Age Advantages in Emotional Experience Persist Even Under Threat From the COVID-19 Pandemic: Supplemental Material

Supplemental Results

R Packages

Analysis was conducted using R version 3.6.1 (R Core Team, 2019) with packages *pander* (Daróczi & Tsegelskyi, 2018), *knitr* (Xie, 2019), *memisc*: Martin Elff (2020), *sjPlot* (Lüdecke, 2020), *sjmisc* (Lüdecke, 2018), *sjlabelled* (Lüdecke, 2020), *expss* (Demin, 2020), *tidyverse* (Wickham, 2017), *car* (Fox & Weisberg, 2019), *psych* (Revelle, 2018), *GGally* (Schloerke et al., 2018), *lme4* (Bates et al., 2015) ,and *lmerTest* (Kuznetsova et al., 2017).

Intensity of Emotions

Participants reported experiencing emotions with different levels of intensity, when these emotions were felt. Repeated measures ANOVAs revealed significant differences for emotions intensity within positive emotions ($F_{within}(15, 13392) = 95.85$, $p < .001$) and negative emotions ($F_{within}(12, 8332) = 168.2$, $p < .001$) alike. See Table S1 for mean intensities of each emotion.

Age Correlations with Emotions

As a whole, simple correlations of age with the frequencies of positive and negative emotions were not significantly different in strength (Fisher's $Z = 1.83$, $p = .07$)[1]. However, age was more strongly associated with reported intensity of negative, compared to positive, emotions (Fisher's $Z = 3.35$, $p < .001$). Within each valence, there was variability in the strength of association between age and the

[1] When accounting for personality, age was more strongly associated with the frequency of negative emotions ($r(936) = -.19$, $p < .001$) than with that of positive emotions ($r(936) = 0.07$, $p = .03$; Fisher's $Z = 2.65$, $p = .008$).

reported frequency and intensity of discrete emotions (see Figure S1). Age was negatively associated most strongly with the frequencies of feeling bored, ashamed, and guilty. Age was most strongly positively associated with the frequency of feeling interested.

Mixed-effects Models Results

Variability in the strength of age associations with the frequencies and intensities of discrete emotions might suggest that the observed age relationships reported in the main text are driven by specific emotions. To ensure that the observed relationship is not driven solely by specific emotions and to assess the generalizability of our findings, we also ran the final regression model, with all covariates, as a mixed-effects model with random age slopes for specific emotions. As can be seen in Table S2, the effect of age remained significant, suggesting that even though age is more strongly associated with reporting a lower frequency of certain negative emotions, the overall pattern is generalizable across them. The same is true for the association between age and higher frequency of positive emotions, suggesting that both patterns are generalizable across individual positive and negative emotions in terms of emotional frequency.

When we used the same mixed-effects models approach for reported intensities of emotions, the association between age and reporting lower intensity of negative emotions remained significant. Though age is not a significant predictor of the intensity of positive emotions in the mixed-effects model, this is due to the inclusion of personality covariates (as described in the main text). When random age slope for specific emotions was entered to the model predicting the reported intensity of positive emotions by age alone, the relationship was significant (B = 0.05, t(16.06) = 2.56, p = .02).

Age and Gender Interactions

As reported in the main text, the majority of our age effects held across gender, with a significant age-gender interaction only for frequency of positive emotions. We found that age is associated with reporting feeling negative emotions less frequently regardless of gender (Age x Gender interaction: $\beta = .05$, $p = .18$), and gender interactions did not alter the association between age and reported intensity of negative emotions. (Age x Gender interaction: $\beta = .04$, $p = .37$). Similarly, the interaction between age and gender was not significant in the model predicting self-reported intensity of positive emotions ($\beta = -.04$, $p = .25$).

