Are You in Control?

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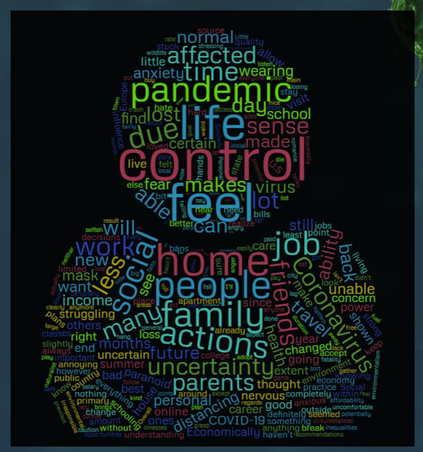
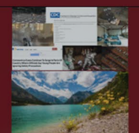
Abstract

Locus of control (LOC) is a psychological trait measuring the degree to which someone believes the causes of events or outcomes are due to self (internal) versus external forces. Life history theory predicts that environments marked by instability, resource poverty, social, physical and productive stress will cause individuals to become more external in their LOC personality trait, since predicting outcomes in such ecologies would prove uncertain and costly. We randomly surveyed 96 college students in 28 states via email to assess whether their LOC was impacted by ecological factors. We found that household stress, adverse childhood experiences (ACES), and gender significantly impact Nowicki LOC measures. But only gender significantly impacted all three portions of the Levenson LOC; those being Internality, Powerful Others, and Chance with ACES marginally impacting the later two constructs and health status marginally impacting Chance. In this data, men were more external across all LOC domains. While priming participants with photos only marginally affected their Levenson LOC, we found that individuals primed with serene photos were more certain about the future and were more likely to purchase half-off tickets to the future show of a favorite performer/festival than those primed with Covid-19 news images. Qualitative data highlighted a significant degree of personal uncertainty and sense of lack of control during the current pandemic. Overall, these data indicate that, there may be different psychological constructs to Locus of Control and that ecological stress, both in the past and now, may shift individuals toward a more external locus of control, causing them to discount the future in a world of unpredictability or resource poverty.



Methods

Using publicly available student directories from U.S. 4-year universities, participants were randomly selected based on last name to participate in an online survey through SurveyMonkey. Respondents (n = 96) answered demographic information about gender identity, political orientation, and family income. There were also asked questionnaires to measure adverse childhood experiences (ACEs) and current homelife stressors. Respondents were then randomly primed with photos, viewing either a serene landscape or one with pandemic news. After viewing the photo, they estimated how certain they were about the future, whether they would invest money in the future, and whether they had an internal or external locus of control (LOC) as measured by their answers on two standard psychological LOC questionnaires (Nowicki & Duke and Levenson). Finally, participants were asked about their overall health and Covid-19 status followed by an open-ended question about how they have been affected by Covid-19.

Variable	Measuring	Question Example	Responses
ACEs	Childhood adversity	Did a parent or other adult in the household often… - Swear at you, insult you, put you down, or humiliate you? Or - Act in a way that made you afraid that you might be physically hurt?	10 statements silimar to this were given, and participants were asked to respond with "Yes" or "No" and then a score was calculated based on the number of "yeses". A higher score indicates greater adversity during a participant's childhood.
Current Home Stress	Stress due to current circumstances	There is a lot of conversation in my household about concern over the economy	8 statements were given in a matrix and participants were asked to respond using a 5 point Likert Scale. Participant's responses for each of the 8 statements was averaged to create a single variable.
Primer Image	Morbidity Cue		Participants were randomly assigned to recieve either the image meant to act as a morbidity cue, or the control image
	Control		
Future Certainty	Comfort predicting the future	On a scale from "0% able" to "100% able", how able do you feel to predict what your life will look like in the future. (For example, what will social norms look like, what will the economy look like, what will education look like?)	2 other questions similar to this were also asked, and the responses were compared based on which primer image teh participants recieved.
Levenson LOC	Internal/External LOC	Whether or not I get to be a leader depends mostly on my ability	24 statements comprised this questionarre. Participants responded using a 5 point Likert Scale. Responses were seperated based on which category the questions were related to, and then averaged to form a separate composite score for each of the measures.
	Powerful Others	I feel like what happens in my life is mostly determined by powerful people	
	Chance	It's chiefly a matter of fate whether or not I have few friends or many friends	
Nowicki & Duke LOC	Internal/External LOC	Do you believe that when bad things are going to happen they just are going to happen no matter what you do to try to stop them?	40 questions similar to this were asked and participants were asked to respond "yes" or "no" and their responses were averaged.
Covid-19 and Control	Impacts of Covid-19	In what ways has the Covid-19 pandemic affected your sense of control about personal, social, or economic factors in your life?	This response was left open-ended and responded to by a total of n=75 participants.

