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The role of time perspective and acculturative stress on adaptive and maladaptive stress coping strategies of Puerto Ricans living in the island of Puerto Rico and the state of Connecticut in mainland United States

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Abstract

We assessed the role of Time Perspective (TP) and acculturative stress on adaptive and maladaptive coping strategies, across healthy and treatment-seeking Puerto Ricans living in the island of Puerto Rico (PR), as well as at the state of Connecticut in mainland United States (US). Participants were comprised of 197 adults from the island of PR, as well as 138 adults from Connecticut. TP was measured through five categories assessed by the Zimbardo TP Inventory (Past Positive, Past Negative, Present Fatalistic, Present Hedonistic, and Future), the Deviation from a Balanced Time Perspective-revisited (DBTPr) coefficient, and the Deviation from the Negative Time Perspective (DNTP) coefficient. Acculturative stress was measured with the Acculturative Distress Scale. Adaptive and maladaptive stress-coping were measured through the Brief COPE Inventory. DNTP predicted adaptive coping, whereas acculturative stress, Present Hedonistic, and DBTPr predicted maladaptive coping. Puerto Ricans living in Connecticut engaged more often in maladaptive coping than those in PR. Acculturative stress partially mediated the influence of DBTPr on maladaptive coping. DNTP mediated the influence of state on adaptive coping. DBTPr and acculturative stress totally mediated the influence of state on maladaptive coping. These findings suggest that assessing TP, levels of acculturative stress, and coping strategies could assist in tailoring evidence-based interventions to the specific needs of Puerto Rican populations. Doing so could be effective in promoting a Balanced Time Perspective, reducing acculturative stress, increasing adaptive coping, and improving mental as well as physical health, on Puerto Ricans living in PR or mainland US.

Keywords Time Perspective · Acculturative Stress · Coping · Adaptive Stress Coping Strategies · Maladaptive Stress Coping Strategies · Puerto Rico · Connecticut · United States · Deviation from the Balanced Time Perspective-revisited (DBTPr) coefficient · Deviation from the Negative Time Perspective (DNTP) coefficient

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Introduction

Immigration rates of Hispanic/Latinos in the United States (US) have increased by 43% over the past decade (Aragones et al., 2014). According to the 2011 Census Bureau's American Community Survey, about 4.9 million (9.5%) of the US Hispanic/Latino population is composed of Puerto Ricans (Motel & Patten, 2012). These rates rank Puerto Ricans as the second-largest Hispanic/Latino population residing in the US. Unfortunately, 28% of Puerto Ricans residing in the US live in poverty, at a rate that ranks them higher in poverty than the overall US Hispanic/Latino population (26%) and the general US population (16%). Since poverty has previously been linked to acculturation processes across Puerto Rican families living in mainland US (Elam, 1969), Puerto Ricans living under the poverty line in the US may be at high risks of experiencing stress related to acculturation processes.

Culture, acculturation, and acculturative stress

Culture can be considered as a highly complex, continuously evolving system of meaning that is learned, shared, transmitted, altered, and transferred across generations (Triandis, 1995). Similarly, *acculturation* refers to changes in an individual's culture, influenced by the continuous, direct contact an individual experiences with a novel culture (Redfield et al., 1936). More specifically, acculturation can exert changes in behavioral and psychological dimensions (Berry, 2003). On the behavioral dimension, individuals can become more aligned with the host culture, in terms of cultures and traditions. On the psychological dimension, individuals can intensify their attachment to the host culture. When changes on these dimensions mount together, a particular type of stress occurs, known as acculturative stress (Berry, 2006). Acculturative stress is the type of stress that occurs when an individual's adaptive resources become insufficient to assertively adjust to a novel cultural environment (Capielo Rosario & Dillon, 2020; Duarte et al., 2008). According to transactional theory (Berry, 2006), acculturative stress can result as a consequence of negative interactions between ethnic minority groups and members of the dominant culture. As such, acculturative stress can lead to physical and mental illnesses, which in turn can cause individuals to experience numerous vicissitudes while learning how to assertively cope with such complications (Berry et al., 1987; Organista et al., 2003). Thus, acculturation and acculturative stress can explain the alarming rates of physical and mental illness among Puerto Rican populations living in the US (Rogler et al., 1991), and even more specifically at the state focused on this study, Connecticut.

Acculturation and physical illnesses of Puerto Ricans living in Connecticut

Regarding physical illnesses, an analysis of the 1980 Census Microdata identified the standardized incidence ratio (SIR) for invasive cancers of the stomach, esophagus, and cervix as significantly elevated across female Puerto Rican-born patients residing in Connecticut (Polednak, 1992). Similarly, the SIR for invasive cancers of the oral cavity, esophagus, and stomach and for leukemia were identified as significantly elevated across male Puerto Rican-born patients residing in Connecticut. The described findings were interpreted as suggestive of sex differences in acculturation and lifestyle changes relevant to cancer risks in Puerto Ricans residing in Connecticut (Polednak, 1992).

Acculturation and mental illnesses of Puerto Ricans living in Puerto Rico and Connecticut

A comparative study examining acculturation-related stress reported that overall prevalence and patterns of psychiatric comorbidity appeared to be remarkably similar across both Puerto Ricans living in Puerto Rico (PR) and those living in Connecticut (Conway et al., 2007). However, despite overall psychopathological similarities, the degree of acculturation-related family stress appeared to be positively associated with co-occurring substance and psychiatric disorders among those who migrated to Connecticut, rendering these individuals with an increased risk to develop affective disorders.

The identified high indices of physical and mental illnesses of Puerto Ricans living at the state of Connecticut suggest an increased vulnerability of this population to adversities associated with acculturative stress. Thus, it is important to account for psychological factors that could also be associated to acculturative stress in these individuals. One psychological construct that could be related to the described associations between physical/mental ailments and acculturative stress across Puerto Ricans might be a psychological construct previously shown to influence physical and mental health, called Time Perspective (Oyanadel & Buela-Casal, 2011).

Time perspective

Time Perspective (TP) is operationally defined as a multidimensional, semi-flexible cognitive, emotional, and social process that assigns conscious human experiences into past, present and future domains or psychological time zones (Holman & Zimbardo, 2009). To measure this construct, the Zimbardo Time Perspective Inventory (ZTPI) was developed

(Zimbardo & Boyd, 1999). It measures five time orientations or tendencies, whereby fixations towards any one of these TP tendencies at the expense of others can result in dysfunctional personality traits and/or psychiatric distortions (Boniwell & Zimbardo, 2003). These five TP tendencies have been named as Past Negative, Past Positive, Present Hedonistic, Present Fatalistic, and Future.

Time perspective tendencies

First, Past Negative refers to the tendency of looking upon one's past in a negative way. Individuals scoring high on this factor tend to experience anxiety (Åström et al., 2014), undermining interactions, social conflict, less social support and shorter lasting relationships in the aftermath of stress (Holman & Zimbardo, 2009). Second, Past Positive is represented by the past being seen from a pleasant, nostalgic point of view. Individuals who score high on this TP tend to report fewer social conflicts (Holman & Zimbardo, 2009). Third, Present Hedonistic reflects preferences for pleasurable activities and sensation-seeking behaviors, which can render individuals more prone to academic/professional difficulties, as well as accidents, injuries and addictions (Boniwell & Zimbardo, 2003). Fourth, Present Fatalistic is characterized by a catastrophic view of the present, with less hope for the future. Similar to Past Negative, individuals who score high on Present Fatalistic tend to experience more stress-related problems, such as aggression (Stolarski et al., 2016), symptoms of anxiety and depression (Lefèvre et al., 2019; Zimbardo & Boyd, 1999), perceived stress (Papastamatelou et al., 2015), burnout (Meidani et al., 2019; Unger et al., 2022), allostatic load (Bourdon et al., 2020), and PTSD (Zimbardo et al., 2012). Finally, Future denotes an orientation towards planning for the future. This factor is related to the presence of high degrees of stress and heightened pressures to use time efficiently (Zimbardo & Boyd, 1999). On the other hand, Future has also been correlated with optimism, which is protective against distress (Kimhi et al., 2013; Segerstrom et al., 1998). In summary, all five traditional TPs have been shown to bear different associations to diverse aspects of stress phenomena.

Balanced time perspective

Even though the described five TPs are thought to be independent from each other, two distinct TP profiles have been identified: *Balanced Time Perspective* (BTP) and *Negative Time Perspective* (NTP). Individuals who score low on the Past Negative and Present Fatalistic dimensions, moderate on Present Hedonistic, moderately high on Future, and high on Past Positive are considered to reflect the BTP profile (Stolarski et al., 2015). BTP is associated with decreased negative affect and higher life satisfaction, happiness, positive affect, psychological need satisfaction, self-determination, vitality, and gratitude (Zhang et al., 2013), positive mood (Stolarski et al., 2014), emotional intelligence (Stolarski et al., 2011), psychological well-being (Sailer et al., 2014), and amplified cortisol secretion (Olivera-Figueroa et al., 2015). On the other hand, NTP is the opposite to the BTP and results in an emotionally stressful profile (Oyanadel & Buela-Casal, 2014). For instance, NTP has been associated with PTSD (Papastamatelou et al., 2021) and blunted cortisol secretion (Olivera-Figueroa et al., 2015). Thus, similar to the five traditional TP tendencies, both TP profiles (BTP and NTP) have also been shown to reflect different associations to aspects related to stress phenomena. Nonetheless, despite TP's growing popularity in psychology, no studies have thus far addressed whether TP tendencies and/or profiles directly influence stress and coping processes related to acculturation.

