Emotional Reactions to Regret – A Confirmatory Factor Analysis

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Abstract

Regret is a moral, latent emotion that has been described as both negative and positive in its psychological effects. How the action regret is processed by the individual will differentiate how the regret impacts other emotions and therefore effect behaviour. In this study, 200 participants recalled an action regret, then completed a 34-item emotional reaction to action regret survey concerning the action regret. Content analysis of the recalled action regret revealed three types of regret: connection, moral and function regrets. Secondly, a confirmatory factor analysis of the items, resulted in three factors: shame, self-punishment, and moral judgement. There were no significant differences on the factors between the three types of regret. The results helped to validate the factor structure of a new measure of action regret.

Declaration

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September 2023

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WRITING – REVIEW & EDITING	Critical review, commentary or revision of original draft			X	

Emotional Reactions to Regret - A Confirmatory Factor Analysis

Regret, a complex and deeply human emotion, has fascinated economists, marketers, philosophers, psychologists, and scholars for centuries. Psychologists recognise its existence, but it is not tangible, not uniquely visible, and unable to be measured on its own, therefore a latent construct. For this reason, regret is approximated through other measures that psychologists believe to be part of the construct, for example, shame and guilt. Regret can be a moral emotion that causes self-conscious affect that arises from the recognition of and reflection upon past actions or decisions that one wishes could have been different. Scholars have traditionally seen regret as a negative emotion and something to avoid, because it has the highest cognitive loads of all emotions (Landman, 1993), and its effects can linger. In a survey by Shimanoff (1984), conversations between groups of college students and married couples were collected and analysed for discourse about emotions, and regret was the second most mentioned emotion after love. Regret is the central theme in popular culture and portrayed in films, literature, poems, music (Landman, 1993) and quoted by famous individuals, for example, “I’d rather regret the things that I’ve done than regret the things I have not done” (Lucille Ball, n.d). Regret has the power to evoke a wide range of emotions and its effects can permeate various aspects of an individual's life by the way they react to the regret. It can affect relationships and self-confidence and influence how people behave in social situations. Regret has been linked to other emotions such as remorse, shame, guilt, self-forgiveness, and repair.

Regret can be separated into two broad categories: action, and inaction regret. Action regret refers to anguish felt when action is taken, that in retrospect, one later wishes that one had not taken, for example: having an affair which could lead to feeling guilty that marital vows have been broken or shame because the trust in the marriage has been shattered due to your action. An inaction regret is where you regret not doing something; for example, not studying for an exam and getting a poor grade or not asking someone out on a date. Non-action regret is a boldness regret,

where a person regrets the omission rather than commission and opportunities lost (Pink, 2022). Temporal discounting is a contributing factor of inaction regret, overvaluing the current, immediate opportunities and not considering consequences for the future. Action and inaction regrets differ in the timing between the regret and the emotional reaction. Emotional reactions of action regrets are usually immediate, while non-action regrets can cause the most negative thoughts, but they are delayed (Gilovich &Thomas, 1995). This is because of the omission is not realised until when the consequences are felt, for example, the consequences for a low grade in an exam. Counterfactual thinking (Byrne, 2016; Epstude & Roese, 2008; Kahneman & Tversky, 1982; Landman, 1987) and counterfactual curiosity (FitzGibbon et al. 2021) is a result of non-action regrets - this occurs when individuals imagine alternatives to a decision they regret and the consequences. It is the "if only" the action was taken, for example, if only you had asked that person out on a date, you would be happily married with many children now. Action regret usually has immediate consequences, whereas non-action regret's consequences and subsequent emotions are usually not realised until much later (Gilovich & Thomas, 1994). Due to differences between action and non-action regret, for example, the emotional reactions operate on different timelines, and the emotional reactions are so different, it would be difficult to measure both types of regret in one measure.

Regret has traditionally been defined as a moral emotion (Pink, 2022; Gotlib, 2020; Landman, 1993), the ability to regret an action encourages moral actions, to behave pro-socially, and make up for any damage caused (de Hooge et al., 2007, Kroll & Egan. 2004). A violation of a moral judgement can lead to regret (Byrne, 2016) due to the negative consequences and knowing that the actor should have known better. People behave in morally appropriate ways to avoid social ostracization (Tracy & Robins, 2003). Moral judgement is related to regret because if the actor thinks they have behaved wrongly, they consider the effects of their behaviour on others, their behaviour can be empathetic. They take responsibility of their actions; understand it was a mistake and they should have known better.

Remorse is a legal term that has been linked to regret; Landman (1993) believes that remorse is distress caused by agonising on past wrongs that were within our control. Regrets, on the other hand, are both within and outside of our control. However, remorse is more other-focused than regret (Proeve & Tudor, 2010) and of interest to the legal process, particularly in sentencing offenders, therefore, regret is a broader concept than remorse. Regretting an action can lead to negative emotions due to the responsibility lying with the actor, and it can cause either (or both) interpersonal or intrapersonal harm (Zeelenberg & Breugelmans, 2008). Regret was initially seen as a negative, maladaptive emotion and associated with guilt (Darwin, 2009; Weiss, 2020). Studies have revealed that emotions following a regretful action were dominated by more positive and valued emotions and experiences (Saffrey et al., 2008). Regret has since been expanded to include a myriad of emotional outcomes with adaptive values that provide instruction, forewarning and mobilisation (Landman, 1993). It can induce growth in decision making and learnings from past actions (Pink, 2022; Gotlib, 2020) and motivate cooperation (de Hooge et al. 2007; Tangney, 2003).

H.B Lewis (1971) pioneered the research differentiating the two main emotional reactions to action regret -guilt and shame. Guilt is more adaptive, and shame is ruminative and unproductive and ultimately, shame has negative impacts on the therapeutic process. Those who have guilt tendencies saw the action as the regret, whereas those with shame tendencies place the blame on themselves, behaviour versus self (Teroni & Deonna, 2008; Proeve & Tudor, 2010). Therefore, guilt is deflected outwardly and easier to differentiate the person from the behaviour, whereas shame is inward looking, and the person is the cause of the distress because they actioned the regret. Regret can encompass both interpersonal and intrapersonal harm, whereas guilt is an emotion that predominately applies to interpersonal harm (Zeelenberg & Breugelmans, 2008). Shame affects the core of a person's identity and self-worth (Tangney & Dearling, 2002), whereas guilt is directed as the act rather than the self. Guilt and shame are also seen as individual and public emotions. If the

regretful act is in private, then the resulting emotion is likely to be guilt, if public- then shame is likely (Johnson et al. 1987).

