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Reactive, Agentic, Apathetic, or Challenged? Aging, Emotion, and Coping During the COVID-19 Pandemic

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Abstract

Background and Objectives: Advanced age is generally associated with improved emotional well-being, but the coronavirus 2019 pandemic unleashed a global stressor that gravely threatened the physical well-being and ostensibly challenged the emotional well-being of older adults disproportionately. The current study investigated differences in emotional experiences and coping strategies between younger and older adults during the pandemic, and whether these differences were accounted for by age differences in appraisal of the pandemic.
Research Design and Methods: We asked younger (n = 181) and older (n = 176) adult participants to report their stress, appraisals of the pandemic, emotions, and the ways in which they were coping with the pandemic.
Results: Results indicated that older adults experienced less stress and less negative affect and used greater problem-focused coping and less avoidant coping in response to the pandemic than younger adults. Furthermore, age differences in affect and coping were partially accounted for by age differences in appraisals of the pandemic.
Discussion and Implications: Despite their objectively higher risk of illness and death due to the pandemic, older adults experienced less negative affect and used more agentic coping strategies than younger adults.

Keywords: Affect, Aging, Appraisal, Chronic stress, Emotion regulation

In late 2019, the World Health Organization (WHO) identified a novel coronavirus (SARS-CoV-2) from a cluster of cases of pneumonia in Wuhan, China (WHO, 2020). By April 2020, the coronavirus disease 2019 (COVID-19) had spread around the world, infecting more than 3 million people (Coronavirus Pandemic, 2020), unleashing an unpredictable, complex stressor on the human population. The Center for Disease Control (CDC) articulated that older individuals were disproportionately at risk for hospitalization and death compared to younger individuals: Approximately 80% of deaths reported in the United States were among those older than the age of 60 (CDC, 2020; Smith-Ray et al., 2020). As such, COVID-19 posed a more serious threat for older than younger adults, thereby potentially resulting in higher levels of stress and negative emotions for older adults. However, some of the societal measures (e.g., stay-at-home orders) that many countries imposed to combat the virus may have been easier to follow for older adults due to fewer work-related responsibilities. Thus, it was an open question whether and how older adults differed from their younger counterparts in their emotional responses to the pandemic.

Life-span theories of adult development can guide research on this question. Strength and vulnerability integration theory (SAVI; Charles, 2010) would predict that the way individuals across the adult life span deal with a new chronic stressor depends on age-related strengths and vulnerabilities. According to SAVI, older age is related to increased vulnerabilities in physiological flexibility that make it difficult to deal with high levels of distress-related physiological activation (Charles et al., 2009; Charles & Piazza, 2009; Neupert et al., 2007). On the other hand, SAVI also posits that older age is related to increased strengths in emotional appraisals and adaptive coping strategies that lead to adaptive responses to many other stressors (Charles, 2010; Charles & Luong, 2013; Schirda et al., 2016). For example, older adults' interpersonal expertise and improved use of emotion regulation strategies have been shown to lead to less social stress and fewer negative emotions in response to stressors relative to younger adults (Almeida & Horn, 2004; Charles et al., 2010; Luong & Charles, 2014). Overall, age-related strengths tend to outweigh age-related vulnerabilities, leading to improved emotional well-being as we age; older age is associated with the experience of fewer negative emotions and similar or greater levels of positive emotions, a phenomenon referred to as *age-related positivity* in emotional experience (different from the positivity effect in attention and memory; Carstensen & Mikels, 2005; Mikels et al., 2014). Unknown is whether age-related positivity persists in response to a pandemic that gravely challenges both physical and mental well-being.

If age-related strengths outweigh age-related vulnerabilities in response to the pandemic, this may be due to age-related differences in appraisals of the pandemic (Charles & Carstensen, 2010). Appraisal theories of emotion posit that *appraisal* is the central process of evaluating the environment in relation to the individual's well-being—and that *appraisal processes* elicit and differentiate emotional experiences through interactional patterns across various dimensions of appraisal (e.g., goal relevance, certainty, agency; Moors et al., 2013). The appraisal approach to aging and emotion (AAAE) places appraisal as the central mechanism that differentiates emotional experience for younger and older adults (Mikels & Young, 2018; Young et al., 2020). Evidence indicates that younger adults' goals focus on acquiring resources to deal with an uncertain future, whereas older adults' goals focus on maintaining socioemotional harmony in the present moment (Carstensen et al., 1999; Fung & Carstensen, 2004; Penningroth & Scott, 2012). The AAAE framework postulates that age differences in patterns of goal-related appraisals (e.g., goal relevance, goal congruence) and other appraisals (e.g., certainty, agency) may influence how older versus younger adults respond to and cope with the pandemic. The nascent evidence supporting AAAE shows that older adults

report lower levels of negative affect in response to uncertain ambiguous situations, which is mediated by age differences in higher appraisals of personal control (Young & Mikels, 2021). Thus, along with other possible appraisals, goal- and control-related appraisals may be important in shaping younger and older adults' response to the pandemic. Relatedly, younger and older adults are known to implement different control processes that change depending on life constraints (Baltes & Baltes, 1990; Heckhausen et al., 2010). Specifically, as direct control over the environment declines in old age, alternative control strategies such as goal modification become more successful (Heckhausen et al., 2010). AAAE posits that appraisals of control, power (over the environment), and adjustment (to the environment) relate to these processes and help form a sense of control that can be implemented via primary or secondary control mechanisms.

In addition to shaping emotional responses to stressors like the pandemic, appraisal processes are also theorized to shape coping responses to stressors (Folkman et al., 1986; Folkman & Moskowitz, 2004). The cognitive theory of psychological stress and coping posits that *stress* occurs when an individual appraises the person–environment relationship as uncontrollable and threatening to well-being and that patterns of appraisal guide coping (Folkman & Moskowitz, 2004). As such, individuals with different goal and agency appraisal patterns may tend to use different coping strategies to deal with the pandemic. For example, individuals who appraise high levels of the agency may be more likely to use control-oriented coping strategies (e.g., problem-focused), whereas individuals who appraise situations as less controllable may be more likely to use passive types of coping (e.g., avoidant). Given that older adults tend to appraise greater agency than younger adults (Young & Mikels, 2020), it would follow that older adults might report greater problem-focused coping and less avoidant coping compared to younger adults. Appraisal may therefore be the mechanism that differentiates older and younger adults' emotional *and coping responses* to a stressor such as the pandemic.

The current study was designed to examine the ways in which younger and older adults appraise, feel, and cope in response to the COVID-19 pandemic. To test appraisal theory in a novel way, we assessed appraisals and then extracted four unique profiles that varied in appraisal patterns using hierarchical cluster analysis. We hypothesized that if older adults appraise more agentically, we expect them (a) to experience less stress and less negative affect relative to younger adults and (b) to report more problem-focused coping and less avoidant emotion regulation strategies relative to younger adults. In addition, we hypothesized that older and younger adults would vary in the profiles of appraisals they endorsed, such that (c) age differences in appraisal patterns would explain age differences in emotional experience and coping strategies.

Method

COVID-19 status and vulnerability perceptions

Participants were asked three questions to measure their perception of their own vulnerability to COVID-19. One question asked participants: "Have you been sick in the past months and think that perhaps you had COVID-19?" Participants responded to this question by selecting one of the three answers (*I'm certain I have not had COVID-19*; *Maybe I have had COVID-19*; *I'm certain I have had COVID-19*). Next, two questions assessed perceptions of vulnerability related to contracting COVID-19. Participants were asked to select how much they agreed with the statements: "I am vulnerable to getting the coronavirus" and "If I get the virus, I am vulnerable to getting very sick from it." Participants responded to these questions on a bipolar scale ranging from –3 (*Strongly Disagree*) to 3 (*Strongly Agree*). Each item was treated as a separate scale. As such, reliability analyses across these items are not reported.

Social distancing measures

Participants were asked three questions to measure the extent to which they were socially distancing during the pandemic. The first question asked participants: "Are you currently living alone?" Participants responded to this question by selecting either "Yes" or "No." In addition, participants were asked two questions about their perceived ability to socially distance during the pandemic. One question asked "To what extent are you currently doing social distancing as a result of COVID-19?" and the other question asked "To what extent are you currently NOT doing social distancing (e.g., because of care responsibilities, place of work, other household members) as a result of

COVID-19?" Both questions asked participants to respond on a scale of 1 (*Not at all*) to 7 (*Extremely*). Each item was treated as a separate scale. As such, reliability analyses across these items are not reported.

Participants

Sample size for this study was determined using a power analysis that calculated the minimum sample size ($N = 352$) needed to detect effects as low as Cohen's $d = 0.3$ between age groups with 80% power. A total of 388 participants were recruited to ensure an adequate sample size after excluding participants due to attention checks (failed at least one of two attention checks; 15 excluded) and to not meeting age requirements (i.e., aged 30–54; 21 excluded). The final sample consisted of 181 younger (*M* age = 24.6, *SD* = 1.9, range = 18–25, 38.7% women) and 176 older adults (*M* age = 63.3, *SD* = 5.3, range = 55–79, 64.7% women) for a total of 357 participants (see Table 1 for a description of the sample). Participants were recruited via Amazon's Mechanical Turk and compensated $3 in April 2020. The study was approved by DePaul University's Institutional Review Board, and the data can be found on the Open Science Framework: https://osf.io/h38bs/.

Materials

Stress aspects manipulation

One part of the present study was designed to examine how younger and older adults responded to the cognitive versus interpersonal aspects of the pandemic. Therefore, participants were randomly assigned to either a cognitive ($n = 169$) or interpersonal ($n = 188$) survey condition that

Table 1. Participant Demographics, Health Status, Perceptions of Vulnerability to COVID-19, and Perceptions of Social Distancing by Age Group

Variable	Younger adults (*N* = 181)			Older adults (*N* = 176)			Test statistic	
	Mean	*SD*	%	Mean	*SD*	%	*t* or χ^2	*p*
Age (years)	24.60	1.90		63.30	5.30		*t* = 90.5	<.001
Education (years)	15.30	2.10		15.20	2.70		*t* = –0.578	.560
Income[a]	2.70	0.90		2.40	0.90		*t* = –3.12	<.002
Sex (female)[b]			38.7			64.7	χ^2 = 24.5	<.001
Race (White)[c]			61.9			92.0	χ^2 = 50.2	<.001
Health status[d]	0.96	0.71		0.84	0.79		*t* = –1.52	.130
COVID status (not had)			78.5			80.1	χ^2 = 2.60	.720
Vulnerability (to COVID)	–0.36	1.80		0.77	1.70		*t* = 6.02	<.001
Vulnerability (very sick)	–0.56	1.80		1.11	1.70		*t* = 8.85	<.001
Living alone (% yes)			21.5			29.9	χ^2 = 2.60	.100
Socially distancing	5.97	1.20		6.38	0.91		*t* = 3.67	<.001
Not socially distancing	2.41	1.80		1.65	1.10		*t* = –4.81	<.001

[a]On a scale ranging from 1 (*lower income*) to 5 (*upper income*).
[b]Possible options: male, female, prefer not to answer.
[c]Possible options: Black or African American, American Indian/Alaska Native, Asian, Native Hawaiian or Pacific Islander, White, Other.
[d]On a scale ranging from 1 (*very bad*) to 5 (*very good*).

framed the questions in terms of those pandemic-related sources of stress. Age group differences in stress, appraisal, affect, and coping were not influenced by the framing of the questions (interpersonal aspects vs. cognitive aspects), so analyses pooled both conditions together, but included the survey condition to which participants were assigned as a covariate for control purposes.

Perceived stress scale

The Perceived Stress Scale (PSS) is a 10-item scale that measures the degree to which a person perceives their life as stressful (Cohen et al., 1994). Participants responded to each item on a 5-point scale (0 = *Never*, 4 = *Very Often*; α = 0.89).

Appraisals

To measure appraisals related to the pandemic, we adapted 17 different appraisal dimensions that are generally agreed to be important to emotional experience from an appraisal theory perspective (Scherer, 2013; Smith & Ellsworth, 1985). The appraisal dimension questions were adapted to be oriented toward evaluations related to the pandemic (see Supplementary Appendix 1 for a list of the appraisal dimensions). Participants responded to each appraisal dimension on a 7-point scale (1 = *Not at all*, 7 = *Extremely*). Each appraisal dimension was treated as a separate scale. As such, reliability analyses across the appraisal dimensions are not reported.

Modified differential emotions scale

We adapted the modified differential emotional scale (mDES; Fredrickson et al., 2003) to specifically measure the emotions people were experiencing because of stress related to the pandemic. The mDES measures 12 positive emotional states (amusement, awe, compassion, contentment, gratitude, hope, interest, joy, love, pride, surprise, and flirtatious) and eight negative emotional states (anger, contempt, disgust, embarrassment, fear, guilt, sadness, and shame) using word triads (i.e., three words that represent the same emotional state: e.g., amusement, fun-loving, and silly). Participants were asked to think back to how they felt in the past week when dealing with stress related to the pandemic. Participants responded to the extent that they have felt each of the 20 emotion triads on a 5-point scale (0 = *Not at all*, 4 = *Extremely*). Positive and negative affect scores were calculated by averaging the 12 positive emotion triads (α = 0.88) and the eight negative emotion triads (α = 0.82), respectively.

