



An investigation into the relationship between the reported experience of negative life events, trait stress-sensitivity and false confessions among further education students in Iceland [☆]



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ABSTRACT

This study investigates the interplay between the reported experiences of negative life events, reported levels of nerves, fear and tension experienced over the past 30 days, and reported false confessions. Data were obtained from 11,388 students in further education in Iceland, out of which 5439 participants were male and 5837 were female. Single level, random intercept, structural equation models were fitted showing that latent stress-sensitivity, indicated by levels of nerves, tension, fear, and the number of negative life events experienced exerted a significant direct effect on the likelihood of false confessions. Stress-sensitive interviewees (those reporting high levels of nerves, fear, tension and negative events) may be more susceptible to environmental influences, due to heightened physiological responsiveness towards and a negative perception of situations and social encounters, with false confessions being a direct consequence of this. A suggestion from the findings is that the type of false confession (the reason for it) may possibly dependent upon which contextual trigger has influenced the interviewee the most – those within the police interview itself and/or pressures from the wider environment within which they reside.

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1. Introduction

Research into the factors that might increase the risk of false confessions is important, as it further increases our understanding of why false confessions occur, and facilitates the revision and improvement of both police interrogation methods as well as procedures aimed at identifying vulnerable interviewees (Gudjonsson & Pearce, 2011; Kassin et al., 2010; Young, Goodwin, Sedgwick, & Gudjonsson, 2013). In spite of the implementation of the PEACE model in England and Wales, which is thought to produce fewer false confessions than the Reid Model commonly used in the USA (Gudjonsson & Pearce, 2011; Kassin et al., 2010), there remains a general failure to identify psychological vulnerabilities within detainees (Young et al., 2013).

Some cross sectional studies have documented significant associations between the reporting of certain negative life events

and the emergence of false confessions during police questioning (e.g. Gudjonsson, Sigurdsson, & Sigfusdottir, 2009; Gudjonsson, Sigurdsson, Sigfusdottir, & Asgeirsdottir, 2008; Gudjonsson, Sigurdsson, Sigfusdottir, & Young, 2012). In these studies, the *negative life events* measure is a composite variable, encompassing items measuring whether or not a person has been a victim of bullying, witnessed family conflict, physical abuse, parental divorce, and/or suffered a serious illness themselves or within their family. Higher scores on the negative life event scale may increase the likelihood that people are not able to cope effectively with stressful situations, such as police questioning, which [thus] may lead to an increased risk of internalisation of any interviewer coercion (such that the suspect becomes convinced that they did in fact perpetrate the offence) or compliance (the suspect going along with the interviewer, confessing due to a desire to get out of custody).

Other research within the child development and applied forensic field, has triggered a need to re-investigate the direct association between the experience of negative life events and false confessions (Belsky & Pluess, 2009; Drake, 2014; Gudjonsson, Sigurdsson, Asgeirsdottir, & Sigfusdottir, 2006; Gudjonsson et al., 2012; McGroarty & Thompson, 2013): (i) Belsky and Pluess

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(2009) review a whole body of child development research implicating latent trait stress-sensitivity (observed via a variety of phenotypes, such as anxiety, nervousness, fearfulness and/or negative emotionality/temperament) in heightening child- susceptibility to their environmental influences (with increased adverse consequences for mental health if those influences are negative); (ii) Gudjonsson et al. (2006) noticed that the false confessors within their sample of secondary school children displayed higher levels of emotional disturbance and anxiety compared with the other participants; (iii) Gudjonsson et al. (2012) also argue that, although the experience of negative events is a significant contributing factor to false confessions in ADHD sufferers, what weakens their resilience to pressure is their condition [ADHD], which is associated with susceptibility factors key in the pathogenesis of anxiety and negative emotionality (Gizer, Ficks, & Waldman, 2009); (iv) When it comes to susceptibility to suggestions and pressure, associated with internalised and compliant false confessions, McGroarty and Thompson (2013) found that the experience of negative life events was not significantly correlated with interrogative suggestibility (including susceptibility to pressure), but found instead that negative emotional states (associated with neuroticism) was; and (v) Drake (2014) also found that the direct effect of the reported experience of negative life events on susceptibility to misinformation was only statistically significant at high levels of participant trait anxiety.

