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The influence of demographics and personality on COVID-19 coping in young adults



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ABSTRACT

The global COVID-19 pandemic has had an unprecedented effect on human behavior and well-being. Demographic factors and personality traits have been shown to independently influence whether individuals adopt adaptive or maladaptive coping responses. However, to date, researchers have not considered how demographics and personality could interact to influence COVID-19 coping responses. In a sample of 516 North American young adults, we found direct links from two demographic factors (i.e., income and having children) and from multiple personality traits (as captured by the HEXACO model) to adaptive and maladaptive COVID-19 coping responses. We also found that personality indirectly linked a broader range of demographic factors (income, age, gender, having children) with COVID-19 coping responses. We encourage future research on COVID-19 coping responses to consider not just the individual contributions of demographics and personality, but their interdependent influence on whether individuals adopt more or less adaptive COVID-19 pandemic coping responses.

1. Introduction

The global COVID-19 pandemic has had unprecedented health, financial, and social consequences (Sohrabi et al., 2020), including abrupt changes to interpersonal and workplace behavior due to government-imposed lock downs and other social limitations (Wang et al., 2020). Individuals' responses to the virus and these government-imposed measures have varied widely. Some have coped with positive or adaptive responses, such as relying on increased social support (Cao et al., 2020) and adopting preventative measures to offset or minimize the health and financial risks presented by COVID-19 (Wang et al., 2020). Other coping responses have been more maladaptive, such as heightened anxiety and fear about COVID-19 and/or one's post-pandemic future (Rajkumar, 2020) and increased drug or alcohol use or breaking isolation rules (Clay & Parker, 2020). In broad ways, COVID-19 coping strategies appear to be similar to general coping strategies involving problem-solving, emotional/social support seeking, positive appraisals, and avoidance (Chew et al., 2020; Roesch & Weiner, 2001; Zeidner & Saklofske, 1996). However, given the unprecedented scope of COVID-19 stressors and challenges, examining the correlates of adaptive and maladaptive coping responses could inform public health

initiatives and individuals' risk-management strategies should future conditions require continued or renewed government-mandated restrictions (Sohrabi et al., 2020).

Some researchers have identified demographic factors as potential risks for adopting more maladaptive coping responses during a pandemic (Park et al., 2020). These risk factors include age, gender, race, socio-economic status (SES), and being a parent (Atchison et al., 2020; Lund, 2020; Park et al., 2020). In addition to basic demographics, individual differences, like those captured by personality, also appear to influence the adoption of adaptive coping responses (Bacon & Corr, 2020; Carvalho et al., 2020; Garbe et al., 2020; Saklofske et al., 2007; Zeidner & Saklofske, 1996). However, to date, researchers have not explored how personality traits and demographic factors could jointly influence COVID-19 coping responses (Chew et al., 2020). Previous research has shown personality can often mediate the relation between demographic factors and health-related behavior (Cheng & Furnham, 2003; Nabi et al., 2008). Thus, indirect paths could provide important insights into the variation seen in COVID-19 coping (Chew et al., 2020). Given that younger individuals appear more likely to engage in riskier responses (Atchison et al., 2020; Barari et al., 2020), the goal of our study was to examine direct and indirect links between demographics,

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personality, and COVID-19 coping responses in, younger adults using the HEXACO model of personality.

1.1. Demographics and COVID-19 coping stressors

Gender is one of the most fundamental demographic factors related to coping stressors and responses (Geary, 2010). Although we acknowledge and respect the increasing need to recognize the non-binary nature of gender (Matsuno & Budge, 2017), the current literature on COVID-19 has focused primarily on differences in the behavioral responses of men and women to COVID-19, perhaps due to distinct differences found in men's and women's general behavior and coping responses (Liddon et al., 2018). Women have reported more emotional distress and negative thoughts in response to COVID-19 than men (Liu et al., 2020; Park et al., 2020; Wang et al., 2020), particularly a tendency to worry more about their family and their health than financial concerns (McLaren et al., 2020). This could be because women often bear a relatively disproportionate cost of caretaking duties during a pandemic (e.g., during the African Ebola outbreak; Androsik, 2020).

Being a parent also tends to increase worry generally (Liu & Doan, 2020), with parents tending to worry not only about their own health, but the health of their children and their families in general (Park et al., 2020; Wang et al., 2020). Parents could also face additional stress from having to cope with the increased childcare duties caused by school closures, particularly if they are compounded by remote employment demands (Bayham & Fenichel, 2020; Coyne et al., 2020). This stress load likely increases with financial pressures (see below) and/or the number of children in a given household (Cluver et al., 2020).