Shame is a self-conscious emotion that is a pivotal factor in how people behave, think and feel (Tracy & Robins, 2004). M. Lewis (2003) explains that for shame to exist, a person must understand social rules and norms, how the individual behaves knowing these norms and know about themselves; only then can they feel shame. They compare their behaviour against a standard. Cibich et al. (2016) define shame as both a problematic and productive emotion. Shame protects social bonds and social status, but also that it is linked to psychopathologies such as anxiety, depression and post-traumatic stress disorder (Cibich et al., 2016). Tangney and colleagues, in their studies, have focused on the tendencies toward shame and guilt (shame-proneness and guilt-proneness). Shame-proneness has been found to be positively correlated with depression and anxiety, irritability, suspiciousness (Tangney et al. 1992) and personal distress (Tangney, 1991). Shame-proneness has been negatively correlated with empathy (Tangney, 1991). Guilt-proneness was positively correlated with empathy (Tangney, 1991) and perspective talking ability and total empathy (Leith & Baumeister, 1998), both more positive cognitive tendencies and arguably more treatable in a therapeutic setting. It has been suggested that shame should be seen as a functional emotion, but can become problematic when it is avoided, usually when the situation is seen as irreparable (Cibich et al., 2016). Shame can be shown by displaying emotions such as, self-conscious behaviour, wanting to be alone and feeling alone, avoiding gaze, denying the action, hiding from people and concealing inadequacies. Shame-proneness is positively correlated with anger management, hostility and blaming others (Tangney et al., 2011).

Initial psychometric tools used to assess guilt and shame did not separate the self and behavioural aspects of these emotions (Enikolopov & Makogon, 2013). Recent psychological studies have corrected this and focused on negative self-evaluations (NSE) and negative behaviour

evaluations (NBE) (Cohen et al., 2011; Gevrekci & Cirakoglu, 2017). Shame is associated with negative self-evaluation and guilt with negative behaviour evaluation.

Repair encompasses both inter-repair and intra-repair. Both have shared traits; they are the result of an action where the transgressor is not necessarily entitled to forgiveness but strives for it or is given it anyway (Hall & Fincham, 2005), and forgiveness does not mean that the action is forgotten or condoned. If repair is successful, then offenders can rid themselves of the negative emotions of regret and start to use the learnings of the actions as adaptive and they can change future behaviour (Fisher & Exline, 2006). Research shows that if an opportunity to repair via self-improvement or assistance from those who were affected presents itself, this an lead to reparation of social self; the alternative is to avoid the situation and the emotions become problematic (Cibich et al., 2016).

To self-forgive, the person must admit that their transgressions were wrong and commit to change to be able to move forward. If this does not happen, there is potential for self-harm and negative affect, such as depression, denial, or suppression (Hall & Fincham, 2005). Webb et al. (2017) identify five components to self-forgiveness, reconciliation, acceptance, accountability, human-connectedness, and change-commitment. Self-forgiveness is positively correlated with self-esteem and life satisfaction (Hall & Fincham, 2005), narcissism and self-centeredness (Tangney et al., 2002) and negatively related with neuroticism, depression, anxiety, and hostility. An apology is an important part of repair and research has shown that actors that have guilt-proneness or guilt NBE and guilt-repair had high correlations with apologies. Inversely, those with high shame proneness and shame-withdraw had low correlation with apologies (Howell et al., 2012). True self-forgiveness takes time and energy and can be humbling (Fisher & Exline, 2006). The negative to self-forgiveness is forgiving damaging behaviour or making reparations and potentially enabling the actor to repeat the behaviour (Wohl & Thompson, 2011; Fisher & Exline, 2006).

Self-punishment, in the context of regret, occurs when the action is so dire, that the actor cannot forgive themselves or if there is no way to repair harm to others (Nelissen & Zeelenberg, 2009). The perpetrator of the action wants to punish themselves, be punished, suffer, hurt themselves or even die because of the action. To regret an action, there is negative affect associated with the decision and counterfactual thoughts (Buchanan et al., 2016), and is a desire for an alternative to a decision that we made. The blame is solely on the decision maker and if there is no opportunity to correct or be forgiven, this leads to self-punishment (Gotlib, 2020). The emotions following guilt are not always prosocial, there is a darker side of regrets (Nelissen & Zeelenberg, 2009). The prosocial elements have been depicted in guilt, but not shame in previous studies (de Hooge et al., 2007). Taking responsibility for one's actions is the key to processing the regret and this can be done by self-punishment to re-assert their social status and moral identity (Woodyatt & Wenzel, 2014)

Previous research has shown differences between the latent concepts of shame, guilt, moral judgement, repair, and self-punishment, which are all associated with regret. We still need to understand and accurately report how people react to regret and therefore, assist people towards adaptive, prosocial, and positive reactions to regret. This study will validate and confirm the factors associated with action regret and formulate an analytic tool to depict the emotional reaction to individual regrets. I want to understand what emotions follow specific regret types. Clinical and forensic psychologists need to understand the emotional responses to regret so we can successfully treat people following a regretful action. Shame is linked to aggression, victim blaming and evading responsibility (Tangney et al., 2011). In contrast, guilt is linked with PTSD and addiction – alcohol, drugs, compulsive sexual behaviour, obsessive-compulsive and eating disorders (Grynberg et al., 2017; Bennett, 1995; Moualeu, 2022; Scherer et al., 2011, Brem et al., 2018). The latent emotions this research focuses on is seen by psychologists in the following ways: social psychologists with lying, empathy, relationship outcomes, perfectionism. Forensic psychology, regret and remorse have

been used in rehabilitation and sentencing outcomes. The resultant emotions can be used by the treating psychologist to tailor treatment to improve outcomes.