The COPE

To measure the ways in which people cope in response to the pandemic, we used the COPE, which is a 60-item measure that assesses various ways people respond to stress (Carver et al., 1989). Participants responded to each item on a 4-point scale (1 = *I usually don't do this*, 4 = *I usually do this a lot*). We used the factor structure extracted in the work of Litman (2006) that identified four COPE subscales. The subscales include *problem-focused coping* (active coping, planning, suppression of competing activities; α = 0.89), *emotion-focused coping* (positive reinterpretation, acceptance, restraint, humor, religion; α = 0.85), *socially supported coping* (emotional–social support, instrumental–social support, venting; α = 0.90), and *avoidant coping* (see Author Note 1; behavioral disengagement, denial, substance use, mental disengagement: α = 0.89).

Procedure

Upon signing up and then consenting to participate in the study, participants completed a series of questionnaires. First, participants completed questions related to their current health status, perceptions of COVID-19, and social distancing. Then, participants completed the PSS, the appraisal questions, the mDES, and the COPE, in that order. Prior to ending the study, participants completed a demographic questionnaire.

Results

The following analyses were conducted using R (R Core Team, 2019), and the packages ggstatsplot (Patil, 2018), and effectsize (Ben-Shachar et al., 2020). Table 1 presents the demographic, health status, perceptions of vulnerability to COVID-19, and perceptions of the ability to social distance by age group. The cognitive (c; $n = 169$) and interpersonal (i; $n = 188$) stress aspects conditions did not differ (all t values <1.96, all p values > .05) in terms of stress ($M_c = 1.36$, $SD_c = 0.82$; $M_i = 1.54$, $SD_i = 0.80$), positive emotions ($M_c = 1.65$, $SD_c = 0.79$; $M_i = 1.45$, $SD_i = 0.79$), negative emotions ($M_c = 0.95$, $SD_c = 0.80$; $M_i = 1.03$, $SD_i = 0.83$), problem-focused coping ($M_c = 2.36$, $SD_c = 0.67$; $M_i = 2.26$, $SD_i = 0.63$), emotion-focused coping ($M_c = 2.29$, $SD_c = 0.51$; $M_i = 2.21$, $SD_i = 0.51$), socially supported coping ($M_c = 2.02$, $SD_c = 0.64$; $M_i = 1.96$, $SD_i = 0.67$), or avoidant coping ($M_c = 1.64$, $SD_c = 0.52$; $M_i = 1.65$, $SD_i = 0.53$). However, as stated above, the stress aspects condition variable was used as a covariate in all subsequent analysis. Relative to younger adults, older adults reported more vulnerability to COVID-19, but also greater perceptions of the ability to socially distance. Younger and older adult groups also differed on income level, sex, and race, so we included these demographic variables as covariates in all the subsequent analyses.

Age Differences in Stress, Emotion, and Coping During the Pandemic

We first conducted a series of analysis of covariances (ANCOVAs) to investigate age differences in stress, affect, and coping during the pandemic after adjusting for stress aspects condition; age differences in income, sex, race, perceptions of vulnerability to COVID-19; and social distancing (see Table 2 for a complete list of test statistics). Results indicated

Table 2. ANCOVA Results for the Stress, Emotion, and Coping Measures by Age Group

Variable	Younger adults (N = 181)		Older adults (N = 176)		Test statistic		
	Mean	SD	Mean	SD	F(3, 336)	p	Cohen's f
PSS	1.77	0.76	1.14	0.74	83.80	<.001	0.50
Positive affect	1.63	0.80	1.47	0.78	0.39	.533	0.03
Negative affect	1.24	0.89	0.73	0.64	36.40	<.001	0.33
Problem-focused	2.26	0.66	2.36	0.63	5.73	.017	0.13
Emotion-focused	2.26	0.54	2.24	0.48	0.52	.470	0.04
Socially supported	2.11	0.57	1.87	0.62	18.60	<.001	0.24
Avoidant	1.84	0.61	1.45	0.34	32.00	<.001	0.31

Note: ANCOVA = analysis of covariance; PSS = Perceived Stress Scale.

that older adults reported less stress and less negative affect relative to younger adults. Older adults also reported more problem-focused coping and less socially supported coping and avoidant coping. These results suggest that older, relative to younger, adults responded less negatively and were coping by focusing on the problems rather than avoiding them.

An Analysis of Appraisal Patterns

To extract different patterns of appraisal, we conducted a hierarchical cluster analysis (HCA) on the 17 appraisal dimensions across all participants. The 17 appraisal dimensions were first standardized and then converted into a distance matrix using a Euclidean distance formula. Next, a hierarchical clustering algorithm using Ward's method was applied to the appraisal data using the hclust function (R Core Team, 2019). To determine an optimal number of clusters for the HCA, a parallel analysis was conducted using the nFactors package (Raiche & Magis, 2020). A parallel analysis is a method that uses a Monte Carlo simulation to determine at what point the addition of more clusters is unable to explain additional variance based on eigenvalues. The parallel analysis suggested that four clusters were an optimal solution. As such, four distinct appraisal profiles (i.e., patterns/clusters) were determined and served as between-subjects variables for further analyses.

The appraisal profiles

To characterize the four profiles across the appraisal dimensions, we looked for patterns within and across the profiles and categorized them as follows (see Table 3 for a summary of the means that describe the appraisal profiles). The group of participants assigned to Profile 1, termed the "Apathetic" profile, indicated that the pandemic was not relevant to them, and had low agency to deal with problems related to the pandemic. The group of participants assigned to Profile 2, termed the "Reactive" profile, indicated that the pandemic was obstructing their goals, and that it was both a moderately high pleasant and unpleasant state, potentially due to their increased uncertainty but also agency-related appraisals. The group of participants assigned to

Profile 3, termed the "Agentic" profile, had the highest level of agency to deal with problems related to the pandemic and indicated that the pandemic did not obstruct their goals. The group of participants assigned to Profile 4, termed the "Challenged" profile, indicated that the pandemic was the most relevant to them, highly unpleasant, yet they also displayed moderately high levels of agency to deal with problems related to the pandemic.

Age differences in the appraisal profiles

To determine whether age differences existed across the appraisal profiles, we regressed the age group (ref = older adults) on the appraisal profile variable (ref = apathetic profile) in a multinomial logistic regression. The Apathetic profile was used as the reference group for the appraisal profiles because it had relatively similar numbers of older and younger adults compared to the other three profiles. Results indicated that relative to the *Apathetic* profile, the *Reactive* profile was more likely to include younger adults ($B = 1.89$, $SE = 0.49$, odds ratio [OR] = 6.63, 95% confidence interval [CI] 2.69–18.93, $p < .001$), whereas the *Agentic* ($B = -0.849$, $SE = 0.30$, OR = 0.428, 95% CI 0.235–0.771, $p < .006$) and *Challenged* ($B = -0.979$, $SE = 0.32$, OR = 0.376, 95% CI 0.200–0.695, $p < .003$) profiles were more likely to include older adults. Overall, it appears that younger adults were similarly distributed across the four profiles ($\chi^2 = 5.5$, $p < .139$), but older adults were more likely to be in the *Agentic* and *Challenged* profiles and less likely to be in the *Reactive* profile ($\chi^2 = 69.1$, $p < .001$; Figure 1). As such, the results indicate that older adults were more likely to appraise in an agentic or challenged manner, whereas younger adults appraised in a variety of different ways.

Differences in Emotional Experience Between Appraisal Profiles

Analyses were conducted on the positive and negative emotional experience and stress levels of the participants in each appraisal profile. A mixed-effects model was conducted to examine the levels of positive and negative affect in each appraisal profile. We tested the 2 (Valence: positive, negative) within × 4

Table 3. A Summary of the Means of the Appraisal Profiles

Appraisal dimensions	Profile 1 "Apathetic" N = 73 (43 YA, 30 OA) Mean	Profile 2 "Reactive" N = 63 (57 YA, 6 OA) Mean	Profile 3 "Agentic" N = 121 (46 YA, 75 OA) Mean	Profile 4 "Challenged" N = 100 (35 YA, 65 OA) Mean
Goal relevance	3.27	4.63	2.60	5.56
Pleasantness	2.14	4.49	3.04	1.89
Unpleasantness	3.30	4.63	2.02	4.94
Goal obstruction	2.85	4.83	1.90	4.92
Urgency	2.89	4.63	1.67	3.66
Unexpectedness	2.86	4.60	2.14	4.42
Predictability	2.48	4.80	3.30	2.87
Understandability	3.78	5.08	4.89	5.49
Other fault	3.82	4.44	3.05	4.96
Circumstantial fault	2.22	4.51	3.01	2.63
Intentionality	1.99	4.49	2.91	2.40
Self-control	2.82	4.37	5.07	3.98
Other control	2.88	4.38	2.10	3.55
Circumstantial control	2.93	4.67	3.48	3.30
Adjustment	3.25	4.86	5.63	4.50
Coping potential	3.73	4.65	5.84	4.68
Personal value change	2.38	4.86	1.47	2.63

Notes: OA = older adults; YA = younger adults. All of the appraisal dimensions are on a 1 (*Not at all*) to 7 (*Extremely*) scale.
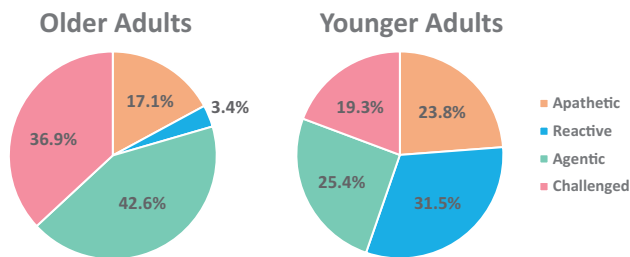

Figure 1. The distribution of the younger and older adult groups across the four appraisal profiles.

(Appraisal profile: *Apathetic*, *Reactive*, *Agentic*, *Challenged*) between-subjects interaction controlling for age group, stress condition, and the other demographic variables that differed by age group. A significant Valence by Appraisal profile interaction indicated that each appraisal profile was associated with different levels of positive and negative affect ($F(3, 676) = 49.1$, $p < .001$, Cohen's $f = 0.47$, 95% CI 0.40–0.53). Both the *Agentic* and *Apathetic* profile participants reported greater positive than negative affect, although the differences were much larger for the *Agentic* profile participants (positive: $M = 1.80$, $SD = 0.81$; negative: $M = 0.390$, $SD = 0.39$; $t(120) = -16.08$, $p < .001$, $g = -1.45$, 95% CI −1.72 to −1.21) than the *Apathetic* profile participants (positive $M = 1.26$, $SD = 0.72$; negative: $M = 0.928$, $SD = 0.62$; $t(72) = -2.96$, $p < .005$, $g = -0.34$, 95% CI −0.59 to −0.11). Both the *Reactive* and *Challenged* profile participants reported similar levels of positive and negative affect, although overall levels were much higher for the *Reactive* profile participants (positive:

$M = 1.97$, $SD = 0.62$; negative: $M = 1.88$, $SD = 0.77$) than the *Challenged* participants (positive: $M = 1.19$, $SD = 0.69$; negative: $M = 1.21$, $SD = 0.74$). This pattern of findings indicates that participants who appraised in an agentic manner also reported experiencing the greatest levels of positive relative to negative emotions. Overall, this suggests that the *Agentic* appraisal pattern relates to better emotional well-being during the pandemic relative to the other profiles.

In addition, differences between profiles were found within negative and positive valence. For negative affect, *Reactive* profile participants had significantly higher levels compared to participants in each of the other three profiles (*Challenged*: $t(161) = 5.56$, $p < .001$, $g = 0.89$, 95% CI 0.56–1.23; *Apathetic*: $t(134) = -7.89$, $p < .001$, $g = -1.36$, 95% CI −1.73 to −0.98: *Agentic*: $t(182) = 14.51$, $p < .001$, $g = 2.45$, 95% CI 1.79–2.72). The *Challenged* participants had the second highest levels of negative affect, significantly higher than the other two profiles (*Apathetic*: $t(171) = -2.67$, $p < .01$, $g = -0.40$, 95% CI −0.72 to −0.11; *Agentic*: $t(219) = -9.92$, $p < .001$, $g = -1.37$, 95% CI −1.65 to −1.03). Finally, the *Apathetic* profile participants had significantly higher levels than the *Agentic* participants: $t(181) = 6.63$, $p < .001$, $g = 1.03$, 95% CI 0.66–1.30).

For positive affect, the *Reactive* participants reported higher levels of positive affect than the *Apathetic* ($t(134) = -6.20$, $p < .001$, $g = -1.06$, 95% CI −1.43 to −.70) and the *Challenged* participants ($t(182) = 7.52$, $p < .001$, $g = 1.19$, 95% CI 0.86–1.55), but similar levels to the *Agentic* participants. The *Agentic* participants also

reported higher levels of positive affect than the *Apathetic* ($t(171) = -4.83$, $p < .001$, $g = -.70$, 95% CI –1.01 to –.41) and the *Challenged* participants ($t(219) = 6.06$, $p < .001$, $g = 0.81$, 95% CI 0.54–1.09).

To test if participants from different appraisal profiles differed in their stress to the pandemic, a four (Appraisal profile: *Apathetic*, *Reactive*, *Agentic*, *Challenged*) between-subjects ANCOVA was conducted controlling for age group, stress condition, and the other demographic variables that differed by age group. A significant main effect of appraisal profile indicated that there were differences in stress between the appraisal profiles ($F(3, 333) = 32.6$, $p < .001$, Cohen's $f = 0.54$, 95% CI 0.44–0.63). Consistent with the pattern of negative affect, the participants with the most stress were the *Reactive* participants ($M = 1.98$, $SD = 0.48$) and the *Challenged* participants ($M = 1.76$, $SD = 0.85$), which were statistically similar. The *Reactive* participants reported more stress relative to the *Apathetic* ($M = 1.58$, $SD = 0.67$) and the *Agentic* ($M = 0.87$, $SD = 0.63$) participants ($t(134) = 4.00$, $p < .005$, $g = -0.68$, 95% CI –1.03 to –0.34; $t(182) = 13.4$, $p < .001$, $g = 1.98$, 95% CI 1.70–2.44), respectively. In addition, the *Challenged* and the *Apathetic* participants reported more stress compared to the *Agentic* participants ($t(219) = 8.70$, $p < .001$, $g = -1.19$, 95% CI –1.46 to –0.89; $t(171) = 7.30$, $p < .001$, $g = 1.09$, 95% CI 0.77–1.39), respectively. In summary, these findings suggest that the *Reactive* participants were the most stressed and most emotional compared to the other participants. On the other hand, it also indicates that the *Agentic* participants responded with the least stress and greatest emotional well-being, in terms of positive relative to negative emotions.

In summary, each profile displayed a unique pattern of perceived stress and emotional responding. The *Reactive* participants reported the highest stress and similarly high levels of negative and positive affect. Regarding the *Challenged* profile, these participants reported similarly high levels of stress compared to the *Reactive* participants, but lower negative and positive affect. In comparison, the *Agentic* participants reported similarly high levels of positive affect relative to the *Reactive* participants, but the lowest levels of stress and negative affect compared to the other profiles. In contrast, the *Apathetic* participants also reported lower levels of stress and negative affect relative to the *Reactive* and *Challenged* participants, but only slightly greater positive than negative affect.

Appraisal Profiles Account for Age Differences in Negative Emotional Experience

Given that older and younger adults differed in their negative, but not positive, affect, we aimed to test the hypothesis that age differences in appraisal profiles account for age differences in emotional experience. To do this we conducted a mediation analysis to test for indirect effects (IEs) of age group on negative affect using the appraisal profile factor

as a mediator. For this analysis, two regressions were conducted to estimate the IEs using a bootstrapping procedure. For the A-paths, a multinomial logistic regression was used to regress the age group (ref = older adults) on the appraisal profile factor (ref = Apathetic profile). Then, both age group and appraisal profile were regressed on negative affect, establishing the B- and C-paths (see Figure 2 for all pathways).

The IEs of age group via the appraisal profiles on negative affect were estimated using 5,000 bootstrapped samples, and the 95% CI was computed by determining the IE at the 2.5% and 97.5% percentiles for the mediator. Results indicated that age differences in negative affect can be accounted for by the appraisal profiles. Specifically, more younger relative to older adults fell into the *Reactive* profile appraisal patterns, which was related to greater negative affect for younger adults (IE = 1.75, $SE = 0.009$, $p < .001$, 95% CI 0.789–3.10, Proportion Mediated = 0.64). On the other hand, more older adults relative to younger adults fell into the *Agentic* profile appraisal pattern, which was related to lower levels of negative affect (IE = 0.417, $SE = 0.002$, $p < .001$, 95% CI 0.130–.760, Proportion Mediated = 0.15). However, another cluster of older adults tended to be included in the *Challenged* profile appraisal patterns more so than younger adults, which was related to an increased level of negative affect (IE = –0.330, $SE = 0.002$, $p < .001$, 95% CI –0.686 to –0.088, Proportion Mediated = 0.12), but less so than the *Reactive* profile pattern of appraisal. Overall, these findings indicate that younger and older adults' negative reactivity during the pandemic was at least in part due to age differences in their appraisal patterns.
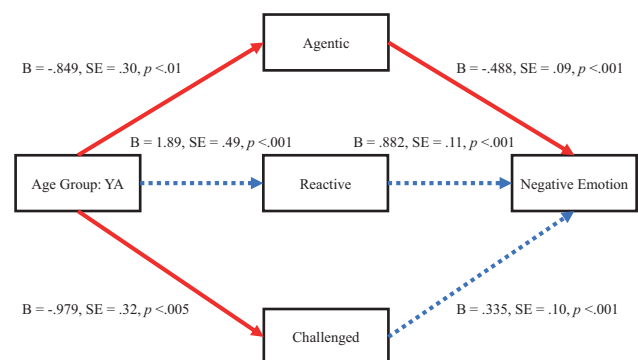

Figure 2. An illustration of the paths tested in the mediation analysis showing that the age difference in negative emotional experience during the pandemic is accounted for by differences in the way participants appraised the pandemic. Note: Two separate models were used to estimate these paths. The older adult group and the Apathetic profile are used as reference groups for the regressions used in this analysis. Solid lines between age group and an appraisal profile indicate that younger adults are less likely to appraise via that appraisal profile type, and dashed lines indicate that younger adults (YA) are more likely to appraise via that appraisal profile type relative to older adults. Solid lines between an appraisal profile and negative affect indicate less negative affect relative to the apathetic profile, and dashed lines indicate more negative affect relative to the apathetic profile.

Differences in Coping With the Pandemic Between the Appraisal Profiles

Four ANCOVAs examined differences in coping with the pandemic between the appraisal profiles. Due to age differences in demographic and COVID-19-related variables, we included these variables as covariates for each ANCOVA. The analyses reported here will focus on the effect of the appraisal profile on each coping type. See Table 4 for a full list of descriptive statistics and omnibus tests.

Results of the four ANCOVAs indicated a main effect of appraisal profile for each coping type. Overall, the *Reactive* participants reported the greatest attempt to cope across all coping types. For problem-focused coping, the *Reactive* participants reported more coping compared to *Agentic* ($t(182) = 4.09$, $p < .001$, Cohen's $d = 0.63$, 95% CI 0.32–0.95) and *Apathetic* participants ($t(134) = -5.96$, $p < .001$, Cohen's $d = -1.02$, 95% CI –1.4 to –0.66), but similar levels of problem-focused coping to the *Challenged* participants. The *Challenged* participants reported more problem-focused coping only relative to the *Apathetic* participants ($t(171) = -3.58$, $p < .001$, Cohen's $d = -0.55$, 95% CI –0.86 to –0.24). The *Agentic* participants were statistically similar to both the *Challenged* and the *Apathetic* participants for problem-focused coping. In summary, the *Reactive* participants reported using the most problem-focused coping, and the *Apathetic* participants reported the least.

For emotion-focused coping, the *Reactive* participants reported more coping compared to all the other profiles (*Agentic*: $t(182) = 3.53$, $p < .001$, Cohen's $d = 0.55$, 95% CI 0.24–0.86; *Challenged*: $t(161) = 4.76$, $p < .001$, Cohen's $d = 0.77$, 95% CI 0.44–1.1; *Apathetic*: $t(134) = -5.53$, $p < .001$, Cohen's $d = -0.95$, 95% CI –1.3 to –0.59). The other three profiles reported statistically similar levels of emotion-focused coping. In other words, the *Reactive* participants used more emotion-focused coping relative to the other appraisal profile groups.

For socially supported coping, the *Reactive* participants reported more coping compared to all the other profiles (*Agentic*: $t(182) = 10.1$, $p < .001$, Cohen's $d = 1.57$, 95% CI 1.2–1.9; *Challenged*: $t(161) = 4.72$, $p < .001$, Cohen's $d = 0.76$, 95% CI 0.43–1.1; *Apathetic*: $t(134) = -7.79$, $p < .001$, Cohen's $d = -1.34$, 95% CI –1.7 to –1.0). The

Challenged participants reported more coping compared to *Agentic* ($t(219) = -4.79$, $p < .001$, Cohen's $d = -0.65$, 95% CI –0.92 to –0.38) and *Apathetic* participants ($t(171) = -3.01$, $p < .005$, Cohen's $d = -0.46$, 95% CI –0.77 to –0.16). The *Agentic* and the *Apathetic* participants reported statistically similar levels of coping. This pattern indicates that the *Reactive* profile reported the most socially supported coping, whereas the *Apathetic* profile reported the least.

For avoidant coping, the *Reactive* participants reported more coping compared to all the other profiles (*Agentic*: $t(182) = 15.2$, $p < .001$, Cohen's $d = 2.36$, 95% CI 2.0–2.7; *Challenged*: $t(161) = 8.78$, $p < .001$, Cohen's $d = 1.41$, 95% CI 1.1–1.8; *Apathetic*: $t(134) = -8.14$, $p < .001$, Cohen's $d = -1.40$, 95% CI –1.8 to –1.0). The *Challenged* and the *Apathetic* participants reported more coping compared to the *Agentic* participants ($t(219) = -5.92$, $p < .001$, Cohen's $d = -0.80$, 95% CI –1.1 to –0.52; $t(192) = 5.36$, $p < .001$, Cohen's $d = 0.79$, 95% CI 0.49–1.1). As such, the *Reactive* participants reported the most avoidant coping and the *Agentic* participants reported the least.

In summary, these results indicate that participants who appraised differently reported different patterns of coping across the various strategies. The *Reactive* participants attempted to cope the most, whereas the other profiles' coping patterns varied. It is interesting to note that although the *Agentic* participants appraised high levels of the ability to cope with the pandemic, they reported relatively lower levels of socially supported and avoidant coping but reported higher levels of problem- and emotion-focused coping specifically.

Appraisal Profiles Account for Age Differences in Coping With the Pandemic

Given that age differences in coping were found for socially supported coping, avoidant coping, and problem-focused coping, we tested the hypothesis that age differences in coping can be accounted for by age differences in the appraisal. For these analyses, we conducted mediation analyses examining the appraisal profile factor as a mediator in the relationship between age group and coping. Two regressions

Table 4. Summary of the ANCOVAs Testing for Coping Differences Between Appraisal Profiles

Coping type	"Apathetic"		"Reactive"		"Agentic"		"Challenged"		ANCOVA result		
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	F(3,333)	f	95% CI
Problem-focused	2.07	0.58	2.63	0.50	2.22	0.70	2.40	0.63	8.18*	0.27	0.17–0.35
Emotion-focused	2.09	0.48	2.53	0.46	2.25	0.53	2.18	0.47	6.78*	0.25	0.14–0.33
Social support	1.81	0.59	2.56	0.52	1.72	0.55	2.10	0.65	19.20*	0.42	0.31–0.50
Avoidant	1.61	0.42	2.32	0.59	1.34	0.28	1.62	0.42	42.00*	0.62	0.51–0.71

Notes: ANCOVA = analysis of covariance. These effects hold with and without including the covariates in the analysis.
*Indicates $p < .001$.

were conducted to estimate the IEs using a bootstrapping procedure. For the A-paths, a multinomial logistic regression was used to regress age group on the appraisal profile factor, using the Apathetic profile, and older adult groups as reference groups. Then both age group and the appraisal profile factors were regressed on socially supported coping, avoidant coping, and problem-focused coping, establishing the B- and C-paths. The analysis indicated that age group indirectly influenced socially supported, avoidant coping, and problem-focused coping via appraisal profile paths. For socially supported coping, age group indirectly influenced coping via the *Reactive* (IE = 1.44, *SE* = 0.008, *p* < .001, 95% CI 0.68–2.6, Proportion Mediated = 0.69) and the *Challenged* profiles (IE = −0.313, *SE* = 0.002, *p* < .001, 95% CI −0.65 to −0.07, Proportion Mediated = 0.30), but not the *Agentic* profile. This result indicates that age differences in socially supported coping can be accounted for by older and younger adults' different appraisal patterns during the pandemic.

For avoidant coping, age group indirectly influenced coping with the pandemic via the *Reactive* (IE = 1.29, *SE* = 0.009, *p* < .001, 95% CI 0.58–2.2, Proportion Mediated = 0.63) and *Agentic* profiles (IE = 0.198, *SE* = 0.001, *p* < .001, 95% CI 0.05–0.39, Proportion Mediated = 0.23), but not the *Challenged* profile. This result indicates that younger adults' increased avoidant coping is related to their reactive appraisal pattern, whereas older adults' decreased use of avoidant coping is related to the agentic appraisal pattern.

For problem-focused coping, age group indirectly influenced coping with the pandemic via the *Reactive* (IE = 1.26, *SE* = 0.007, *p* < .001, 95% CI 0.59–2.2, Proportion Mediated = 0.51) and *Challenged* (IE = −0.290, *SE* = 0.002, *p* < .001, 95% CI −0.63 to −0.06, Proportion Mediated = 0.23), but not the *Agentic profile*. This result indicates that increased use of problem-focused coping for younger adults is related to a reactive type of appraisal whereas for older adults' problem-focused coping is related to a challenged type of appraisal.

Discussion

The current findings illustrate how younger and older adults evaluated, felt, and coped in response to a novel global stressor, the COVID-19 pandemic. Despite greater perceptions of vulnerability to COVID-19, older adults were less stressed and had lower levels of negative affect compared to younger adults, aligning with other work on aging and stress during the pandemic (Nelson & Bergeman, 2020). In addition, older adults reported more problem-focused coping and less avoidant and socially supported types of coping with the pandemic relative to their younger counterparts.

Drawing from the cognitive theory of psychological stress and coping (Folkman et al., 1986; Folkman & Moskowitz, 2004) and AAAE (Young et al., 2020), results confirmed our expectations, indicating that differences in emotional experience and coping were related to age differences in appraisal of the pandemic. We found that people's appraisals of the pandemic fell into four distinct patterns that differed by age group, except for the *Apathetic* profile which was relatively similar in numbers of younger and older adults. Compared to older adults, younger adults were much more likely to be in the *Reactive* profile. The *Reactive* profile was associated with high goal relevance and obstruction, certainty of pandemic outcomes, and agency appraisals that indicated it was unclear if self or others were in control during the pandemic. These reactive participants also reported the highest levels of stress, positive and negative affect, as well as the most avoidant coping. This pattern of findings indicates that people in this group were the most labile in their emotions and attempted to regulate these emotions the most.

Relative to younger adults, older adults were more likely to be in the *Agentic* and *Challenged* profiles. The *Agentic* profile, which was associated with high agency and low goal obstruction, was related to low stress, much greater levels of positive affect relative to negative affect, and the least amount of avoidant coping. On the other hand, the *Challenged* profile, which was associated with high goal relevance and unpleasantness, and also lesser agency, was related to moderate levels of stress, similar positive and negative affect, greater levels of problem-focused, and socially supported coping relative to other profiles. The appraisal pattern of the agentic profile sheds light on the ability of older adults to maintain emotional well-being in the face of the pandemic. The older adults who reported greater agency related to the pandemic with less goal obstruction and displayed less negative affect, but the older adults who appraised the pandemic as highly relevant, highly obstructing, unpleasant, and with less agency showed greater negative affect.

Overall, this pattern is consistent with AAAE and SAVI's predictions about younger versus older adult emotional experience. Older adults who appraised in an agentic manner reported a pattern of emotional experience that reflects age-related strengths outweighing age-related vulnerabilities, which in turn related to less negative affect relative to younger adults in general. However, older adults who appraised the pandemic in a challenged manner tended to show a pattern of increased negative affect. In other words, differences in appraisal can account for age differences, but also can account for variability in affect within the older group.

The finding that older adults were most likely to fall into either the *Agentic* or the *Challenged* profile reveals that the older adults varied in their response to the pandemic, with some responding with less distress than others. We speculate that some differences in older adults' appraisal patterns may be related to differences in either a perceived or even an actual elevated risk of COVID-19 infection, given that older adults vary in health status, and some may have a chronic physical condition or engage in a behavior (e.g., smoking) that increases their risk if they contract the disease. In addition,

differences among older adults may also be related to biases in memory recall or individual differences in dispositional factors. SAVI predicts that older adults are successful at maintaining high levels of well-being only in situations where they can engage in thoughts and behaviors that allow them to avoid highly distressing situations (Charles, 2010). Perhaps the older adults in the agentic pattern represent those who were successful in their ability to socially distance and reduce their exposure, whereas those in the challenged profile group were those whose circumstances made it impossible to avoid highly risky situations. On the other hand, age differences in how older and younger adults implement control processes may also underlie age differences in the appraisal profiles. Given older adults' decline in the ability to assert direct control over the environment (*primary control*), they may instead rely more on their abilities to self-regulate to improve their response to the environment (*secondary control*; Heckhausen et al., 2010). Although we cannot distinguish between appraisal and primary and secondary control processes in the current work, the present study does show that patterns of appraisal relate to the coping strategies that younger and older adults reported using during the pandemic. In other words, the ways in which older and younger adults evaluated the pandemic related to the ways in which they regulated in response to the environment, suggesting that age differences in secondary control may be present.

In summary, the current work examined age differences in stress, emotion, and coping in the context of a pandemic. It is the first to comprehensively extract the appraisal patterns of younger and older adults as they contribute to age differences in emotional experience and coping. Although there are limitations to this study, such as recruitment using a specific online platform and a correlational approach, this work builds upon a body of research showing age-related improvements in emotional experience. Specifically, our study indicates that emotional well-being in older adulthood persists even in the face of being objectively more at risk of illness and death due to the COVID-19 pandemic. Ultimately, this study indicates that although older adults understood their vulnerability to COVID-19, it did not negate age-related positivity, resulting from age-related differences in appraisal and coping. Thus, despite age-related vulnerabilities, the emotional strengths of our older adults often supersede these vulnerabilities—even in the face of a global pandemic.

Supplementary Material

Supplementary data are available at *The Gerontologist* online.

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Conflict of Interest

On behalf of all authors, the corresponding author states that there is no conflict of interest.

Author Note

1. Note some conceptualizations of avoidant coping include strategies aimed at the avoidance of interpersonal conflict (Charles et al., 2009; Fingerman & Charles, 2010). The present conceptualization and measurement of avoidant coping do not include the avoidance of interpersonal conflict and are therefore conceptually different from avoidance of interpersonal conflict.

References

Almeida, D. M., & Horn, M. C. (2004). Is daily life more stressful during middle adulthood. In O. G. Brim, C. D. Ryff, & R. C. Kessler (Eds.), *How healthy are we?: A national study of well-being at midlife*. University of Chicago Press.

Baltes, P. B., & Baltes, M. M. (1990). Psychological perspectives on successful aging: The model of selective optimization with compensation. In P. B. Baltes & M. M. Baltes (Eds.), *Successful aging: Perspectives from the behavioral sciences* (pp. 1–34). Cambridge University Press.

Ben-Shachar, M., Makowski, D., & Lüdecke, D. (2020). "Compute and interpret indices of effect size." *CRAN*. R package, https://github.com/easystats/effectsize

Carstensen, L. L., Isaacowitz, D. M., & Charles, S. T. (1999). Taking time seriously: A theory of socioemotional selectivity. *American Psychologist*, **54**, 165–181. doi:10.1037/0003-066X.54.3.165

Carstensen, L. L., & Mikels, J. A. (2005). At the intersection of emotion and cognition: Aging and the positivity effect. *Current Directions in Psychological Science*, **14**, 117–121. doi:10.1111/j.0963-7214.2005.00348.x

Carver, C. S., Scheier, M. F., & Weintraub, J. K. (1989). Assessing coping strategies: A theoretically based approach. *Journal of Personality and Social Psychology*, **56**(2), 267–283. doi:10.1037/0022-3514.56.2.267

Centers for Disease Control and Prevention. (2020, April 30). *Older adults*. https://www.cdc.gov/coronavirus/2019-ncov/need-extra-precautions/older-adults.html

Charles, S. T. (2010). Strength and vulnerability integration: A model of emotional well-being across adulthood. *Psychological Bulletin*, **136**(6), 1068–1091. doi:10.1037/a0021232

Charles, S. T., & Carstensen, L. L. (2010). Social and emotional aging. *Annual Review of Psychology*, **61**, 383–409. doi:10.1146/annurev.psych.093008.100448

Charles, S. T., & Luong, G. (2013). Emotional experience across adulthood: The theoretical model of strength and vulnerability integration. *Current Directions in Psychological Science*, **22**(6), 443–448. doi:10.1177/0963721413497013

Charles, S. T., Luong, G., Almeida, D. M., Ryff, C., Sturm, M., & Love, G. (2010). Fewer ups and downs: Daily stressors mediate age differences in negative affect. *The Journals of Gerontology, Series B: Psychological Sciences and Social Sciences*, **65**, 279–286. doi:10.1093/geronb/gbq002

Charles, S. T., & Piazza, J. R. (2009). Age differences in affective well-being: Context matters. *Social and Personality Psychology Compass*, **3**(5), 711–724. doi:10.1111/j.1751-9004.2009.00202.x

Charles, S. T., Piazza, J. R., Luong, G., & Almeida, D. M. (2009). Now you see it, now you don't: Age differences in affective reactivity to social tensions. *Psychology and Aging*, **24**(3), 645–653. doi:10.1037/a0016673

Cohen, S., Kamarck, T., & Mermelstein, R. (1994). Perceived stress scale. *Measuring stress*: *A guide for health and social scientists*, **10**, 1–2.

Coronavirus Pandemic. (2020, May 6). Tracking the global outbreak. *BBC News*. https://www.bbc.com/news/world-51235105

Fingerman, K. L., & Charles, S. T. (2010). It takes two to tango: Why older people have the best relationships. *Current Directions in Psychological Science*, **19**(3), 172–176. doi:10.1177/0963721410370297

Folkman, S., Lazarus, R. S., Gruen, R. J., & DeLongis, A. (1986). Appraisal, coping, health status, and psychological symptoms. *Journal of Personality and Social Psychology*, **50**, 571–579. doi:10.1037//0022-3514.50.3.571

Folkman, S., & Moskowitz, J. T. (2004). Coping: Pitfalls and promise. *Annual Review of Psychology*, **55**, 745–774. doi:10.1146/annurev.psych.55.090902.141456

Fredrickson, B. L., Tugade, M. M., Waugh, C. E., & Larkin, G. R. (2003). What good are positive emotions in crises? A prospective study of resilience and emotions following the terrorist attacks on the United States on September 11th, 2001. *Journal of Personality and Social Psychology*, **84**(2), 365–376. doi:10.1037//0022-3514.84.2.365

Fung, H. H., & Carstensen, L. L. (2004). Motivational changes in response to blocked goals and foreshortened time: Testing alternatives to socioemotional selectivity theory. *Psychology and Aging*, **19**(1), 68–78. doi:10.1037/0882-7974.19.1.68

Heckhausen, J., Wrosch, C., & Schulz, R. (2010). A motivational theory of life-span development. *Psychological Review*, **117**(1), 32–60. doi:10.1037/a0017668

Litman, J. A. (2006). The COPE inventory: Dimensionality and relationships with approach- and avoidance-motives and positive and negative traits. *Personality and Individual Differences*, **41**, 273–284. doi:10.1016/j.paid.2005.11.032

Luong, G., & Charles, S. T. (2014). Age differences in affective and cardiovascular responses to a negative social interaction: The role of goals, appraisals, and emotion regulation. *Developmental Psychology*, **50**(7), 1919–1930. doi:10.1037/a0036621

Mikels, J. A., Reed, A. E., Hardy, L. M., & Löckenoff, C. E. (2014). Positive emotions across the adult life span. In M. M. Tugade, M. N. Shiota, & L. D. Kirby (Eds.), *Handbook of positive emotions* (pp. 256–271). Guilford Press.

Mikels, J. A., & Young, N. A. (2018). New directions in theories of emotion and aging. In C. Robazza, & M. C. Ruiz (Eds.), *Oxford research encyclopedia of psychology* (December 2018 ed.). Oxford University Press. https://www.oxfordreference.com/view/10.1093/acref/9780190681852.001.0001/acref-9780190681852-e-339

Moors, A., Ellsworth, P. C., Scherer, K. R., & Frijda, N. H. (2013). Appraisal theories of emotion: State of the art and future development. *Emotion Review*, **5**, 119–124. doi:10.1177/1754073912468165

Nelson, N. A., & Bergeman, C. S. (2020). Daily stress processes in a pandemic: The effects of worry, age, and affect. *The Gerontologist*, 61(2), 196–204. doi:10.1093/geront/gnaa187

Neupert, S. D., Almeida, D. M., & Charles, S. T. (2007). Age differences in reactivity to daily stressors: The role of personal control. *The Journals of Gerontology, Series B: Psychological Sciences and Social Sciences*, **62**(4), 216–225. doi:10.1093/geronb/62.4.p216

Patil, I. (2018). *ggstatsplot: "ggplot2" based plots with statistical details*. doi:10.5281/zenodo.2074621. https://CRAN.R-project.org/package=ggstatsplot

Penningroth, S. L., & Scott, W. D. (2012). Age-related differences in goals: Testing predictions from selection, optimization, and compensation theory and socioemotional selectivity theory. *International Journal of Aging & Human Development*, **74**(2), 87–111. doi:10.2190/AG.74.2.a

R Core Team. (2019). *R: A language and environment for statistical computing*. R Foundation for Statistical Computing. http://www.R-project.org/

Raiche, G., & Magis, D. (2020). *nFactors: Parallel analysis and other non graphical solutions to the Cattell Scree Test. Version 2.4.1.*

Scherer, K. R. (2013). The nature and dynamics of relevance and valence appraisals: Theoretical advances and recent evidence. *Emotion Review*, **5**(2), 150–162. doi:10.1177/1754073912468166

Schirda, B., Valentine, T. R., Aldao, A., & Prakash, R. S. (2016). Age-related differences in emotion regulation strategies: Examining the role of contextual factors. *Developmental Psychology*, **52**(9), 1370–1380. doi:10.1037/dev0000194

Smith, C. A., & Ellsworth, P. C. (1985). Patterns of cognitive appraisal in emotion. *Journal of Personality and Social Psychology*, **48**(4), 813–838.

Smith-Ray, R., Roberts, E. E., Littleton, D. E., Singh, T., Sandberg, T., & Taitel, M. (2020). United States distribution of patients at risk for complications related to COVID-19. *JMIR Preprints*, 19606. doi:10.2196/preprints.19606

World Health Organization. (2020). *WHO timeline—COVID-19*. https://www.who.int/news-room/detail/27-04-2020-who-timeline---covid-19

Young, N. A., & Mikels, J. A. (2020). Paths to positivity: The relationship of age differences in appraisals of control to emotional experience. *Cognition & Emotion*, **34**(5), 1010–1019. doi:10.1080/02699931.2019.1697647

Young, N. A., Minton, A. R., & Mikels, J. A. (2021). *The Appraisal Approach to Aging and Emotion: An Integrative Theoretical Framework*. Manuscript submitted for publication.