It could well be the case that latent stress-sensitivity levels moderate the effect of the reported experience of negative life events on the likelihood of false confessions. High trait stress-sensitivity levels may increase susceptibility to coercion and/or social pressure (not just during police questioning, but within the wider environment in which individuals reside), increasing the likelihood of false confessions as a result of threats from others, covering for someone else, the desire to avoid and escape the perceived stressfulness of the police interview (compliant false confessions), and, when it comes to internalised false confessions, a greater likelihood of misinformation acceptance (Gudjonsson, Sigurdsson, Sigurdardottir, Steinthorsson, & Sigurdardottir, 2014).

On the other hand, the processing of experiences has been shown to depend on two correlated, yet independent, systems: (i) a biological system, responsible for governing the degree of physiological arousal in response to situations/events (manifest in individual differences in tension, nervousness, fearfulness experienced); and (ii) a cognitive-interpretive component, affecting the extent to which situations/events are interpreted as positive or negative. Negative life event scores, to an extent, may reflect this cognitive-interpretive aspect of the processing of situations. In order to rate an event as negative, there first has to be a negative interpretation of that event (see Hervé, Cooper, & Yuille, 2013 for a review of the literature). It could instead be the case that the reporting of negative life events and scores on the levels of nerves, fearfulness and tension reportedly experienced indicate a common latent (stress-sensitivity) factor, which exerts a direct effect on the likelihood of false confessions emerging (see Gudjonsson et al., 2012, 2014). The reporting of negative life events tends to correlate significantly with trait anxiety and other facets of stress-sensitivity (Drake, 2014).

The aim of this study is to investigate the interplay between: (a) the reported experience of negative life events; (b) the levels of fearfulness, nerves, and tension reportedly experienced; and (c) reported false confessions. Two models will be tested and compared: In model 1: Latent stress sensitivity, indicated by the reporting of negative life events, nerves, fearfulness and tension scores, will exert a significant, positive, direct effect on the likelihood of false confessions emerging. The higher the stress-sensitivity scores, the more likely a false confession will be reported. In model 2: The significant, positive, direct effect of the reported

experience of negative life events on the likelihood of a false confession being reported is moderated by latent stress-sensitivity levels, indicated by scores on nerves, fearfulness and tension experienced. The direct effect of the reported negative life events on false confessions will only be significant at high levels of latent stress-sensitivity.

2. Method

2.1. Participants

The total sample consisted of 11,388 students in further education in Iceland, out of which 5439 participants were male and 5837 were female ($N = 112$ did not indicate their gender). Age-wise: $N = 3095$ (28%) 16 years old or younger, $N = 2590$ (23%) 17 years old, $N = 2238$ (20%) were 18 years old, $N = 1749$ (16%) were 19 years old, and $N = 1306$ (12%) were 20 years old or older. $N = 410$ did not indicate their age.

The data used in the study come from a *National Youth in Iceland* programme of surveys that have been conducted, in Iceland, by the Icelandic Centre for Social Research and Analysis for the past 17 years. All students attending junior colleges on the day of the survey were invited to take part in the survey. The participants have 80 min (two school lessons) to complete the questionnaires and seal them in blank envelopes. The data collection is conducted in accordance with the Privacy and Data Protection Authority in Iceland, including anonymity and participants' informed consent by and under the direction of the Icelandic Centre for Social Research and Analysis. Participation is voluntary and students were not paid.

2.2. Measures

2.2.1. False confessions (see Gudjonsson et al., 2008, 2012)

False confessions data were obtained through participants being asked if they have ever been interrogated by the police at a police station, and how they reacted to being questioned, including whether or not they had ever made either a confession or false confession. Participants were first asked: 'How often have you been interrogated at a police station as a suspect in a criminal offence?' (Only tick one column in each category): 'Never', 'Once', 'Twice', '3–5 times', '6 or more times'. Following this, they were asked: "Did you commit the offence?" (To which participants answered either 'Yes' or 'No'). Participants were then asked: 'Have you ever confessed during police interrogation to a criminal offence that you did not commit (i.e., you had nothing to do with the offence and are completely innocent)?' The reply was rated on the five-point scale: 'Never', 'Once', 'Twice', '3–5 times', '6 or more times'. Participants who indicated that they had falsely confessed were also asked to categorise the reasons for the false confession, by being asked: "What was the reason for you confessing to something you did not do?"; participants had to select from the following reasons: to cover up for somebody else, due to being threatened, due to police pressure, [they] wanted to get away from the police, [they were experiencing] alcohol/drug withdrawal, [they were] taking revenge on the police, cannot remember the reason, and other.