In addition to the worries of having children, age could be an important factor predicting coping stressors, responses and perceived health threats during a pandemic. Some younger adults (ages 18–35) have adopted maladaptive avoidant and problem-solving coping strategies, including drinking more, less social distancing, and disobeying government curfews (Atchison et al., 2020; Barari et al., 2020). Interestingly though, there was a negative correlation between age and COVID-19 stress in a sample of American adults, with younger individuals reporting more stress (Park et al., 2020). This suggests that young adults may engage in less positive thinking as a coping strategy, which could result in maladaptive outcomes (Campbell-Sills et al., 2006). This could be because age enables older individuals to contextualize a novel stressor (Bacon & Corr, 2020) or increases comfort with the concepts of illness and death, even though they are more susceptible to both (Cicirelli, 1999). Furthermore, older individuals tend to have more stable and better-paying jobs than younger individuals (Cutler & Gregg, 1991), thus reducing anxiety about the pandemic effects on their livelihood.

Compliance with COVID-19 government regulations also appears to be linked to financial capacity (Atchison et al., 2020; Bodas & Peleg, 2020). Presumably, financial resources buffer one from financial stresses, while also providing the flexibility to choose more positive COVID-19 coping responses (Ahmed et al., 2020). It is worth noting, however, that financial resources are not typically equally distributed (Ahmed et al., 2020). Racial status is often correlated with SES, and as such, racial minority groups could have a greater risk of experiencing stress in response to COVID-19 (Atchison et al., 2020). Racialized individuals are also more likely to experience larger family sizes, less flexible work schedules, and systemic bias and/or racism at work and in public spaces that could further impact COVID-19 coping responses (Kantamneni, 2020; Lund, 2020). Taken together, there are numerous demographic factors that could have unique and combined influences on stressors that might in turn influence individual coping responses to COVID-19. But are there also individual differences that influence how individuals respond to COVID-19 stressors? In addition to demographic differences, previous research has shown that how individuals cope in novel and stressful situations is significantly related to personality traits (Buss & Greiling, 1999; Connor-Smith & Flachsbart, 2007).

1.2. Personality and COVID-19 coping responses

Several recent studies present evidence that personality is related to COVID-19 coping responses. In particular, similar to general coping responses (Campbell-Sills et al., 2006), three general domains of personality appear to have relevant effects on COVID-19 coping: extraversion, conscientiousness, and emotional stability. As a measure of one's willingness to engage in social relationships, extraversion is perhaps not surprisingly associated with a decreased willingness to engage in social distancing with other individuals (Carvalho et al., 2020). Conscientiousness, a measure of self-control and planning, is positively related to social distancing and to indicators of cautious rule-following like handwashing and stockpiling goods (Carvalho et al., 2020; Garbe et al., 2020). Finally, lower emotional stability (e.g., neuroticism, negative affectivity or emotionality) is associated with increased feelings of stress and worry and to increased stockpiling of goods (Garbe et al., 2020; Somma et al., 2020). Although these traits have been measured with the Big Five, they have not been measured with the HEXACO model of personality, which has advantages over the Big Five conceptualization (Ashton & Lee, 2020). These three general traits are well-represented by the HEXACO personality traits of Emotionality (E; a measure of attachment and anxiety rather than emotional stability), Conscientiousness (C), and Extraversion (X; Ashton & Lee, 2007), suggesting a novel role for the HEXACO in explaining health-related behavior (Garbe et al., 2020). These three HEXACO traits are also consistent with prior research on Type D personality (Esmailpour et al., 2013; a tendency to be pessimistic, worried, and stressed), that has been shown to be related to maladaptive health outcomes (Ilbeigy Ghale Nei et al., 2014).