Proeve (2001) focused on the similarities, and differences of remorse with guilt, shame and regret, using items associated with these four emotions from previous literature. Subsequent exploratory factor analysis showed four factors underlying those items: moral judgement, shame, repair and self-punishment. Given that remorse is a limited form of regret, it is likely that these four factors and associated items can be applied to measurement of emotional reactions to regret.

Emotional reactions to regret, and particularly action regret, is the central focus of this thesis. In particular, the research focuses on confirmatory factor analysis of an exploratory measure of emotional reactions to regret. This study aims to ascertain whether the four factors obtained in the exploratory analysis are confirmed in a study of regretted actions. Secondly, it will explore whether types of regret differ in the strength of their emotional reaction.

Method

This study is a confirmatory factor analysis of Proeve's exploratory factor analysis (EFA based on unpublished analysis of emotional reactions of remorse, guilt, shame, and regret to actions, 2001). The Emotion Reaction to Action Regret (ERAR) survey used in this study was developed from this EFA. The survey was separated into three components: demographics, free recall of a regreted event, and the ratings of items. The primary aim of the study was to conduct CFA of the ERAR survey. The secondary aim was to compare the emotional consequences of type of regret.

Power Analysis

A power analysis was performed to ascertain the quantity of completed surveys required for a significant result. Using factor loadings, item uniqueness, and latent factor correlation estimates from Proeve's EFA, an a priori Monte Carlo simulation (1000 iterations) with a sample size of 100 observations indicated that 95.7% of the iterations resulted in significant correlations between all latent factors at an $\alpha = 0.05$ (i.e., a power level of 95.7%). Given the expectation of unusable data, I

obtained 200 responses. Prior to recruiting participants, ethics approval was sought and granted from the low-risk committee for the School of Psychology.

Participants and Procedure

A total of 200 participants were recruited anonymously via Prolific and financially reimbursed for their completed responses. It was specified that they had to be over the age of 18 years, speak fluent English, live in the United States of America or the United Kingdom and able to give consent to participate in the study. The survey took approximately 25 minutes to complete (mean=1511 seconds). The responses were analysed and all non-action regrets and invalid, inappropriate, and unintelligible regrets or responses were removed. There were 200 initial responses, which included invalid responses (*n*=3) and non-action regrets (*n*=18), which were removed prior to analysis. The total number used in analysis was *n*=179.

Participants were aged between 18-81 with a mean of 40.19 (SD=12.64). Participants were 58.1% female (*n*=104), 40.78% male (*n*=73) and 1.12% identified as non-binary (*n*=2). With regard to other demographic variables, 41.34% of participants were married (*n*= 74) and 40.22% never married (*n*=72), 36.31% (*n*=65) had completed high school and 40.78% (*n*=73) had an undergraduate degree, 35.2% (*n*=63) identified as Christian, 43.58% (n=78) as Atheist/agnostic, 6.15% (*n*=11) as Catholic, 5.59% (*n*=10) as Muslim, and 1.12% (*n*=2) as both Jewish and Buddhist. 68.16% (*n*=122) were from the UK, 16.76% (*n*=30) from North America, 2.79% (*n*=5) from Africa, and 12.29% (*n*=22) from outside the above regions. Participants stated who was involved in the incident, 25% (*n*=45) reported that they acted alone, 29% (*n*=52) with family, 15% (*n*=27) an organisation, 13% (*n*=23) a friend, 11% (*n*=20) a colleague and 7% (*n*=12) other. Other data gathered from participants included, how long they took to complete the survey and time since event occurred; I have not used this data in the study.

Emotion Reaction to Regret Survey

The Emotion Reaction to Regret (EER) Survey (see appendix) is a 34-item questionnaire that asks the participant to recall and describe an event, then answer 34 items. The items were statements, presented to the participants in random order, about how they currently feel about the recalled transgression. Each item is associated with one of the four sub-scales developed from the EFA. Participants were asked to rate each statement using a 7 Likert Scale (1= very true, 2 = true, 3 = a little true, 4 = neither, 5 = slightly true, 6 = true, 7 = very true). The shame sub-scale (12 items) included items such as - *feel as though people are looking at you*. The moral judgement sub-scale (8 items) included items such as - *think that you should have known better*. The repair sub-scale (8 items) included items such as - *want to get a second chance*. The self-punishment sub-scale (6 items) included items such as - *feel like kicking yourself*. Internal consistencies for the sub-scales developed from the EFA were, shame, ω= .902, Moral Judgement, ω= .908; Self-punishment, ω= .904; Repair, ω= .789.

Data Analysis

A content analysis was completed on the recalled described event of the 179 responses. The categories initially used were those defined by Pink (2022): foundation regret, connection regret, boldness regret and moral regret. At stage one, the author and a second student researcher categorised 50% each of the responses to ascertain the fit of the categories. It was decided that the categories did not work for our data for two main reasons. Firstly, boldness regret was non-action regret, and this research is only focused on action regret. Secondly, Pink's foundation regret was too broad and captured 83% of responses. In stage two, the two researchers re-defined the categories that would best suit the data as follows (see appendix 2 for full definitions).

Moral regrets were separated into moral high ground and moral low ground. Moral high ground refers to - good intention with the awareness of a moral just choice of options. Moral low ground is when intentions are dishonourable. Foundation regrets included two types: financial or

physical. These regrets can affect the trajectory of a person's life. There is an initial desire for financial safety, progression or growth that leads to a negative outcome. Foundation physical regret includes (but is not limited to) health, metal health, wellness, and addiction. Connection regrets included decisions and outcomes that affect the relationships with other people.

In stage three, the author categorised all 179 responses into these 3 categories and researcher 2, separately, categorised a sample of 20% of the responses; the results were analysed using Cohen's Kappa (a validity score recommended by Boateng et al. (2018)). The result was an inter-rater coefficient of 0.833, which indicates almost perfect agreement.

Confirmation Factor Analysis (CFA) was conducted using JASP. The CFA was assessed using 5 global fit indices: chi-square, comparative fit index (CFI), Tucker Lewis Index (TLI), Root Mean Square Error of Approximation (RMSEA) and Standardised Root Mean Square Residual (SRMR). The confidence interval was also considered to ascertain the precision of the data. An excellent fit would have the following value of the indices - CFI > .95 and TLI > .95 (Marsh et al. 2004), RMSEA <.06 (Marsh et al. 2004) and <.08 for SRMR (Hu & Bentler, 1999).

Results

Confirmation Factor Analysis (CFA)

Prior to completing a Confirmation Factor Analysis (CFA) the data were checked for normally distributed data (an assumption of CFA) by completing a Mardia's coefficient. The data were not normally distributed. To account for this violated assumption, by changing the model parameters, I used a robust estimation method of Satorra-Bentler scaling (Yuan & Bentler. 1998). The data, using the new model parameters, was used to complete a CFA. A baseline was used to ascertain the fit of the 4-factor model and then reduced based on conceptual and statistical manipulation. Initially I analysed the 5 global fit indices and if they were not showing a good fit, I then evaluated the parameter estimates and the residual variances and removed items that were not fitting well (less

than .700 in the parameter estimates or large residual/error loadings). The initial model was 4-factor model with thirty-four corresponding items.

The results of the CFA that was used to analyse the model fit are reported in table 1. The initial model (model 1) showed an imperfect fit for the indices, $\chi 2(521) = 1344.068$, $p < .001$, CFI = .749, TLI = .730, RMSEA = .094, 90% CI [.088, .100], SRMR = .101. None of the parameters (CFI, RMSEA, TLI and SRMR) met standard cut off criteria (Marsh et al., 2004). Scrutiny of the data showed a positive correlation between the factor of repair and moral judgement, $r (177) = .893$, $p = <.001$. A shared covariance of 79% (.893*.893) is quite high and indicates that these two factors are very similar. Statistically, the two factors were loading to the model in similar ways- therefore, they were loaded as one factor onto the model (model 2). The result still did not meet standard cut off criteria; and it had not improved any of the indicators.

Table 1
Results of the Confirmation Factor Analysis

	X2	df	p	CFI	TLI	RMSEA	SRMR	CI lower	CI Higher
Model 1	1344.068	521	<.001	0.749	0.730	0.094	0.101	0.088	0.100
Model 2	1359.241	524	<.001	0.745	0.727	0.094	0.104	0.088	0.101
Model 3	1283.453	520	<.001	0.767	0.749	0.091	0.102	0.084	0.097
Model 4	853.680	321	<.001	0.805	0.787	0.096	0.111	0.088	0.104
Model 5	695.778	272	<.001	0.832	0.815	0.093	0.090	0.085	0.102
Model 6	500.436	206	<.001	0.868	0.853	0.089	0.077	0.079	0.099
Model 7	357.694	149	<.001	0.899	0.884	0.088	0.073	0.077	0.100
Model 8	274.477	116	<.001	0.917	0.902	0.087	0.073	0.074	0.101
Model 9	259.410	115	<.001	0.924	0.910	0.084	0.069	0.070	0.097
Model 10	210.935	100	<.001	0.939	0.926	0.079	0.054	0.064	0.094

The factor of repair did not load well onto the model. Analysis of people involved in the regretted incident showed that 47% (n=84) of the regrets reported either having no-one else (25%), a company or organisation (15%) or other (7%) involved in the regretted action. Therefore, it was decided to remove the factor of *repair* completely from the model and the results improved (model 3), but still did not meet acceptable criteria.

The model indices showed a link between the factors of *repair*, item 7 (I want to get a second chance) and moral judgement, item 2 (I should have known better). Both items indicated an interpersonal repair item with another person. I decided to link these two factors together to see if that would improve the data. The result was model 4, which is a slight improvement on the indices, except for SRMR.

The next step was to analyse the parameter estimates and the residual loadings. Any factor loadings under .700 are weak (Marsh et al. 2004) and not fitting the model. Item 4 of *self-punishment* (feel like kicking yourself) had a low factor loading of .452. This item was removed from the model which resulted in model 5.

Model 6 was the result of removing items in the *moral judgment* factor with low factor loadings, which included item2 (think you were responsible for what happened), item 5 (think that you would like what happened to be undone) and item 6 (think what you did was inexcusable) the items rated as .365, .623 and .606 respectively. This model showed a better fit, but still not acceptable.

The factor of *shame* was the focus of model 7. The items removed were 1 (feel as if people are looking at you), item 6 (look towards the ground) and item 10 (feel self-conscious), the ratings were .412, .366 and .448 respectively. Removing these shame items provided a much better model fit. The parameters of CFI and TLI were almost a good fit and the SRMR had reduced by a quarter from the baseline statistics.

Model 8 reduced the *shame* items by a further 2 – item 7 (deny what you did) and item 8 (want to hide from other people) - the ratings for these items were .507 and .547. Model 9 portrays a better fit, with CFI and TLI indexes are now in the above the cut off criteria.

Model 9 conceptually improved the model because the modification indices showed a link between the items of *shame* - item 9 (feel alone) and item 11 (feel like hiding from other people), both of which indicate solitude for the transgressor. The modification indices show a better model fit

and an improved expected path coefficient if these items were linked. The result was an improvement in all the model indices.

The final model (10) was derived by removing *self-punishment* item 3 (think that you should suffer) which had a factor loading of .620. This was removed because the loading was below .7 and the residual loading was .616, which equates to high levels of unexplained variances left over. The use of the word suffer in this instance is arbitrary and not clearly defined. It is subjective and not consistent and could be taken to mean different things for different people. For model 10, CFI and TLI are both above .9, RMSEA is below .08 (as is SRMR). These results indicate a good fit for a 3-factor model.

The final 3-factor model is depicted in diagram 1 below. The sixteen items and their descriptive statistics are represented in Table 2 below.