Question: In what ways has the Covid-19 pandemic affected your sense of control about personal, social, or economic factors in your life?

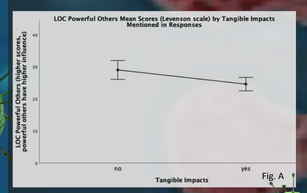
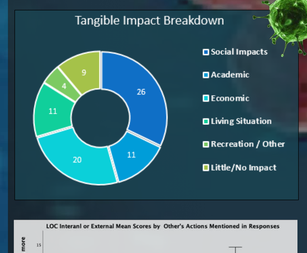


Fig. A



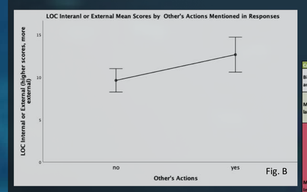


Fig. B

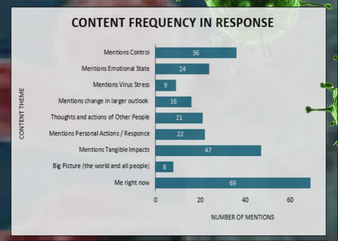


Fig. A: An independent-samples t-test indicated that LOC powerful others scores were significantly higher for those who did not mention tangible impacts (M = 24.6, SD = 7.005) on their lives due to Covid-19 in their open-ended responses than those who did mention tangible impacts (M = 29.03, SD = 8.064), $t(74) = 2.548$, $p = .03$, $d = .588$. This is a statistically significant finding at $p < .05$. Cohen's d indicates that there is a medium size difference between the two means.

Fig. B: An independent-samples t-test indicated that LOC internal or external scores were significantly higher for those who mentioned other's actions (M = 12.65, SD = 4.404) in their open-ended responses than those who did not (M = 9.62, SD = 4.959),$t(70) = 2.395$, $p = .019$, $d = .324$. This is a statistically significant finding at $p < .05$. Cohen's d indicates that there is a medium size difference between the two means.

Results

Research Question: What ecological factors affect locus of control (LOC) and how does that affect future discounting?

H_0: Exposure to ecological stressors result in a more external locus of control and future discounting.

P_1: If an individual has had adverse childhood experiences (ACEs), mainly social or economic, then they will exhibit a more external LOC.

P_2: If an individual is exposed to mortality cues, then they will exhibit a more external LOC.

P_3: If an individual has a more external LOC, then will be more likely to discount the future.

