Lower emotional awareness is associated with greater early adversity and faster life history strategy

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Abstract

Recent theoretical work suggests that emotional awareness (EA) depends on the harshness/predictability of early social interactions – and that low EA may actually be adaptive in harsh environments that lack predictable interpersonal interactions. In evolutionary psychology, this process of psychological “calibration” to early environments corresponds to life history strategy (LHS). In this paper, we tested the relationship between EA and LHS in 177 (40 male) individuals who completed the levels of emotional awareness scale (LEAS), Arizona Life History Battery (short form: K-SF-42), and two measures of early abuse/neglect. Significantly lower EA was observed in those with faster LHS and who had experienced greater early adversity. Notably, LEAS was associated with differences in 1) general reflective cognition, and 2) emotional support from parents during childhood. This suggests that EA may be learned during development based on the benefits of cognitive reflection in environments with different levels of harshness and social predictability.

Keywords: Emotional Awareness; Life History Strategy; Development; Early Childhood

Adversity

Significance statement: This study found evidence that individuals who grew up in more harsh and unpredictable environments (e.g., abuse/neglect) also had less awareness for their own emotions and the emotions of others. This relationship was (partially) explained by differences in an evolutionary construct called life history strategy (LHS), which suggests that harsh and unpredictable early environments teach organisms to devote less energy toward planning for the distant future or maintaining long-term relationships. This suggests that individual differences in emotional awareness may follow from the way early environments influence whether or not we spend energy on reflective thinking and forming close bonds with others.

Introduction

Trait emotional awareness (EA) is a widely recognized individual difference variable relevant to mental health. Outwardly, high levels of EA reflect the tendency of individuals to report granular emotional experiences in themselves and to infer similar experiences in others. This outward tendency is thought to arise from trait differences in attention to affective (e.g., bodily) sensations and motivations, as well as the precision or specificity of the emotion concepts an individual has learned to use to understand those experiences. As measured by the Levels of Emotional Awareness Scale (LEAS; (Lane, Quinlan, Schwartz, Walker, & Zeitlin, 1990)), multiple studies suggest that EA is an important determinant of adaptive emotional functioning. High EA has been linked to multiple socially and emotionally adaptive skills and personality traits, such as emotion recognition ability and openness to experience (Barchard, Bajgar, Leaf, & Lane, 2010; Bréjard, Bonnet, & Pedinielli, 2012; Ciarrochi, Caputi, & Mayer, 2003; Lane et al., 1990; Lane et al., 1996; Lane, Sechrest, Riedel, Shapiro, & Kaszniak, 2000; Smith et al., 2019; Wright, Riedel, Sechrest, Lane, & Smith, 2017). Low EA has also been observed in multiple affective disorders (Berthoz, Ouhayoun, & Parage, 2000; Bydlowski et al., 2005; Donges et al., 2005; Frewen et al., 2008; Levine, Marziali, & Hood, 1997). Understanding the origin of individual differences in EA may therefore be important for both improving mental health and more fully characterizing the nature of interactions between cognitive and socio-affective processes.

In a recent review drawing on research within evolutionary biology (Smith, Steklis,

Steklis, Weihs, & Lane, 2020), a link was proposed between EA and the construct of life history strategy (LHS) (Ellis, Figueredo, Brumbach, & Schlomer, 2009; Figueredo, Vasquez, Brumbach, & Schneider, 2004, 2007; Sherman, Figueredo, & Funder, 2013). LHS reflects a continuum between ‘fast’ and ‘slow’ strategies that characterizes differences in cognition and behavior both within and between species. A slow LHS indicates the tendency to act as though distant future outcomes are predictable, and supports a greater allocation of metabolic resources to effortful cognition and the maintenance of social bonds. In humans, this leads to long-term goal-directed behaviors, such as maintaining long-term romantic relationships, strong parental investment, low risk-seeking, and greater engagement in reflective, future-oriented cognition and planning (Sherman et al., 2013). Slow LHS is thought to develop through a “calibration” of cognitive/behavioral tendencies to early childhood environments that are socially stable and predictable, where future-oriented cognition would be adaptive (Brumbach, Figueredo, & Ellis, 2009; Ellis et al., 2009). In contrast, ‘fast’ LHS is thought to develop through calibration to harsh and unpredictable early environments (e.g., abuse, neglect, and high levels of crime and mortality) in which reflecting on the thoughts and emotions of others (and long-term future outcomes generally) may be less adaptive. Such individuals tend to be more risk-seeking and impulsive, as immediate gains are (at least implicitly) believed to be essential for survival. They are likely to engage in many shallow, short-term sexual relationships with low investment in parenting (Wolf & Figueredo, 2011). This suggests that it may be adaptive in socially unpredictable environments to avoid attending to (and learning about) emotions (i.e., to have low EA), because attention to (unpredictable) patterns in affective responses may carry less useful

action-guiding information.