Figure 1

3-factor Model of the Emotional Reaction to Action Regret

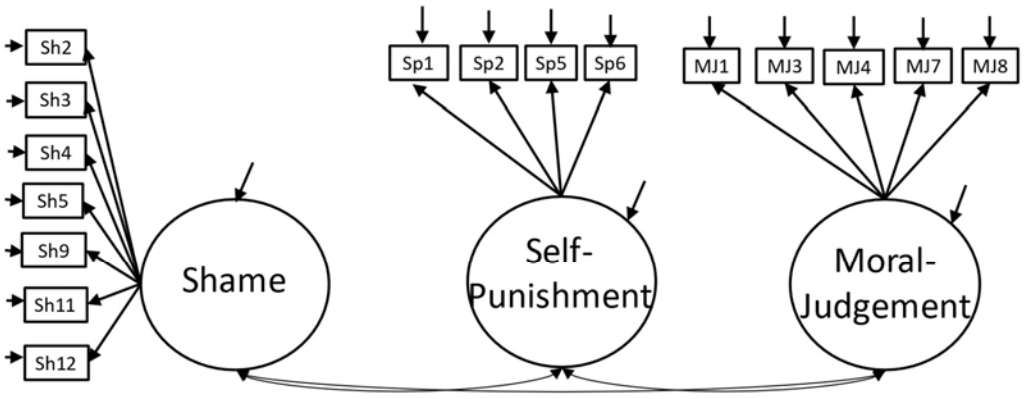

Table 2

Items and Their Factor Loadings

Factor	Item	Statement	Factor Loading
Self-punishment	I 1	Feel like punishing yourself	.812
	I 2	feel like hurting yourself	.668
	I 5	Want to die	.611
	I 6	Want to be punished	.841
Moral Judgement	I 1	Think that you should have known better	.835
	I 3	Think of what a mistake you made	.669
	I 4	Think about the effects of what you did on other people	.651
	I 7	Think that you did wrong	.675
	I 8	Think that you shouldn't have done what you did	.741
Shame	I 2	Become introspective, turn inwards	.756
	I 3	Want to conceal your inadequacies	.835
	I 4	Avoid meeting people's gaze	.706
	I 5	Feel like being by yourself	.797
	I 9	Feel alone	.945
	I 11	Feel like hiding from people	.938
	I 12	Blush	.608

Content Analysis

All participants written regret responses were categorised into one of the three regret types: foundational (*n*=101), connection (*n*=40) and moral (*n*=38). The definitions of categories were based on Pink's (2020) regret types and modified to fit our data. The content analysis resulted in 3 primary categories that can be further deduced into 5 categories, if required. This is because the regrets can be differentiated by moral high ground (*n*=8) where individuals believe they are doing the right thing to help, but in fact they are getting involved in a situation that does not involve them. Foundation regret can be separated into material regret (*n*=77) which are financial regrets or health regrets (*n*=24) which are physical. There were not separated because of the small number of moral high ground regrets could skew the data. Separating them did not obtain a significant result.

ANOVA

Scores on each of the three factors were compared across regret categories of moral judgement, shame and self-punishment using ANOVA. The means and standard deviations are presented in Table 3 below.

Table 2
Descriptive Statistics for Factors Scores

Regret Type	*Foundation*		*Moral*		Connection	
	M	SD	M	SD	M	SD
Self-Punishment Factor	2.645	1.52	2.287	1.399	2.167	1.285
Shame Factor	4.213	1.625	3.878	1.74	4.298	1.978
Moral Judgement Factor	5.531	1.336	5.568	1.286	5.292	1.491

None of the ANOVAs were significant at the 0.05 level. The results for the self-punishment factor were - F (2, 176) = 1.666, p= .192, η^2 = .019, results for the shame factor were - F (2,176) = .940, p= .393, η^2 = .011, and results for the moral judgement factor were - F (2, 176) = .398, p = .673, η^2 = .004. All ANOVAs indicated a small effect.

Discussion

This study has created a revised model for the emotional reactions to action regret questionnaire. This is exploratory research that attempts to explain how people process an action regret and the associated emotions. 200 participants were asked to recall a regret and responded to statements regarding their emotions after the regret. The research into regret shows that it is primarily a robust learning tool. People may regret what they have done in the past, but it can have positive impacts of cognitive decision-making process and learning from mistakes (de Hooge et al., 2007, Kroll & Egan. 2004). The focus of this study was to ascertain whether the four factors obtained in the exploratory analysis are confirmed in a study of regretted actions. This study did confirm three factors and refined their items down to sixteen.

The primary aim of this study is to confirm the four factors of regret that were depicted in the exploratory research. Three factors were found to fit the model well, they are shame and self-punishment and moral judgement, with seven, four and five items respectively. The factor that was removed to create this model was repair. Repair did not fit in the model, due to 47% (see table 4) of the reported action regrets occurred with and to themselves, with an organisation or other. Therefore, there is no one to apologise to or to ask for forgiveness. The research suggests that taking responsibility and even apologising for past actions, helps mend, heal, and grow (Howel et al., 2012; Landman, 2001), but if no one else was involved in the regret, then apologising cannot occur. Additionally, if those who were wronged do not want reparation, a repair reaction can transform into shame and externalise the blame away from the actor (Landman, 2001; Tangney et al., 2014; Howell et al., 2012). Shame can also be the result when the situation is seen as irreparable (Cibich et al., 2016)

Table 4

Who was Involved in the Regret

Who was involved	Total	Percentage (%)
No-one	45	25%
Family	52	29%
An Organisation or Group	27	15%
A Friend	23	13%
A Colleauge	20	11%
Other (Stranger/cat/medical professional/teacher)	12	7%
Total	179	100%

Shame responses can be associated with the timing between the regretted event and the recall; the longer the period, the less likely the actor will be able to repair the relationship. This could be another reason why repair did not fit the model well. The majority (72.22%) of the regrets reported in this survey were experienced a year or more ago. The participants have had time to reflect on the regrets and renumerate on decisions they had made and how that impacts their lives. Distance and time shift perspective of the event and assist in reconstructing and regulating emotions (Kross & Ayduk, 2001). Time can be a positive by redirecting behaviour, improving cognitive

processes, such as, strengthen thinking and improving wisdom and even reducing blood pressure (Kross & Ayduk, 2017; Kross et al., 2005). The two items with the largest factor loadings were items of shame, feel alone (.945), and feel like hiding from people (.938). Both items represent avoiding people and the situation. This would lead to repairing, correcting, or apologising for the regretful action and possibly create problematic behaviour (Cibich et al., 2016).