Supplemental References

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Supplemental Tables

Table S1

Mean Intensities of Emotions

	M	*SD*	95% CI
Positive Emotions (*N*=945)			
Appreciative [a]	2.36	1.01	[2.30, 2.42]
Quiet [ab]	2.28	0.95	[2.22, 2.34]
Calm [b]	2.21	0.93	[2.15, 2.27]
Interested [b]	2.17	0.87	[2.11, 2.22]
Content [c]	2.03	0.93	[1.97, 2.09]
Relaxed [c]	2.03	0.92	[1.97, 2.08]
Happy [c]	2.00	0.86	[1.95, 2.06]
Peaceful [cd]	1.97	0.92	[1.91, 2.03]
Amused [cd]	1.97	0.91	[1.91, 2.03]
Affectionate [de]	1.87	0.95	[1.81, 1.93]
Accomplished [ef]	1.80	0.89	[1.75, 1.86]
Proud [efg]	1.75	0.99	[1.69, 1.81]
Energetic [fg]	1.73	0.86	[1.68, 1.79]
Relieved [gh]	1.70	0.88	[1.64, 1.75]
Joyful [gh]	1.69	0.92	[1.63, 1.75]
Excited [h]	1.61	0.85	[1.56, 1.66]
Negative Emotions (*N*=942)			
Concerned [a]	2.23	0.98	[2.16, 2.29]
Frustrated [b]	2.12	1.07	[2.05, 2.19]
Anxious/worried [bc]	2.10	1.06	[2.03, 2.16]
Bored [bc]	2.05	1.13	[1.98, 2.13]
Irritated [cd]	2.00	1.06	[1.93, 2.07]
Lonely [de]	1.95	1.16	[1.88, 2.03]

Sad [e]	1.87	1.06	[1.80, 1.93]
Angry [f]	1.66	0.98	[1.60, 1.72]
Disgusted [f]	1.61	1.11	[1.54, 1.68]
Fearful [f]	1.59	0.99	[1.53, 1.65]
Guilty [g]	1.32	0.92	[1.26, 1.38]
Ashamed [g]	1.17	0.92	[1.11, 1.23]
Embarrassed [g]	1.12	0.88	[1.06, 1.17]

Note: Within each valence, emotions that share a superscript do not differ significantly in a paired t-test at the alpha=0.05 level, after a Bonferroni correction for multiple comparisons.

Table S2

Mixed-effects Linear Models Predicting Emotional Well-being by Age and Covariates

	Frequency: Negative Emotions			Frequency: Positive Emotions			Intensity: Negative Emotions			Intensity: Positive Emotions		
Fixed Effects:	*B*	95% CI		*B*	95% CI		*B*	95% CI		*B*	95% CI	
(Intercept)	**1.42*****	1.08	1.75	**2.03*****	1.86	2.20	**1.63*****	1.38	1.88	**1.92*****	1.80	2.04
Age	**-0.12****	-0.19	-0.04	**0.06***	0.01	0.11	**-0.18*****	-0.26	-0.11	-0.03	-0.07	0.01
Risk to self	**0.09*****	0.08	0.11	**-0.05*****	-0.07	-0.03	**0.11*****	0.08	0.13	**-0.04*****	-0.05	-0.02
Risk of complications	**0.05*****	0.03	0.08	**0.03****	0.01	0.05	**0.07*****	0.04	0.09	**0.06*****	0.04	0.08
Openness	0.002	-0.00	0.03	0.01	-0.02	0.01	**0.07*****	0.05	0.09	0.01	-0.01	0.03
Conscientiousness	**-0.05*****	-0.07	-0.03	**0.03*****	0.02	0.05	**-0.05*****	-0.07	-0.03	**0.03****	0.01	0.04
Extraversion	**0.02***	0.00	0.04	**0.04*****	0.03	0.05	0.002	-0.02	0.02	**0.03****	0.01	0.04
Agreeableness	**-0.02***	-0.04	0.00	**0.05*****	0.03	0.06	0.02	-0.01	0.04	**0.06*****	0.05	0.08
Emotional Stability	**-0.30*****	-0.32	-0.28	**0.20*****	0.19	0.22	**-0.29*****	-0.31	-0.27	**0.18*****	0.16	0.20
Race (White) [a]	-0.02	-0.06	0.02	**-0.05****	-0.08	-0.02	**0.05***	0.00	0.1	0.02	-0.02	0.05
Health	-0.005	-0.02	0.02	**0.10*****	0.09	0.12	0.007	-0.03	0.02	**0.12*****	0.10	0.14
Education Level	0.005	-0.01	0.02	**-0.03*****	-0.05	-0.02	0.003	-0.02	0.02	**-0.02****	-0.04	-0.01
Employed (Yes) [a]	0.01	-0.02	0.05	0.01	-0.02	0.04	-0.03	-0.07	0.01	0.01	-0.02	0.04
Live alone (Yes) [a]	-0.02	-0.05	0.02	**-0.07*****	-0.10	-0.03	**0.15*****	0.10	0.20	0.01	-0.03	0.05
Random Effects:	(variance)			(variance)			(variance)			(variance)		

Emotions: Intercepts	0.305	0.095	0.162	0.049
Emotions: Age slopes	0.014	0.007	0.013	0.004
Residual variance	0.762	0.651	0.913	0.761

Note. Continuous predictors were standardized. Statistical significance was obtained through t-tests using the Satterthwaite method.

[a] Parentheses denote values of binary variables coded as 1.

*$p < .05$. **$p < .01$. ***$p < .001$.

Supplemental Figures

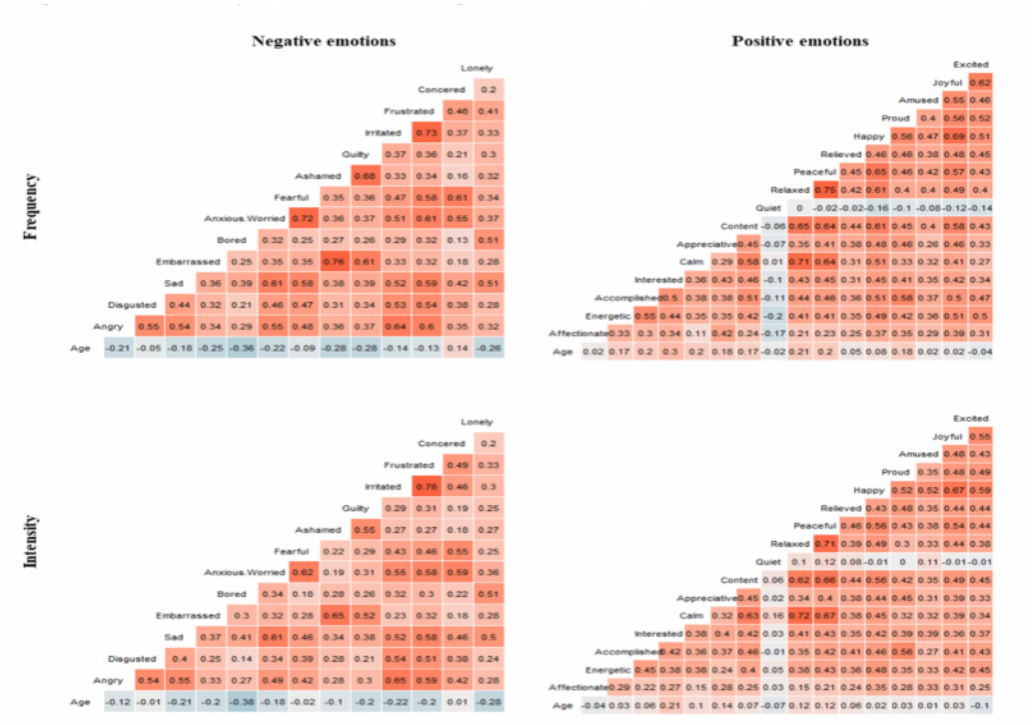

Fig. S1. Correlations of emotions with age, by valence and measure. Correlations with | < = 0.06 | are not significant with alpha = .05. Correlations with | < = 0.08 | are not significant with alpha = .01.