Theoretically, HEXACO Honesty-Humility (H) and Agreeableness (A), measures of selflessness and forgiveness respectively, should be related to a willingness to cooperate with regulations that benefit others. H has been negatively linked to a tendency to take health and safety risks (e.g., not wearing a seat belt; Weller & Tikir, 2011), though to date, neither H nor A have been associated with COVID-19 responses (e.g., Garbe et al., 2020). There have been links between the Dark Triad and avoidant or maladaptive COVID-19 responses (Nowak et al., 2020). Given the links between the Dark Triad and lower H (Hodson et al., 2018), it may be that lower H is in fact associated with lower problem-solving and higher avoidance strategies. Finally, there have been no published links between COVID-19 responses and Openness to Experience (O), which is associated with an increased tolerance for, and appreciation of, new ideas (Lee & Ashton, 2008). It could well be that O relates to a willingness to adopt new government rules or science-based evidence, but it could also relate to a tolerance for unrealistic conspiracy theories. Thus, there are many potential associations between HEXACO factors and COVID-19 coping responses that remain to be studied, especially alongside demographic factors. In particular, personality can act as a mediator between demographic factors and individual coping and health-related behavior (Cheng & Furnham, 2003; Nabi et al., 2008). For example, age and gender have been found to be indirectly related to suicide through self-directedness and harm avoidance, respectively (Grucza et al., 2005). In other research, personality traits have mediated the relation between demographics and mortality or well-being (Jensen et al., 2020; Nabi et al., 2008). Thus, some evidence suggests that personality could be directly related to health/coping behavior and also indirectly linked with demographic factors.

1.3. The present study

Our study extends previous research by examining the unique, direct effects of demographic factors and HEXACO personality traits on adaptive (i.e., problem-focused and seeking socioemotional support) and maladaptive (i.e., avoidance and negative appraisals) coping responses to the unprecedented stressors of COVID-19 and considering

potential indirect paths from demographic variables to coping responses through a novel model of personality that affords the opportunity to study unique demographic-personality-coping responses. We studied these relations in a sample of younger adults during the 2020 Spring lock down phase in Canada and the United States because this age group has been identified as being more likely to engage in maladaptive coping behavior (i.e., risky or harmful behavior; Barari et al., 2020; Park et al., 2020). Consistent with previous research discussed above, we predicted that HEXACO traits of higher E, lower X, and lower C would be associated with less adaptive COVID-19 coping responses, such as more avoidance and negative appraisals, alongside less problem-solving and seeking socioemotional support. Given the links to Dark Triad traits, we also expected lower H to be associated with fewer adaptive coping responses (especially avoidance strategies). We also expected that these HEXACO personality traits would play a significant role in indirectly linking most, if not all, of the relations between the aforementioned relevant demographic factors and adaptive or maladaptive COVID-19 coping responses.

2. Method

2.1. Participants

A total of 516 young adults (50% women) between the ages of 24 and 35 ($M = 29.62$, $SD = 3.05$) were sampled from the United States and Canada using crowdsourcing platforms Mechanical Turk (MTurk) and CloudResearch (Litman et al., 2017). The majority of participants were White (70.3%), followed by Black (11.4%), Asian (7.8%), Latino (6.0%), and other (4.5%). Given the smaller numbers of participants in races other than White and for analytical purposes, race was coded as 0 (White) and 1 (Non-white). Most participants (57.8%) had no children, 23.9% had one child, and 18.3% had two or more children. The median income, measured ordinally, was \$41,000–\$60,000. To avoid biasing our data, we excluded any participants who had tested positive for COVID-19 ($n = 8$), leaving a final sample of 508 adults. Participants received written briefing, along with a consent form and a written debriefing. All procedures were approved of by the university research ethics board.

2.2. Measures

Personality traits were measured using the 60-item HEXACO scale (Ashton & Lee, 2009). Internal consistencies in this sample ranged from $\alpha = 0.76$ (Agreeableness) to 0.82 (Openness to Experience). Four questionnaires surrounding the COVID-19 pandemic were administered to capture adaptive and maladaptive ranges of coping responses (Chew et al., 2020).

To capture negative appraisals and attitudes, we used a future perception scale (Beck et al., 1974; Yip and Cheung, 2006) with 4 items rated as 1 (false) or 2 (true) regarding how participants view the future (e.g., “My future is dark to me”). Higher values indicate greater future concern. A related measure of negative employment appraisals (adapted from De Witte, 2000) and included 4 items rated from 1 (strongly disagree) to 5 (strongly agree), with higher scores reflecting greater concern about employment (e.g., “I feel insecure about the future of my job”). Third, we administered the Fear of COVID-19 Scale (FCV-19S; Ahorsu et al., 2020) that contains 7 items rated from 1 (strongly disagree) to 5 (strongly agree), where higher scores reflect greater fear of COVID-19 (e.g., “I am afraid of losing my life because of coronavirus-19”). Lastly, we measured distinct areas of behavior change (adaptive and maladaptive) since the COVID-19 pandemic (adapted from Padyab, 2009) with 12 items on a scale ranging from 0 (not at all) to 3 (all the time).