Both high EA and slow LHS are thought to depend on early social environments where stable patterns of interpersonal engagement persist over time. Females also tend to have slower LHS characteristics than males (e.g., greater parental investment), similar to the pattern of sex differences seen in EA (Barrett, Lane, Sechrest, & Schwartz, 2000; Ciarrochi, Hynes, & Crittenden, 2005; Wright et al., 2017). Based on these and other considerations, it has been proposed that LHS may contribute to EA in at least two ways (Smith et al., 2020). First, individuals may display lower EA as part of a more general tendency not to engage in reflective, future-oriented cognition (i.e., failing to reflect on emotions is one example of failing to internally reflect more generally before making decisions). Second, low EA may manifest as a direct consequence of not having the opportunity to learn about emotions in childhood, which arises from the early abuse, neglect, and inconsistent social interactions with parents associated with fast LHS calibration. However, the hypothesized relationships between EA, LHS, and associated levels of harshness and unpredictability in early childhood have yet to be tested empirically. If confirmed, this would provide insights about the developmental origins of EA and support the idea that EA corresponds to the application of general reflective cognitive capacities to emotion-related signals (e.g., facial cues in others, or felt patterns of bodily sensations and motivations in oneself within particular contexts). In this study, we collected data on EA, LHS, and early childhood environments in the same individuals to test the hypothesized relationship between these variables, with a particular focus on the relationship between early childhood abuse/neglect, reduced use of general reflective cognitive capacities, and the lower levels of EA

expected to result from these factors. Due to the well-known differences in EA between males and females (Wright, Riedel, Sechrest, Lane, & Smith, 2017), and differences in the effects of early adversity on males vs. females (Bath, 2020), we also explore whether patterns in these relationships differ by sex.

Method

Participants

A convenience sample of students at the University of Arizona (mean age = 19, SD = 2 years), 40 male and 137 female, was recruited from Tucson, AZ. Participants gave informed consent and received course credit for their participation.

Measures

The primary variables of interest were LEAS scores (Barchard et al., 2010; Lane et al., 1990) and scores on the K-SF-42, a common measure of LHS (Figueredo et al., 2017; Manson, Chua, & Lukaszewski, 2020). We also collected two measures of early childhood adversity, the Childhood Trauma Questionnaire (CTQ; Bernstein et al., 2003) and the Childhood Experiences of Care and Abuse questionnaire (CECA; Bifulco, Bernazzani, Moran, & Jacobs, 2005).

The LEAS asks participants to describe the feelings they believe they and another individual would feel in each of 20 scenarios; scoring is based on the words used to describe feelings, irrespective of the appropriateness of the response. For each of 20 stated scenarios: a

score of 0 is given to non-emotional words (e.g. confused); a score of 1 is given to words related to bodily sensations (e.g., “tired”); a score of 2 is given to words that denote emotional actions (e.g., “punching”) or simple valence distinctions (e.g., good/bad) that entail approach/avoidance; a score of 3 is given to single emotion concept terms (e.g., “happy,” “sad”); and a score of 4 is given when at least 2 emotion concept terms are used for a single scenario. For each scenario, the self- and other-related responses are scored separately (i.e., with a value of 0-4). A “total” score is then given for each of the 20 LEAS scenarios, which reflects the higher of the self- and other-related scores, unless a score of 4 is given for both. In that case, a total score of 5 is given for the scenario, as long as the self- and other-related responses are differentiable (for more details see (Lane et al., 1990)). The inter-rater reliability (intra-class correlation) of the LEAS total score is .96, along with a Cronbach’s alpha of .88 (Lane et al., 2000). These data were scored based on a previously validated computer scoring method (Barchard et al., 2010).