Time perspectives and acculturation

Few studies have addressed relationships between temporality and stress phenomena related to acculturation processes. For instance, a study that examined associations of cultural time orientation with acculturation on immigrant workers revealed that those characterized by integrated acculturation were primarily future-time oriented, somewhat present-time oriented, and interpreted organizational time as less urgent and scarce than those characterized by segregated acculturation (Lee & Flores, 2019). Regarding the specific construct of TP, one study reported that in Mexican Americans acculturation does not moderate the relationship between TP and psychological well-being (Romero, 2009). Along these lines, a study investigating the relationship between TPs and immigrants' psychological adaptation (i.e. affective aspects of migration) on a sample of Ukrainian immigrants residing in Poland revealed that Past Negative, Present Fatalistic, and NTP are related to depressed psychological adaptation; whereas BTP facilitated psychological adaptation across this immigrant group (Marczak et al., 2020). Concerning refugees, a study on TPs and PTSD-vulnerability among Syrian refugees in Greece revealed that high Past Negative, high Present Fatalistic, low Future, and low BTP predicted PTSD symptoms among Syrian refugees (Papastamatelou et al., 2021). Correspondingly, a study conducted on adolescent refugees from Syria and Afghanistan in Germany revealed that low Future appeared to be related to high levels of anxiety, and high Past Negative was associated with high levels of general psychological distress, PTSD symptoms, and depression (Walg et al., 2020). Thus, the described studies demonstrate that TP definitely impacts migration processes. Nonetheless, the described studies did not address coping strategies to deal with stress, limiting the applicability of their conclusions to shift from perceptions to behavior.

Coping

Coping is often defined as the intrapsychic, action-oriented process that attempts to manage demands created by stressful circumstances appraised as taxing, or exceeding an individual's resources (Lazarus & Folkman, 1984; Taylor & Stanton, 2007). For its part, coping strategies or coping styles refer to efforts directed to prevent or reduce a perceived or actual threat, harm, loss, and associated distress (Carver & Connor-Smith, 2010). Given that coping strategies largely depend on the individual's cognitive appraisal of the situation (Holahan & Moos, 1987), as well as the individual's emotional status during the stressful situation (Folkman & Moskowitz, 2000), they can be implemented during stressful circumstances (Baumstarck et al., 2017). Conversely, appraisals and emotions about stressors can both can hinder or support the selection of coping strategies during times of distress.

Coping classifications: adaptive engagement coping versus maladaptive disengagement coping

The coping classification focus of the present study is on the distinction between adaptive engagement coping and maladaptive disengagement coping (Carver & Connor-Smith, 2010). Engagement coping (a.k.a. approach coping) refers to dealing directly with a stressful event or distressful emotions that tend to follow the stressor. It is considered to be an adaptive coping strategy, characterized by an approach aimed at tackling the source of distress, hence it also being known as problem-focused coping (Folkman & Lazarus, 1985; Holahan & Moos, 1987). Some examples of adaptive engagement coping are positive reframing, use of instrumental support, and planning. Conversely, disengagement coping (a.k.a. avoidance coping) refers to coping aimed at escaping from dealing with the stressor or the resulting distress emotions (Carver & Connor-Smith, 2010). It is considered to be a maladaptive coping strategy, characterized by avoidance or withdrawal, hence it also being known as avoidant coping (Holahan & Moos, 1987). Some examples of maladaptive disengagement coping are substance use, self-distraction, and denial. These maladaptive coping strategies may appear to be effective in the short-term, but in the long run tend to be less adaptive (Taylor & Stanton, 2007). Importantly, coping strategies should be considered as different, yet not as opposite to other coping strategies (Compas et al., 2001).

Conceptual models of culture, stress, and coping

In terms of study design, for this study coping is conceptualized as the outcome of acculturative stress, due to the documented influence of culture and acculturation on coping. For instance, Ben Kuo identified four theories on which culture affects stress-coping (Kuo, 2011). First, the Resource-Congruence Model of Coping (Wong, 1993), derived from Lazarus and Folkman's theory of stress and coping (Lazarus & Folkman, 1984), posits that culture affects the stress-coping process by (i) defining what is stressful, (ii) predisposing individuals' responses to stress in a traditional manner, (iii) delimiting the nature and range of implemented resources, (iv) providing cultural knowledge for culturally appropriate coping responses towards a particular stressor, and (v) dictating the expression of coping outcomes (Wong & Ujimoto, 1998). Second, the Multiaxial Model of Coping, derived from Hobfoll's Conservation of Resources Theory of Stress (Hobfoll, 1998, 2001), states that culture can affect stress and coping processes through the following factors: (i) objective factors based on an individual's accurate interpretation; (ii) objective factors based on culturally shared biases within a culture; (iii) objective factors based on familial norms and rules; (iv) illusions based on individual, familial, and cultural biases; and (v) illusions based on personal biases. Third, the Transactional Model of Cultural Stress and Coping (Chun et al., 2006), asserts that acculturation can act as both an "antecedent" and "intermediate" variable in one's coping process, where acculturation circumscribes acculturative stress and coping resources like social support, associated with a person during his or her cultural transition (Berry, 1997). Fourth, the Sociocultural Model of Stress, Coping, and Adaptation states that culture determines (i) the nature of cultural context that shapes stressors often faced by members of a particular culture, (ii) the extent of strain and stressfulness triggered by the stressor, (iii) the selection of coping strategies for particularly stressful situation, and (iv) different institutional mechanisms (e.g., therapeutic interventions, social support, etc.) through which people cope with stress (Aldwin, 2007). In summary, the referenced conceptual models of culture, stress, and coping could be interpreted as indicative that individuals' acculturation levels. Relatedly, cultural orientations should be carefully considered in determining their preferred coping strategies, even within a ethnocultural group, which is the case of the two Puerto Rican populations in this study.

Coping and acculturative stress of Puerto Ricans living in mainland United States, such as Connecticut

Several studies have been published throughout the past few decades addressing relationships between coping dynamics and acculturation-related stress of Puerto Ricans. First, a study conducted across Puerto Ricans living in Connecticut revealed that increasing length of residence in that state is associated with worse stress outcomes when few psychosocial resources for coping are available to the individual (Dressler & Bernal, 1982). More recently, higher levels of acculturative stress, frequent use of maladaptive coping, and infrequent use of adaptive coping were identified among Puerto Ricans living in Central Florida (Capielo Rosario

et al., 2015). A follow-up study from Capielo and colleagues revealed that highly stressed Puerto Ricans living in mainland US with a partial marginalization strategy (i.e. low Puerto Rican and American behavioral and ethnic identity orientation) tend to report markedly high levels of acculturative stress when compared to their peers (Capielo Rosario & Dillon, 2020). These findings demonstrate the importance of further identifying predictive factors to coping strategies across Puerto Rican populations living in mainland US.

Time perspectives and coping

The relationship between TP and coping has been assessed in many countries. In the US, diverse coping strategies have been associated with each TPs (Holman & Zimbardo, 1999; Zimbardo & Boyd, 1999). Positive emotional growth coping appeared to be positively associated with Past Positive, yet negatively associated with Past Negative. Avoidance coping appeared to be associated with Present Hedonistic. Active problem-solving coping appeared to be negatively associated with Present Fatalistic. Active problem-solving coping and emotional growth appeared to be strongly associated with Future. Similarly, Future also predicted adaptive coping on homeless adults (Epel et al., 1999), and elementary school students at risk for early substance use (Wills et al., 2001).

In Greece, Past Negative and Present Fatalistic were negatively correlated to proactive coping (Anagnostopoulos & Griva, 2012). However, Future was positively associated with proactive coping.

In Italy, a study conducted on emerging adults revealed that Future-oriented TP positively correlated with proactive coping, reflective, and preventive coping, whereas Present-oriented TP negatively correlated with reflective and preventive coping strategies (Zambianchi & Bitti, 2014). A follow-up study conducted on adolescents and young adults revealed that Present TP positively correlated with avoidant coping in both groups assessed (Zambianchi, 2018). Moreover, in the same study Future TP positively correlated with problem-solving coping in both samples, with social support coping in emerging adults, and negatively correlated with avoidant coping in emerging adults.

In Russia, a study on the role of TP in coping strategies yielded several findings (Bolotova & Hachaturova, 2013). Past Positive correlated with adaptive coping. Past Negative was positively correlated with maladaptive coping, as well as exhibited negative correlations with adaptive coping. Present Hedonistic correlated with both adaptive and maladaptive coping. Present Fatalistic positively correlated with maladaptive coping, as well as negatively correlated with adaptive coping. Future correlated with adaptive coping.

In Sweden, a study using a version of the ZTPI that divides the Future scale into two parts: the Future Positive (FP) and Future Negative (FN) scales (Carelli et al., 2011), investigated the joint influence of TP and attachment to parents on coping in adolescence (Blomgren et al., 2016). The findings of this study revealed that over and beyond attachment, Present Hedonistic and Positive Future predicted adaptive coping, whereas Past Negative, Present Hedonistic and Negative Future predicted maladaptive coping. Because Present Hedonistic yielded positive associations to both adaptive and maladaptive coping, further examination was made of the individual subscales of the Brief Cope questionnaire utilized on that study (Carver, 1997). This examination revealed that the relationship of Present Hedonistic with adaptive coping was driven mainly by positive associations with the subscales humor, using emotional support, using instrumental support, and positive reframing. On the other hand, Present Hedonistic appeared to be related to self-distraction, and the venting subscales, which are part of maladaptive coping. According to the authors, these patterns were interpreted as suggestive that Present Hedonistic is most characterized by emotion-focused coping in general, including adaptive strategies, and some that may be less adaptive.

In China, a study addressed whether coping strategies would serve as a mediator in the relation between the Future Negative (FN) scale (Carelli et al., 2011) and risk-taking behaviors (Dou et al., 2020). Results indicated that both positive and negative coping strategies mediated the relation between Future Negative and risk-taking behavior. Further examination of these results revealed that the indirect effects that Future Negative exhibited on risk-taking behaviors were stronger through negative coping than through positive coping. Additional analyses on this study reported that low levels of self-control appear to be the variable that heightens the risk for adolescents characterized by high levels of Future Negative who frequently use negative coping strategies.

In Poland, a study conducted across young adults aimed to explore which TPs might predict three types of coping strategies: (1) problem-oriented; (2) active emotion-oriented; and (3) avoidant (Nowakowska, 2020). Past Positive emerged as the most prominent predictor of problem-oriented and active emotion-oriented coping out of all the TPs. Conversely, Past Negative was identified as a negative predictor of problem-oriented and active emotion-oriented coping, as well as the most prominent predictor of avoidant coping out of all the TPs. Present Hedonistic appeared to be a positive predictor of both active emotion-oriented coping and avoidant coping. Future appeared to be a positive predictor of problem-oriented and active emotion-oriented coping, as well as a negative predictor of avoidant coping.

In the US and Taiwan, the relationship between future time orientation, proactive coping, and perceived work-from-home productivity during the coronavirus pandemic was examined cross-culturally (Chang et al., 2021). Results showed that future time orientation fully mediated the relationship between proactive coping and perceived work productivity in Taiwan, and partially mediated it in the US.

Objectives

As the reviewed literature shows, diverse TPs have continuously appeared to be associated with coping strategies in many countries. Additionally, coping strategies have been previously described as dependent of migrants' extent of acculturation levels and adopted acculturation strategies (Kuo, 2011, 2014). For instance, varying degrees of acculturation among Chinese Canadian adolescents have been shown to influence their preferences of individualistic vs. collectivistic coping strategies (Kuo et al., 2006). Furthermore, acculturative stress has been previously reported to negatively predict coping strategies like perseverance coping and meaning-focused coping (MFC) across East Asian international students enrolled in colleges and universities in the US (Liw, 2020). Thus, for this study our main objective was to investigate relationships between the constructs of TP, acculturative stress, and coping across Puerto Ricans in their native island, as well as in mainland US. More specifically, the primary aim of this cross-cultural study was to address the role of TP tendencies, TP profiles, and acculturative stress on predicting adaptive and maladaptive coping strategies across healthy and treatment-seeking Puerto Ricans living in PR, as well as at the state of Connecticut.

Derivation of hypotheses

Bolotova and Hachaturova previously reported that Past Positive, Present Hedonistic, and Future correlated with adaptive coping (Bolotova & Hachaturova, 2013). Similarly, Marczak and colleagues previously reported that the BTP profile predicted psychological adaptation across immigrants (Marczak et al., 2020). Therefore, our first hypothesis is:

H_1: Positive TP tendencies (i.e.: Past Positive, Present Hedonistic, and Future) and/or the BTP profile will predict adaptive coping across the investigated cultures.

Bolotova and Hachaturova previously reported that Past Negative and Present Fatalistic correlated with maladaptive coping (Bolotova & Hachaturova, 2013). Similarly, Marczak and colleagues previously reported that the NTP profile predicted depressed psychological adaptation across immigrants (Marczak et al., 2020). Moreover, Capielo Rosario and colleagues previously reported that acculturative stress correlated with maladaptive coping among Puerto Ricans living in mainland US (Capielo Rosario et al., 2015). Therefore, our second hypothesis is:

H_2: Negative TP tendencies (i.e., Past Negative and Present Fatalistic), the NTP profile, and/or acculturative stress will predict maladaptive coping across the investigated cultures.

Since Puerto Ricans residing in Connecticut have been previously documented to experience high levels of acculturative stress (Conway et al., 2007; Dressler & Bernal, 1982), we hypothesized that:

H_3: Puerto Ricans living in Connecticut will apply maladaptive coping more frequently than those living in PR.

Zajenkowski and colleagues previously reported that stress-states mediated the relationship between NTP and intelligence (Zajenkowski et al., 2016), which is a construct that has been previously related to adaptive coping (Libin, 2017). Therefore, our fourth hypothesis is:

H_4: Acculturative stress will mediate the influence of BTP on adaptive coping. Similarly, acculturative stress will mediate the influence of NTP on maladaptive coping.

Unger and colleagues previously reported that NTP mediated the influence of the factor "country" on proneness for compulsive buying tendencies in two out of three cross-cultural comparisons, where excessive shopping was considered maladaptive coping (Unger et al., 2018). Therefore, our fifth hypothesis is:

H_5: Acculturative stress and BTP will mediate the influence of state on adaptive coping. Similarly, acculturative stress and NTP will mediate the influence of state on maladaptive coping.

Methods

Design

This study followed a cross-sectional design, where psychological questionnaires were administered once as outcome measures. The target population were healthy and treatment-seeking adult Puerto Ricans living in PR, as well as in Connecticut.

Total number of participants

One hundred thirty-eight adult Puerto Ricans (38 men and 100 women) between the ages of 18 to 78 (mean + SEM age: 47.44 + 1.05 years) living in Connecticut participated in this study ($n = 138$). In addition, one hundred ninety-seven adult Puerto Ricans (82 men and 115 women) between the ages of 21 to 79 (mean + SEM age: 40.33 + 4.94 years) living in PR participated on this study ($n = 197$). Thus, a total of three hundred thirty-five Puerto Ricans participated on this study ($n = 335$).

Healthy participants

Healthy Puerto Ricans were defined as those engaged in activities contributing to their well-being and without a reported history

of treatment-seeking. Healthy Puerto Rican participants living in Connecticut were recruited through the community group: "Pequeñas Ligas Hispanas de New Haven" (i.e., Minor Leagues of New Haven). Healthy Puerto Ricans residing in PR were recruited at the fitness center "Trinity Gym", the church "Tabernacle of Prayer", and the church "Ambassador's Center" of Cabo Rojo, PR.

Treatment-seeking participants

Treatment-seeking Puerto Rican participants were considered as those who confirmed they were receiving services at the time of recruitment, which occurred in outpatient mental health treatment facilities. Specifically, treatment-seeking Puerto Rican participants living in Connecticut were recruited at the Hispanic Clinic of the Connecticut Mental Health Center (CMHC)/Yale University, and at BHcare, a behavioral healthcare clinic located in Branford, Connecticut. Treatment-seeking Puerto Rican participants residing in PR were recruited at the Albizu Clinic of Albizu University in San Juan, PR.

Ethical statement and informed consent

Because the study involved the in-person administration of psychological questionnaires, it was not considered to present any risk to its participants. To maintain the confidentiality of participants, only an alphanumeric set of characters was utilized to identify the data records of questionnaires answered by the study's participants. As such, no personal identifiers were collected from the study participants. Moreover, the design of this study allowed for a waiver of informed consent to its participants. In summary, the performed study procedures followed the Code of Ethics included in the American Psychological Association (APA) standards (American Psychological Association, 2017), as well as the 1964 Helsinki Declaration and its later amendments.

Payment for participation

Participants were compensated with a $5 gift card. Besides this compensation, the participants did not receive any other direct benefit from participating on this study.

Measurement outcomes

Sociodemographic questions

Participants were asked questions pertaining to sociodemographic information. On this regard, participants were asked to disclose information about their: age, gender, state, current history of diagnosed medical conditions, current history of diagnosed mental health conditions, and health status, with the latter measured through the dichotomous categories of either being healthy or treatment-seeking. For this study, the term "healthy" refers to participants recruited from community groups, fitness centers, and churches in PR or Connecticut who indicated not having a history of seeking psychiatric or psychological treatment. On the contrary, for this study the term "treatment-seeking" refers to participants recruited from clinics in PR and Connecticut who were receiving treatment at the time of their participation.

Zimbardo Time Perspective Inventory (ZTPI)

The Zimbardo Time Perspective Inventory (ZTPI) was developed to measure scoring on five different TPs, namely *Past Positive*; *Past Negative*; *Present Hedonistic*; *Present Fatalistic*; and *Future* (Zimbardo & Boyd, 1999). The original questionnaire entails 56 items assessing the described five TP tendencies. Each item follows a 5-point Likert scale format, ranging from *very characteristic* (5) to *very uncharacteristic* (1).

For this study, we sought to measure the TPs of Puerto Ricans in a culturally-sensitive manner. To achieve that goal we culturally adapted from the original English-language ZTPI the specific items included on the Chilean ZTPI-short version (Jofré-Oliden et al., 2021) to the Spanish-language dialect spoken in PR, following the guidelines of the Human Services Research Institute Toolkit on Translating and Adapting Instruments (Chávez & Canino, 2005). The Chilean ZTPI-short version consists of 15 items, 3 items for each of the 5 scales of the original ZTPI. The psychometric properties reported for the validation of the Chilean ZTPI-short demonstrated adequate internal consistency for all subscales with an exception of Past Positive ($\alpha = 0.51$), considering that a small number of items typically underestimate the internal consistency by leading to lower α-values. The other subscales showed higher internal consistencies, which were $\alpha = 0.71$ for Past Negative, $\alpha = 0.69$ for Present Hedonistic, $\alpha = 0.64$ for Present Fatalistic, and $\alpha = 0.69$ for Future. In our study similar internal consistencies were observed, with $\alpha = 0.62$ for Past Positive, $\alpha = 0.70$ for Past Negative, $\alpha = 0.73$ for Present Hedonistic, $\alpha = 0.76$ for Present Fatalistic, and $\alpha = 0.81$ for Future. The selected items present a good adaptation obtaining CFI = 0.926, TLI = 0.903, RMSEA = 0.049 [0.042; 0.57], indicating a good fit of the model (Jofré-Oliden et al., 2021). In our study a similar fit was observed with CFI = 0.908, TLI = 0.863, IFI = 0.914, RMSEA = 0.047 [0.037; 0.056), indicating a configural measurement invariance, since this CFA was based on a pairwise comparison of the two groups that participated on this study (i.e., Puerto Ricans in PR and Puerto Ricans in Connecticut).

To assess BTP and NTP profiles on this study, deviation coefficients were measured. For the measurement of the NTP profile the *Deviation from the Balanced Time Perspective-revisited* (DBTPr) coefficient was implemented (Jankowski et al., 2020). This coefficient measures the deviation of individuals from an ideal TP profile. The farther a DBTP value is from zero, the more unbalanced an individual's TP profile is considered to be, resulting in the NTP profile.

$$DBTPr = \sqrt{(1 - ePN)^2 + (5 - ePP)^2 + (1 - ePF)^2 + (3.4 - ePH)^2 + (5 - eF)^2}$$

In this formula *e* equals the *expected* optimal value for each TP, as indicated by Jankowski, Zajenkowski, and Stolarski [1.0 for Past Negative (PN), 5.0 for Past Positive (PP), 1.0 for Present Fatalistic (PF), 3.4 for Present Hedonistic (PH), and 5.0 for Future (F)].

In contrast, the Deviation from the Negative Time Perspective (DNTP) coefficient measures the deviation an individual displays from an unbalanced TP profile. Therefore, the farther a value appears to be from zero, the more optimal the individual's TP profile would be considered to be.

In this formula *n* equals the observed *negative* value obtained for each measured TP, whereas *e* equals the *expected* negative value for each TP, as indicated by Zimbardo, Sword and Sword [4.35 for Past Negative (PN), 2.80 for Past Positive (PP), 3.30 for Present Fatalistic (PF), 2.65 for Present Hedonistic (PH), and 2.75 for Future (F)] (Zimbardo et al., 2012).

$$DNTP = \sqrt{(nPN - ePN)^2 + (nPP - ePP)^2 + (nPF - ePF)^2 + (nPH - ePH)^2 + (nF - eF)^2}$$

Acculturative distress scale

Acculturative stress was measured through the Spanish-language version of Acculturative Distress Scale (Alegria et al., 2004), since a systemic review had previously documented consistent links between DBTP and distress (Stolarski et al., 2020). This scale assesses acculturative stress through nine items, and has the dichotomous response categories of 'Yes' or 'No'. Importantly, three items of this scale were excluded from this study because Puerto Ricans are natural-born US citizens, and therefore not vulnerable to experiencing any stress related to the legality of immigration status. As such, the referenced three items were deemed inapplicable to this study. The psychometric properties yielded by the Acculturative Distress Scale in this study demonstrated adequate internal consistency for the index-scale ($\alpha = 0.67$), considering the low number of six items. Moreover, the selected items present a good adaptation with an acceptable model fit indicated by obtaining CFI = 0.903, TLI = 0.839, IFI = 0.907, RMSEA = 0.074 [0.051; 0.098], indicating a configural measurement invariance between both groups that participated on this study (i.e., Puerto Ricans in PR and Puerto Ricans in Connecticut).

Brief COPE inventory

Coping strategies were measured through the Spanish-language version of the original Brief COPE inventory (Perczek et al., 2000), since it had yielded adequate psychometric properties ($\alpha = 0.87$ for adaptive coping; $\alpha = 0.74$ for maladaptive coping) in a previous study conducted on Puerto Ricans living in mainland US (Capielo Rosario et al., 2015). The original version of the Brief COPE contains 28 items, with each coping strategy being captured by two items (Carver, 1997). Each item follows a 4-point Likert scale format, ranging from "I haven't been doing this at all" (1) to "I've been doing this a lot" (4). The mean-index of each coping strategy enables the calculation of subscales representing adaptive and maladaptive coping strategies. The adaptive coping strategies measured by this inventory are acceptance, active coping, humor, planning, positive reframing, religion, use of emotional support, and use of instrumental support. The maladaptive coping strategies measured through this inventory are behavioral disengagement, denial, self-distraction, substance use, venting, and self-blame. However, use of instrumental support and self-blame were not included in the Spanish translation of the Brief Cope (Perczek et al., 2000). As such, the Brief COPE was administered through the subscales that appear in both the English and Spanish-language versions of this instrument. Furthermore, a Confirmatory Factor Analysis (CFA) was conducted to test if these subscales show a two-factorial structure (adaptive vs. maladaptive coping strategies) between both sub-samples of this study, and thus a corresponding index calculation is justified. Based on this CFA six of these subscales were identified for adaptive coping and five subscales were identified for maladaptive coping, which yielded a relatively poor fit in both samples (CFI = 0.848, TLI = 0.776, IFI = 0.856, and RMSEA = 0.061[0.051; 0.072]. Two mean indices capturing all available subscales of the adaptive and maladaptive coping constructs on the Spanish-language version of the Brief Cope (Perczek et al., 2000) were then formed, with the exception of humor, which was excluded due to its items having displayed factor loadings that were too low. Thus, the number of Brief COPE items administered to the participants of this study was 24, of whom 22 were applied for the calculation of the two indices (for adaptive and maladaptive coping strategies). Moreover, the psychometric properties yielded by the Brief COPE on this study demonstrated adequate internal

Table 1 Pearson's correlations among age, time perspective subscales, DBTPr, DNTP, acculturative stress, adaptive coping and maladaptive coping

	1	2	3	4	5	6	7	8	9	10	11
Age	-										
Past Negative	.056	-									
Past Positive	-.165**	-.169	-								
Present Hedonistic	-.114*	.237**	.040	-							
Present Fatalistic	.125*	.437**	-.357**	.367**	-						
Future	-.278**	-.190**	.649**	-.047	-.334**	-					
DBTPr	.216**	.547**	-.747**	.131*	.689**	-.758**	-				
DNTP	-.210**	-.651**	.353**	-.015	-.460**	.327**	-.465**	-			
Acculturative Stress	.124*	.010	-.045	-.021	.025	-.036	.081	-.025	-		
Adaptive Coping	-.220**	- 123*	.247**	-.007	-.236**	-.314**	-.310**	.291**	-.052	-	
Maladaptive Coping	.018	.084	.212**	.152**	.170**	-.158**	.267**	-.037	.215**	.090	-
Mean	40.33	2.49	3.38	3.05	2.53	3.39	3.61	1.73	1.33	2.79	1.88
SD	14.23	0.98	1.02	0.97	1.10	1.09	1.44	0.27	1.50	0.59	0.67

DBTPr = Deviation from balanced time perspective revisited

DNTP = Deviation from negative time perspective

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

consistency for the two overall subscales (α = 0.838 for adaptive coping; α = 0.780 for maladaptive coping).

Statistical analyses

For ensuring the sampling adequacy we conducted Bartlett's test of sphericity and calculated the KMO for all used scales, as in the five TP subscales of the ZTPI, the Acculturative Distress Scale (ADS), and the adaptive and maladaptive stress coping subscales of the Brief COPE Inventory. The Kaiser–Meyer–Olkin measure and the Bartlett's test of sphericity indicated a good sampling adequacy (see footnote)[1].

[1] We tested for sampling adequacy by calculating the Kaiser–Meyer–Olkin measure (KMO) and Bartlett's test of sphericity. For the ZTPI-15 the Bartlett's test of sphericity was significant (X2 (105) = 1642.54, $p < 0.001$), and the Kaiser–Meyer–Olkin measure was high (KMO = 0.82). For the Acculturative Distress Scale (ADS) the Bartlett's test of sphericity reached significance X2(5) = 283.71, $p < 0.001$), and the Kaiser–Meyer–Olkin measure was above the required threshold value of KMO > 0.60 (KMO = 0.76). For the Brief COPE Inventory, the Bartlett's test of sphericity reached significance (X2(231) = 2548.88, $p < 0.001$) and the Kaiser–Meyer–Olkin measure was sufficiently high, with KMO = 0.79.

According to our missing data analysis, we observed a number of missing cases of $n = 2$ for the Brief COPE Inventory, $n = 0$ for the ADS and $n = 16$ each for the DBTPr and the DNTP. The relatively high but still acceptable number of non-responses for both overall TP coefficients result from the combined calculation of all five TPs. The missing cases for the single TPs are as follows: Past-Positive ($n = 5$), Past-Negative ($n = 7$), Present-Hedonistic ($n = 6$), Present Fatalistic ($n = 6$) and Future ($n = 4$).

Despite the exhaustive number of items of the current survey, the prevalence of non-responses remained quite low.

In terms of descriptive statistics, for this study correlation analyses were conducted for the variables of age, all five TP sub-scales, the DBTPr and DNTP coefficients, acculturative stress, adaptive and maladaptive coping (Table 1).

In order to test the first two hypotheses, hierarchical linear regression analyses (HLRAs) were conducted to examine the influence of the controlling variables and main predictor variables of TPs and acculturative stress on the outcome variables of adaptive and maladaptive coping. For this study, coping strategies were considered an outcome and acculturative stress a predictor due to (i) coping having been previously described as dependent of migrants' extent of acculturation levels and adopted acculturation strategies (Kuo, 2011, 2014), (ii) varying degrees of acculturation among Chinese Canadian adolescents having been previously shown to influence their preferences of individualistic vs. collectivistic coping strategies (Kuo et al., 2006), and (iii) acculturative stress having been previously reported to negatively predict perseverance coping and meaning-focused coping (MFC) across East Asian international students enrolled in colleges and universities in the US (Liw, 2020). The first block included age, gender, state, medical conditions, mental health conditions, and health status category (i.e.: healthy vs. treatment-seeking) as controlling variables, utilizing the enter method. The second block included acculturative stress as a predictor, utilizing the enter method. The third block included the five TP tendencies (Past Positive, Past Negative, Present Hedonistic, Present Fatalistic, and Future) as predictors, utilizing the stepwise method. The fourth block included DBTPr as a predictor, utilizing the

enter method. The fifth block included DNTP as a predictor, utilizing the enter method. The described five-block approach was implemented to measure the additive predictive value of each variable assessed through the third, fourth, and fifth blocks, beyond the predictive value of the controlling variables assessed through the first and second blocks. Following the described methods, one HLRA was conducted on the outcome variable of adaptive coping to test our first hypothesis, and another HLRA was conducted on the outcome variable of maladaptive coping to test our second hypothesis.

To test our third hypothesis one MANOVAs was conducted with the outcome variables of adaptive and maladaptive coping as a function of state. For the examination of our fourth hypothesis, a mediator analysis was conducted with DNTP as the independent variable, acculturative stress as a mediator, and adaptive coping as the dependent variable. For the fourth hypothesis, an additional mediator analysis was conducted with DBTPr as the independent variable, acculturative stress as a mediator, and maladaptive coping as the dependent variable. In order to examine our fifth hypothesis, a mediator analysis was conducted with state (PR or CT) as the independent variable, DNTP and acculturative stress as the mediators and adaptive coping as the dependent variable.

Results

The HLRA conducted on the outcome variable of adaptive coping yielded six models (see Table 2). Of these six models, the sixth and final one provided the best model fit (R = 0.427; R square: 0.182; R square change = 0.033; $p < 0.001$). Hierarchical regression analyses revealed that adaptive coping was only predicted by DNTP ($\beta = 0.215$, $B = 0.462$, $SE\ B = 0.134$, $t = 3.463$, $p = 0.001$; all p-values are reported for two-tailed tests).

The HLRA conducted on the outcome variable of maladaptive coping yielded six models (see Table 3). Of these six models, the fifth one provided the best model fit (R = 0.380; R square: 0.144; R square change = 0.012; $p < 0.044$). Maladaptive coping was predicted by acculturative stress ($\beta = 0.190$, $p = 0.001$), Present Hedonistic ($\beta = 0.135$, $p = 0.019$), and DBTPr ($\beta = 0.183$, $p = 0.044$).

A MANOVA with the variables as a function of country, showed significant differences between the countries in Medical Health conditions: (F = 110.41, $p < 0.001$) PR < CT; Mental Health conditions (F = 59.24, $p < 0.001$) PR < CT; acculturative stress (F = 32.00, $p < 0.001$) PR < CT; DBTPr (F = 135.86, $p < 0.001$) PR < CT; DNTP (F = 34.38, $p < 0.001$) PR < CT; Past Positive (F = 120.34, $p = < 0.001$) PR < CT; Present Fatalistic (F = 39.74, $p < 0.001$) PR < CT; Future (F = 223.05, $p < 0.001$) PR < CT; adaptive coping (F = 35.97, $p < 0.001$) CT < PR; maladaptive coping (F = 10.50, $p = 0.001$) PR < CT.

A lack of significant difference between cultures was identified for Present Hedonistic (F = 0.11, $p = 0.736$) and Past Negative (F = 3.60, $p = 0.059$) (Table 4).

The mediator analysis with DNTP as independent variable, acculturative stress as mediator and adaptive coping as dependent variable, showed that the direct effect of DNTP on acculturative stress was significant ($p = 0.016$). There was

Table 2 Hierarchical linear regression with age, gender, state, mental health conditions, medical conditions, healthy / treatment seeking category, acculturative stress, ZTPI-15-subscales, DBTPr, and DNTP predicting adaptive coping

Model 6	*β*	*t*	*B*	Sig. *B*	*R* .427	*R 2* .182	*ΔR 2* .033	*ΔF* 11.99	Sig. *ΔF* .001
Age	.021	.388	.000	.698					
Gender	.092	1.700	.112	.090					
State	.095	1.143	.115	.254					
MH Conditions	-.130	-1.875	-.166	.062					
Med Conditions	.001	.013	.001	.990					
Category	-.024	-.404	-.028	.687					
Acculturative Stress	.013	.235	.005	.814					
Past Negative									
Past Positive									
Present Hedonistic									
Present Fatalistic	-.040	-.485	-.021	.628					
Future	.123	1.254	.067	.211					
DBTP-r	-.016	-.137	-.007	.891					
DNTP	.215	3.463	.462	.001					

Notes: State = Puerto Ricans in Connecticut vs. Puerto Ricans in Puerto Rico; MH = Mental Health; Med = Medical; Category = healthy vs. treatment seeking; ZTPI-15 = 15-item short version of the Zimbardo Time Perspective Inventory; DBTPr = Deviation from the Balanced Time Perspective Revisited coefficient; DNTP = Deviation from a Negative Time Perspective coefficient

Table 3 Hierarchical linear regression with age, gender, state, mental health conditions, medical conditions, healthy / treatment seeking category, acculturative stress, ZTPI-15-subscales, DBTPr, and DNTP predicting maladaptive coping

Model 5	*β*	*t*	*B*	Sig. *B*	*R* .380	R^2 .144	ΔR^2 .012	*ΔF* 4.096	Sig. *ΔF* .044
Age	.068	1.242	.001	.215					
Gender	-.050	-.895	-.071	.371					
State	.061	.761	.085	.447					
MH Conditions	.055	.779	.082	.436					
Med Conditions	.029	.465	.040	.642					
Category	.080	1.331	.110	.184					
Acculturative Stress	.190	3.357	.086	.001					
Past Negative									
Past Positive	-.069	-.813	-.047	.417					
Present Hedonistic	.135	2.361	.096	.019					
Present Fatalistic									
Future									
DBTP-r	.183	2.024	.087	.044					
DNTP									

Notes: State = Puerto Ricans in Connecticut vs. Puerto Ricans in Puerto Rico; MH = Mental Health; Med = Medical; Category = healthy vs. treatment seeking; ZTPI-15 = 15-item short version of the Zimbardo Time Perspective Inventory; DBTP-r = Deviation from the Balanced Time Perspective Revisited coefficient; DNTP = Deviation from a Negative Time Perspective coefficient

Table 4 MANOVA for differences between countries

Source	*df*	*MS*	*F*	*p*	*M (SD)*	
					Puerto Rico:	*US-mainland:*
MH Conditions	1	17.409	110.46	< .001	0.12 (0.32)	0.60 (0.49)
Med Condition	1	12.400	59.24	< .001	0.38 (0.49)	0.79 (0.41)
Acculturative Stress	1	49.937	23.00	< .001	1.00 (1.29)	1.83 (1.71)
DBTPr	1	212.970	153.86	< .001	2.92 (1.17)	4.63 (1.17)
DNTP	1	2.311	34.38	< .001	1.80 (0.24)	1.62 (0.28)
Past Positive	1	87.426	120.34	< .001	3.85 (0.77)	2.76 (0.97)
Past Negative	1	3.471	3.60	.059	2.42 (0.92)	2.64 (1.00)
Present Hedonistic	1	.106	0.11	.736	3.07 (0.99)	3.03 (0.92)
Present Fatalistic	1	42.618	39.74	< .001	2.22 (1.01)	2.98 (1.07)
Future	1	152.228	223.05	< .001	3.98 (0.73)	2.53 (0.95)
Adaptive Coping	1	11.153	35.97	< .001	2.95 (0.51)	2.56 (0.62)
Maladaptive Coping	1	4.727	10.50	.001	1.77 (0.64)	2.02 (0.72)

All p's are for two-tailed tests

no direct effect of acculturative stress on adaptive coping ($p = 0.187$). In addition, the direct effect of DNTP on adaptive coping was significant ($p < 0.001$). Acculturative stress did not mediate the influence of DNTP on adaptive coping, since the indirect effect did not reach significance (indirect effect = 0.020, BC95%CI from -0.012 to 0.061) (Fig. 1).

Additionally, we conducted a mediator analysis with DBTPr as independent variable, acculturative stress as mediator and maladaptive coping as dependent variable. The results of this mediator analysis showed that the direct effect of DBTPr on acculturative stress ($p < 0.001$), as well as the direct effect of acculturative stress on maladaptive coping ($p < 0.001$) were significant. Moreover, the direct effect of DBTPr on maladaptive coping was significant ($p < 0.001$). Acculturative stress partially mediated the influence of DBTPr on maladaptive coping, since the indirect effect reached significance (indirect effect = 0.082, BC95%CI from 0.006 to 0.034) (Fig. 2).

A mediator analysis with state (PR or Connecticut) as independent variable, DNTP and acculturative stress as mediators and adaptive coping as dependent variable revealed that the direct effect of state on DNTP was significant ($p = < 0.001$). Furthermore, the direct effect of state on acculturative stress was significant ($p = < 0.001$),

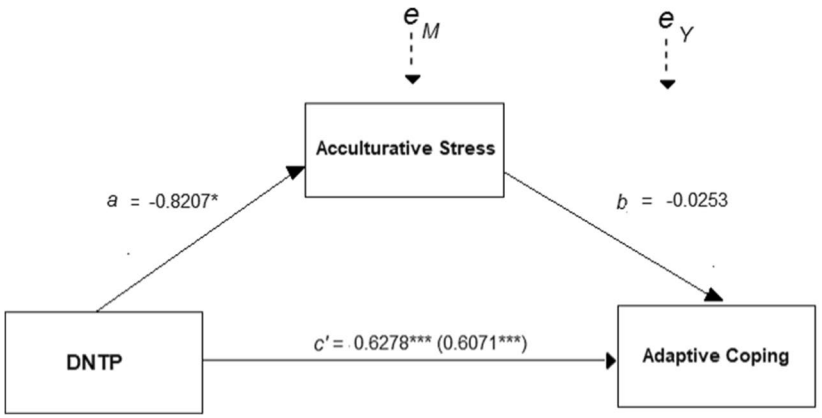

Fig. 1 Mediator analysis with DNTP as independent variable, acculturative stress as mediator and adaptive coping as dependent variable

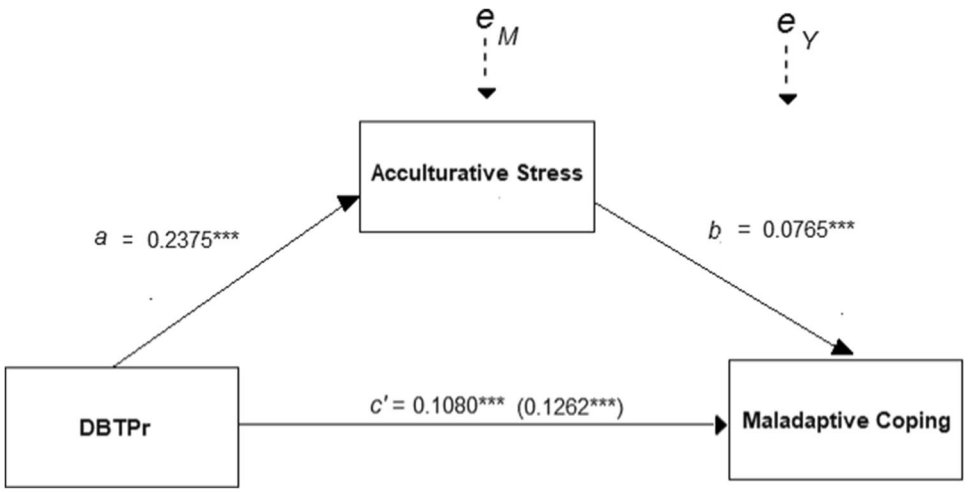

Fig. 2 Mediator analysis with DBTPr as independent variable, acculturative stress as mediator and maladaptive coping as dependent variable

while there was no direct effect of acculturative stress on adaptive coping ($p = 0.532$). There was a direct effect of DNTP ($p = < 0.001$) and state ($p = < 0.001$) on adaptive coping. DNTP mediated the influence of state on adaptive coping, since the indirect effect reached significance (indirect effect = 0.078, BC95%CI from 0.033 to 0.131). In contrast, the acculturative stress did not mediate this influence (indirect effect = -0.018, BC95%CI from -0.079 to 0.041) (Fig. 3).

The last mediation analysis, with state as an independent variable, DBTPr and acculturative stress as mediators, and maladaptive coping as the dependent variable, showed that the direct effect of state on DBTPr was significant ($p = < 0.001$). In addition, the direct effect of state on acculturative stress was significant ($p < 0.001$). There was a direct effect of acculturative stress ($p < 0.001$) and DBTPr ($p < 0.001$) on maladaptive coping ($p < 0.001$), and no direct effect of state ($p = < 0.001$) on maladaptive coping. DBTPr and acculturative stress totally mediate the influence of state on maladaptive coping, since the indirect effect reached significance (indirect effect DBTPr = -0.203, BC95%CI from -0.315 to -0.080; indirect effect AS = -0.122, BC95%CI from -0.202 to -0.049) and there is no direct effect (Fig. 4).

Discussion

The present study addressed the role of TP tendencies, TP profiles, and acculturative stress on adaptive and maladaptive stress coping strategies of healthy and treatment-seeking Puerto Ricans living in PR, as well as in Connecticut. As part of our study's design, we formulated five hypotheses, which were addressed through diverse statistical approaches. As such, below we interpret our findings in relation to each corresponding hypothesis, as well as address the cross-cultural implications of these results.

In terms of our study's main statistical analyses, two HLRAs were conducted to address the predictability of acculturative stress, the five TP tendencies, DBTPr and DNTP on the outcome variables of adaptive and maladaptive coping, while controlling for age, gender, state, medical conditions, mental health conditions, and health status category (i.e.:

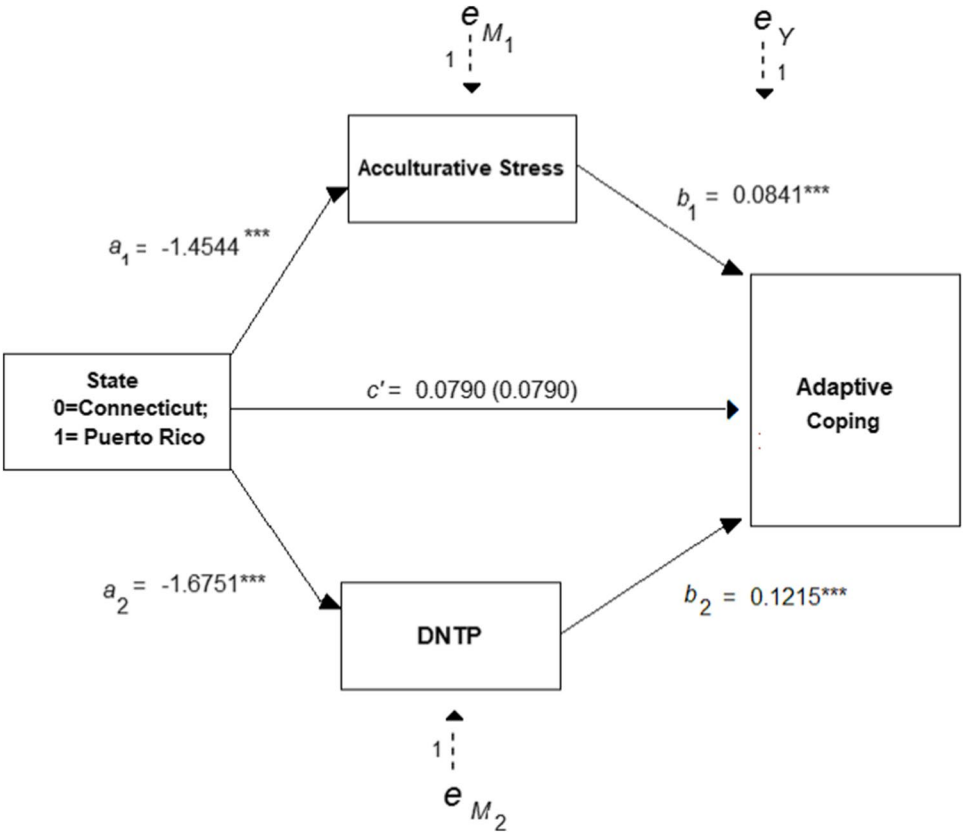

Fig. 3 Mediator analysis with state (PR or CT) as independent variable, DNTP and acculturative stress as mediators and adaptive coping as dependent variable

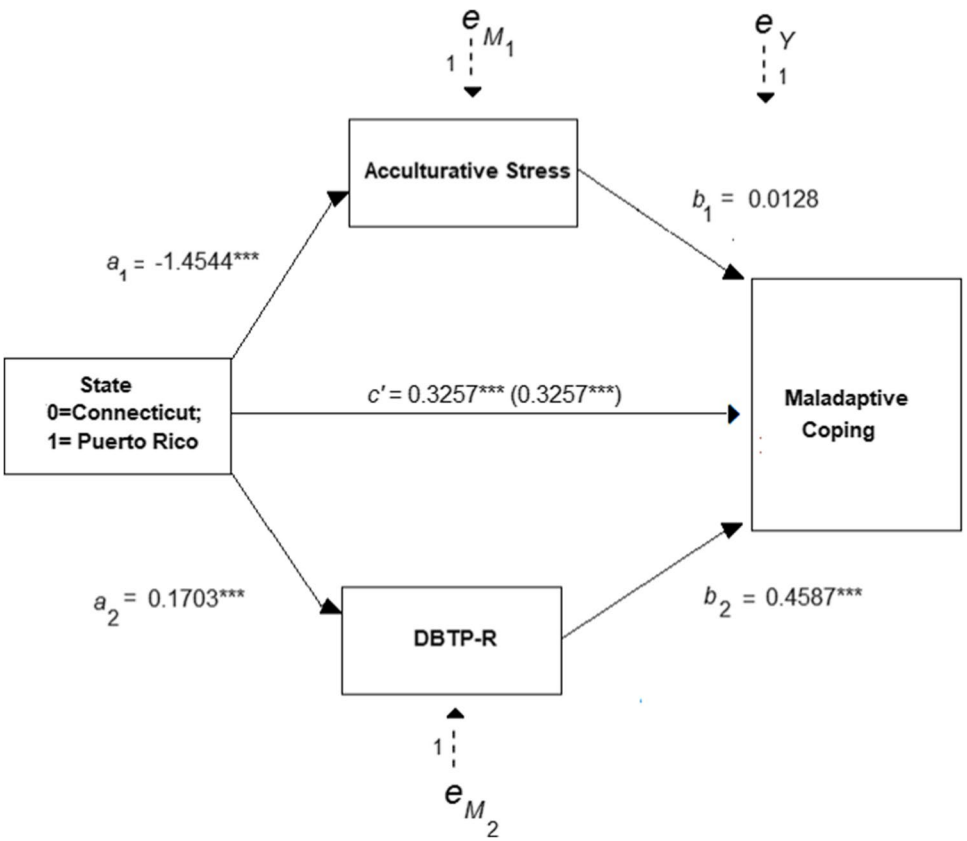

Fig. 4 Mediator analysis with state as an independent variable, DBTPr and acculturative stress as mediators, and maladaptive coping as the dependent variable

healthy vs. treatment-seeking). None of the controlling variables yielded any statistically significant findings in either HLRA conducted on our study. Thus, any detected associations between TP, acculturative stress, adaptive coping, and maladaptive coping represent those over and beyond effects explained by the controlling variables of age, gender, state, medical conditions, mental health conditions, and health status category (i.e.: healthy vs. treatment-seeking). Importantly, we controlled for the mentioned variables because a vast amount of research literature supports the argument that stress coping behavior can differ substantially across these variables. Thus, age and gender differences are reported (e.g. Al-Bahrani et al., 2013; López-Pérez & Pacella, 2021; Thompson et al., 2010). Many studies also reported associations between mental health-related variables and stress coping strategies (e.g. Gudiño et al., 2018; Torres et al., 2018). Finally, differences in stress coping strategies between Puerto Ricans in Puerto Rico and those living in the US mainland were reported by Capielo Rosario and Dillon (2020). Thus, we ensured to control for these variables despite the final non-significant effects of the control variables on the dependent variables.

First, the HLRA conducted on the outcome variable of adaptive coping revealed that in our study adaptive coping was only predicted by DNTP, which is an indicator of BTP. Therefore, our first hypothesis about Past Positive, Present Hedonistic, Future, and/or the BTP profile predicting adaptive coping was only confirmed with respect to BTP. When interpreting this finding it is important to consider that this is the first time that a research study has reported an association between BTP and adaptive coping, since previous studies on TP and coping mainly focused on addressing relationships between specific TPs and diverse aspects of adaptive coping. For instance, in a study conducted by Bolotova and Hachaturova adaptive coping appeared to be positively correlated with Past Positive, Present Hedonistic, Future, as well as negatively correlated with Past Negative, Present Fatalistic, and Present Hedonistic (Bolotova & Hachaturova, 2013). Since individuals who score high on Past Positive, moderate on Present Hedonistic, moderately high on Future, and low on the Past Negative and Present Fatalistic tendencies are considered to reflect the BTP profile, it is possible that it is the optimal balance on TP tendencies (i.e., BTP) what mainly predicts adaptive coping. Thus, the present study further extends knowledge about TP's relationship with adaptive coping, since it uncovers for the first time ever that BTP predicts adaptive coping, at least on Hispanic/Latino populations such as Puerto Ricans. Nonetheless, it is important to note that our finding of BTP having predicted adaptive coping across Puerto Ricans bears resemblance to the findings of a previous study, where BTP predicted psychological adaptation across Ukrainian immigrants in Poland (Marczak et al., 2020). As such, the referenced finding from the study of Marczak and colleagues further supports the findings of our study pertaining to BTP and adaptive coping.

Second, the HLRA conducted on the outcome variable of maladaptive coping revealed that maladaptive coping was predicted by acculturative stress, Present Hedonistic, and DBTPr, which is an indicator of NTP. Of those findings, the association observed in our data between maladaptive coping and acculturative stress was supported by a previous study, where higher levels of acculturative stress and frequent use of maladaptive coping were identified across Puerto Ricans living in Central Florida (Capielo Rosario et al., 2015). Similarly, the finding of Present Hedonistic having predicted maladaptive coping was supported by previous studies that have reported associations between Present Hedonistic and maladaptive/avoidance coping (Blomgren et al., 2016; Holman & Zimbardo, 1999; Nowakowska, 2020; Zimbardo & Boyd, 1999). Regarding the finding of maladaptive coping having been predicted by DBTPr (i.e. NTP), this is also the first time that a research study has reported an association between NTP and maladaptive coping, since previous studies on TP and coping mainly focused on addressing relationships between specific TPs and diverse aspects of maladaptive coping. Since the NTP profile refers to individuals who score high on the negative TPs (Past Negative and Present Fatalistic) and low on all three positive TPs (Past Positive, Present Hedonistic, and Future), it is possible that it is the unbalance on TP tendencies (i.e., NTP) what mainly predicts maladaptive coping. Therefore, our second hypothesis about acculturative stress, Past Negative, Present Fatalistic, and/or the NTP profile predicting maladaptive coping was only confirmed with respect to acculturative stress and NTP. Thus, the present study further extends knowledge about the role of acculturative stress and TP on maladaptive coping, particularly since it uncovers for the first time ever that NTP predicts maladaptive coping, at least on Hispanic/Latino populations such as Puerto Ricans. Nonetheless, it is important to note that our finding of NTP having predicted maladaptive coping across Puerto Ricans bears resemblance to the findings of a previous study, where NTP predicted depressed psychological adaptation across Ukrainian immigrants in Poland (Marczak et al., 2020).

Third, the MANOVA conducted to test our third hypothesis stating that Puerto Ricans living in Connecticut would apply maladaptive coping more frequently than those living in PR fully confirmed that hypothesis. This finding was supported by a previous study, where increasing length of residence in Connecticut was associated with worse stress outcomes when few psychosocial resources for coping were available to the individual (Dressler & Bernal, 1982). Moreover, additional support to this finding can be observed in a study where higher levels of acculturative stress and frequent use of maladaptive coping were

identified across Puerto Ricans living in Central Florida (Capielo Rosario et al., 2015).

Fourth, several findings were yielded by the two mediator analyses conducted to address Hypothesis 4, which stated that acculturative stress would mediate the influence of DNTP (i.e., BTP) on adaptive coping, as well as mediate the influence of DBTPr (i.e., NTP) on maladaptive coping. Of these mediator analyses, the one conducted with DNTP as the independent variable, acculturative stress as a mediator, and adaptive coping as the dependent variable revealed that acculturative stress did not mediate the influence of DNTP on adaptive coping. Thus, no support was found for the specific fourth hypothesis point stating that acculturative stress would mediate the influence of DNTP (i.e., BTP) on adaptive coping. In contrast, the mediator analysis conducted with DBTPr as the independent variable, acculturative stress as a mediator, and maladaptive coping as the dependent variable revealed that acculturative stress partially mediated the influence of DBTPr on maladaptive coping. Thus, the specific fourth hypothesis point stating that acculturative stress would mediate the influence of DBTPr (i.e., NTP) on maladaptive coping was confirmed. This finding is supported by the results of a previous study, where stress states mediated the relationship between NTP (measured through DBTP) and intelligence (Zajenkowski et al., 2016), which is a construct that has been previously related to coping (Libin, 2017).

Fifth, several findings were yielded by the two mediator analyses conducted to address Hypothesis 5, which stated that acculturative stress and DNTP (i.e., BTP) would mediate the influence of state (i.e., PR or Connecticut) on adaptive coping, as well as mediate the influence of state on maladaptive coping. Of these mediator analyses, the one conducted with state as the independent variable, DNTP and acculturative stress as mediators and adaptive coping as dependent variable revealed that DNTP mediated the influence of state on adaptive coping, whereas acculturative stress did not mediate this influence. Thus, no support was found for the specific fifth hypothesis point stating that acculturative stress would mediate the influence of state on adaptive coping. In contrast, the specific fifth hypothesis point stating that DNTP (i.e., BTP) would mediate the influence of state on adaptive coping was confirmed. This finding is supported by our HLRA result identifying DNTP (i.e., BTP) as the only predictor of adaptive coping in this study.