2.2.2. Negative Life Events scale (Gudjonsson et al., 2012)

Participants answered yes/no in response to whether or not they had experienced the following 12 negative life events: You have experienced a serious accident, you have suffered serious illness, your parents are divorced or separated, you have had serious arguments with your parents, you have witnessed a serious argument between your parents, you have witnessed physical abuse

at home involving an adult, you have experienced physical abuse at home involving an adult, your parent or sibling has died, your friend has died, you have been rejected by friends or boyfriend/girlfriend, you have been expelled from school, and you have experienced sexual abuse. Scores ranged between 0 and 12. The internal reliability of the scale (α) is .79.

2.2.3. Nerves, fearfulness and tension scores

Nerves, fearfulness and tension scores were derived from three items chosen from the Symptom Check List-90 (Derogatis, Lipman, Covi, & Rickels, 1971). Participants were asked how often, in the past 30 days, have you been feeling: (i) nervous/anxious; (ii) scared for no reason; and (iii) tense? The items were rated on a four-point frequency scale ('never', 'seldom', 'sometimes' and 'often') to indicate severity of symptoms.

2.3. Analytical strategy

Two single-level random intercept structural equation models (SEMs) were fitted using MPlus software, which is a latent variable modelling programme (Muthén & Muthén, 1998–2012). The maximum likelihood with robust standard errors (MLR) estimate, in conjunction with numerical monte-carlo integration (using 500 integration points), was used to calculate parameter estimates and model fit indices (Lei & Wu, 2007; Muthén & Muthén, 1998–2012). MLR is robust to any non-normality and non-independence of observations. This parameter estimation method is recommended with general, random intercept models, with at least one binary or ordered categorical dependent variable (Muthén & Muthén, 1998–2012). In this study, the false confessions dependent variable is binary. Age and gender are categorical and binary (respectively) independent variables.

In SEM1, the direct effect of (latent) stress levels experienced on the likelihood of a reporting false confession was estimated, controlling for gender and age. In SEM2, the direct effects of both: (i) latent stress-sensitivity and (ii) reported negative life events on false confessions were estimated first, controlling for age and gender. The latent stress-sensitivity \times NLE interaction term was included in the model thereafter. Continuous observed variables (NLE, nerves, tension and fearfulness) were first zero-mean centred, prior to the creation of the latent construct included in both SEMs as well as the interaction term in SEM2 (Preacher, Curran, & Bauer, 2006). Within both SEMs, the factor loading of the indicator, nerves, onto the latent construct was fixed to 1, such that the latent construct acquired the scale of 1 to 4: 1 = nearly never; 2 = rarely-seldom; 3 = sometimes; and 4 = often.

Prior to fitting the SEMs, confirmatory factor analysis (CFA) was used to evaluate the quality of the hypothesised measurement models MM1 and MM2 (the latent constructs predicted in the hypotheses), before they were subsumed within the broader SEMs (Lei & Wu, 2007). The hypothesised measurement models (in SEM1 and 2) were also compared with two further nested alternatives, MM3 and MM4, using absolute model fit indices and chi-square difference tests; in MM3 and MM4, the *fear* and *tense* loading (respectively) onto the latent construct was constrained to zero. When the *nerves*-loading was constrained to zero (MM5 – not included in Table 2), the measurement model failed to converge.

2.3.1. Model fit

The quality of the latent stress construct, derived from CFA, was assessed using indices of absolute model fit (i.e. the Comparative Fit Index [CFI], the Tucker–Lewis Index [TLI], and the Root Mean Square Error of Approximation [RMSEA]). CFI of values of .90 or above and RMSEA values of .08 or lower are considered to indicate an acceptable model fit (Bentler, 1990). An RMSEA of less than .05 is considered a close fit, from .05 to .08 is acceptable, and .08 to .10

is regarded as a fairly average (Lei & Wu, 2007). The TLI values close to 1.00 indicate that the statistical model is close fitting to the data.