The K-SF-42 is a shortened version of the Arizona Life History Battery (Figueredo et al., 2017). It contains 42 statements, assessing seven LHS sub-domains (6 items each), where participants select responses either from “strongly disagree” (-3) to “strongly agree” (+3) or from “not at all (0) to “a lot” (4), depending on the statement. These items reflect parental support during childhood as well as current behaviors associated with fast vs. slow LHS. The seven domain scores indicate: general reflective cognition (“insight, planning, and control”), general supportiveness to others (friends, family, and community), level of religiosity, comfort with close emotional relationships, emotional support received from parents during childhood, and current emotional support received from family and friends. Domain scores are simply the mean

of the associated item scores. Total scores reflect the mean of the normalized domain scores. A higher score indicates a slower life history strategy.

The CTQ measures emotional, physical, and sexual abuse with three subscales, each consisting of five items scored on a five-point rating scale (1 = ‘never true’ and 5 = ‘very often true’). We also took the mean of the subscale scores to generate a total CTQ score. The CECA measures lack of parental care with subscales corresponding to ‘neglect’ and ‘antipathy’. These two subscales consist of eight items each, and each item is scored separately for mother and father figures (32 items total). An example item is ‘she was very difficult to please’, where participants are asked to rate this item on a five-point scale (1 = ‘no, not at all’, 3 = ‘unsure’ and 5 = ‘yes, definitely’). We also took the mean of the subscale scores to generate a total CECA score. The scales of the CTQ and CECA have good reliability and validity (Bernstein et al., 2003; Bifulco et al., 2005).

Analyses

EA and LHS. To assess the relationship between EA and LHS, we first ran JZS Bayes factor analyses with default prior scales in R (BayesFactor package (Morey & Rouder, 2015; Rouder, Morey, Speckman, & Province, 2012)) comparing null (intercept only) models to the space of models that included all combinations of main effects of age, sex, and K-SF-42 scores on LEAS total scores. A BF represents the ratio of the probability of observed data under one model vs. another (i.e., where a higher probability of data under a model provides more evidence for that model). That is, if H_0 indicates the null hypothesis, H_1 indicates the alternative hypothesis, and d

indicates the data, then:

$$BF = \frac{p(d|H_1)}{p(d|H_0)}$$

For example, $BF = 1$ indicates equal evidence for two models, while $BF = 3 = .75/.25$ – that is, three times as much evidence for the alternative hypothesis over the null hypothesis. When interpreting the strength of evidence of each finding below, we adopt the guidelines described in Lee and Wagenmakers (Lee & Wagenmakers, 2014): $BF = 1-3$, poor/anecdotal evidence; $3-10$, moderate evidence; $10-30$, strong evidence, $30-100$, very strong evidence, >100 , extremely strong evidence.

Because LHS is thought to reflect an early developmental calibration process (with limited evidence of malleability later in life; (Conradt et al., 2018)), whereas EA reflects concept learning and selective attention habits that can be learned throughout childhood and adulthood (Burger et al., 2016; Colvert et al., 2008; Montag et al., 2014; Neumann, Malec, & Hammond, 2017; Radice-Neumann, Zupan, Tomita, & Willer, 2009; Smith, Killgore, & Lane, 2018; Smith et al., 2019; Thakur et al., 2017), it was most theoretically appropriate to have LHS as a predictor of EA. After confirming the presence of this hypothesized relationship, we then performed secondary correlational analyses examining relationships with LEAS scores when only looking at self- vs. other-focused emotional descriptions. Given expected sex differences (Bath, 2020; Ellis et al., 2009; Wright et al., 2017), we further examined the correlation between LEAS scores and K-SF-42 scores separately in males and females. These secondary analyses were performed

to best interpret the specific nature of the relationship between EA and LHS.

Early adversity. To assess the hypothesized role of early childhood environments in calibrating LHS, and in turn influencing EA, we then conducted a second set of analyses to examine 1) the expected relationship between greater early childhood adversity and faster LHS, and 2) the degree to which early adversity accounts for shared variance between LEAS and LHS. To do so, we first conducted Bayes factor analyses analogous to those above to confirm that CTQ and CECA scores predicted the K-SF-42 scores within the winning model predicting LEAS total scores. We then conducted a series of additional analyses using the *mediation* package in R (Tingley, Yamamoto, Hirose, Keele, & Imai, 2013) to assess the degree of shared vs. unique variance in the relationship between LEAS, K-SF-42, and CTQ/CECA scores. This was not intended as a strong test of causal influences (i.e., as our data is cross-sectional, despite reflecting self-reported childhood experiences); however, it affords some additional insights about the degree to which early adversity and LHS have shared vs. unique explanatory variance when accounting for differences in EA (i.e., noting that the K-SF-42 scales measure current cognitive/behavioral strategies in addition to childhood experiences).