Self-punishment is an output of shame. It can be one of the ways that shame manifests itself. If the actor is not able to repair a relationship in time, then that could lead to shame and internalising the action. The actor can try taking responsibility for the action and regain social status, through self-punishment (Woodyatt & Wenzel, 2014). *Wanting to be punished* (.841) and *feel like punishing yourself* (.812) are the highest loaded items of the self-punishment factor. It is difficult to face an uncomfortable situation and take responsibility for a regrettable action. Not taking responsibility can cause problematic responses, such as self-punishment (Fisher & Exline, 2010).

Moral Judgement is when people behave against what they believe and been taught is in line with social and moral standards (de Hooge et al., 2007, Kroll & Egan. 2004). The highest weighted items for moral judgement are *think that you should have known better* (.835) and *think that you shouldn't have done what you did* (.741). Moral judgement is assessing actions against norms that should be followed. A violation of these norms and thinking they should have better results in regret (Byrne, 2016).

The correlation between the factors depicted shame and moral judgement resulted in, r= .325. Logically they should correlate highly, but in fact it was shame and self-punishment that correlated higher; r = .449. Elements of shame are judgement from breaching moral and social norms, this is one of the reasons why they should correlate higher, but the research suggests that self-punishment is an output of shame, especially where the same is avoided (Cibich et al., 2016). Moral judgment is an essential aspect of guilt, feeling guilty that they should have known better than to go against their moral code of conduct.

Conceptually, self-punishment should line up with guilt, because guilt occurs when the person saw the action as the regret, and this could lead to punishing themselves. Increasing the level of punishment given - alleviated the feelings of guilt (Inbar et al., 2013). When opportunities to correct or redeem themselves because of the behaviour are not present, self-punishment or self-denied pleasure may occur (Nelissen & Zeelenberg, 2009). Shame has more of a reputation maintenance function than guilt, but it is more aligned with self-punishment (Tanaka et al., 2015). This is not because shame externalises the action regret, but because the actor internalised the feelings and self-punishes to release the emotion (Teroni & Deonna, 2008). Research by Suneja (2018) differentiated between shame and guilt in the study and shame correlated higher with self-inflicted injury.

Moral judgement is a manifestation of guilt and does not align with shame and self-punishment because it is all about intensity of the emotions (Tanaka et al., 2015). Shame and shame-proneness are a more intense emotions with a deeper associated reaction. The two highest rated items were in shame (as mentioned above), followed by a self-punishment item. Table 3 depicts the means of the items according to the factors. As can be seen in the table, the aggregate mean of self-punishment is 2.366, this is the lowest of the three factors, followed by shame at 4.130 and moral judgement is the highest at 5.463. This suggests that the actors should have known better than to breach their moral code, and this was a more common emotion than the shame and self-punishment items. Regret is referred to in literature as a moral emotion (Pink, 2022; Gotlib, 2020; Landman, 1993), so conceptually it is understandable that moral judgement would rate as higher of the three factors.

The categories of regret that were used in this study were garnished from Pink's (2022) work. He used four categories, foundation, connection, moral and boldness regret. Boldness regret is a non-action regret, either a collective or a single decision or omission, "play it safe, or take a chance?" (Pink, 2022, p.101). This study is specifically focused on action regrets, so boldness regrets

were omitted. The other three categories did not fit the data well, so their definitions were changed by narrowing the definition of foundation regret and broadening moral and connection regrets (see appendix 2). Pink's data from the American Regret Project (Pink et al., 2021, as cited in Pink, 2022) revealed that family and partners were the highest reported regrets – connection; followed by education, career, and finance – foundation. It is difficult to ascertain from this list the moral regrets because they are not stipulated. This study showed that most regrets were moral regrets (45.81%), followed by foundation (40.22%) and connection (13.97%). The differences are the change in definition and moral regrets can be included in the smaller categories, the specifics of the regret reported in the American Regret Project need to be analysed to confirm a moral regret. The ANOVA of the regret factors compared to the regret categories shows they are closely related to each other. The most significant was self-punishment with a p=.192, but not beneath our threshold of p=.05. The foundation and moral regrets were reduced to financial and physical regrets and high and low regrets respectively. ANOVAS were run on these new categories and there was still no significant result. This was done because the moral categories were so conceptually different that it could have caused the results to be similar, this did not affect the ANOVA results and there were only 8 regrets in the moral high ground, this could skew the data.

Action and non-action regrets are vastly different and difficult to measure in one model. Action regrets have a more immediate impact, whereas non-action regrets have a delay (Gilovich & Thomas, 1995). The impacts of temporal discounting (Pink, 2022) occur in the future, that is when the associated emotions are felt. For example, not going to university. The immediate impact could be a more active social life and higher income due to full time employment. In the future, the actor may not be considered for promotion because of lack of higher education, and this is when the regret is encountered. A counter-factual is the "if only" surrounding the non-action regret; if only I had gone to university, I would be in a management position now. This may not have eventuated.

Due to these differences, action regrets are the central focus of this study. A larger study may want to focus on both action and non-action regrets and compare the results.

Implications

The implication of this study is a means to measure action regret and associated emotions. The results confirm that a 3-factor model is statistically sound. The application of the questionnaire is in clinical and incarceration settings to ascertain the emotions following the action regret and how they can be treated. This is not a diagnosis tool. For example, if a perpetrator has a motivation to hide, this is the main inhibiting factors of recidivism (Tangney et al., 2014). It is important that the emotions following regretful actions are understood so the behaviour can be treated with the focus on the emotions to avoid potentially destructive behaviour. Moral judgement is a good example of application, because if the client rates high in this factor, then self-forgiveness treatment can be used to increase pro-social behaviour (Fisher & Exline, 2006, Bem et al., 2021). Values need to be examined and the use of new wave therapies, such as Acceptance and Commitment Therapy together with self-forgiveness are getting successful results, including for an offence when no one else was involved – an action regret against oneself (Dewer et al., 2017). Shame and self-punishment are related conceptually, therefore share the same approach. The therapy used would be compassion-focused (Matos & Steindl, 2020; Mernagh et al., 2020), mindfulness and self-forgiveness.

The strengths of this study were the size and variety of responses. The power analysis depicted a sample size of 100 would provide significant results, 200 participants were surveyed for these results, a high level of statistical power reduces the risk of failing to detect a true effect. The responses were diverse, regret is subjective and unique to each person. Some of the examples of the recalled action regrets were, moral regret: “I had an affair with a man who was engaged and due to be married the following week. His fiancée found out and they broke up and my partner found out and we broke up.” A financial foundation regret: “About 12 years ago I had won about £18,000 the money was due to be deposited into my account and I had booked in to view a car I wanted to buy, I

checked my bank account at 4am and the money was in. I pondered whether to go to the casino and try win a few more thousand. I ended up going and lost it all." Connection regret: "I decided to work abroad for a short while. I was good at my job and many other jobs followed. Many years later I have realised that I spent too much of my married life abroad to the extent that I missed seeing most of my children growing up." The reaction to the regrets was varied. The type of regret was spread well among the three types. The ages of the participants varied from 18 – 81.

Limitations and Future Research Directions

The limitations of the study are the participants were all part of a paid database of Prolific, homogeneous culture and lack of repair responses. The cohort that are on Prolific need to be aware of its existence to sign up. This could be a limitation because 89.94% (*n*=170) of the respondents had completed high school and 58.66% (*n*=105) had a higher education (undergraduate or postgraduate qualifications), therefore they are highly educated and according to Statisa.com, account for 37.9% (https://www.census.gov/newsroom/press-releases/2022/educational-attainment.html) of the population. Therefore, the results could be skewed. The participants were homogeneous because the 84.92% of the respondents were European or North American (*n*=152). This is not culturally sensitive and focusing in on Western, Education, Industrialised, Rich, and Democratic (WEIRD) societies will not provide a comprehensive view of the world's population. The lack of repair regrets changed the outcome of the data because the repair factor did not fit the model.

Improvements on this study could be - gaining a larger sample - for example, the American Regret Project obtained a weighted sample size of 4489 (https://www.danpink.com/surveyresults/) with diverse data and the scope to incorporate both action and non-action regrets. This survey is also homogeneous because it is an American survey with 62.9% white or non-Hispanic and 71.9% believe in God. Adopting this style but making it a world survey would enable different types of questions to capture all regret types of responses.

An improvement could be to research different samples, such as those in a clinical setting, incarceration or relationship counselling. This would capture more serious regrets and associated emotions and more repair responses.

A change in the methodology to qualitative would garnish richer data. The researcher wouldn't get the same number of responses as a quantitative method, but they could have a semi-structured questionnaire and ask the participants to elaborate and lead the conversation to obtain detailed and thorough data.

This research was completed after the COVID-19 pandemic and mental health was a common response to regrets in the data. There are a number of campaigns that have assisted to bring mental health into the spotlight, such as R U OK?, and mental health days are part of a work life balance in 2023. Over the last ten years, society has been focused on ensuring that the stigma is taken out of mental health and people are more self-aware of emotions and burnout and are comfortable discussing it. Comments such as "making me check in with myself", "aware of my mental health and taking breaks" were throughout the date, and the participants were able to articulate their feelings and emotions clearly. I believe this is a sign of the time, that society, especially after the lock downs and isolation of COVID-19, can communicate their feelings and mental health clearly.

Conclusion

The results of this study confirmed a 3-factor model of reactions to action regret via a sixteen-item survey. This is not a diagnosis tool, but an assessment tool to ascertain how the regret is processed by the individual. This has the potential to assist therapists and clinicians to obtain emotional understanding via responses to a quick questionnaire and therefore, the ability to tailor the treatment to meet the specific needs of the client in a clinical, therapeutic, or incarcerated setting.

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Appendix 1 – ERAR Suvey

Appendix 1 - Emotion Reaction to Action Regret

Q1. Do you give consent to participate in this survey?

- ○ Yes (1)
- ○ No (2)

Please enter your Prolific ID:
Please note that this response should auto-fill with the correct ID.

_____

Thank you for taking part in this survey.
If completing this study has caused you distress in any way please discuss any matters with a trusted friend, family member, or medical practitioner.
If you require immediate support please call a support line or in an emergency please call your local emergency services number.

If you have any queries or complaints about this survey please contact either:
XXXXX

For any questions about the ethical conduct of the research, please contact Professor [redacted]@adelaide.edu.au) chair of the low risk Human Research Ethics Committee in the School of Psychology.

Please provide your demographic information below.

Please select your gender:

- ○ Male (1)
- ○ Female (2)
- ○ Non-binary / transgender (3)
- ○ Prefer not to say (4)

How old are you?

_____

What is your marital status?

- ○ Married (1)
- ○ Widowed (2)
- ○ Divorced (3)
- ○ Separated (4)
- ○ Never married (5)
- ○ Defacto (6)

What is your highest level of educational attainment?

- ○ Post graduate (1)
- ○ Undergraduate (2)
- ○ Completed high school (3)
- ○ Did not complete high school (4)
- ○ Trade/apprenticeship (5)

Do you have any religious beliefs?

- ○ Christian (1)
- ○ Catholic (2)
- ○ Muslim (3)
- ○ Buddhist (4)
- ○ Jewish (5)
- ○ Hindu (6)

- ○ Atheist/agnostic (7)
- ○ other (please specify) (8) _____

What nationality do you identify with?

- ○ United Kingdom (1)
- ○ Australian (2)
- ○ European (3)
- ○ Asia (4)
- ○ North American (5)
- ○ South American (6)
- ○ Indian (7)
- ○ Chinese (8)
- ○ African (9)
- ○ Mixed (10)
- ○ Other (please specify) (11) _____

(Written regret)

In this questionnaire please write about out a past event in your life in which you made an active, committed choice or decision, which you had control over, where the outcome was negative in some way. Additionally, when looking back, describe whether you were aware, or believed a better outcome could have resulted, or you wish you could have changed your choice, decision or behaviour at that time. Picture this situation in your mind. Try to remember it as vividly as you can what this situation was like. When you have this memory clearly in mind, please write about the situation, answering the following questions in your description.