We used these measures to create two adaptive coping response measures (i.e., problem-solving and socioemotional support seeking) and two maladaptive coping response measures (i.e., negative

appraisals and avoidance strategies). Regarding the latter, we computed a Negative Appraisals score that combined the future perception and employment perception scales ($\alpha = 0.80$) and an Avoidance score ($\alpha = 0.71$) that combined the FCV-19S and five behavior change items that capture negative self-focused coping (e.g., “I have done more recreational drugs”, “I have attended an in-person party”). Regarding adaptive responses, we computed a Seeking Socioemotional Support score ($\alpha = 0.66$) of 2 socially engaging behavior change items (e.g., “I have reached out to my family and friends more than usual”, “I have spent extra time communicating with my friends online”) and a Problem-Solving strategies score ($\alpha = 0.65$) of 5 healthy behavior change items, including cautionary (e.g., “I have taken more care about cleanliness”) and distancing behavior (e.g., “I have avoided crowds”).

2.3. Procedure

The present data come from a larger Qualtrics study on young adults' personality and attitudes on MTurk from April 30 to May 12, 2020 involving 575 participants. Using CloudResearch functions (Litman et al., 2017), the study was limited to young adults (24–35 years of age). Registered MTurk workers who fit our age and geographic criteria (Canada and USA) were directed to our study (approximately 30 min, questionnaires were randomly presented). Participants were screened for data accuracy (e.g., attention check questions) were compensated \$10 for their time. Workers were rejected if they did not meet the age requirements, if they answered two attention check questions incorrectly, or if they completed the survey in less than 10 min. These criteria resulted in 59 participants being rejected of a total of 575. We further deleted 8 participants who indicated they had either been infected with or suspected to be infected with COVID-19, resulting in a final sample of 508 participants.

3. Results

Inspection of univariate assumptions had outliers beyond ± 3 standard deviations for Seeking Socioemotional Support, Avoidance, Negative Appraisal, and Problem-solving Strategies, all of which we then Winsorized. There were no other violations for univariate and multivariate assumptions (Tabachnick & Fidell, 2007). A Missing Values Analysis indicated that Little's (1988) test of Missing Completely at Random (MCAR) was not significant ($p > .05$), so we did not impute missing values. To examine the associations between demographics, personality, and COVID-19 coping outcomes we conducted a path analysis with maximum likelihood to estimate the model using Mplus version 7.2. (Muthén & Muthén, 1998–2017). To examine indirect effects, we used bootstrapped confidence intervals (95% bias corrected) that were computed using 10,000 samples and Maximum Likelihood estimation (ML). Due to the exploratory nature of our research, the model was fully saturated as we estimated all direct and indirect paths. However, only statistically significant paths are indicated in the diagram for ease of presentation. As indicated in Supplemental Table 1, all personality traits except O had significant relations of small-to-medium size with COVID-19 coping responses. Furthermore, income level, number of children, and gender had small, significant correlations with coping responses.

3.1. Direct paths

Statistically significant ($p < .05$) direct paths between higher income, E, X, and higher levels of seeking socioemotional support were found ($\beta = 0.11$, $\beta = 0.25$, $\beta = 0.32$, respectively). Lower H, higher E, higher X, lower C, and higher number of children were associated with direct paths to higher avoidance ($\beta = 0.18$, $\beta = 0.35$, $\beta = 0.17$, $\beta = -0.33$, $\beta = -0.11$, respectively). Lower X, lower C, and higher O were associated with direct paths to higher negative appraisal ($\beta = -0.40$, $\beta = -0.23$, $\beta = 0.13$, respectively). Higher E and C were

associated with direct paths to engaging in higher problem-solving strategies ($\beta = 0.19$, $\beta = 0.12$, respectively). Being a man was associated with direct paths to lower H, E, C, and O ($\beta = -0.23$, $\beta = -0.39$, $\beta = -0.11$, $\beta = -0.09$, respectively). Older participants had direct paths with lower H ($\beta = -0.23$). Higher income was associated with direct paths to higher X ($\beta = 0.22$). Having more children was associated with direct paths to higher X and lower O ($\beta = 0.11$, $\beta = -0.18$, respectively; see Supplemental Table 2 and Fig. 1 for details).

3.2. Indirect paths

3.2.1. Seeking socioemotional support

The following statistically significant ($p < .05$) indirect paths were found. Being a woman was indirectly associated with higher levels of seeking socioemotional support through higher E ($\beta = -0.10$). Being a man was indirectly associated with higher levels of seeking socioemotional support through higher X ($\beta = 0.03$). Having more children or a higher income were indirectly associated with higher levels of seeking socioemotional support through higher X ($\beta = 0.04$, $\beta = 0.07$, respectively; see Supplemental Table 3).

3.2.2. Negative appraisal

Being a woman was indirectly associated with higher levels of negative appraisal through lower X ($\beta = -0.04$). Being a man was indirectly associated with higher levels of negative appraisal through lower C ($\beta = 0.03$). Having more children or a higher income were indirectly associated with having lower negative appraisal through higher X ($\beta = -0.04$, $\beta = -.09$, respectively), and having fewer children was indirectly associated with higher negative appraisal through higher O ($\beta = -0.03$; see Supplemental Table 3).

3.2.3. Avoidance

Being a man was indirectly associated with higher levels of avoidance through lower H and lower C ($\beta = 0.04$, $\beta = 0.04$, respectively). Being a woman was indirectly associated with higher avoidance through higher E ($\beta = -0.13$). Having more children was indirectly associated with higher avoidance through higher X ($\beta = 0.02$; see Supplemental Table 3).

3.2.4. Problem-solving strategies

Being a woman was indirectly associated with higher problem-solving strategies through higher E ($\beta = -0.07$; see Supplemental Table 3).

4. Discussion

Our initial results revealed that a number of demographic factors and personality traits were positively and negatively correlated with COVID-19 coping responses. As a result, we conducted a path analysis to determine their unique contributions. Consistent with our prediction, we found several direct links from personality traits to coping responses; whereas almost all the demographic factors were indirectly linked to coping responses via the HEXACO personality traits.

4.1. Direct demographic paths

Only two demographic factors had significant direct links with COVID-19 responses. First, SES was positively associated with socioemotional support seeking. This is consistent with previous literature suggesting that wealthier individuals have more available options for support, including social and emotional support (Ahmed et al., 2020; Atchison et al., 2020; Bodas & Peleg, 2020). Financial resources presumably afford individuals the time and the means to connect with those close to them, which highlights the importance of considering poverty as a risk factor for social isolation and thus negative coping

patterns.

Results also showed that individuals with more children tended to make greater use of avoidance strategies, a sobering finding, given the importance of parents' well-being in promoting the well-being of their families in general (Park et al., 2020; Wang et al., 2020). This result could reflect that parents with more children have greater demands on their time and their emotional and financial resources that in turn could lead them to engage in avoidance responses such as consuming more alcohol (Clay & Parker, 2020; Cluver et al., 2020). In addition, parents could be more generally anxious about the virus due to concerns about their children and/or childcare should something happen to them (Liu & Doan, 2020).

4.2. Direct personality paths

In general, our data on the HEXACO and coping responses are consistent with previous literature on personality and COVID-19 coping, as well as the literature on Type D personality and general coping in young adults (Campbell-Sills et al., 2006; Esmailpour et al., 2013). This suggests that individual coping responses share similar personality profiles despite potentially significant differences in the global breadth of the stressor. Specifically, E, X and C were the most important HEXACO factors in predicting COVID-19 responses. Seeking socioemotional support was associated with higher E and X. The former contrasts with previous data suggesting that higher E might pose a risk in the face of health challenges (Ilbeigy Ghale Nei et al., 2014). This novel finding could be due to the novel tie between E and attachment-seeking behavior (Ashton & Lee, 2007), which would promote seeking solace with family and friends during times of stress. Similarly, X is associated with a motivation to seek out others (Ashton & Lee, 2007) and this appears to remain true during COVID-19. Given the benefits of social contacts (Banerjee & Rai, 2020), individuals higher in E and X appear to be relying on social contact to help cope positively with COVID-19 stressors.

In a similar manner, the adoption of problem-solving coping strategies that promoted individual safety was associated with higher E, likely due to the anxiety, harm avoidance and concern that is associated with this trait (Ashton & Lee, 2007). Not surprisingly, this cautious strategy was also associated with higher C, suggesting that planning and forethought do indeed underlie taking adequate safety precautions with regards to the virus and social distancing. Thus, higher X, C, and especially E were associated with more adaptive COVID-19 coping responses. In more general terms, our data suggest a personality profile of being socially involved, socially sensitive and thoughtful/careful as being positively associated with healthier responses.

In contrast, avoidance strategies (i.e., fear and reckless behavior) were associated with a host of direct personality paths. Lower H and lower C were both linked to maladaptive coping, consistent with their associations with delinquent behavior (including substance use and rule breaking; Lee et al., 2005), and tendencies to take health and safety risks (Weller & Tikir, 2011), which align with the selfish and impulsive aspects of these traits (Ashton & Lee, 2007; Hodson et al., 2018). Higher E was also associated with more avoidance strategy use. The anxiety component of E is likely tied to the fear of COVID-19 aspect of negative coping, as well as to Type D personality (Esmailpour et al., 2013). Thus, in our data, Emotionality does not represent a clearly protective factor, as worry and concern promote cautious and connecting behavior but also unhealthy anxiety and fear. Higher X was associated with fewer negative appraisals, perhaps because those higher in X possess greater optimism (Ashton & Lee, 2007). Lower C (i.e., lack of planning/self-regulation) and higher O (i.e., openness to science and new ideas) were also associated with more negative appraisals thoughts. The former could undermine problem solving during challenging times (Ashton & Lee, 2007), whereas openness to new information could promote negative appraisals based on the novel dire predictions made in scientific models regarding the COVID-19 pandemic.

It is interesting to note that A, a measure of patience and forgiveness, was not directly associated with COVID-19 responses. The sense of impatience that has often been attributed to individuals under lock down did not differentially influence our participants' responses. Perhaps this is because we might not have captured the relevant response measures (e.g., the quality of interactions with family or roommates). More optimistically, given that we collected data at the height of the North American initial lock down response, it could be that most of our participants responded to the extraordinary circumstances of the moment with high levels of patience regardless of their underlying A. It would thus be worthwhile to study whether this non-significant link would persist over time as the public's appetite for strong measures wanes. Interestingly, again unlike all of the other HEXACO traits, A did not statistically link any demographic factors and COVID-19 coping. There were, however, numerous indirect paths involving the other HEXACO traits.

4.3. Indirect paths

With regard to adaptive coping responses, E and X, respectively, linked women and men with seeking out more socioemotional support. These findings are in line with general gender differences in these traits and suggest the likelihood that seeking socioemotional support is related to different personality traits for men and women (Ashton & Lee, 2007; Geary, 2010). Wealthier individuals and those with more children were more likely to seek socioemotional support through higher X. These indirect paths indicate that personality differences correlated with these demographic factors partly explain the greater tendency to seek socioemotional support, a consideration that may well have been overlooked if only direct paths between demographics and coping responses were examined.

Being a woman was indirectly associated with problem-solving responses through higher E. Given the aforementioned gender differences in E, women who are more strongly attached to and/or worry more about their families could be more motivated to engage in adaptive problem-solving responses (Androsik, 2020). The fact that some men did not engage in more problem-solving coping responses as a function of higher E indicates a possible difference in how men and women respond to concerns about their family and friends, and how this affects coping behavior.

However, women were also associated with more avoidance and negative appraisals through higher E and lower X, respectively. Once again, we believe the former finding relates to women's predominant roles as providers of care. The stress of caring for others and/or losing important social bonds appears to put women at risk for using less adaptive coping responses, particularly if they are introverted, pessimistic and/or lack social support. Men were associated with avoidance and negative appraisals through higher selfishness (lower H) and/or recklessness (low C), which could lead them to place their own needs ahead of those of others. These differences are once again in line with expected gender differences (Ashton & Lee, 2007).

Having more children was also associated with more avoidance through higher X, but higher X also linked having more children with fewer negative appraisals. We argue that extraverted adults are likely to be more optimistic in the face of COVID-19 challenges (i.e., having fewer negative thoughts; Ashton & Lee, 2007) and are simultaneously predisposed to coping with stress through social engagement (e.g., increased partying or drinking). We found a similar behavioral pattern of engaging in risky social behavior for wealthier individuals who were high in X.