Results

Emotional Awareness and Life History Strategy

The descriptive statistics for our key variables of interest are given in **Table 1**, which also indicates the presence of any sex difference. Age was not significantly correlated with LEAS, K-

SF-42, CTQ, or CECA total scores. When analyzing subscales, older age was associated with greater CECA mother antipathy and neglect scores ($r = .21$ and $.23$, $p = .005$ and $.002$) and less support from parents and family on the K-SF-42 ($r = -.17$ and $-.21$, $p = .02$ and $.005$).

Table 1. Summary statistics (mean and SD) for study measures by sex

Measures	Females (N = 137)	Males (N = 40)	p^a
Age	18.99 (1.71)	19.38 (2.12)	0.233
LEAS Total	33.81 (4.06)	31.62 (3.28)	0.002
LEAS Self	29.58 (4.41)	26.32 (4.34)	<0.001
LEAS Other	27.50 (3.97)	25.42 (4.91)	0.007
K-SF-42 Total	1.20 (0.50)	1.11 (0.63)	0.349
K-SF-42 Reflective Cognition	1.53 (1.01)	1.49 (1.01)	0.815
K-SF-42 General Supportiveness	0.18 (1.11)	0.05 (1.27)	0.54
K-SF-42 Religiosity	0.21 (1.84)	-0.32 (1.77)	0.738
K-SF-42 Comfort with Emotionally Close Relationships	0.13 (1.36)	-0.10 (1.27)	0.875
K-SF-42 Emotional Support from Parents during Childhood	2.45 (0.72)	2.43 (0.65)	0.895
K-SF-42 Current Emotional Support from Family	2.31 (0.73)	2.09 (0.85)	0.112
K-SF-42 Current Emotional Support from Friends	2.30 (0.75)	2.14 (0.85)	0.264
CTQ Total	7.34 (2.94)	7.08 (2.84)	0.63
CTQ Physical Abuse	6.49 (2.97)	6.88 (3.06)	0.473
CTQ Emotional Abuse	9.38 (4.61)	8.38 (4.14)	0.217
CTQ Sexual Abuse	6.14 (3.14)	6.00 (2.91)	0.803
CECA Total	16.04 (5.18)	17.08 (4.99)	0.262
CECA Mother Antipathy	18.01 (6.10)	19.05 (5.27)	0.332
CECA Mother Neglect	11.92 (5.63)	13.75 (6.52)	0.083
CECA Father Antipathy	18.36 (6.88)	18.75 (5.15)	0.743
CECA Father Neglect	15.85 (7.49)	16.75 (7.40)	0.502

^ap-values are based on two-sample t-tests between males and females.

In a Bayes factor analysis assessing models with age, sex, and K-SF-42 scores as possible predictors of LEAS total scores, the most evidence was found for a model including sex and K-

SF-42 subscale scores for reflective cognition and support from parents (Bayes factor [BF] = 605 relative to an intercept-only model; extremely strong evidence). The 2nd-best model also included the K-SF-42 subscale for comfort in emotionally close relationships as an additional predictor (BF = 393 relative to an intercept-only model). Post-hoc Pearson correlation analyses showed the expected positive relationship between LEAS total scores and the K-SF-42 subscale scores in the winning model (reflective cognition: $r = .21, p = .005$; support from parents: $r = .21, p = .005$), and a post-hoc two-sample t-test confirmed the expected sex effect with females having higher LEAS total scores than males ($t(77) = 3.50, p < .001$). K-SF-42 total scores were marginally associated with LEAS total scores ($r = .14, p = .06$).