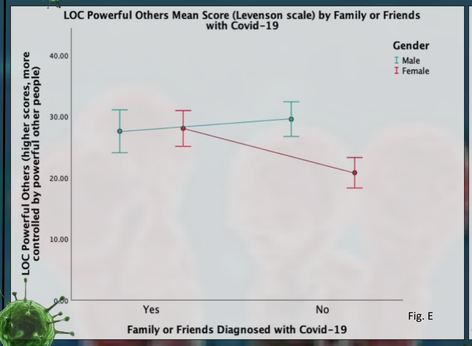


Fig. E

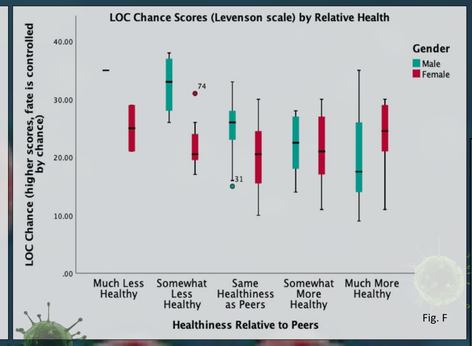


Fig. F

Fig. E: Results of the general linear model indicated that there was a collective significant effect between gender, ACES, and whether or not respondents have friends or family diagnosed with Covid-19 on LOC Powerful Others scores ($F(3, 92) = 4.685$, $p = .004$, $r^2 = .136$). The individual predictors were examined further and indicated that Gender ($t = 2.692$, $p = .008$), and CovidFamFriends ($t = 2.202$, $p = .030$) were significant predictors in the model at $p < .05$, while ACES ($t = 1.592$, $p = .116$) was not a significant predictor.

Fig. F: Results of the general linear model indicated that there was a collective significant effect between gender, Home Stress satisfaction, and health relative to peers on LOC Chance scores ($F(3, 91) = 4.524$, $p = .005$, $r^2 = .134$). The individual predictors were examined further and indicated that Gender ($t = 2.481$, $p = .015$), and HealthtoPeers ($t = -2.126$, $p = .036$) were significant predictors in the model at $p < .05$, while HouseStress ($t = 1.598$, $p = .114$) was not a significant predictor.

Fig. D: Results of the general linear model indicated that there was a collective significant effect between ACES, Home Stress satisfaction, and gender and mortality primer ($F(4, 100) = 5.181$, $p = .001$, $r^2 = 1.78$). The individual predictors were examined further and indicated that Gender ($t = 2.639$, $p = .010$), ACES ($t = 3.292$, $p = .001$), HomeStress ($t = 1.890$, $p = .062$) were significant predictors in the model at $p < .001$ and $p < .05$, while Mortality Primer ($t = -.702$, $p = .484$) was not significant.

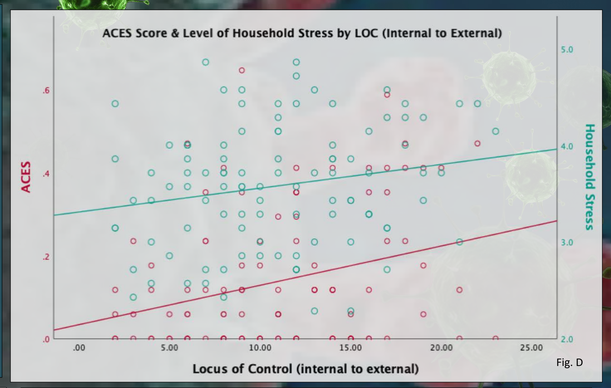


Fig. D

Statistics

		Locus of Control Levenson Scale (external to internal)	Locus of Control Powerful Others (higher scores, more controlled by powerful other people)	Locus of Control Chance (higher scores, fate is controlled by chance)	Locus of Control (internal to external)
N	Valid	99	98	98	103
	Missing	43	44	44	39
Mean		34.8766	26.4184	22.7449	10.9417
Median		35.0000	26.0000	23.0000	11.0000
Std. Deviation		4.50734	7.47770	6.27269	5.02899
Variance		20.316	55.916	39.347	25.291
Minimum		26.00	10.00	9.00	2.00
Maximum		46.00	43.00	38.00	23.00

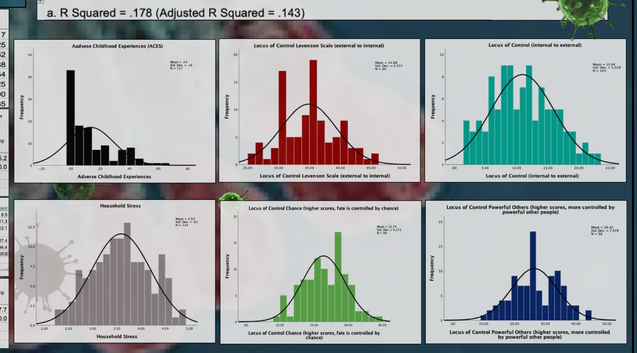
Our university data sample LOC mean was significantly higher than that of University students randomly sampled in 1974 ($p < .001$ and mean difference 1.88), they were significantly lower than firefighters sampled in 2011 ($p < .05$ and mean difference -.988), and significantly higher than college alumni sampled in 1986 ($p < .001$ and mean difference 3.8).

Tests of Between-Subjects Effects

Dependent Variable: Locus of Control (internal to external Nowicki)

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	457.644[a]	4	114.411	5.181	.001	.178
Intercept	64.739	1	64.739	2.932	.090	.030
GenBinary	153.795	1	153.795	6.964	.010	.068
PrimerImage	10.890	1	10.890	.493	.484	.005
HouseStress	78.889	1	78.889	3.572	.062	.036
ACES	239.272	1	239.272	10.835	.001	.101
Error	2119.999	96	22.083			
Total	14667.000	101				
Corrected Total	2577.644	100				

a. R Squared = .178 (Adjusted R Squared = .143)



Statistics

		HouseStress	ACES
N	Valid	124	117
	Missing	18	25
Mean		3.5887	.1362
Median		3.5714	.0588
Std. Deviation		.60980	.15954
Variance		.372	.025
Minimum		2.29	.00
Maximum		4.86	.65

Has anyone you personally know among friends, family or close acquaintances, been diagnosed with Covid-19?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	53	37.3	55.2	55.2
	No	43	30.3	44.8	100.0
	Total	96	67.6	100.0	
Missing	System	46	32.4		
Total		142	100.0		

What is your ethnicity?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Hispanic or Latino/a	11	7.7	8.9	8.9
	Black or African American	3	2.1	2.4	11.4
	American Indian or Alaska Native	1	.7	.8	12.1
	Asian or Pacific Islander	19	13.4	15.3	27.4
	White or Caucasian	83	58.5	66.9	94.4
	Multiple Ethnicity/Other	7	4.9	5.6	100.0
	Total	124	87.3	100.0	
Missing	System	18	12.7		
Total		142	100.0		

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	46	32.4	37.7	37.7
	Female	76	53.5	62.3	100.0
	Total	122	85.9	100.0	
Missing	System	20	14.1		
Total		142	100.0		

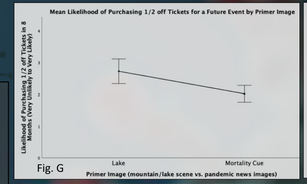


Fig. G

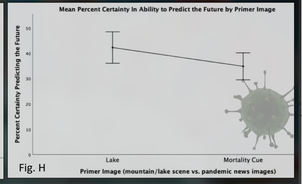


Fig. H

Independent-Samples Mann-Whitney U Test Summary

Total N	115
Mann-Whitney U	1234.000
Wilcoxon W	2887.000
Test Statistic	1234.000
Standard Error	172.557
Standardized Test Statistic	-2.428
Asymptotic Sig.(2-sided test)	.015

Independent-Samples Mann-Whitney U Test Summary

Total N	114
Mann-Whitney U	1306.000
Wilcoxon W	2959.000
Test Statistic	1306.000
Standard Error	176.220
Standardized Test Statistic	-1.807
Asymptotic Sig.(2-sided test)	.071

Fig. G: A Mann-Whitney Test indicated that the likelihood of purchasing a ½ off ticket for an event 8 months in the future was significantly less likely for those exposed to the Mortality Cue primer image ($Mdn = 2$) than for those exposed to the Control primer image ($Mdn = 3$), $U = 1234.2 = -2.428$, $p = .015$, $r = -.226$. The null hypothesis is rejected with $p < .05$. The magnitude of effect is small (r = -.226), showing that the variables have a minimal effect on each other. $r^2 = .051$, indicating that 5.1% of the likelihood of purchasing tickets is related to exposure to the different primer images.

Fig. H: A Mann-Whitney Test indicated that the percent certainty for ability to predict the future was marginally less for those exposed to the Mortality Cue primer image ($Mdn = 43\%$) than for those exposed to the Control primer image ($Mdn = 45\%$), $U = 1306$, $Z = -1.807$, $p = .071$, $r = -.396$ We fail to reject the null hypothesis with $p > .05$. The magnitude of effect is medium (= -.396), showing that the variables have some effect on each other. $r^2 = .157$, indicating that 15.7% of respondent's percent certainty in their ability to predict the future is related to exposure to the different primer images.

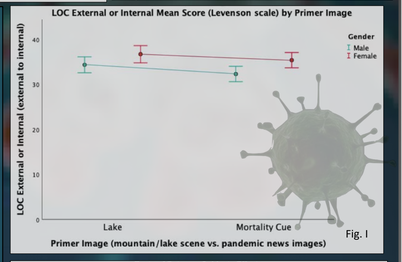


Fig. I

Tests of Between-Subjects Effects

Dependent Variable: Locus of Control Levenson Scale (external to internal)

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	221.982[a]	4	55.496	2.973	.023	.114
Intercept	3203.751	1	3203.751	171.620	.000	.651
GenBinary	173.577	1	173.577	9.298	.003	.092
ACES	2.863	1	2.863	.153	.696	.002
HouseStress	10.534	1	10.534	.564	.454	.006
PrimerImage	61.148	1	61.148	3.276	.074	.034
Error	1717.429	92	18.668			
Total	120050.088	97				
Corrected Total	1939.412	96				

Fig. I: Results of the general linear model indicated that there was a collective significant effect between gender, ACES, Home Stress scores, and mortality primer on LOC External or Internal scores ($F(4, 96) = 2.973$, $p = .023$, $r^2 = .114$). The individual predictors were examined further and indicated that Gender ($t = -3.049$, $p = .003$), and Mortality Primer ($t = 1.810$, $p = .074$) were significant or marginally significant predictors in the model at $p < .05$, while ACES ($t = -.392$, $p = .696$), and HouseStress ($t = .751$, $p = .454$) were not significant predictors.

Discussion

We predicted, according to life history theory, that individuals living in more stressful ecological environments will shift toward a more external locus of control (LOC). This is because taking individual responsibility for outcomes and expending energy to predict the future is more costly in risky environments, such as those with high parasite loads, high external mortality, and adverse productive and social situations. We further predicted that individuals primed with mortality cues would have a harder time predicting the future and would be less inclined to invest in the future. To some degree, our overarching hypothesis was supported.

Surprisingly, the most consistent and significant finding was that among the University students surveyed, women had a more internal LOC than men. We believe this may be due to shifting gender stratification and emerging social and economic opportunities for women. Controlling for gender, adverse childhood experiences (ACES) was significantly, and household stress marginally positively associated with an external locus of control (Nowicki-Duke). This may support the argument that LOC is state specific, set during childhood, with a limited degree of flexibility in adulthood. Mortality picture priming was marginally predictive (p=.065 2-tailed) of the Levinson LOC, but household stress and ACES were not. This unusual finding compared to the Nowicki scale provides support for arguments that different mental constructs may make up the LOC trait; namely internal, versus powerful others, versus chance effects. For example, another outcome of the study was that men who reported having family or friends diagnosed with Covid-19 were more likely to say that powerful others controlled events in their lives, whereas men who are more healthy than peers were less likely to blame events on chance.

Our qualitative data illustrates many of these findings (in the words of our participants). When asked about the effects of Covid-19 on their sense of control, individuals who responded by citing the thoughts and actions of others also scored significantly ($p = .019$) more external per Nowicki LOC. While more research is needed to confirm such trends, this may be indicative of participants' rationalization of the asymmetrical experience of their own actions in impacting their ecology.

Finally, our data show that mortality priming significantly predicts disinclination to invest in the future and a marginal inability to predict the future, both of which support our hypothesis. Internal individuals (Levinson) reported a more certain ability to predict what their life will be like in a year from now. Taken as a whole, these pilot data indicate that adverse ecological variables in the past and now may shift individuals toward a more external LOC and cause them to discount the future due to its unpredictability. More robust research with larger sample sizes will help answer some of the marginal and confirm the significant findings in this study.

References

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