1. Please tell us in as much detail as possible what happened:

_____

_____

_____

_____

_____

Q4 2. Regarding the event you recalled, please tell us in as much detail as possible about what you were feeling and thinking:

_____

_____

_____

Q5 3. Regarding the event, please tell us about what you did and said:

_____

_____

_____

Q6 4. Regarding the event, please tell us how that situation has had an impact on you emotionally, in your thinking, and physically:

_____

_____

Q7 Who else was involved in the situation?no-one (1)

- ○ Friend (2)
- ○ Family (3)
- ○ Colleague (4)
- ○ Organisation or group (5)
- ○ Object (please specifiy) (6) _____
- ○ Other (please specify) (7) _____

Q8 How long ago did the event occur?

- ○ Less than 3 months ago (1)
- ○ 3-6 months ago (2)
- ○ 6-12 months ago (3)
- ○ 1-5 years ago (4)
- ○ More than 5 years (5)

Commitment (quality) check question

We care about the quality of our survey data. For us to get the most accurate measures of your opinions, it is important that you provide thoughtful answers to each question in this survey.

Do you commit to providing thoughtful answers to the questions in this survey?

- ○ I can't promise either way (1)
- ○ Yes, I will (2)
- ○ No, I will not (3)

Reactions to my action.

Looking back on the event that you recalled, below is a list of statements describing the thoughts feelings, or actions you experience in relation to that event. Please read each statement carefully and indicate how true that statement is of you. Below is a list of statements describing your feelings about your actions or people's assumptions about you. Please read each statement carefully and indicate the likelihood of how true or untrue they are of you, or how likely that option applies to you by numbering the choices.

	Not true at all (1)	Untrue (2)	Slightly untrue (3)	Neither true or untrue (4)	Slightly true (5)	True (6)	Very true (7)
Feel as if people are looking at you (1)	○	○	○	○	○	○	○
Think that you should have known better (2)	○	○	○	○	○	○	○
Feel like punishing yourself (3)	○	○	○	○	○	○	○
Try to understand what you did (4)	○	○	○	○	○	○	○

Think that you are responsible for what happened (5)	○	○	○	○	○	○	○
Become introspective, turn inwards (6)	○	○	○	○	○	○	○
Want to conceal your inadequacies (7)	○	○	○	○	○	○	○
Think about a lost opportunity (8)	○	○	○	○	○	○	○
Want others to feel better (9)	○	○	○	○	○	○	○
Feel like hurting yourself (10)	○	○	○	○	○	○	○
Avoid meeting people's gaze (11)	○	○	○	○	○	○	○
Think of what a mistake you made (12)	○	○	○	○	○	○	○
Think that you should suffer (13)	○	○	○	○	○	○	○
Feel like being by yourself (14)	○	○	○	○	○	○	○

Think about the effects of what you did on other people (15)	○	○	○	○	○	○	○
Feel like kicking yourself (16)	○	○	○	○	○	○	○
Want to preserve a relationship with someone you have wronged (17)	○	○	○	○	○	○	○
Think that you would like what happened to be undone (18)	○	○	○	○	○	○	○
Look down towards the ground (19)	○	○	○	○	○	○	○
Do something to improve the situation (20)	○	○	○	○	○	○	○
Think that what you did was inexcusable (21)	○	○	○	○	○	○	○
Deny what you did (22)	○	○	○	○	○	○	○
Want to die (23)	○	○	○	○	○	○	○

Do something differently (24)	○	○	○	○	○	○	○
Want to hide from other people (25)	○	○	○	○	○	○	○
Feel alone (26)	○	○	○	○	○	○	○
Think that you did wrong (27)	○	○	○	○	○	○	○
Want to get a second chance (28)	○	○	○	○	○	○	○
Feel self-conscious (29)	○	○	○	○	○	○	○
Want to be punished (30)	○	○	○	○	○	○	○
Feel like hiding from people (31)	○	○	○	○	○	○	○
Blush (32)	○	○	○	○	○	○	○
Want to feel better (33)	○	○	○	○	○	○	○

Think that you shouldn't have done what you did (34)	○	○	○	○	○	○	○

Appendix 2 – Definitions of Regret Categories

Moral regrets:

Moral regrets were separated into moral high ground and moral low ground. Moral high ground refers to good intention with the awareness of a moral just choice of options. This choice still leads to a negative outcome for the individual or third party. The moral high ground is usually when someone gets involved in a situation that does not include them, they attempt to assist/help the third party and it goes awry.

Moral low ground is when intentions are dishonourable, when a choice presented, and the rules are not followed, for example, cheating on a spouse/partner, extortion, stealing or scandal, awareness that they made the wrong choice.

Foundation regret:

Foundation regrets included two types: financial or physical. These regrets can affect the trajectory of a person's life. There is an initial desire for financial safety, progression, growth that leads to a negative outcome. This includes (but is not limited to) rushed and impulsive decisions. Outcomes include financial loss, lost opportunity, career prospects and adverse health outcomes. Results due to lack of research or of planning for the future, ignoring obvious consequences, warnings, and advice. Events are justified at the time by a need for excitement, escape, fun, convenience, ease, or peer pressure. The negative behaviour must apply directly to the individual, any harm occurring to others, or a third party may classify as moral low ground regret. Examples of financial foundation regret – Career, employment, financial loss, gambling, education, living and housing arrangement. Examples of physical foundation regret – health, mental health, wellness, addiction, alcohol and drug taking and reckless behaviour and getting into a known inappropriate marriage.

Connection regrets:

Connection regrets included decisions and outcomes that affect the relationship with other people. Any decision that leads to relationships suffering in a way or causes animosity or distancing between two parties. Relationships that were violent, disrespectful, or ill advised. This includes broken or damaged friendships, family, marriage, partners, neighbours, and colleagues. Also caused decreased, minimal or loss of contact with the member(s) in the relationship or network. Includes: divorce or a bad marriage.