To better understand the nature of the observed relationships between EA and LHS, we then performed post-hoc correlation analyses between K-SF-42 scales and LEAS scores, while also analyzing EA for self and others separately. **Figure 1** shows correlation matrices indicating these relationships, both including all participants and separated by sex. **Figure 2** shows scatterplots of some of the notable relationships between the LEAS and K-SF-42 measures. As can be seen in these figures, LEAS scores showed significant (but fairly weak) positive relationships with reflective cognition and the presence of emotionally supportive parents during childhood. The pattern was broadly similar in males and females, although no relationships were statistically significant in males due to the smaller sample size. Several relationships also appeared somewhat stronger (numerically, but not significantly) in females.

All Subjects

Females

Males

<

Figure 1. Pearson correlations between LEAS (total, self, and other) scores and the total and seven subscales of the K-SF-42. The top panel shows correlations across the whole sample, while the middle and lower panels show relationships in females and males separately. For reference, red asterisks indicate $p < .05$ (uncorrected). Note that these were post-hoc analyses to guide interpretation of the initial hypothesized finding that LEAS total scores and K-SF-42 scores would be positively related. Also note that, despite having similar magnitude, no correlations were significant in males due to the smaller sample size ($N = 40$, compared to $N = 137$ for females).

Figure 2. (Left) Scatterplots illustrating the relationship between LEAS total scores and K-SF-42 scores corresponding to 1) the tendency to engage in reflective cognition (“insight, planning, and control”), and 2) how emotionally supportive one’s parents were during childhood. (Right) Scatterplots illustrating the relationship between LEAS total scores and early adversity scores reflecting overall childhood trauma (CTQ) and experiences of neglect from one’s mother during childhood (CECA).

Early Adversity and Life History Strategy

Before assessing joint relationships between early adversity, LHS, and EA, here we first confirm the expected relationships between early adversity, as measured by the CTQ and CECA scales, and the K-SF-42 scales that were associated with LEAS total scores above. We focus specifically on the K-SF-42 reflective cognition scale, as it is more central to the hypothesis that EA is facilitated by an LHS-related calibration of general reflective tendencies (note also that the

K-SF-42 parental support items have much stronger direct content overlap with the CTQ and CECA items and would therefore be expected to correlate based on this alone).

In a Bayes factor analysis assessing age, sex, and CTQ scores (and interactions between sex and CTQ scores) as possible predictors of K-SF-42 cognitive reflection scores, the most evidence was found for a model including CTQ sexual abuse scores ($BF = 3.6e+4$ relative to an intercept-only model; extremely strong evidence). The 2nd-best model also included age as an additional predictor ($BF = 1.4e+4$ relative to an intercept-only model). A post-hoc Pearson correlation analysis showed the expected negative relationship between CTQ sexual abuse scores and K-SF-42 cognitive reflectiveness scores (i.e., greater sexual abuse was associated with less cognitive reflectiveness; $r = -.37, p < .001$). To more fully understand the relationship between CTQ scores and K-SF-42 scores, and to facilitate hypothesis generation for future studies, we subsequently conducted post-hoc correlations between the other K-SF-42 and CTQ scales (shown in **Figure 3**). This revealed the broader pattern of expected relationships between these measures.

Figure 3. Pearson correlations between early adversity (CTQ and CECA) scores and the total and seven subscales of the K-SF-42. For reference, correlation thresholds for uncorrected p -value thresholds are shown in the upper right corner.

In a Bayes factor analysis assessing age, sex, and CECA scores (and interactions between sex and CECA scores) as possible predictors of K-SF-42 cognitive reflection scores, the most evidence was found for a model including age, and CECA scales for father antipathy and neglect from both mother and father ($BF = 224$ relative to an intercept-only model; extremely strong evidence). The 2nd-best model removed age from the winning model ($BF = 131$ relative to an intercept-only model). Post-hoc Pearson correlation analysis showed the expected negative relationship between K-SF-42 cognitive reflectiveness scores and both father antipathy and mother neglect scores (i.e., higher scores were associated with less cognitive reflectiveness; $r = -.18$ and $-.25$, $p = .02$ and $p < .001$, respectively). The zero-order correlation with father neglect was non-significant ($r = -.05$). Further inspection within linear regression analyses unexpectedly revealed a significant positive relationship between father neglect and cognitive reflectiveness after accounting for father antipathy and mother neglect ($t(173) = 2.8$, $p = .006$). As with the CTQ, to more fully understand the relationship between CECA scores and K-SF-42 scores, and to facilitate hypothesis generation for future studies, we subsequently conducted post-hoc correlations between the other K-SF-42 and CECA scales (shown in **Figure 3**). This further confirmed the broader pattern of expected relationships. Analogous correlation matrices separated by sex for CTQ and CECA scores are shown in **Supplementary Materials**. These suggested broadly similar patterns in males and females; however, males showed significant correlations between early adversity and religiosity not present in females and also showed a general pattern of weaker correlations between K-SF-42 scores and CTQ scores.

Early Adversity, Life History Strategy, and Emotional Awareness

Having confirmed that early adversity is related to the LHS domains associated with EA, we now assess whether early adversity also predicts EA. We then perform further mediation analyses to examine the plausibility of a model in which early adversity ‘calibrates’ LHS, which in turn influences the development of EA. That is, we assess the degree to which our measures of early adversity and LHS have shared or unique explanatory variance with respect to differences in EA.

In a Bayes factor analysis assessing age, sex, and CTQ scores (and interactions between sex and CTQ scores) as possible predictors of LEAS total scores, the most evidence was found for a model including sex and CTQ physical abuse scores ($BF = 3.5e+4$ relative to an intercept-only model; extremely strong evidence). The 2nd-best model further included CTQ sexual abuse scores ($BF = 1.5e+4$ relative to an intercept-only model). Both physical and sexual abuse subscales and CTQ total scores showed significant negative correlations with LEAS total scores (for subsequent post-hoc correlational results, see **Figure 4**; also see scatterplot in **Figure 2**).

		<u>Early Adversity</u>							
		CTQ Total	CTQ Physical Abuse	CTQ Emotional Abuse	CTQ Sexual Abuse	CECA Total	CECA Mother Antipathy	CECA Mother Neglect	CECA Father Antipathy
All Subjects	LEAS Total	-0.26 *	-0.33 *	-0.08	-0.29 *	-0.1	-0.07	-0.21 *	-0.02
	LEAS Self	-0.27 *	-0.29 *	-0.14	-0.26 *	-0.18	-0.1	-0.25 *	-0.12
	LEAS Other	-0.18 *	-0.29 *	0.02	-0.26 *	-0.07	-0.03	-0.16 *	-0.04
Females	LEAS Total	-0.3 *	-0.34 *	-0.13	-0.32 *	-0.09	-0.09	-0.18 *	-0.03
	LEAS Self	-0.31 *	-0.31 *	-0.21 *	-0.26 *	-0.19 *	-0.14	-0.23 *	-0.14
	LEAS Other	-0.24 *	-0.32 *	-0.04	-0.31 *	-0.08	-0.06	-0.12	-0.03
Males	LEAS Total	-0.17	-0.31	0.04	-0.23	-0.04	0.13	-0.25	0.1
	LEAS Self	-0.23	-0.22	-0.06	-0.35 *	-0.08	0.17	-0.22	-0.02
	LEAS Other	-0.06	-0.21	0.16	-0.18	0.01	0.14	-0.19	0.1

Figure 4. Pearson correlations between LEAS (total, self, and other) scores and early adversity (CTQ and CECA) scores. The top panel shows correlations across the whole sample, while the middle and lower panels show relationships in females and males separately. For reference, red asterisks indicate $p < .05$ (uncorrected). Note that these were post-hoc analyses to guide interpretation of the initial hypothesized finding that LEAS total scores and early adversity scores would be negatively related. Also note that, despite having similar magnitude, most

correlations were not significant in males due to the smaller sample.

In a Bayes factor analysis assessing age, sex, and CECA scores as possible predictors of LEAS total scores, the most evidence was found for a model including sex and CECA mother neglect scores ($BF = 50$ relative to an intercept-only model; extremely strong evidence). The 2nd-best model further included age ($BF = 39$ relative to an intercept-only model). Only the mother neglect scale showed a significant negative correlation with LEAS total scores (for post-hoc correlations, see **Figure 4**; also see scatterplot in **Figure 2**).

Because multiple CTQ subscales and CTQ total scales were significantly related to LEAS total scores, we here chose to examine whether the effect of CTQ total scores on LEAS total scores was fully or partially mediated by K-SF-42 reflective cognition scores. As shown in **Figure 5**, the regression coefficients between CTQ total scores and LEAS total scores ($-.35, p < .001$), between CTQ total scores and K-SF-42 reflective cognition scores ($-.12, p < .001$), and between K-SF-42 reflective cognition scores and LEAS total scores ($.83, p = .005$) were significant. The indirect effect was $(-.12) * (.83) = -.1$. We tested the significance of this indirect effect using bootstrapping procedures. Unstandardized indirect effects were computed for each of 1,000 bootstrapped samples, and the 95% confidence interval was computed by determining the indirect effects at the 2.5th and 97.5th percentiles. The bootstrapped unstandardized indirect effect was $-.065$, and the 95% confidence interval ranged from $-.15$ to 0.00 ($p = .05$). As the direct effect of CTQ total scores on LEAS total scores remained significant ($-.29, p < .001$), this

indicated a marginal partial mediation.

Figure 5. Illustration of mediation analyses illustrating that early adversity and current tendencies toward reflective cognition share explanatory variance in accounting for individual differences in emotional awareness (LEAS total scores).

Because only CECA mother neglect scores were significantly related to LEAS total scores, we here chose to examine whether the effect of CECA mother neglect scores on LEAS total scores was fully or partially mediated by K-SF-42 reflective cognition scores. The regression coefficients between CECA mother neglect scores and LEAS total scores ($-.14, p = .005$), and between CECA mother neglect scores and K-SF-42 reflective cognition scores ($-.04, p < .001$) were significant. The indirect effect was $(-.04) \times (.83) = -.03$. The bootstrapped unstandardized indirect effect was $-.03$, and the 95% confidence interval ranged from $-.06$ to 0.00 .

($p = .03$). As the direct effect of CECA mother neglect scores on LEAS total scores remained significant ($-.12, p = .01$), this indicated a partial mediation.

Discussion

Based on a recent theoretical model (Smith et al., 2020), in this paper we tested the prediction that lower EA was associated with faster LHS, and particularly with reduced application of general reflective cognitive processes and more harsh and unpredictable parenting. In support of this prediction, Bayesian analyses supported models that included both sex, LHS, and early adversity as predictors of EA. Further inspection of these hypothesized relationships based on sex, EA for self vs. others, and different components of LHS revealed a number of specific insights. First the positive relationship between EA and LHS was driven primarily by 1) the general tendency to engage in (i.e., allocate metabolic resources to) effortful/reflective cognition (insight, planning, control), and 2) the presence of emotionally supportive parents during development.

The relationship with general reflective cognition supports our previous proposal (Smith et al., 2020) that EA depends on the application of domain-general cognitive capacities (e.g., attention, working memory, concept learning) to emotion-related (e.g., interoceptive) information. The relationship with emotionally supportive parents is also consistent with previous theoretical work (Smith et al., 2018) emphasizing the way that early interactions with parents is a primary means by which children learn to understand their own emotions and those of others. This interpretation was further bolstered by mediation analyses that revealed significant relationships between

childhood abuse/neglect, LHS, and EA, and suggested that LHS (and particularly reflective cognition) may partially mediate the relationship between early adversity and EA. While our early adversity measures ask retrospectively about childhood experiences, it is important to highlight that the cross-sectional nature of our data still precludes drawing strong causal conclusions from these results. However, they are consistent with a model in which early adversity “calibrates” LHS, which in turn influences the development of EA.

Put together, these findings therefore support the idea that acquiring high EA – which involves emotion concept learning that can occur (or fail to occur) both early and later in life (Burger et al., 2016; Colvert et al., 2008; Montag et al., 2014; Neumann et al., 2017; Radice-Neumann et al., 2009; Smith et al., 2019; Thakur et al., 2017) – depends on both 1) developing general tendencies to engage goal-directed cognitive capacities based on the general predictability of early childhood environments, and 2) the availability of emotional signals to learn from via interactions with emotionally supportive caretakers. However, while significant, the observed relationships between LEAS and K-SF-42 scores were weaker than expected. Here it may be important to consider that this was a college student sample, where individuals with the fastest life history strategies are less likely to be present (i.e., choosing to go to college is itself a “slow” LHS behavior). College samples are also less likely to adequately represent populations of individuals who grew up in the dangerous, low socio-economic status environments associated with the fastest end of the LHS spectrum. It is therefore possible that stronger relationships between EA, LHS, and early adversity would be observed in a community sample of individuals with a broader range of socioeconomic backgrounds and who showed K-SF-42 scores and early

adversity scores in the faster and more severe ranges (respectively) that were underrepresented in our sample.

In summary, this was the first study to test a theoretically motivated prediction regarding the relationship between emotional awareness and life history strategy – that is, the more general cognitive calibration to levels of social predictability and safety in early childhood environments. Our findings support this relationship and offer insights into the origins of EA and its relationship to other cognitive and developmental processes. This was also the first study to demonstrate the expected relationship between emotional awareness and parental abuse/neglect, and to confirm their joint relationship with life history strategy. The evolutionary psychological basis of the confirmed predictions also emphasizes the possibility that low EA may in fact be adaptive in some early childhood environments with less stable/predictable socio-affective response patterns. Future longitudinal research, which uses multiple methods for assessing LHS, will be necessary to further delineate the relationship between emotional awareness, life history strategy, and associated experiences of early adversity observed in this study.

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Supplementary materials:

**Lower emotional awareness is associated with greater early
adversity and faster life history strategy**

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$r < -.17, p < .05$
 $r < -.29, p < .001$

K-SF-42

Females Only

	Total	Reflective Cognition	General Supportiveness	Religiosity	Emotionally Close Relationships	Emotionally Supportive Parents	Supportive Family	Supportive Friends
CTQ Total	-0.43	-0.4	0.03	0	-0.17	-0.5	-0.46	-0.32
CTQ Physical Abuse	-0.27	-0.38	0.01	0.1	-0.07	-0.41	-0.3	-0.21
CTQ Emotional Abuse	-0.42	-0.24	0.04	-0.04	-0.25	-0.46	-0.51	-0.24
CTQ Sexual Abuse	-0.34	-0.41	0.02	-0.03	-0.05	-0.35	-0.25	-0.34
CECA Total	-0.37	-0.23	0.11	0.07	-0.23	-0.63	-0.49	-0.23
CECA Mother Antipathy	-0.32	-0.18	0.07	0.04	-0.18	-0.47	-0.45	-0.23
CECA Mother Neglect	-0.38	-0.32	0.01	-0.09	-0.08	-0.47	-0.37	-0.21
CECA Father Antipathy	-0.28	-0.18	0.1	0.07	-0.24	-0.45	-0.36	-0.15
CECA Father Neglect	-0.21	-0.07	0.14	0.16	-0.2	-0.6	-0.39	-0.15

Figure S1. Pearson correlations in females only between early adversity (CTQ and CECA) scores and the total and seven subscales of the K-SF-42. For reference, correlation thresholds for uncorrected p -value thresholds are shown in the upper right corner.

$r < -.32, p < .05$
 $r < -.50, p < .001$

K-SF-42

Males Only

	Total	Reflective Cognition	General Supportiveness	Religiosity	Emotionally Close Relationships	Emotionally Supportive Parents	Supportive Family	Supportive Friends
CTQ Total	-0.17	-0.1	0.11	0.08	-0.19	-0.54	-0.16	-0.23
CTQ Physical Abuse	-0.11	-0.06	0.07	0.04	-0.12	-0.4	-0.03	-0.19
CTQ Emotional Abuse	-0.26	0.01	0.08	-0.07	-0.24	-0.5	-0.35	-0.28
CTQ Sexual Abuse	0.01	-0.24	0.14	0.28	-0.09	-0.46	0.07	-0.07
CECA Total	-0.5	-0.07	-0.06	-0.39	-0.13	-0.66	-0.53	-0.39
CECA Mother Antipathy	-0.45	-0.09	-0.15	-0.33	-0.15	-0.37	-0.49	-0.32
CECA Mother Neglect	-0.48	-0.05	-0.11	-0.35	0.02	-0.78	-0.54	-0.43
CECA Father Antipathy	-0.42	-0.16	0.02	-0.4	-0.28	-0.19	-0.36	-0.29
CECA Father Neglect	-0.32	0.02	0.02	-0.24	-0.06	-0.7	-0.36	-0.26

Figure S2. Pearson correlations in males only between early adversity (CTQ and CECA) scores and the total and seven subscales of the K-SF-42. For reference, correlation thresholds for uncorrected p -value thresholds are shown in the upper right corner.