

**THE APPLICATION OF TOKEN REINFORCEMENT PROCEDURES IN THE  
MODIFICATION OF ACADEMIC PROCRASTINATION:  
ARE THE RESULTS WHAT THEY SEEM?**

Claudia Colarossi  
Department of Psychology  
University of Cape Town

A minor dissertation submitted in partial fulfilment for the degree of  
Master of Social Science in Psychology at the University of Cape Town.

30 October 2008

Supervisor: Terry Dowdall

Word count:

Abstract: 189

Main Text: 10100

## **ACKNOWLEDGEMENTS**

Terrence Dowdall: Supervisor of this project. His time, commitment, close supervision, hard work, and calm reassurance all contributed to making this thesis what it is – thank you.

Laura Colarossi: Mother to the Researcher. For her continuous support and listening ear throughout my project.

Gerard Ralphs: Partner to the Researcher. For his time, commitment, patience and help with the formatting of this project.

Leigh Schrieff: Lecturer and Friend. For availing herself to answer queries and for additional intellectual support.

**TABLE OF CONTENTS**

ACKNOWLEDGEMENTS .....	2
TABLE OF CONTENTS.....	3
LIST OF FIGURES .....	6
LIST OF TABLES.....	7
ABSTRACT.....	8
INTRODUCTION .....	9
Background.....	9
Theoretical framework.....	10
Cognitive-behavioural interventions with procrastination.....	12
SPECIFIC AIM.....	14
METHOD .....	14
Participants.....	14
Setting .....	15
Apparatus and instruments.....	15
Design .....	15
Procedure .....	16
RESULTS .....	17
The applied behaviour analysis.....	17

DATA ANALYSIS.....	20
A parallel qualitative data analysis of the token-reinforcement schedule .....	20
Conditioned emotional responses and affective feedback.....	20
<i>At the beginning, when the task is initially received.....</i>	20
<i>Half way through the procrastinatory process .....</i>	21
<i>The state of urgency: just before the task needs to be completed, work finally begins .....</i>	21
<i>Affective elements of regulated study behaviour .....</i>	22
External reinforcers.....	23
<i>The token system and monetary back-up reinforcement.....</i>	23
<i>Social reinforcement inherent in the research situation.....</i>	23
<i>Social feedback in the study situation.....</i>	25
a) Distractions .....	25
b) Reinforcement and punishment effects received from other people whilst on the programme .....	26
Self-generated feedback.....	26
<i>Perceived demand characteristics of the research process.....</i>	27
<i>Perceptions about study capabilities and self-efficacy.....</i>	28
<i>Counterproductive or irrational belief structures .....</i>	29
<i>Cognitive evaluation of beliefs regarding studying behaviour.....</i>	30
<i>Issues of self-regulation .....</i>	31
DISCUSSION.....	33
Limitations of the study .....	35
CONCLUSION.....	36
REFERENCES .....	37
APPENDIX A.....	42
Baseline Sheet.....	42

APPENDIX B .....	43
Intervention Weekly Schedule .....	43
APPENDIX C .....	45
Consent form.....	45
APPENDIX D.....	47
Interview Questions .....	47
APPENDIX E .....	48
Behaviour Contract.....	48
APPENDIX G.....	51
Ethical implications .....	51
APPENDIX H.....	52
Transcribed excerpt of interview with Participant 1 .....	52
Self-documented report of panic attack from Participant 3 .....	53

**LIST OF FIGURES**

Figure 1 Participant 1's academic study behaviour over a 12 week cycle.....	17
Figure 2 Participant 2's academic study behaviour over a 12 week cycle.....	18
Figure 3 Participant 3's academic study behaviour over a 12 week cycle.....	18

**LIST OF TABLES**

Table 1 Average study hours in each phase of the ABAB intervention design .....	19
Table 2 Scheduled versus actual study hours completed .....	19

**ABSTRACT**

This study used an applied behavioural analysis model in the modification of academic procrastination and study behaviour. It further used a qualitative analysis within a cognitive-behavioural framework to explore cognitive and affective elements of procrastination and participation in a behaviour modification programme. In the behaviour modification study three undergraduate volunteers with academic procrastination problems had their monthly allowance linked through a variable-ratio reinforcement schedule to the performance of scheduled and structured hours of academic study. An ABAB reversal design was used. All three participants showed significant increases in the study hours of the reinforcement phases and decreased frequency of study hours in the return to baseline phase. In parallel with the applied behaviour analysis study a qualitative analysis was carried out through weekly interviews conducted with all participants supplemented by regular documentation by the participants of their thoughts and feelings in relation to their study behaviour, which was analyzed within a broad cognitive-behavioural framework. The analysis of this data indicated that the formal behaviour modification programme may be insufficient to explain behaviour change fully, and that self-generated feedback may play an important role in the modification of study behaviour.

Keywords: procrastination, applied behaviour analysis, cognitive-behaviour analysis, token reinforcement, self-generated feedback, study program



## INTRODUCTION

Procrastination is a pervasive form of academic behaviour amongst university students. The Latin derivation of the word ‘procrastinate’ is: *pro*, “forward, in favour of” and *crastinnus*, “of tomorrow” (Steel, 2007, p. 66). Milgram (1992), quoted in Steel (2007), argues that procrastination became salient and a problem because of the numerous commitments and deadlines required by technically advanced societies. Academic procrastination occurs when students intend to complete an academic task but postpone it through avoidance mechanisms. As the deadline approaches, this avoidance reaches a high level of urgency and the discomfort of needing to complete the task becomes overwhelming (Milgram & Toubiana, 1999). Estimates of the extent of this problem vary, but a general consensus is that over 80% of American students procrastinate, with almost 50% procrastinating to a level that is problematic to academic performance (Steele, 2007). Moreover, the process of delaying tasks often produces great stress and anxiety causing the student physical, mental, and emotional strain (Olafson, Schraw & Wadkins, 2007). It is therefore a problem of some social importance. Scrutiny of the literature in this area shows that research in procrastination gained momentum from the 1980’s onwards.

### Background

There have been two basic research strategies in the field of academic procrastination. In the first and major strategy, a large number of correlational studies have attempted to identify ‘personality traits’ or psychological variables associated with procrastination. These have included neuroticism, impulsiveness, lack of conscientiousness, low level of agreeableness (Schouwenburg & Lay, 1995; Steel, 2007); high levels of depression and trait anxiety (Milgram & Toubiana, 1999; Stober & Joormann, 2007; Rothblum Solomon & Murakami, 1986; Spada, Hiou, & Nikcevic, 2006); shame, worry and guilt (Fee & Tangney, 2000; Ryan, 1982; Senecal, Koestner, & Vallerand, 1995); perfectionism (Burns, Ditmann, Nguyen, & Mitchelson, 2000; Stober & Joormann, 2007); fear of failure (Ferrari, 2001; Schouwenburg, 1992; Senecal et al., 1995); the use of irrational cognitions (Bridges & Roig, 1997; Harrington, 2005; Rothblum et al., 1986); an external locus of control (Jassen & Carton, 1999); lack of self-regulation (Ferrari, 2001; Senecal et al., 1995; Wolters, 2003); low levels of self-efficacy (Pajares, 1996; Wolters, 2003) and low levels of self-awareness (Ferrari, Driscoll, & Diaz-Morales, 2007; Ferrari, 2001). Most of these correlational studies used samples of between 50 and 150 university students, who were typically given self-report inventories or questionnaires, the results of which were subjected to correlational

analysis. In a meta-analysis, Ferrari (2004) reported that the variables showing the highest correlations with paper-and-pencil self-report measures of procrastination were fear of failure, 'self-handicapping', depression and 'guilt affect'. Negative correlations were highest with self-efficacy, optimism and 'decisional self-confidence'. The limitations of these studies are that they depend on the validity of the procrastination scales and how these relate to real-life procrastination, which very few studies investigate; and these studies do not offer many guidelines to actually deal with procrastination in real life. There are clearly a great many factors that co-vary with procrastination and probably many of these factors influence procrastinatory behaviour.

The second major research strategy involves developing and evaluating treatment programmes for procrastinators, also usually done with students. Most of these fall within the broad area of behavioural and cognitive-behavioural treatment, and this is the theoretical framework within which this research has been carried out. Before reviewing the limited research in this area, the theoretical framework pertaining to this study is outlined.

### **Theoretical framework**

The basic assumptions of reinforcement theory come from the operant learning model (Kazdin, 2001). The basis of this model is that behaviour is a function of its consequences, in context i.e. the key elements are antecedents, behaviour and consequences.

Reinforcement "refers to an increase in the probability of a response when that response is immediately followed by consequences" (Kazdin, 2001, p. 50). Positive reinforcement refers to the consequences often seen as 'rewarding'; negative reinforcement involves the presentation of an aversive stimulus, which the person, through their behaviour, avoids or escapes. Punishment is a consequence of a behaviour that results in a decrease in the likelihood of that behaviour in the same situation in the future. If one is punished severely, the antecedents, or discriminative stimuli, become associated through classical conditioning with the aversive reaction (such as fear or anxiety) that was elicited by punishment (Wolpe, 1982). Hence in future, in the presence of that stimulus, anxiety will be aroused, and escape or avoidance behaviour will be negatively reinforced by the reduction of the conditioned anxiety.

Much procrastinatory behaviour (which is basically avoidant behaviour) is negatively reinforced in this way (e.g. Milgram & Toubiana, 1999). The consequences of behaviour, or reinforcement, may have many components. Tharp and Wetzel (1969) propose that the 'total consequences' that follow a behaviour are complex and consist of

many elements, each of which may have its own weight and value. They use the term “reinforcing event” as “the construct which describes the total consequences of behaviour” (Tharp & Wetzel, p. 46). This may include both reinforcing and punishing elements, and the authors argue “It is possible to view these consequences as bearing a sign (+ or –) indicating their functional reinforcing value. Their combined value may be inferred from subsequent behaviour (sic) itself: continuation indicates a plus-combined value, decrease indicates negative consequence” (Tharp & Wetzel, 1969, p. 45). This would be how a token reinforcement programme would work, in that the desired behaviour (studying) may have a lesser ‘plus’ weight than the procrastinatory behaviour. By adding a significantly valued reinforcer to the consequences of studying, one alters the weighting of the reinforcing event, and study behaviour would be expected to increase in frequency. Token reinforcement has been seen as an effective way of using a wide range of reinforcers practically, by using a ‘point’ or token system in which units of behaviour earn ‘tokens’ which can be exchanged for valued back-up reinforcers (Kazdin, 2001). The literature shows that token reinforcements can work in many different situations (Kazdin, 2001), but some research shows that the use of external reinforcement can undermine intrinsic motivation (Deci, 1971). However Levine & Fasnacht (1974) point out in a review of this phenomenon that this may not apply when motivation is low – “If a behavior is of low base rate and its occurrence is important, token approaches may have to be used” (p. 820).

The reinforcing event is not limited to external feedback. Bandura (1974) has argued that although external consequences are important factors in feedback, they are not the only determinants of human behaviour – “People partly regulate their actions by self-produced consequences” (Bandura, 1974, p. 852). Cautela and Kearney (1990) argue that thoughts (covert behaviour) are governed by the same learning principles as overt behaviour. Within this approach cognitive-behaviour theory is not separate from reinforcement theory or the operant model. Cognitions or self-produced consequences will form part of the reinforcing event – in other words what we think about a situation or our actions will impact on whether the feedback is punishing or reinforcing. For example, if a student is punished by harsh and upsetting criticism by her teacher when she submits an essay, a classically conditioned response of anxiety associated with the idea that her capability is not enough, is likely to be aroused in the student the next time she has to write an essay. She may respond by avoiding this threatening task or leaving it to the last minute, making various rationalisations for the avoidance. This procrastinatory behaviour is negatively reinforced behaviour in which cognitions play an important part.

In relation to the field of procrastination, various researchers have emphasised that behaviour has to be seen together with thoughts and feelings (Schouwenburg, 2004). This has been the basis of a number of explanations of procrastinatory behaviour. Cognitions have been seen as central, particularly by cognitive-behavioural researchers. Meta-cognitions – an overarching thinking ‘canopy’ that self-governs beliefs and thought processes involved in the control and interpretation of thinking – are seen as basic to generating many of the dysfunctional thinking patterns associated with procrastination (Spada et al., 2006; Flavell, 1979). Another major approach to cognition is to see them as serving self-protective functions – mainly to rationalise avoidant behaviour (Bridges & Roig, 1997). Baumeister & Scher (1988) suggested that rationalisations about procrastination could serve as a self-protective mechanism where negative thoughts portraying the self as ‘lazy’ may protect the student from confronting anxieties about lack of ability to perform a task. Milgram & Toubiana (1999) see procrastinatory rationalisations as negatively reinforced because, despite their negative results, they permit the avoidance of more aversive threats to self-esteem. Feelings or affect are central to the process of procrastination in a large percentage of procrastinators, particularly those whose work-avoidance serves to temporarily reduce conditioned anxiety (Milgram & Toubiana, 1999; Rothblum, Solomon & Murakami, 1986). In the words of Spada, Hiou & Nikcevic (2006) “Procrastination has been presented as a strategy for regulating negative cognition and affect” (p. 320).

### **Cognitive-behavioural interventions with procrastination**

In the field of application of cognitive behavioural treatment to procrastination, very few studies have been reported. In a recent meta-analytic review of procrastination literature (Steel, 2007) notes that “Finally a book by Schouwenburg, Lay, Pychyl and Ferrari (2004) reviewed the topic” (p. 65). Their focus was primarily on “technical expositions of procrastination treatment programs for academic counsellors” (p. 65), and this is the general area in which this research falls. There are four studies that fall within the broad cognitive-behaviour paradigm in Schouwenburg et al.’s (2004) collection of studies compiled in his book *Counselling the procrastinator in academic settings* and these will be evaluated.

Van Essen, Van den Heuvel and Ossebaard (2004) report on two ‘self-management’ programs set up on the Groningen and Utrecht university campuses. They adopt an approach using a broad cognitive-behaviour framework including elements of reinforcement theory as well as Rational-Emotive Behaviour Therapy (REBT). They

attempt to address the cognitive, affective and behavioural dimensions of procrastination through group discussion and homework assignments disputing irrational thoughts and formulating 'effective' beliefs; developing appropriate study plans and time management; and using self-monitoring and stimulus control techniques, as well as self-reinforcement techniques to stabilise study behaviour. Both studies ran over seven sessions and used pre-post self-report inventories and questionnaires to measure behaviour change. They both report success with 'procrastination scores' dropping more than one standard deviation by the end of the course. A follow-up study using two groups (with and without the REBT component) found no difference in scores, suggesting that REBT was not a crucial component for change.

In another behavioural study using group monitoring, Tuckman and Schouwenburg (2004) used 'Task Management Groups' to apply structured time management and social reinforcement of the group to alter study behaviour. Dilatory behaviour beyond certain clear limits resulted in expulsion from the group. Results were measured using self-report inventories, a satisfaction questionnaire and an 'Academic Procrastination State Inventory' questionnaire. The results showed high satisfaction on the part of student participants, but little change in the average procrastination scores as measured by the inventory.

Work by Van Horebeek, Michielsen, Neyskens and Depreeuw (2004) also used a group context for a cognitive-behavioural approach with students with procrastination problems. Dobson (1988) has characterised cognitive-behavioural approaches as sharing a basic assumption that "internal covert processes called thinking or cognition occur, and that cognitive events may mediate behavior change" (p. 6). This fitted the work of Van Horebeek et al, who set up training sessions to "give the participants insight into the factors and processes that play an important role in causing procrastination" (p. 108). After reviewing goals and thinking patterns of their participants, the next phase used an applied behaviour analysis of their procrastinatory behaviour, involving antecedents, cognitive factors, and the behaviour and positive or negative consequences. Emphasis was placed on the processes and the students' interpretations of the situations they found themselves in. At weekly group meetings students reported their study hours and these were graphed and displayed, thus incorporating social reinforcement. Furthermore, students were encouraged to set up self-reward or punishment in relation to meeting their behavioural study goals. Self-reported weekly work hours and a pre-post questionnaire covering study valuation, task competence confidence, test anxiety and procrastinatory tendencies were used to assess changes, and written comments were submitted by students and found to be generally

positive. However, no systematic quantitative evaluation was undertaken. There was a drop-out rate of around 33% from the programme.

In summary, there is very little literature available regarding the treatment of academic procrastination, because the vast majority of the research is the correlational exploration of 'traits' associated with procrastination. The cognitive-behavioural work that has been done tends to be in group settings. It relies on social reinforcement, which may be effective but is difficult to record or quantify. In fact these treatment programmes have a large number of different factors operating together, and it is difficult to identify the main variables. In the one case where REBT was controlled for, it did not seem to make a difference (Van Essen et al., 2004). It is also not clear to what extent perceived-demand factors influenced the outcomes. These studies mostly used indirect measures of procrastination such as inventories or questionnaires. It was difficult to determine whether real change had occurred because no baseline data was taken (although pre-tests were often done) – but some of these studies would be no more than 'B' designs, with nothing more than the intervention phase and some student feedback.

This research project attempts to address some of these weaknesses by using a more structured research design for actual procrastination behaviour, as well as attempting to explore cognitive and affective dimensions emerging in the treatment programme, through a parallel qualitative study.

## **SPECIFIC AIM**

The aim of the research was to modify procrastinatory behaviour patterns of students through a standard behaviour modification programme, specifically a token reinforcement system. In addition to this, the researcher aimed to qualitatively analyse the affective elements and cognitive processes that occurred during the implementation of the programme, and the role of cognitions for procrastinatory behaviour, through weekly meetings, interviews, and self-reporting.

## **METHOD**

### **Participants**

Volunteers were recruited from the first-year psychology course at UCT for a study aimed at modifying procrastinatory behaviour. A total of 15 students applied through a motivational letter and three first-year students were interviewed to evaluate their suitability. Students working six hours or less per week who wanted to work a minimum of

10 hours per week were earmarked. All three of the participants (aged between 17 and 19 years) were female. The researcher and her supervisor, an experienced clinical psychologist, selected the participants.

### **Setting**

During the academic year, participants were required to monitor their academic behaviour in their designated study areas, for example at their desk at home or residence, or in the university library. All meetings and interviews took place in the psychology department at UCT.

### **Apparatus and instruments**

Notes and dictaphone recordings which were subsequently transcribed were used during weekly interviews with participants. Weekly time and comment sheets (see Appendix A and B) were provided for participants to record study hours and comment on their cognitive and affective responses to their own study behaviour within the token reinforcement program.

### **Design**

The independent variable was the monetary reinforcer, and the dependent variable was the number of hours studied weekly. A standard within-subject reversal experimental design (ABAB) was adopted (Kazdin, 2001). In the baseline phase (A), the pre-intervention level of study hours were completed and recorded daily by participants. In the intervention phase (B), a token reinforcement programme was implemented. Similar programmes were set up for each participant, although each programme was individually tailored according to timetable and extra-curricular requirements. A seven day programme was drawn up in which the participant selected specific hours for daily study. Study times were a full hour (60 minutes). The instruction to participants was that study hours should be rigidly completed for each study unit to be counted for reinforcement. Starting late or interrupting study resulted in the loss of the reinforcement. Participants were required to make study notes during every study period, and these were shown to the researcher at the end of each week as a form of proof of study. However, high levels of trust, integrity, and honesty were expected between researcher and participant.

Reinforcement was arranged as follows: participants were permitted to choose a reinforcer attached via a variable number of points, or reinforcement units correlated to each study period. In all three cases the participants chose their monthly allowance as the back-

up reinforcer, which they deposited with the researcher and could potentially earn back weekly. The allowance was distributed among the study hours on a variable ratio schedule, such that any particular hour may have had a very high or insignificant monetary value. For example, one study period may be valued at R1 and the next period R75; only the researcher knew the pre-arranged values attached to each study period. The participant was only informed of this value after she presented her completed weekly schedule to the researcher at the end of the week. Reinforcement was then paid out. The one direct requirement of the participants was that they comply fully with the rules of the study programme – that is, they report honestly and accurately on the study hours completed according to the rules, and hence properly experience the reinforcement contingencies.

### **Procedure**

Each participant was interviewed on the procedure of the study, and to evaluate her commitment to a twelve week research period. Consent forms (see Appendix C) outlining the costs and benefits of participation, as well as the practicalities of the programme were provided. Participants were given recording sheets to document time spent actually studying over the baseline period. They were instructed to write a one-page essay detailing: alternative activities (to studying), thoughts and feelings experienced during procrastination, and thoughts and feelings experienced when the time finally approached to complete the task for deadline. This data was submitted at the end of the baseline period, providing qualitative and quantitative data on the normal study behaviour of the participant.

The second interview explored their procrastinatory experiences and why they believed they procrastinated (see Appendix D for interview guide). After the interview, a study schedule was drafted. Participants indicated the specific study hours they wished to set aside each day. The rules of the experiment were explained, discussed and stipulated in a behaviour contract (see Appendix E). The behaviour contract emphasised compliance with the agreed-upon consequences if the rules were not adhered to.

The intervention strategy was constructed over a four week period. The study did not run over an exam or study week period as this would not reflect ordinary study behaviour. At weekly meetings participants met the researcher to collect their ‘earnings’, show the researcher notes as proof of study, and provide information on the cognitive and affective responses vis-à-vis the requirements of the programme.

After the four week intervention stage, participants returned to the baseline phase of documenting their study behaviour patterns – without intervention. This return to the

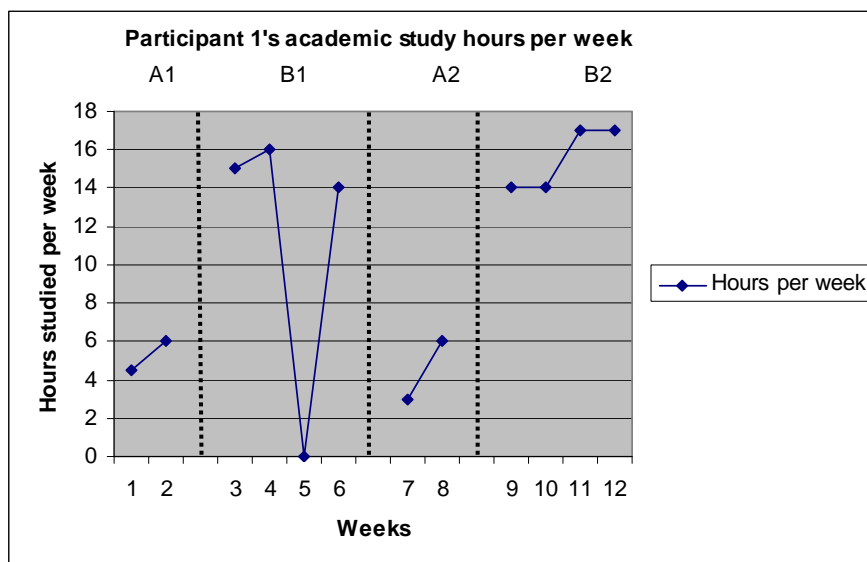


baseline phase occurred over an additional two weeks, and included the weekly interviews. The intervention strategy was then re-introduced as before for another four week period. At the end of the study, participants were asked to complete an evaluation sheet (see Appendix F), which communicated how participants had experienced the research process, and what improvements could be made for future administration of the study. The money they had lost was returned to participants, although they were unaware that this would happen from the outset (see Appendix G for ethical issues raised).

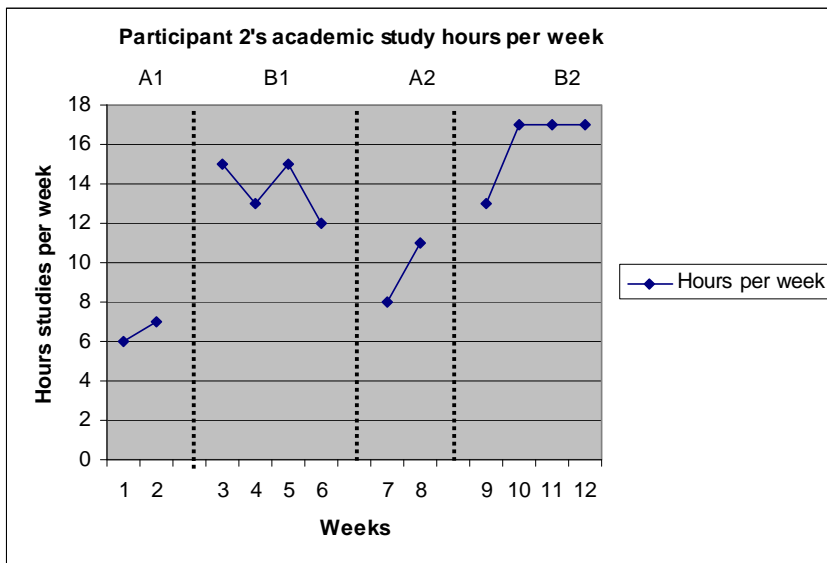
## RESULTS

### The applied behaviour analysis

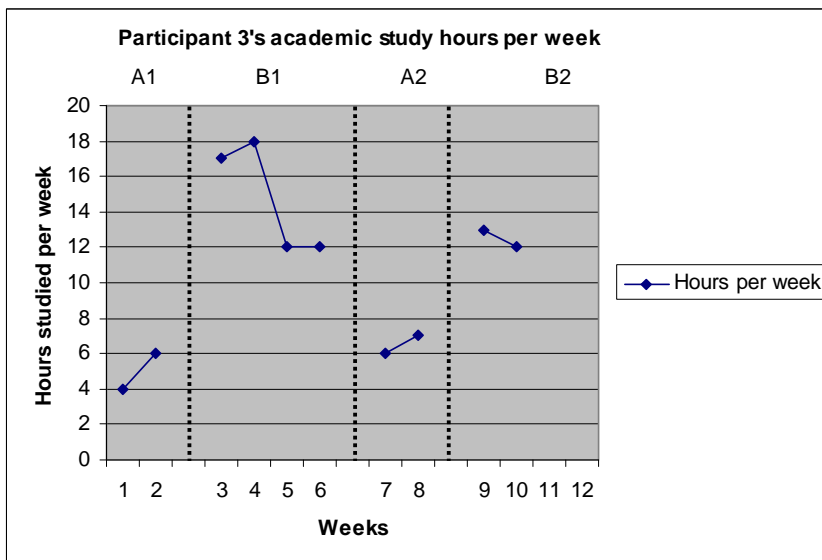
The quantitative applied analysis illustrates the outcome of the token reinforcement schedule, based on the frequency of study hours achieved. The results of the token reinforcement schedule are set out below with number of hours worked per week shown over the duration of the ABAB programme for the 12-week period. Furthermore, a comparison of the participants scheduled hours with actual hours completed is illustrated. These results are further contextualised in the data analysis section, which explores the data collected during the programme within a broad cognitive-behaviour paradigm.



**Figure 1** Participant 1's academic study behaviour over a 12 week cycle.



**Figure 2** Participant 2's academic study behaviour over a 12 week cycle.



**Figure 3** Participant 3's academic study behaviour over a 12 week cycle

Figures 1, 2 and 3 illustrate that the token reinforcement schedule increased the frequency of study hours. All three participants increased the average number of study hours from A1 to B2 by more than 200%. Participant 3 resigned from the research project during the second intervention stage in week 10 of the 12 week programme. Thus, her weekly hours represent only 2 weeks of intervention in B2, unlike participants 2 and 3 which represent 4 weeks of intervention in B2. Participant 1 did no work during week 5 of the intervention phase due to personal problems and thus recorded zero study hours. Both intervention phases indicated a marked increase in study hours for all participants. The

reversal phase of the programme during A2 when the intervention strategy was removed, illustrated a decline in all the participants study hours from B1.

**Table 1** Average study hours in each phase of the ABAB intervention design

<b>Baseline (A) and Intervention (B) Phases</b>	<b>Participant 1 Average hours studied</b>	<b>Participant 2 Average hours studied</b>	<b>Participant 3 Average hours studied</b>
<b>A 1</b>	5	6	5
<b>B 1</b>	11	14	13
<b>A2</b>	5	10	7
<b>B 2</b>	15	16	13

It is clear that all participants increased their working hours substantially from baseline (A1) to intervention (B1) phase, suggesting that the intervention was effective. In the reversal phase (A2), when reinforcement was suspended, the weekly averages fell significantly for all subjects, though with Participants 2 and 3 averages still remained higher than baseline. In the final intervention phase (B2), averages again increased to the same or more hours than B1.

**Table 2** Scheduled versus actual study hours completed

	Scheduled hours	Actual hours
<b>Participant 1</b>		
1	17	15
2	18	16
3	18	0
4	15	14
5	15	14
6	16	14
7	17	17
8	17	17
<b>Participant 2</b>		
1	17	15
2	15	13
3	15	15
4	13	12
5	12	13
6	12	17
7	15	17
8	17	17
<b>Participant 3</b>		
1	21	17
2	18	18
3	17	12
4	15	12
5	13	13
6	13	12
7		
8		

Table 2 illustrates that during B1 participants struggled to *actually* complete the hours that they scheduled. However, during B2 participants were more likely to fulfil their scheduled hours, and Participant 2 did more than scheduled.

## **DATA ANALYSIS**

### **A parallel qualitative data analysis of the token-reinforcement schedule**

The qualitative analysis of the project involved weekly collection of interview and self-report data (see appendix H for excerpts), which was analysed within the broad framework of reinforcement theory, incorporating cognitions.

The behaviour-modification treatment programme aimed to change behaviour based on the external reinforcement of a back-up monetary reinforcer, by linking completed study hours to a variable-ratio material reinforcement schedule. Although the behaviour outcomes in studies like this are attributed to the application of this single external reinforcer, the broad cognitive-behaviour analysis illustrated that the ‘reinforcing event’ of the participants’ behaviour was multiply determined. The self-generated feedback – thoughts and feelings accessed through interview sessions and written feedback – showed that other reinforcing stimuli may have had significant weight. The participants had their own beliefs, attitudes and assumptions about all aspects of the programme. Various affective responses went together with these, which determined whether feedback was aversive or reinforcing. All of this ‘self-generated feedback’ contributed to the construction of the reinforcing event and to the behavioural outcome. It is important to note that even ‘objective’ external reinforcers such as money are cognitively constructed by individual participants, and differentially weighted as reinforcers.

### **Conditioned emotional responses and affective feedback**

Affective elements appear to play an important part in procrastination, mainly through negative reinforcement. Participants seemed to go through three stages, with conditioned anxiety getting higher at each stage until the anxiety about not working outweighed the anxiety about sitting down to work. At that point there was usually not enough time to do it properly.

#### *At the beginning, when the task is initially received*

In the early stages participants felt conditioned anxiety when they thought about starting the work. They could reduce this anxiety by doing some other task, rationalising their

avoidance behaviour as important or as getting ready for study. Often this avoidance behaviour was also positively reinforced by some immediate gratification activity like eating. Negative feelings are suppressed at this stage. For example participants stated:

*Participant 1:* I feel so overwhelmed and anxious that I often close my bedroom door with all my work and go watch television or clean frantically.

*Participant 2:* I just need to eat something before I start work.

*Participant 3:* I'll start that in about half an hour I just need to relax for a bit.

#### *Half way through the procrastinatory process*

As procrastinatory avoidance continued, anxiety increased with guilty feelings (e. g. Fee & Tangney, 2000) that made the participants feel worse.

*Participant 1:* First I felt guilty for not doing it; then I felt scared at the amount of work I had.

I'm scared I'm not going to achieve, or do as well as I'd like to be doing, and that makes me feel guilty about it.

*Participant 2:* I feel guilty I did not work yesterday.

*Participant 3:* There are three things that I go through. I feel guilty 'cause I know I should be working and I know I could be doing well. And then I feel anxious. I'm like 'oh my goodness I have so much piled up I don't know what I'm going to do. And then like, I also, I get very scared just 'cause the anxiousness and the fear soak up all my actions.

The fear of exposure as incapable seemed to be linked to the fear of failure. Participant 1 repeatedly expressed this fear. "I can't fail! What happens if I fail?! It'll be really pathetically sad if I fail at the end of the year." This would probably link to a poor sense of self-efficacy and self-worth, which is connected to academic performance in this student. Some authors (Schouwenberg, 1992; Fee & Tangney, 2000) suggest that the fear of failing a task is linked to the fear of self-exposure and the negative evaluation of others.

#### *The state of urgency: just before the task needs to be completed, work finally begins*

By this stage the participants have to cope with two conflicting anxieties: anxiety about confronting the work and a rising anxiety about failing. This illustrates an 'avoidance-

avoidance conflict' (Passer & Smith, 2007), where the chosen behaviour will be the least anxiety-inducing alternative. Finally beginning to work is a negatively reinforced behaviour because it reduces the greater anxiety of not doing the work. This anxiety can be severe, as participants express the following sentiments.

*Participant 1:* I often lay awake feeling so anxious with my stomach in knots and having difficulty breathing that I needed my inhaler...When the sun comes up then I hit panic frenzy, at this point I know it's all over I can not turn back.

*Participant 2:* The night before an assignment is due I get so frustrated with myself for leaving it until the last minute.

*Participant 3:* I couldn't get to sleep because I was so stressed about failing the course...I started to beat myself up about leaving it so late...I tossed and turned feeling guilty, useless and a little desperate...my heart started beating furiously and I broke out into a bit of a cold sweat. I was panicking and the panic was disabling me to do anything about my situation.

Their dilatory behaviour left them feeling "disabled", "frustrated" and "useless", and undermines their sense of self-efficacy.

#### *Affective elements of regulated study behaviour*

When participants worked consistently in the programme they reported significant reduction of negative affective responses. Fixed study times made it easier to begin work and the benefit was felt:

*Participant 1:* I'm proud of myself. For the first time ever I handed my politics essay in two days before. It's a weird feeling. I had the feeling that there was no stress, and I was happy with my quality of work.

I realised how satisfied one can feel by actually putting in the effort and getting the results you want.

My anxiety is less. No asthma pumps didn't need to be on hand.

*Participant 2:* It feels really good to be prepared for a test.

Felt good about my work, and really pleased to be getting ahead of my psychology readings.

*Participant 3:* I felt proud at getting all my money for the week.

It feels good when I am able to stick to my hours.

The positive affective elements associated with the experience of engaging with the work before a level of urgency arose, allowed the participants to associate positive feelings with their interpretation of the work. However, as the weeks went by, other factors in the feedback complex became more influential, such as interference with socialising or the sense of having their time too controlled and over-structured. Participant 3 finally withdrew from the programme because she found the demands limited the spontaneity that she valued. Participant 2 on the other hand continued to feel positive about the programme throughout the process, illustrating the individual nature of responses.

### **External reinforcers**

#### *The token system and monetary back-up reinforcement*

The back-up monetary reinforcer used in the token system needed to elicit severe consequential feedback if not adhered to. In the study each participant received different allowance amounts depending on their living arrangements. Thus, the meaning and perceived value of the monetary amounts was different for each participant. Participant 3 relied on the money for food, transport and everyday living expenses, and felt more compelled to complete her hours as her lifestyle was directly affected by the consequence of not receiving this money. Participant 3 stated, “I just didn’t feel like doing it (studying); but I couldn’t afford to lose my money so I did”. Towards the end of the study, Participant 1 concluded that she did not regard the money as enough of an incentive for her to follow through with her commitments. She stated, “It’s just entertainment money. I can live without this money. There were times when I felt I didn’t depend on the money enough for it to actually make me do the hours”. Thus, the token system was not a strong enough reinforcer, as the consequences of not studying were bearable for Participant 1. However, despite the token system not bearing significant weight to reinforce the participant to study, her study hours did increase. Further analysis of other reinforcing mechanisms within the broader context of the study was therefore needed.

#### *Social reinforcement inherent in the research situation*

Participants may have been motivated to increase their study hours due to the special status of being research participants, or the ‘Hawthorne effect’ (Rosenthal & Rosnow, 2008).

Participant 3 stated, “I quite enjoyed the novelty of being part of the project.” The mere cognitive recognition and awareness of being part of the research project may have acted as a reinforcer for this participant to increase her study hours.

It was a clearly expressed condition for participation in the study that the intention of all concerned was to increase study hours, thus the ‘experimenter effect’ (Rosenthal, 1964) would not operate as a confounding variable. Nonetheless it seems possible that the researcher’s expectations of increased study hours were communicated repeatedly, for example through nonverbal affirmation of successful study behaviour. Thus although the researcher intended to maintain a neutral position in relation to the subjects through ordinary, cordial interaction, the participants could easily have interpreted this as affirmation which would positively reinforce them. This will be discussed in more detail under the sub-heading *Perceived demand characteristics*, since the participants’ interpretations are of great importance from this perspective.

The monitoring process involved weekly meetings with each participant throughout the study, to check the hours and pay out for hours completed, to check study notes written as proof of hours completed, to make any necessary changes to the week ahead, and to debrief the participant about the experience of the week’s work. This engagement with the researcher was seen as significant to the participants, who indicated that they found it a strong source of reinforcement. For example, participants stated:

*Participant 1:* I felt compelled to do work because I had to show it.

*Participant 2:* It forced me to plan out my life at the beginning of each week.

I only worked because I had committed to the sessions. I had to force myself to sit at my desk and continue until the work was done.

The meetings provided a reflective space for the participants to express their thoughts and feelings about the past week’s study behaviour. This form of social interaction appears to have further reinforced study behaviour as it encouraged participants to develop awareness of their behavioural choices. As Participant 2 documented:

I think the weekly meetings were the best part of the programme. Not only did I get to plan the week ahead, but I was made to reflect on the past week, and I guess there was a sort of therapeutic value in that. I had to articulate my thoughts and feelings to someone else.



Thus, it seemed that the monitoring process served as social reinforcement for study behaviour and also helped to articulate the participant's perspective on studying. Other social reinforcement that seemed to strengthen study behaviour came from the immediate social and family network of the participants.

*Social feedback in the study situation*

a) Distractions

All participants struggled to reduce the amount of social distractions and temptations while on the programme. Participant 2 articulated the difficulty in having to prioritise her studies over socialising and stated, "The most challenging aspects of the programme were, having to turn people down when I had a session, and having to switch off my cellphone during study sessions". This participant lived in a university residence and expressed that the social interaction was extremely tempting, illustrating a frequent finding in the procrastination literature (Schouwenburg & Groenewoud, 2001). However, whilst on the programme, the punishing effects of distractions encouraged Participant 2 to relocate her place of study to the library which reduced cues for social interaction. Other participants reported the following:

*Participant 1:* I struggled to work some evenings and on the weekends because it's family time, and so we always have my extended family, you know my cousins and them, dropping by.

*Participant 2:* In the beginning it was tough because I hated telling people to leave me alone when I was doing a session. I worried that they might take it the wrong way and I'd be left out of social arrangements.

*Participant 3:* My intentions to study were really good today; but I kept on getting distracted by people walking into my room.

Today was a disappointing day because my roommate interrupted me, and then my sister dropped by.

From these statements it can be interpreted that participants did not always know how to assert their needs in fear of negative social evaluation, and thus blamed their inability to work effectively on the other people as noted in other studies (Pajares, 1996; Jassen & Carton, 1999).

b) Reinforcement and punishment effects received from other people whilst on the programme

How people around the participants reacted to their involvement with this project generated reinforcing or punishing effects. Participant 2 stated that: “My roommate thought it was very funny that I was on your programme, and she kept purposefully trying to distract me as a joke.” This illustrated how she was punished through her external social environment. Participant 3 stated that: “When my mother found out I had to hand over my allowance, and that it would be reduced if I didn’t work, she discouraged me for involving myself.” Participant 3’s mother’s opinion negatively reinforced her daughter to withdraw from the study, and she said in the debriefing when she withdrew early that “My mother’s voice was still ringing in my head”. Participant 1’s mother positively reinforced her by decreasing the environmental distractions in the home. For example when the participants cousins dropped by for a visit whilst the participant was studying in her room, the mother would inform them that she was studying and couldn’t be interrupted. She stated: “Ja, so like, my ma is kinda supporting me, and not just nagging at me all the time to do my work. She would tell my cousins that they couldn’t come disturb, because I was on this study programme for the university. My mom liked the idea of me having to actually work properly.” Thus the participants had to deal with people in their lives who responded to their involvement in the programme. Depending on how they interpreted and managed this social feedback would either reinforce or punish their compliance with the intervention strategy.

**Self-generated feedback**

As discussed earlier, self-generated feedback is shaped to a large extent by metacognitions (Spader et al., 2006) which include overarching beliefs and self-efficacy beliefs. Beliefs pertaining to personal study capabilities, attitudes towards particular course subjects and beliefs about personal priorities in life and about participants’ capacity to cope effectively with study requirements were elicited during interviews and extrapolated from the qualitative data gathered, showing the powerful impact that these had on participants’ study behaviour. For example, a metacognition ‘I need to please people or I will be rejected’ may lead to reinforcing self-generated feedback that ‘I have completed most of the study hours so the researcher will be happy’, or punishing self-produced consequences such as ‘I have not spent enough time with friends, so they may exclude me’. The role of metacognitions needs to be acknowledged and discussed where appropriate; however the discussion will

mostly focus on ‘operational’ cognitions reported by participants. In this study, major themes that arose with self-generated feedback include ‘perceived-demand’ characteristics of the research situation, issues of self-regulation, perceptions about study capabilities and self-efficacy, counter-productive or irrational beliefs, and issues of self-regulation.

*Perceived demand characteristics of the research process*

Perceived demand characteristics of the study may have potentially affected the outcomes (Rosenthal & Rosnow, 2008). The researcher explicitly stated that participants needed to do what they believed was most beneficial to them, and that her main concern was that the participants stick to the behavioural contract. Despite this the participants constructed their own personal interpretation of the study, which may have affected their behaviour.

Participant 1 maintained that having authority figures monitor her study behaviour provided her with a larger incentive. She stated:

Even though you are a student, you still like an authority figure for me. The fact that you in a position of authority causes me to still have the mentality of a scholar not wanting to disappoint the teacher. So even though there may be no consequences for not doing the work I would feel guilty if I showed up empty handed, so that sort of drove me.

To avoid the feeling of guilt she ensured that she complied with what she perceived would please the researcher. Furthermore she stated, “Terry<sup>1</sup> is also like an authority figure. I am scared that if I don’t do your project properly he’ll pick on me in lectures.” The perceived status of the researchers, and the perceived danger of the lecturer singling her out in front of a large group of other students positively and negatively reinforced her study behaviour. Thus her perceptions elicited enough negative affective feedback to negatively reinforce her study behaviour, through the belief that if she did not comply she would experience punishing consequences.

The need to please the researcher contributed to reinforcing the participants study behaviour. Participant 1 stated, “I knew I had to do it (study), because you (the researcher) relied on me.” Despite the researcher’s statements that all that was necessary was compliance with the rules, they felt obligated to perform for the researcher as if the

---

<sup>1</sup> The participants psychology lecturer, and the supervisor of the research project.

researcher needed them to actually complete the hours. At the end of the programme participant 2 wrote that:

I did find myself studying more because of the hours that I had committed to and the money ... But I also felt that if I didn't fulfil my hours I'd be letting the researcher down, because she wouldn't get her results. Although it must be noted that this was not direct external pressure from her.

All three of the participants involved in the study stated that they were "people pleasers" and found it difficult to disrespect or not comply with the researcher's programme. Therefore, 'demand characteristics' seemed to potentially influenced the experimental outcome of the token system (Denzin, 2006).

*Perceptions about study capabilities and self-efficacy*

All participants entered the study with the belief that they were underachieving at university. Participant 1 articulated: "My procrastination habits hinder me from achieving the marks that I am capable of." But at the same time she also stated:

I'm not the sharpest tool in the shed; and  
I hate psychology at the moment I don't know how to study it. I have to think for myself...I'm not a good thinker so, once I fall behind I feel like I can't come up for air. The subject intimidates me.

This reiterates the literature which emphasises that individuals need to not only believe the task is attainable, i.e. that they have the capacity to achieve the marks; but that they are capable of achieving the task (Burns et al., 2000; Bandura, 1974; Thompson, 2004). Her initial belief that she lacked the ability to think makes her believe the task is unachievable, and thus she avoids it until she gets too anxious to put it off any longer. In week 4 of B1, Participant 1's cognitive report back illustrated that despite knowing she had a psychology test at the end of the week, she left her psychology studying till the day before. On the day before the test she stated, "More psychology today. The bottom line is I hate it! I have to study for it today because the test is going to kill me!" The implication of her words "kill me" suggest she perceives herself as a victim of the academic work. These fearful thoughts of the looming task she experienced as a punishment. Her low sense of self-efficacy towards

psychology is linked to the self-generated feedback she constructs (Bandura, 1977) in contrast to her law subjects where she felt she was more capable and thus spent most of her allocated study hours working on law. Furthermore, she has positively reinforced herself to study law, through her constructed belief that “law campus is highly regarded by other people, so I don’t want to fail law. Going to upper campus for my electives isn’t as prestigious as studying on law campus. Plus I don’t understand psychology and I hate it.” Her belief of the status of law suggests her reliance on external social reinforcement. The combination of her lack of self-efficacy, external locus of control and her rationalisation that psychology is less prestigious than law, acted as a punishment for working on psychology, though law study was more positively reinforced.

Higher self-efficacy led to positive self-statements, which in turn reduced the experience of negative affective and cognitive feedback. Participants noted that when they enjoyed the course work and felt that they were capable of performing the tasks the studying was easy. This is indicated in statements such as, “I enjoy writing English essays. I also think I’m quite good at it when I get down to doing it so that helps motivate me.”

Although all three figures in the results illustrate a reduction in study hours during A2, this may be partly due to the participants thinking that this is what the researcher expected. Participant 2 stated: “It was a relief to be back to baseline, as I felt like I could relax again.” However, when she appeared at the beginning of B2, she brought with her a detailed list of all the work she aimed to complete in the week and structured her hours according to her study objectives. She only committed to hours she believed she could definitely fulfil and then did more managing to exceed her target hours by 8 hours. She felt proud at having taken control of the programme and managed it according to her intrinsic motivation, rather than feeling controlled by it.

#### *Counterproductive or irrational belief structures*

At times the participants showed counterproductive beliefs and unrealistic expectations (Burns et al., 2000). Participant 1 described how she would avoid work during the week telling herself she had plenty of time over the weekend. However, when the weekend arrived she adopted the belief that weekends were sociable days where everyone relaxed. Her statements illustrate these rationalisations:

I really wasn’t feeling like I should be studying on a Friday. It feels wrong.

Did absolutely nothing today; but it’s Saturday, need I say more.

Why did I say I'll get up at 7am to start studying at 8am! Who does that?!

Working early on Saturday mornings is not normal.

This work is far too boring for me to do on a Saturday.

It's Friday and I'm in a party-vibe not in a law-vibe so there goes my study intention!

Participant 1 measured her behaviour with what she interpreted as “normal”, as she had constructed expectations of what weekends ought to be like, which were further reinforced by her parents and the extended family, who would gather on weekends. Her belief about the weekends however, was inconsistent with her attitude towards her work during the week where she constantly told herself, “I've had a long day at varsity, I really need to relax this evening, so I'll do it later or on the weekend.” Thus she transfers work to the weekend, but does not recognise the basic belief she holds about the weekends. Thus her beliefs and are inconsistent with her study objectives.

.

#### *Cognitive evaluation of beliefs regarding studying behaviour*

Through reflection on their thoughts and feelings over the programme the participants were able to reduce the discrepancy between their expectations and reality. Furthermore it gave them the opportunity to increase their self-awareness of their behaviours, thoughts and feelings.

Table 2 illustrated the scheduled study behaviour versus the actual study behaviour. The discrepancy between the targeted and actual study behaviour during B1 was higher for all three participants than in B2 illustrating that in the beginning they were not aware of what they were actually capable of achieving, and thus set inappropriately high expectations. This would correspond with recent literature that stated that procrastinators have a greater discrepancy between what they ought to achieve and what they are actually can achieve (Ferrari et al., 2007). However, during B2 all participants set hours they were more likely to fulfil, illustrating the formation of more realistic perceptions about their actual study capabilities.

Participants 2 and 3 reported that the programme increased their awareness of their behaviour, and of the beliefs and perceptions they maintained. Whereas Participant 1 maintained that she “did not really” increase her awareness of her procrastinatory habits, although she did find the weekly meetings a “reality check” as she had to report the

thoughts and feelings she experienced. Thus she had to engage with her attitudes and perceptions about her studies continuously.

*Participant 1:* The weekly meetings were like a reality check for me. I realised I couldn't continue pulling all-nighters, so I guess I had to get my head out the clouds. Even though I was working my hours, I was made aware of how much I hate psychology and how I avoid it. I also realised that sometimes I have to work on weekends, if I don't finish my work during the week, even though I like to regard weekends as social times.

*Participant 2:* Having to keep records in the first baseline period, of what made me procrastinate and what distracted me increased my awareness of my behaviour. The weekly meetings were instrumental in increasing my awareness, as I was forced to articulate my thoughts and feelings about my work to someone else.

*Participant 3:* I was made aware of certain ways of thinking and attitudes I have. For example, I realised that in a decision between supporting a friend and fulfilling a social engagement; and completing work commitments I would almost always lean to the social side. I realised that this isn't acceptable at a university level.

A possible interpretation might be made that the participants' increased awareness and insight allowed them to develop a more realistic self-concept in relation to their student role (Ferrari et al., 2007; Harrington, 2005). This was the first step to gaining self-control over the behaviour. Greater understanding is important for changing the self-generated rationalisations that support procrastinatory behaviour (Milgram & Toubiana, 1999).

#### *Issues of self-regulation*

An interesting phenomenon occurred during B2. All three of the students adopted their own form of self-regulatory mechanisms to comply with the demands of the programme. Although the monetary reinforcement schedule still operated it can be interpreted that they developed intrinsic motivations to the aim of their involvement in the programme. For example, Participant 1 stated:

During the first phase of intervention I was more driven by the money because there was no way I was going to lose my money just for not doing the work. But in the second intervention phase it was the fear of failing that drove me more. I realise my academics are on the line and if I don't jack myself up I would be in serious trouble at the end of the year.

Thus Participant 1 implied that during B1 she was externally motivated; however, in B2 she was intrinsically motivated by her fear of failure and developed an internal need to comply with the study programme.

Participant 2 developed a self-regulated strategy during B2 to avoid losing money and increase her sense of control. "I felt as if I lost enough money during B1, and I was determined not to lose another cent. Plus I realised that it was useful to have someone else monitor my behaviour, so while I was on the programme I needed to use it to my advantage." At the beginning of B2 she brought a detailed list of her work requirements and filled in her study hours based on her actual academic task load, rather than her imagined load. The results illustrated in B2 that she exceeded her target study hours by 14%. She stated, "Going beyond what I had originally targeted gave me a sense of achievement." Participant 2 maintained that "I gained a lot of insights into myself, my habits, and preferences because I had to articulate myself constantly."

At the beginning of the programme Participant 3 maintained that she was "battling" with the academic work load at university and wanted to do more. But although A1 and B1 worked well for Participant 3, she expressed feelings of frustration and resentment during A2 and B2. It was during this phase that she decided to resign. She realised: "Studying is important. But people are more important to me. So if my family or friends need me then I will be there. It's worth the personal expense, even if my studies have to go down." It seemed that the extrinsic motivation was not working for her in the long run. At the end of the study when re-asked why she wanted to be part of the study, she stated:

That's a good question. I guess I always thought I wanted to work harder; but I have realised that I was probably more curious about being part of a postgraduate project than increasing my study behaviour. I am still interested in my academic work; I'm just not prepared to sacrifice being there for others; which means I need a flexible agenda. I just think what I want in my life doesn't fit with the aim of this programme.



She believed that she needed to have the freedom to be “spontaneous” and have control over her own behaviour patterns, despite their irregularity, as she felt too controlled and restrained by the programme. “I feel too controlled in this process and I feel like the money doesn’t motivate me enough anymore, but I can’t afford to lose it. I guess I need something more.” It is possible that she was expecting the researcher to be more socially affirming, since she believed that social affirmation was what motivated her intrinsically.

## **DISCUSSION**

The outcome of the token-reinforcement schedule demonstrated a substantial increase in the frequency of study hours completed by all three participants during the intervention phases of the programme. A 12 week within-subject ABAB design programme was completed by Participant 1 and 2. Participant 3 completed 10 weeks of the programme, after which she decided to resign as she felt the programme was too restraining for her “spontaneous” lifestyle, and demanded too much of her time. However, her results, captured over the 10 week period incorporated in the study, also showed clear increases in study time in the intervention phases. All three participants increased their study hours by more than 200% from A1 to B2. When the monetary back-up reinforcer system was removed in the reversal phase of the programme, the results showed a decrease in study hours from B1 to A2. Two of the participants showed somewhat higher average study frequency hours in the A2 than in A1, although this was still less than 10 hours per week. The increase in A2 (return to baseline) readings for Participant 2 and 3 suggests that other reinforcing factors may have contributed to sustaining higher A2 study frequency results in comparison to their A1 study frequency results.

The applied behaviour modification programme relied on the value of a single monetary back-up reinforcer to elicit a change in study behaviour, and the results show a substantial increase. Apparently a money reinforcer (of high value in these students’ budgets) clearly brought about behaviour change. However, the reflexive information provided within the broader cognitive-behaviour analysis, contextualised the participants’ conditioned affective responses and cognitive interpretations of their study programme, and suggested that other external reinforcing (and punishing) factors may have operated as well. These include: the social reinforcement inherent in the research situation and the social feedback in the study situation. Furthermore, interview data showed that self-generated feedback formed an integral part of the ‘reinforcing event’, with participants’ values and attitudes giving weight to external feedback.

The participants (as in the study by Schouwenburg & Groenewoud, 2000), voluntarily participated in the programme as they believed it would help their procrastination problems. Furthermore, they manifested a number of self-generated beliefs in relation to the project: they felt that they needed to please the researcher by increasing their study hours – referred to as perceived demand characteristics (Kanter, Kohlenberg, & Loftus, 2002), they responded to attention from participating in a research study – referred to as the Hawthorne effect (Rosenthal & Rosnow, 2008), and feared negatively evaluated if they did not comply with the programme (also documented by Burns et al. 2000). These beliefs elicited conditioned affective responses of anxiety, confidence, pleasure, fear, relief, or satisfaction, and constituted part of the perceived feedback complex constituting the reinforcing event. Hence the overall reinforcing event included: receiving their own money back as a reward or losing it as punishment, the social reinforcement of the researcher situation i.e. monitoring their behaviour and close attention to their progress, and the social reinforcement of the study situation i.e. people's punishing or rewarding reactions to their study behaviour. Positive perceived self-generated feedback included factors such as pride in having fulfilled personal commitments, pleasure at fulfilling the researcher's expectations, and a sense of importance for being part of an honours project. The potential negative self-generated feedback of the social reinforcement in the research situation included factors such as anxiety of negative evaluation of the researcher, disappointment at loss of money, frustration of inflexible weekly programming, the frustration of feeling 'controlled' by the schedule, denial of more attractive activities, and (in one case) unwanted engagement with personal thoughts and feelings.

In all three participants, procrastinatory behaviour was a response to aversive conditioned affective responses to a task, which were elicited by inherent metacognitions. (Spada et al., 2006; Flavell, 1979). At times participants demonstrated counter-productive beliefs, for example 'I can't work on weekends because no-one else does', that were inconsistent with their study objectives, or responded in terms of low levels of perceived self-efficacy, for example, 'That task requires capacities I do not have' (Bridges & Roig, 1997; Harrington, 2005) which aroused feelings of anxiety, stress, frustration and helplessness in relation to the tasks (Rothblum et al., 1986; Solomon & Rothblum, 1984; Spada et al., 2006; Ferrari, 1992; Harrington, 2005). External reinforcing stimuli predominantly occurred through social distractions (chatting to friends, Facebook, emailing), or other social punishing effects (mom not supporting the participants involvement in the project). The perceived self-generated feedback of avoiding the task

temporarily reduced anxiety, despite an associated level of guilt (Ryan, 1982). As the urgency of the task increased the subjective benefits of procrastinating diminished and the extreme negative affective elements of anxiety, fear of failure, and panic finally elicited immediate academic action as not working became more stressful than work-avoidance (Senecal et al., 1995).

### **Limitations of the study**

Within-subject designs like this rely on accumulation of case evidence for their validity (Rosenthal & Rosnow, 2008; Kazdin, 2001). Three subjects is a small sample, difficult to generalise from. A control group with weekly meetings but no token system might have excluded the possible carry-over effects of the reversal design. It is also not really clear why reversal phase study hours did not return to baseline for two participants.

The study also relied on the difficulty of knowing if participants were truthful about hours worked, although the production of study notes provided more controls than other studies cited in the literature. Given the financial reward involved, there is incentive to ‘cheat’ so as not to lose money.

Another problem was that in a field study there are many unknowns. It is difficult to determine the weighting of components of the reinforcing event, or even determine all of the components of the reinforcing event. Token systems rely on one heavily weighted positive reinforcer to outweigh all other constituents of the reinforcing event. In this study, for example, the monetary reinforce may not have been very heavily weighted for Participant 1 because she did not rely on the money for her day-to-day living, for Participant 3 the aversiveness of the tight programme control was heavily enough weighted to make her withdraw from the study, as she relied completely on the money for her daily living.

Any pressing academic deadline could have skewed performance in a particular week, but the study did not run in exam time or study week, so this was partly controlled. The quality of work done and appropriate selection of work is also not controlled in this study, so important areas of work – as with Participant 1, may continue to be procrastinated.

In summary, academic procrastination and study behaviour is complex, and simple behavioural studies may change study behaviour on the surface, but many of the cognitive unknowns in this kind of study may be crucial for the real-world success of the application.

## CONCLUSION

Behaviour modification programmes that add a single highly weighted reinforce to the reinforcing event, as token reinforcement programmes do, can be very effective in changing behaviour, as this study shows. However, it also seemed from qualitative analysis that other cognitive and affective elements of the reinforcing event can play a very powerful role and as in the case of one of the participants, lead to withdrawal from the programme, even though it was changing her behaviour in the way she initially wanted. All of the participants altered their behaviour in ways that made them feel more in control of their study behaviour, rather than being externally controlled. It was also true that taking part in the programme increased their awareness of their behaviour thoughts and feelings and got them to re-evaluate some of the beliefs about their study priorities that they originally held. Self-generated feedback – in other words the thoughts and feelings of participants – were more important than the graphed results indicate. This may clarify why behaviour modification programmes such as token reinforcement which work on ‘extrinsic’ reinforcement, may not have lasting effects (Deci, 1971) and why behaviour change programs need to take cognitive and affective factors properly into account.

## REFERENCES

- Bandura, A. (1974). Behavior theory and the models of man. *American Psychologist*, 849-869.
- Bandura, A. (1977). Self efficacy: Toward a unifying theory of behavioural change. *Psychological Review*, 84, 191-215.
- Baumeister, R. F., & Scher, S. J. (1988). Self defeating behaviour patterns among normal individuals: Review and analysis of common self-destructive tendencies. *Psychological Bulletin*, 104, 3-22
- