two latent factors identified; Hankin, Young, Gallop, & Garber, 2018). Moreover, a follow-up study demonstrated a significant decrease in depressive symptoms when youth were matched to interventions that targeted their unique psychosocial risk factors (i.e., cognitive risk versus interpersonal risk;

Hankin, 2020). It should be noted, however, that the current study was not conducted with a clinical sample nor with interventions in mind, therefore these implications are preliminary and future research should apply these methods to clinical settings. Nonetheless, our study results point to the profound impact of specific cognitive styles, and the need to consider cultural influences on intervention design.

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## Appendix: Tables and Figures

**Table 1**

*Temporal Orientation Scale (Jones, Banicky, Pomare, & Lasane, 1999)*

| |
|---|
| 1. I think about the past a lot. |
| 2. When I want to get something done, I make step by step plans and think about how to complete each step. |
| 3. Generally, I am more focused on what is going on now than on what will happen in the future. |
| 4. I think a lot about what life was like when I was younger. |
| 5. I often think of all the things I wish I had done differently in my past. |
| 6. I take care of what needs done before having fun. |
| 7. The joy in my life comes from what I am doing now, not from what I will be doing later. |
| 8. I often wish I could return to things as they used to be. |
| 9. I am able to resist temptation when there is work to be done. |
| 10. I try to live one day at a time. |
| 11. I keep working at a difficult, boring task if it will help me to get ahead. |
| 12. I like to enjoy what I am doing now rather than think about what I need to do to have fun tomorrow. |
| 13. Thinking about the past makes me very emotional |
| 14. I get things done by working at a steady pace. |
| 15. If I take care of the present, the future will take care of itself. |

**Table 2**

*Mean differences of study variables between ethnic groups*

| Variable | Vietnamese American | | European American | | |
|---|---|---|---|---|---|
| | *M* | *SD* | *M* | *SD* | *t*-statistic |
| T1 ALEQ Total Score | 13.5 | 8.07 | 11.1 | 7.78 | 3.79** |
| T1 YSR Internalizing Score | 18.0 | 10.0 | 15.4 | 10.1 | 3.14** |
| T2 YSR Internalizing Score | 17.1 | 10.5 | 14.2 | 10.2 | 3.39** |
| T1 Past Temporal Orientation | 48.2 | 10.6 | 42.5 | 12.6 | 5.83** |
| T1 Present Temporal Orientation | 33.2 | 6.45 | 31.1 | 6.77 | 3.91** |
| T1 Future Temporal Orientation | 42.4 | 8.37 | 42.8 | 9.47 | 0.700 |
| T1 FO – Respect | 3.67 | 0.683 | 3.56 | 0.703 | 1.82 |
| T1 FO – Future | 3.17 | 0.858 | 2.49 | 0.808 | 10.2** |
| T1 FO – Current | 2.98 | 0.846 | 3.06 | 0.945 | -1.18 |
| T1 Interdependent SC | 30.2 | 4.84 | 28.3 | 4.81 | 4.87** |
| T1 Independent SC | 25.8 | 4.44 | 25.3 | 4.10 | 1.76 |

*$p$<.05.**$p$<.01

## Table 3

*Correlations between study variables for each ethnic group*

| Variable | 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. | 10. | 11. | 12. | 13. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Age | ***1*** | | | | | | | | | | | | |
| | 1 | | | | | | | | | | | | |
| 2. Gender | ***-0.06*** | ***1*** | | | | | | | | | | | |
| | -0.009 | 1 | | | | | | | | | | | |
| 3. T1 ALEQ Total Score | ***0.002*** | ***0.122**** | ***1*** | | | | | | | | | | |
| | 0.030 | 0.155* | 1 | | | | | | | | | | |
| 4. T1 YSR Internalizing Score | ***-0.006*** | ***0.268**** | ***0.469**** | ***1*** | | | | | | | | | |
| | 0.030 | 0.313** | 0.439** | 1 | | | | | | | | | |
| 5. T2 YSR Internalizing Score | ***0.012*** | ***0.258**** | ***0.442**** | ***0.762**** | ***1*** | | | | | | | | |
| | 0.083 | 0.303** | 0.422** | 0.770** | 1 | | | | | | | | |
| 6. T1 Past TO | ***-0.024*** | ***0.029*** | ***0.342**** | ***0.393**** | ***0.322**** | ***1*** | | | | | | | |
| | 0.002 | 0.213** | 0.353** | 0.594** | 0.510** | 1 | | | | | | | |
| 7. T1 Present TO | ***-0.068*** | ***-0.098*** | ***0.081*** | ***-0.052*** | ***-0.003*** | ***.283**** | ***1*** | | | | | | |
| | -0.041 | -0.039 | 0.076 | -0.101 | -0.130 | 0.171** | 1 | | | | | | |
| 8. T1 Future TO | ***-0.022*** | ***0.005*** | ***-0.063*** | ***-0.052*** | ***-0.074*** | ***.222**** | ***.472**** | ***1*** | | | | | |
| | -0.070 | 0.220** | 0.031 | 0.039 | 0.052 | 0.284** | .380** | 1 | | | | | |
| 9. T1 FOS – Respect | ***-0.019*** | ***0.027*** | ***-0.101*** | ***-0.116**** | ***-0.066*** | ***0.109**** | ***0.137**** | ***0.294**** | ***1*** | | | | |
| | 0.090 | 0.050 | -0.121* | -0.100 | -0.056 | 0.083 | -0.002 | 0.180** | 1 | | | | |
| 10. T1 FOS – Future | ***-0.081*** | ***0.109**** | ***-0.074*** | ***-0.051*** | ***-0.012*** | ***0.129**** | ***0.148**** | ***0.198**** | ***0.570**** | ***1*** | | | |
| | 0.020 | 0.017 | 0.006 | 0.031 | 0.082 | 0.152** | -0.143** | -0.028 | 0.481** | 1 | | | |
| 11. T1 FOS – Current | ***-0.039*** | ***0.108**** | ***0.041*** | ***0.020*** | ***0.051*** | ***0.078*** | ***0.094*** | ***0.163**** | ***0.322**** | ***0.242**** | ***1*** | | |
| | 0.157** | 0.074 | -0.012 | -0.033 | 0.065 | 0.077 | 0.158** | 0.222** | 0.337** | 0.307** | 1 | | |
| 12. T1 Interdependent SC | ***0.023*** | ***-0.159**** | ***0.028*** | ***0.105**** | ***0.123**** | ***0.262**** | ***0.130**** | ***0.143**** | ***0.188**** | ***0.138**** | ***0.151**** | ***1*** | |
| | 0.025 | -0.112 | -0.019 | -0.001 | 0.002 | 0.128** | 0.056 | 0.051 | 0.161** | 0.115 | 0.063 | 1 | |
| 13. T1 Independent SC | ***0.055*** | ***-0.078*** | ***-0.044*** | ***-0.166**** | ***-0.127**** | ***0.018*** | ***0.429**** | ***0.336**** | ***0.169**** | ***0.151**** | ***0.099*** | ***0.169**** | ***1*** |
| | -0.085 | -0.023 | 0.009 | -0.218** | 0.128* | -0.152** | 0.189** | 0.180** | 0.035 | -0.014 | 0.103 | -0.062 | 1 |

*Note:* Bolded and italicized correlations are for Vietnamese Americans. ALEQ = Adverse Life Events, YSR = Youth Self-Report, TO = Temporal Orientation, FOS = Family Obligation Scale, SC = Self-construal

*$p$<.05.**$p$<.01.

**Table 4**

*Aim 1: Hierarchical regression results for study variables predicting internalizing symptoms at follow-up*

| Variable | *β* | *t* | *p* | Adjusted $R^2$ |
|---|---|---|---|---|
| Block 2 | | | | 0.326 |
| Age | 0.008 | 0.221 | 0.825 | |
| Gender | 0.201 | 5.34 | 0.000** | |
| Ethnicity (reference = VA) | -0.039 | -1.00 | 0.316 | |
| ALEQ | 0.294 | 7.28 | 0.000** | |
| Past TOS | 0.322 | 7.64 | 0.000** | |
| Present TOS | -0.098 | -2.38 | 0.018* | |
| Future TOS | -0.067 | -1.64 | 0.102 | |

*Note.* ALEQ = Adverse Life Events Questionnaire; TOS = Temporal Orientation Scale.

$F(7, 496) = 35.7$, $p < 0.001$ , $R^2 = 0.335$, $R^2_{Adjusted} = 0.326$.

*$p$<.05.**$p$<.01.

**Table 5**

*Aim 2: Moderating effects of temporal orientations on the relationship between adverse life events and internalizing symptoms (Past TO X ALEQ)*

| Variable | *β* | *t* | *p* | Adjusted $R^2$ |
|---|---|---|---|---|
| Block 2 | | | | 0.309 |
| Age | 0.026 | 0.721 | 0.471 | |
| Gender | 0.203 | 5.58 | 0.000** | |
| ALEQ | 0.306 | 7.84 | 0.000** | |
| Past TOS | 0.291 | 7.50 | 0.000** | |
| Block 3 | | | | 0.309 |
| ALEQ X Past TOS | 0.036 | 0.964 | 0.336 | |

*Note.* ALEQ = Adverse Life Events Questionnaire; TOS = Temporal Orientation Scale.

$F(5, 534) = 35.8$, $p < 0.001$ , $R^2 = 0.251$, $R^2_{Adjusted} = 0.309$.

*$p$<.05.**$p$<.01

**Table 6**

*Aim 2: Moderating effects of temporal orientations on the relationship between adverse life events and internalizing symptoms (Present TO X ALEQ)*

| Variable | *β* | *t* | *p* | Adjusted $R^2$ |
|---|---|---|---|---|
| Block 2 | | | | 0.243 |
| Age | 0.021 | 0.565 | 0.572 | |
| Gender | 0.211 | 5.54 | 0.000** | |
| ALEQ | 0.425 | 11.2 | 0.000** | |
| Present TOS | -0.053 | -1.38 | 0.168 | |
| Block 3 | | | | 0.244 |
| ALEQ X Present TOS | -0.043 | -1.15 | 0.251 | |

*Note.* ALEQ = Adverse Life Events Questionnaire; TOS = Temporal Orientation Scale.

$F(5, 532) = 49.1$, $p < 0.001$ , $R^2 = 0.316$, $R^2_{Adjusted} = 0.244$.

*$p$<.05.**$p$<.01.

**Table 7**

*Aim 2: Moderating effects of temporal orientations on the relationship between adverse life events and internalizing symptoms (Future TO X ALEQ)*

| Variable | *β* | *t* | *p* | Adjusted $R^2$ |
|---|---|---|---|---|
| Block 2 | | | | 0.249 |
| Age | 0.020 | 0.524 | 0.600 | |
| Gender | 0.226 | 5.92 | 0.000** | |
| ALEQ | 0.422 | 11.1 | 0.000** | |
| Future TOS | -0.031 | -0.813 | 0.416 | |
| Block 3 | | | | 0.248 |
| ALEQ X Future TOS | -0.013 | -0.331 | 0.741 | |

*Note.* ALEQ = Adverse Life Events Questionnaire; TOS = Temporal Orientation Scale.

$F(5, 523) = 35.7$, $p < 0.001$ , $R^2 = 0.255$, $R^2_{Adjusted} = 0.248$.

*$p$<.05.**$p$<.01.

**Table 8**

*Aim 3: Moderating effects of ethnicity on the interaction between adverse life events and temporal orientation (Past TO X VA X ALEQ)*

| Variable | *β* | *t* | *p* | Adjusted $R^2$ |
|---|---|---|---|---|
| Block 2 | | | | 0.309 |
| Age | 0.027 | 0.760 | 0.448 | |
| Gender | 0.203 | 5.60 | 0.000** | |
| Ethnicity (reference = VA) | -0.027 | -0.73 | 0.473 | |
| ALEQ | 0.303 | 7.74 | 0.000** | |
| Past TOS | 0.285 | 7.20 | 0.000** | |
| Block 3 | | | | 0.309 |
| ALEQ X Ethnicity | -0.029 | -0.57 | 0.570 | |
| ALEQ X Past TOS | 0.046 | 1.15 | 0.251 | |
| Past TO X Ethnicity | 0.088 | 1.55 | 0.122 | |
| Block 4 | | | | 0.310 |
| Past TO X Ethnicity X ALEQ | 0.073 | 1.39 | 0.164 | |

*Note.* ALEQ = Adverse Life Events Questionnaire; TOS = Temporal Orientation Scale.

$F(9, 528) = 27.9$, $p < 0.001$ , $R^2 = 0.322$, $R^2_{Adjusted} = 0.310$.

*$p$<.05.**$p$<.01.

**Table 9**

*Aim 3: Moderating effects of ethnicity on the interaction between adverse life events and temporal orientation* (Present TO X VA X ALEQ)

| Variable | *β* | *t* | *p* | Adjusted $R^2$ |
|---|---|---|---|---|
| Block 2 | | | | 0.249 |
| Age | 0.025 | 0.677 | 0.499 | |
| Gender | 0.212 | 5.57 | 0.000** | |
| Ethnicity (reference = VA) | -0.084 | -2.20 | 0.028* | |
| ALEQ | 0.412 | 10.7 | 0.000** | |
| Present TOS | -0.066 | -1.71 | 0.088 | |
| Block 3 | | | | 0.252 |
| ALEQ X Ethnicity | -0.023 | -0.479 | 0.632 | |
| ALEQ X Present TOS | -0.061 | -1.57 | 0.117 | |
| Present TO X Ethnicity | -0.104 | -2.02 | 0.044* | |
| Block 4 | | | | 0.251 |
| Present TO X Ethnicity X ALEQ | -0.001 | -0.030 | 0.976 | |

*Note.* ALEQ = Adverse Life Events Questionnaire; TOS = Temporal Orientation Scale.

$F(9, 530) = 21.1$, $p < 0.001$ , $R^2 = 0.265$, $R^2_{Adjusted} = 0.251$.

*$p$<.05.**$p$<.01.

**Table 10**

*Aim 3: Moderating effects of ethnicity on the interaction between adverse life events and temporal orientation (Future TO X VA X ALEQ)*

| Variable | *β* | *t* | *p* | Adjusted $R^2$ |
|---|---|---|---|---|
| Block 2 | | | | 0.256 |
| Age | 0.025 | 0.672 | 0.502 | |
| Gender | 0.229 | 6.00 | 0.000** | |
| Ethnicity (reference = VA) | -0.094 | -2.46 | 0.014* | |
| ALEQ | 0.407 | 10.6 | 0.000** | |
| Future TOS | -0.035 | -0.915 | 0.360 | |
| Block 3 | | | | 0.253 |
| ALEQ X Ethnicity | -0.020 | -0.415 | 0.678 | |
| ALEQ X Future TOS | 0.022 | -0.558 | 0.577 | |
| Future TO X Ethnicity | 0.024 | 0.446 | 0.656 | |
| Block 4 | | | | 0.252 |
| Future TO X Ethnicity X ALEQ | 0.042 | 0.848 | 0.397 | |

*Note.* ALEQ = Adverse Life Events Questionnaire; TOS = Temporal Orientation Scale.

$F(9, 519) = 20.8$, $p < 0.001$ , $R^2 = 0.265$, $R^2_{Adjusted} = 0.252$.

*$p$<.05.**$p$<.01.

**Figure 1**

*Relationship between present temporal orientation and internalizing symptoms as a function of ethnicity*