4.4. Limitations

Our study has several limitations. First, our data is cross-sectional, limiting our ability to draw causal conclusions. In particular, without longitudinal data, we cannot definitely evaluate the adaptive or

maladaptive nature of our measure of coping responses. Instead, we rely on the general literature for determining which responses are likely adaptive or not (Campbell-Sills et al., 2006; Chew, 2020; Zeidner & Saklofske, 1996). Second, we only examined younger adults, so we cannot be sure about how well our data would generalize to adults older than 35 or to youth. Third, while we did ask whether an individual had COVID-19, we were not able to ascertain local risk factors, so we are unable to know if there were different rates of experience with infected individuals. Similarly, we did not capture geographical variation that could relate to different COVID-19 rates and/or responses (e.g., Canada versus US, New York State versus Nebraska, or Toronto versus White Horse). Fourth, our use of self-report allows for the possibility of participant bias, although anonymous self-report has been found to be generally accurate in portraying even negative aspects of individuals' behavior (Akers et al., 1983). Fifth, there are broad literatures on general measures of personality and/or coping that may be relevant to the HEXACO and COVID-19 coping (e.g., Carver & Connor-Smith, 2010), but due to space limitations we chose to focus our study on research that was aimed at the health outcomes in general or (preferably) pandemics in particular. We focused on HEXACO research rather than research on other models of personality due to the theoretical and empirical advantages afforded by the former (Ashton & Lee, 2020). To our knowledge, this is the first empirical test of the HEXACO and adaptive coping responses in both a COVID-19 and a general ecological context. Sixth, some scales had alpha levels below the typically accepted threshold of 0.70 (Nunnally & Bernstein, 1994). Given the exploratory nature of our research, we chose to accept a threshold of 0.60 (Cortina, 1993; Nunnally & Bernstein, 1994). Finally, our sampling method limited our analysis to individuals who had access to MTurk. Although much of the Canadian and American adult population has internet access, the use of MTurk might not be equally distributed across racial, cultural, and rural/urban groups. Indeed, it is noteworthy that only non-significant demographic factor was race. This was something of a surprise given previous concerns about the differential vulnerability of marginalized individuals to COVID-19 stresses (Lund, 2020). One possible explanation might be that other variables in our study subsumed the variance associated with racial differences (e.g., number of children, income). Another non-exclusive possibility is that racial groups had similar coping responses, but different experiences of overall COVID-19 stress levels. We therefore encourage researchers to examine these hypotheses by conducting further research.

4.5. Conclusions

Overall, we found a number of direct and indirect links between demographic factors, personality traits, and COVID-19 coping responses. From a theoretical perspective, given that the HEXACO has not been used in an ecological model of coping responses, our data offer theoretical support for the role of HEXACO traits as indirect links between demographic traits and coping responses. Interestingly, our results largely mirrored findings from the Big Five with respect to C and X (two factors that are similar across the two measures; Ashton & Lee, 2007), but they differed with respect to the novel links found for low H and the mixed effects for low E. Our data therefore support the value of generally using the HEXACO over the Big Five in studying coping responses.

At a more applied level, demographic factors had fewer direct effects than did personality traits. It is therefore not surprising that personality traits indirectly linked the paths between demographics and COVID-19 coping responses. Our results therefore suggest using caution when drawing broad conclusions about demographic patterns in COVID-19 responses without considering the importance of individual differences in mediating those broad patterns. Given the potential for COVID-19 to differentially impact various demographic groups (e.g., gender, SES, and racial differences; Ahmed et al., 2020; Lund, 2020), it is important for researchers and practitioners to be aware that

individual differences in personality can, and may, mediate indirect links between demographic factors and COVID-19 responses. In particular, the fact that some personality traits can serve as both adaptive and maladaptive factors for health-related coping responses is worthy of further exploration and consideration from both clinical and theoretical perspectives. Although much of the world appears to be emerging from the initial lock down phase of the COVID-19 response, a second wave could make understanding the demographic and personality correlates of coping responses highly relevant once more, especially amongst the demographic that appears most likely to play a major role in spreading the disease further (Barari et al., 2020; Park et al., 2020).

CRedit authorship contribution statement

Anthony A. Volk: Conceptualization, Methodology, Writing - original draft, Funding acquisition, Supervision. **Kristopher J. Brazil:** Methodology, Data curation, Writing - review & editing, Project administration. **Prarthana Franklin-Luther:** Methodology, Formal analysis, Writing - review & editing. **Andrew V. Dane:** Methodology, Writing - review & editing. **Tracy Vaillancourt:** Conceptualization, Writing - review & editing.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.paid.2020.110398>.

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