The last mediation analysis conducted on this study, with state as an independent variable, DBTPr and acculturative stress as mediators, and maladaptive coping as the dependent variable, revealed that DBTPr and acculturative stress totally mediate the influence of state on maladaptive coping. Thus, the specific fifth hypothesis point stating that acculturative stress and DBTPr would mediate the influence of state on maladaptive coping was confirmed. These findings are supported by our HLRA result identifying both acculturative stress and DBTPr (i.e., NTP) as predictors of maladaptive coping in our study. Furthermore, these findings are also supported by a previous study, where NTP (measured through DBTP) mediated the influence of the factor "country" on proneness for compulsive buying tendencies in two out of three cross-cultural comparisons, where excessive shopping was considered maladaptive coping (Unger et al., 2018).

When interpreting the results of our study, it results important to note the contrast in our first hypothesis stating that Present Hedonistic would predict adaptive coping, and the results from the HLRAs we conducted, which showed that conversely, Present Hedonistic predicted maladaptive coping and not adaptive coping. One potential explanation to this conundrum can be inferred when taking into consideration the findings of a study from Blomgren and colleagues in Sweden (Blomgren et al., 2016), which reported that Present Hedonistic predicted both adaptive and maladaptive coping, as measured through the same questionnaire utilized on our study, the Brief Cope (Carver, 1997). Further examination made of the individual subscales of the Brief Cope utilized on that study revealed that the relationship of Present Hedonistic with adaptive coping was driven mainly by positive associations with the subscales positive reframing, use of emotional support, use of instrumental support, and humor. In contrast, in our study use of instrumental support and humor were not included in our adaptive coping composite measure index, due to use of instrumental support not having been included in the original Spanish translation of the Brief Cope (Perczek et al., 2000), and humor having displayed factor loadings that were too low on its items. Thus, the described differences in the adaptive coping calculation made on our study with the study from Blomgren and colleagues may explain why on our study Present Hedonistic didn't predict adaptive coping, yet on that study from Sweden, Present Hedonistic did predict adaptive coping. As such, it is possible that the adaptive coping strategies of use of instrumental support and humor might be the most influencing coping strategies in the predictability of Present Hedonistic on adaptive coping, and since those two strategies were not included in our adaptive coping calculation, our study didn't detect that association in a statistically significant manner. As such, future research should further study the influence of Present Hedonistic on a wider scope of adaptive coping strategies.

Regarding our finding where Present Hedonistic predicted maladaptive coping, that result is supported by several previous studies that also reported positive associations between Present Hedonistic and maladaptive/avoidance coping across different countries. For instance, Present Hedonistic has appeared to be associated with maladaptive coping in the

US (Zimbardo & Boyd, 1999), Russia (Bolotova & Hachaturova, 2013), Sweden (Blomgren et al., 2016), and Poland (Nowakowska, 2020). Thus, Present Hedonistic appears to be culturally invariant in its predictability of maladaptive coping across cultures, including Hispanic/Latino populations like Puerto Ricans. This cross-cultural pattern could potentially be traced back to the seeking of immediate pleasure or gratification as a coping strategy during distress for Present Hedonistic-oriented individuals. Moreover, the present orientation focus characterized by the Present Hedonistic could also explain its observed association with a maladaptive coping strategy in all the described studies, since consequences for the future are being less considered.

Aside from the described similarities and differences in findings of our study and other studies in regards to associations of Present Hedonistic with adaptive and maladaptive coping, our study also differs from other similar studies in regards to associations of adaptive and maladaptive coping with the other traditional TPs: Past Positive, Past Negative, Present Fatalistic, and Future. For instance, in our study, none of the aforementioned four TPs yielded any statistically significant findings in relation to adaptive and maladaptive coping. However, those four TPs did reflect associations with adaptive and maladaptive types of coping in the US (Zimbardo & Boyd, 1999), and Russia (Bolotova & Hachaturova, 2013). The described contrast may be due to no other previous study on TP's relationship to adaptive and maladaptive coping having accounted for balanced/unbalanced TP profiles, which our study suggests may be a more accurate predictor of adaptive and maladaptive coping than the individual TPs, with the exception of Present Hedonistic.

Limitations and future directions

In terms of limitations, we can highlight that the present study was cross-sectional, only utilized one questionnaire to assess each construct of interest, and relied on self-reported data rather than other measurement approaches, such as behavioral tasks. Thus, we acknowledge the possibility that stigma and fear of self-disclosure for other reasons could have affected the results of this study. Moreover, in our study, TP was measured through a new, short version of the ZTPI, culturally adapted to the Spanish-language dialect spoken in PR. As such, our results should be interpreted cautiously. Additionally, this new instrument should be further tested on future studies conducted across Puerto Rican populations.

Regarding cultural validity of the DBTP-r coefficient in Puerto Ricans, Jankowski et al. (2020) emphasize that testing the DBTP-r in different cultural settings is very important. As such, it has to be considered that the revised DBTP-r is only a slightly and incremental revision of the original optimal values of the ZTPI. These are as follows: 1.0 instead of 1.95 for Past Negative (PN), 5.0 instead of 4.6 for Past Positive (PP), 1.0 instead of 1.5 for Present Fatalistic (PF), 3.4 instead of 3.9 for Present Hedonistic (PH), and 5.0 instead of 4.0 for Future (F). Thus, our results should be interpreted cautiously.

Another limitation is that immigration-status stressors are inapplicable to Puerto Ricans due to them being natural-born US citizens. As such, acculturative stress would be expected to be manifested differently among Puerto Ricans in comparison to other Hispanic/Latino groups living in mainland US. Thus, new, specific measures should be developed to assess acculturative stress across Puerto Rican populations living in the mainland US.

Furthermore, the Spanish-language version of the Brief Cope administered in this study did not include the adaptive coping strategy of use of instrumental support nor the maladaptive coping strategy of self-blame. As such, future research addressing adaptive and maladaptive coping strategies of Puerto Rican populations should involve measurement instruments that cover a more comprehensive scope of adaptive and maladaptive coping strategies, given how unique this population is. One potential solution may be to develop a measurement of both adaptive and maladaptive coping strategies that would be culturally-sensitive to Puerto Rican populations living in PR, as well as in mainland US.

Another potential limitation of the current study is that the Acculturative Distress Scale (ADS) and the Brief COPE Inventory were slightly shorten, albeit due to well justified reasons. Nonetheless, it cannot be fully ruled out that these slight modifications could have reduced the validity of the applied measurement instruments. For instance, the observed fit indices of the Brief COPE Inventory can be considered as an important limitation of the present study. Future studies should include the subscale of humor, which did not work properly in the current study. A better fit could be expected when administering the complete scale (Rand et al., 2019).

Regarding future directions, several factors exist that could potentially influence TP, acculturative stress and coping. Some of these other factors include well-being, life satisfaction, and mindfulness, among many others (Fuentes et al., 2022; Olivera-Figueroa et al., 2016, 2022). Nonetheless, these factors were not measured on this study, which by design was focused on the constructs of TP, acculturative stress and coping strategies. Thus, the potential influence of any of these factors on TP, acculturative stress and/or coping as mediators or moderators reflects interesting avenues of future research that extend beyond the scope of the present study.

Clinical implications

This study highlights the importance of profiling TP, levels of acculturative stress, and coping strategies of Puerto Ricans. Adding such quantitative assessment measures could assist in

monitoring the course of treatment to determine potential modifications of the therapeutic approach. Such assessment could follow the example of a previous study, where administration of the Brief Cope over six months as part of regular health check-ups in primary care setting helped identify associations between diverse coping strategies and health outcomes (Ito & Matsushima, 2017). By expanding the described profiling approach to include monitoring of TP and acculturative stress of Puerto Ricans living in the US, clinicians could devise culturally-sensitive therapeutic interventions that could assist these individuals in shifting from the NTP profile and a predisposition to engage in maladaptive coping to a BTP profile and habituation to engage in adaptive coping. To achieve the proposed goals, we suggest culturally adapting to the needs of Puerto Rican populations principles from evidence-based interventions designed to promote BTP, reduce stress, increase adaptive coping, and improve mental as well as physical health. Some evidence-based interventions that could serve as the basis for the described cultural adaptation purposes include Time Perspective Therapy (Zimbardo & Sword, 2017), mindfulness (Rönnlund et al., 2019), and health promotion programs focused on Hispanic/Latino populations living in mainland US (Jacquez et al., 2019; Terrazas et al., 2015; Tran et al., 2014a, b; Vaughn et al., 2019).

Conclusions and contributions

The present study represents the first attempt to address the role of TP tendencies, TP profiles, and acculturative stress on adaptive and maladaptive coping strategies across healthy and treatment-seeking Puerto Ricans living in PR, as well as at the state of Connecticut in the mainland US. Our results show for the first time that across Puerto Rican populations the BTP profile predicts adaptive coping, whereas acculturative stress, the Present Hedonistic TP, and the NTP profile predict maladaptive coping. Similarly, our study also shows that Puerto Ricans living in Connecticut engage more often in maladaptive coping than their counterparts living in PR. These findings suggest that profiling TP, levels of acculturative stress, and coping strategies of Puerto Ricans could help clinicians adapt evidenced-based interventions like Time Perspective Therapy, mindfulness, and health promotion strategies to the specific needs of Puerto Rican populations. Doing so could be effective in promoting BTP, reducing acculturative stress, increasing adaptive coping, and improving mental as well as physical health, in Puerto Ricans living in PR, as well as in mainland US.

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Data availability Source data for tables and figures are provided with the paper.

Declarations

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