Though absolute fit indices were generated from the CFA, these were not available when the latent construct was subsequently nested within the SEMs. There are two reasons for this lack of availability: (1) Mplus does not generate these when categorical measures are included within the models and (2) these are not generated when latent interaction terms are included within a model (i.e. model 2). As a result, the broader SEMs were compared using the Akaike Information Criterion along with the Bayesian Information Criterion, with lower values being preferable (Bentler, 1990).

3. Results

The results will be presented in three sections: (a) the descriptive statistics; (b) results from the confirmatory factor analysis of the latent stress construct; and (c) the SEM estimates and model fit indices.

3.1. Descriptive statistics

Out of the 11,388 participants, 2104 (19.6%) reported having been interrogated by police, with 64.7% out of the 2104 claiming they committed the offence. 320 participants (244 [4.5%] males and 73 [1.3%] females) reported making false confessions. The main reasons given for the false confessions were: covering up for another person (29%), police pressure (17%), threats (12%), wanting to get out of custody (12%), substance use withdrawal (3%), taking revenge (3%), could not recall the reason (12%), and other – unspecified (12%).

Table 1 reports the means and standard-deviations along with correlation coefficients across the measures. Scores on nerves, tense and fear dimensions correlate strongly with each other ($r > .5$; $p < .001$). The reporting of negative life events also correlates moderately with nerves, tense and fear ($p < .001$), such that the greater the scores on NLEs experienced, the higher the levels of nerves, tension and fear reported. The reporting of negative life events correlates moderately with reporting false confessions ($p < .001$), such that the higher the scores on NLEs reported, the greater the likelihood of false confessions being reported. Fear and tense scores correlate weakly with reporting false confessions, though the associations are statistically significant ($p < .001$). Nerves and false confessions scores are not significantly correlated.

3.2. Confirmatory factor analysis

Table 2 shows the CFA estimates and model fit indices.

Results show that measurement model 1 (MM1) fits closely to the data ($\chi^2_{[2]} = 47.492$; $p < .001$; RMSEA = .045; CFI = .995; TLI = .986). The higher the scores on reported nerves, fear, tenseness and negative life events experienced the higher participants' underlying stress-sensitivity tendencies. Indicators: nerves, fear and tension load strongly onto the latent factor ($\beta > .7$). The NLE loading is weaker, but statistically significant. MM1 provides a significantly better fit to the data than MM2, where latent stress-sensitivity was predicted to be indicated solely by scores of nerves, fear and tension experienced ($\Delta\chi^2_{[1]} = 828.124$; $p < .001$) as well as MM3 ($\Delta\chi^2_{[1]} = 5083.201$; $p < .001$) and MM4 ($\Delta\chi^2_{[1]} = 4789.471$; $p < .001$).

3.3. Structural equation models (see Fig. 1)

Table 3 shows the logistic regression odds ratios, unstandardized estimates of the predictors onto the likelihood of reporting

Table 1
Descriptive statistics.

	FC	Gender	NLE	Nerves	Tense	Fear	Age
FC	–	–.341*	.223*	.023	.115*	.155*	–.065
Gender		–	.028	.345*	.226*	.247*	–.028
NLE			4.815 (2.194)	.202*	.223*	.247*	.051
Nerves				1.054 (1.027)	.536*	.548*	.022
Tense					.929 (.964)	.499*	.023
Fear						.660 (.812)	–.011
Age							1.837 (1.355)
Mean (S.E.)	–	–	2.012 (.029)	1.944 (.012)	1.879 (.012)	1.420 (.017)	–

Note. *N* = 11,388. Means and standard errors (S.E.) of the means are shown for continuous variables. Correlation coefficients appear above the diagonal. Variances are shown on the diagonal, with standard deviations in parentheses. False confessions (FC) and gender are binary variables.

* *p* < .001.

Table 2
Measurement model estimates and fit indices.

	Loadings	χ^2	df	CFI	TLI	RMSEA
MM1: SS						
Nerves	0.756* (.007)					
Fear	0.723* (.007)	47.492	2	0.995	0.986	0.045
Tense	0.702* (.007)					
NLE	0.306* (.010)					
MM2: SS						
Nerves	.767* (.007)					
Fear	.714* (.007)	875.616	3	0.909	0.817	0.160
Tense	.699* (.007)					
NLE	–					
MM3: SS						
Nerves	0.697* (.016)					
Fear	–	5130.693	3	0.463	0.073	0.387
Tense	0.770* (.017)					
NLE	0.290* (.011)					
MM4: SS						
Nerves	0.671* (.014)					
Fear	0.817* (.017)	4836.963	3	0.494	0.012	0.376
Tense	–					
NLE	0.302* (.011)					

Note: Loadings = standardized loadings with standard errors in parentheses. CFI = Comparative Fit Index. TLI = Tucker–Lewis Index. RMSEA = Root Mean Square Error of Approximation.

* *p* < .001.

false confessions, as well as model fit indices: SEM1 is a relatively better fit to the data than SEM2. The quality of the measurement model in SEM1 is also significantly better than the measurement model in SEM2 (see Table 2).

SEM1 shows that the direct effect of the latent stress-sensitivity on the likelihood of reporting a false confession is statistically significant, over-and-above gender and age effects; per unit increase of stress reported (over the past 30 days), the odds of reporting a false confession is 2.315 times more likely. The gender and age effects are also statistically significant; females compared with males are .167 times less likely to report a false confession

Table 3
Structural equation model estimates.

	Odds ratio	Est. (SE)	AIC	BIC
FC (SEM1)				
Gender (Ref: males)	0.168	–1.781*** (.144)	128,130	128,247
Age	0.862	–.149** (.050)		
SS	2.304	.834*** (.085)		
FC (SEM2)				
Gender (Ref: males)	0.227	–1.482*** (.145)	144,218	144,349
Age	0.884	–.123** (.048)		
NLE	1.390	.329*** (.022)		
SS	1.244	.218 (.137)		
Interaction	1.008	.010 (.019)		

Note: Model 1: *N* = 10,946. Model 2: *N* = 10,973. Est. = unstandardized estimates with standard errors in parentheses. AIC = Akaike Information Criterion. BIC = Bayesian Information Criterion. FC = false confession (dichotomous; reference point = no false confession); SS = stress sensitivity; in SEM1 indicated by levels of nerves, fear, tenseness and negative events experienced; in SEM2, SS indicated by levels of nerves, fear and tenseness reported, with the NLE loading fixed to zero (see Table 2 for measurement model estimates and fit indices).

** *p* < .01.

*** *p* < .001.

(*N* = 5513 females reported no false confession, compared with *N* = 4696 males; and *N* = 73 reported a false confession compared with *N* = 244 males). Per unit increase in participants' age-grade, participants are .867 times less likely to report a false confession.

SEM2 shows that, when controlling for gender and age effects, the reported experience of negative life events exerts a statistically significant direct effect on the likelihood of reporting a false confessions (*p* < .001). Per unit increase in reported negative life event scores, reporting a false confession becomes 1.390 times more likely. The direct effect of latent stress-sensitivity levels on the likelihood of false confessions is not statistically significant, nor is the interaction effect (see Table 3). Like in SEM1, gender and age effects are though still statistically significant in this model: females compared with males are .227 times less likely to report a false confession and, per unit increase in age category the

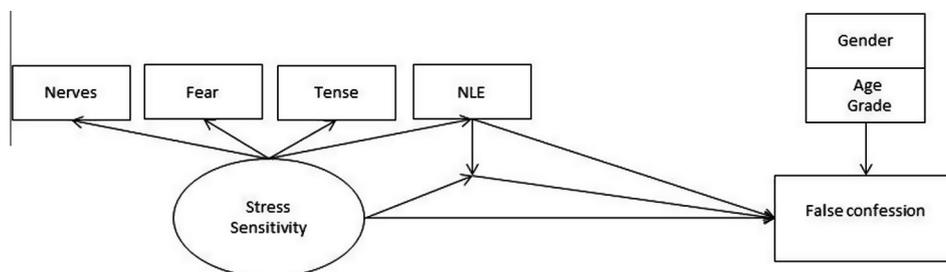


Fig. 1. Parent structural equation model, within which SEM1 and SEM2 are subsumed.

participants belong to, participants are .884 times less likely to report a false confession.

4. Discussion

Results show that SEM1 seems to provide the best fit to the covariance matrix generated by the data: latent stress-sensitivity seems best indicated by scores of nerves, fearfulness and tension experienced over the past 30 days, as well as the number of negative life events experienced. This latent construct may thus reflect: (i) a physiological component, governing levels of nerves, fear and tension experienced within individuals, and (ii) a correlated, cognitive-interpretative component, responsible for the extent to which situations/events are negatively/harmfully perceived (Critchley, 2005; Hervé et al., 2013). SEM1 also shows that latent stress-sensitivity significantly and directly predicts the likelihood of false confessions being reported. Higher tendencies towards stress-sensitivity may encourage both heightened physiological arousal in response to, and a negative interpretation of, contextual factors (i.e. the police interview, but also influences within the suspect’s wider environment; Flouri, Tzavidis, & Kallis, 2010), increasing the likelihood of such suspects making a false confession. By comparison, the hypothesis that stress-sensitivity, indicated only by nerves, fear and tension experienced, may moderate the direct effect of the reported experience of negative life events on false confessions (SEM2) seems a less favourable model. This was somewhat surprising, given that temperamental measures, anxiety, and negative emotionality, for example, have consistently been shown to moderate the effect of exposure to adverse environmental influences on psychopathology (e.g. Bush, Lengua, & Colder, 2010).

The absence of a moderation effect, however, could be for various reasons: experimentally manipulating the adverse nature/pressure of the interview conditions (e.g. see Baxter & Boon, 2000), may have been more helpful, because this would provide a more objective measure of how participants respond under adversity/pressure. A good proportion of the child development studies reviewed in Belsky and Pluess (2009), giving rise to significant moderation effects, have tended to use more objective measures (typically via observation) of, for example, parental rearing factors, such as: maternal sensitivity, parental power-assertion,

and quality of parenting – associated with parent–child attachment. Other studies include measures of contextual risk factors (i.e. neighbourhood effects; Bush et al., 2010; Flouri et al., 2010, amongst many others), but here the neighbourhood effects are measured through recruiting participants across a range of zip/post-codes, rather than using self-report negative life events instruments. A self-reported history of negative life events may not be a sensitive enough environmental-influence measure. It could also be the case that the 12 items comprising the negative life event variable may be differently affecting the likelihood of false confessions. Hence, when the composite variable is used, which combines all of the 12-items, the moderation effect(s) that could have emerged if only a proportion of the items were used may become over-shadowed.

Despite these potential issues though, the large sample size allows a degree of confidence that reported false confessions, made for a range of reasons, appear to be a direct consequence of both the suspect’s physiological response to events and situations (that is, to what extent participants report fear, tension and nervousness in response to police questioning, including the interviewer behaviour towards the interviewee, and/or the wider environment within which they reside), and the extent to which environmental influences are negatively interpreted (Critchley, 2005; Hervé et al., 2013). The motivation behind the false confession may simply depend upon which environmental influence has affected the suspect/detainee the most at the time the confession is made (Flouri et al., 2010; Gudjonsson et al., 2014) (see Fig. 2): when it comes to false confessions due to police pressure, stress-sensitive suspects may have been most susceptible to (and affected by) the intensity of the interview, leading to maladaptive coping mechanisms during questioning (compliant false confessions) and/or the acceptance of misleading/erroneous suggestions (internalised false confessions), when the suspect feels isolated and is exposed to an emotionally intense and persuasive police interview (Belsky & Pluess, 2009; Gudjonsson et al., 2014). When it comes to false confessions arising due to covering up for someone, being or feeling threatened, and taking revenge on someone, the over-riding environmental influencing may instead be the perceived pressure from within the wider environment (i.e. from family members, peers, neighbourhood influences; Flouri et al., 2010) rather than the stress of the police interview.

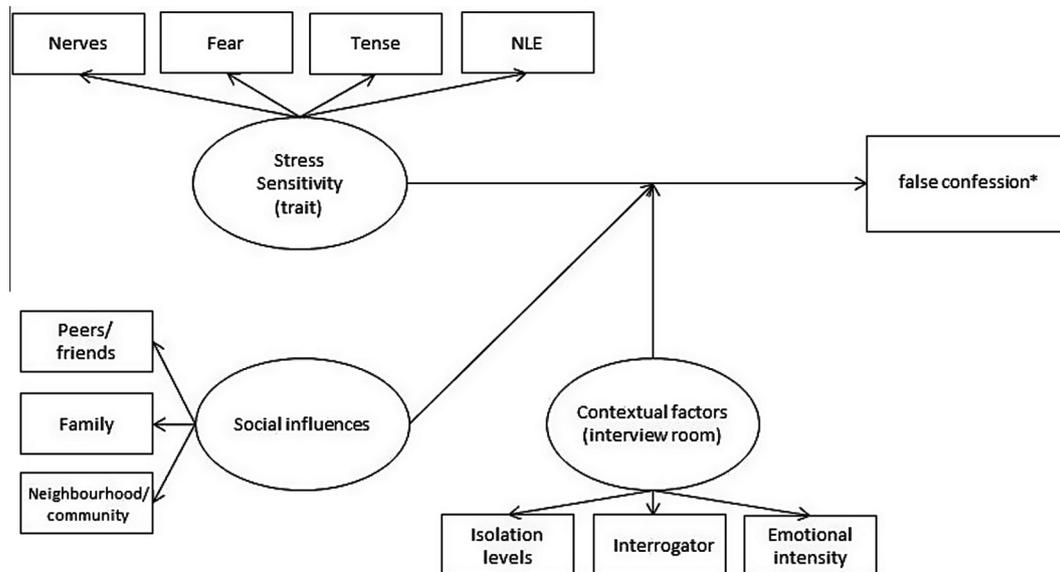


Fig. 2. Model of false confessions. *The type of false confession may depend on which environmental influences, i.e. social influences and/or contextual interview factors, are affecting the suspect most at the time of the police interview.

Research investigating the interplay between trait stress-sensitivity, contextual risk factors and different types of false confessions is therefore important and necessary, as it allows insight into the mechanisms driving the different types of false confessions and the critical predictors thereof. This in turn enables a thorough understanding of how different types of false confessions can best be minimised, or even prevented, in practice. It could be the case that reducing the pressure during police questioning may not reduce the likelihood of all types of false confessions, in that it may minimise the likelihood of internalised and/or compliant false confessions, but not tackle the issue of false confessions occurring due to other reasons such as threats, covering up for someone, and/or taking revenge on someone (the cause of most of the confessions within the current sample). In these cases, influences from within the suspect/detainee's wider environment (i.e. peer group pressure and lack of emotional support) may be more instrumental in encouraging false confessions, such that interventions aimed at communities, parents and care-givers, designed to modify negative influences and improve surroundings, may be more useful.

References

- Baxter, J. S., & Boon, J. C. W. (2000). Interrogative suggestibility: The importance of being earnest. *Personality and Individual Differences*, 28, 753–762. [http://dx.doi.org/10.1016/S0191-8869\(99\)00136-1](http://dx.doi.org/10.1016/S0191-8869(99)00136-1).
- Belsky, J., & Pluess, M. (2009). Beyond diathesis stress: Differential susceptibility to environmental influences. *Psychological Bulletin*, 135, 885–908. <http://dx.doi.org/10.1037/a0017376>.
- Bentler, P. M. (1990). Comparative fit indexes in structural models. *Psychological Bulletin*, 107, 238–246. URL: <<http://www.ncbi.nlm.nih.gov/pubmed/2320703>>.
- Bush, N. R., Lengua, L. J., & Colder, C. R. (2010). Temperament as a moderator of the relation between neighborhood and children's adjustment. *Journal of Applied Developmental Psychology*, 31, 351–361. <http://dx.doi.org/10.1016/j.appdev.2010.06.004>.
- Critchley, H. G. (2005). Neural mechanisms of autonomic, affective, and cognitive integration. *The Journal of Comparative Neurology*, 493, 154–166. <http://dx.doi.org/10.1002/cne.20749>.
- Derogatis, L. R., Lipman, R. S., Covi, L., & Rickels, K. (1971). Neurotic symptoms dimensions: As perceived by psychiatrists and patients of various social classes. *Archives of General Psychiatry*, 24, 454–464. <http://dx.doi.org/10.1001/archpsyc.1971.01750110066011>.
- Drake, K. E. (2014). The role of trait anxiety in the association between the reporting of negative life events and interrogative suggestibility. *Personality and Individual Differences*, 60, 54–59. <http://dx.doi.org/10.1016/j.paid.2013.12.018>.
- Flouri, E., Tzavidis, N., & Kallis, C. (2010). Adverse life events, area socioeconomic disadvantage, and psychopathology and resilience in children: The importance of risk factors' accumulation and protective factors' specificity. *European Child and Adolescent Psychiatry*, 19, 535–546. <http://dx.doi.org/10.1007/s00787-009-0068-x>.
- Gizer, I. R., Ficks, C., & Waldman, I. D. (2009). Candidate gene studies of ADHD: A meta-analytic review. *Human Genetics*, 126, 51–90. <http://dx.doi.org/10.1007/s00439-009-0694-x>.
- Gudjonsson, G. H., & Pearse, J. (2011). Suspect interviews and false confessions. *Current Directions in Psychological Science*, 20, 33–37. <http://dx.doi.org/10.1177/0963721410396824>.
- Gudjonsson, G. H., Sigurdsson, J. F., & Sigfusdottir, I. D. (2009). Interrogations and false confessions among adolescents in seven countries in Europe. What background and psychological factors best discriminate between false confessors and non-false confessors? *Psychology, Crime and Law*, 15, 711–728. <http://dx.doi.org/10.1080/10683160802516257>.
- Gudjonsson, G. H., Sigurdsson, J. F., Asgeirsdottir, B. B., & Sigfusdottir, I. D. (2006). Custodial interrogation, false confession and individual differences. A national study among Icelandic youth. *Personality and Individual Differences*, 41, 49–59. <http://dx.doi.org/10.1016/j.paid.2005.12.012>.
- Gudjonsson, G. H., Sigurdsson, J. F., Sigfusdottir, I. D., & Asgeirsdottir, B. B. (2008). False confessions and individual differences. The importance of victimization among youth. *Personality and Individual Differences*, 45, 801–805. <http://dx.doi.org/10.1016/j.paid.2008.08.010>.
- Gudjonsson, G. H., Sigurdsson, J. F., Sigfusdottir, I. D., & Young, S. (2012). False confessions to police and their relationship with conduct disorder, ADHD, and life adversity. *Personality and Individual Differences*, 52, 696–701. <http://dx.doi.org/10.1016/j.paid.2011.12.025>.
- Gudjonsson, G. H., Sigurdsson, J. F., Sigurdardottir, A. S., Steinthorsson, H., & Sigurdardottir, V. M. (2014). The role of memory distrust in cases of internalised false confessions. *Applied Cognitive Psychology*, 28, 336–348. <http://dx.doi.org/10.1002/acp.3002>.
- Hervé, H., Cooper, B. S., & Yuille, J. C. (2013). Biopsychosocial perspectives on memory variability in eyewitnesses. In B. S. Cooper, D. Griesel, & M. Ternes (Eds.), *Applied issues in investigative interviewing, eyewitness memory, and credibility assessment* (pp. 99–142). New York: Springer.
- Kassin, S. M., Drizin, S. A., Grisso, T., Gudjonsson, G. H., Leo, R. A., & Redlich, A. D. (2010). Police-induced confessions: Risk factors and recommendations. *Law and Human Behavior*, 34, 3–38. <http://dx.doi.org/10.1007/s10979-009-9188-6>.
- Lei, P., & Wu, Q. (2007). Introduction to structural equation modeling: Issues and practical considerations. *Instructional Topics in Educational Measurement*, 33–43.
- McGroarty, A., & Thompson, H. (2013). Negative emotional states, life adversity and interrogative suggestibility. *Legal and Criminological Psychology*, 18, 287–299. <http://dx.doi.org/10.1111/j.2044-8333.2012.02046.x>.
- Muthén, L. K., & Muthén, B. O. (1998). *Mplus User's Guide* (Seventh ed). Los Angeles, CA: Muthén & Muthén.
- Preacher, K. J., Curran, P. J., & Bauer, D. J. (2006). Computational tools for probing interaction effects in multiple linear regression, multilevel modeling, and latent curve analysis. *Journal of Educational and Behavioral Statistics*, 31, 437–448. <http://dx.doi.org/10.3102/10769986031004437>.
- Young, S., Goodwin, E. J., Sedgwick, O., & Gudjonsson, G. H. (2013). The effectiveness of police custody assessments in identifying suspects with intellectual disabilities and attention deficit hyperactivity disorder. *BMC Medicine*, 11, 248. <http://dx.doi.org/10.1186/1741-7015-11-248>.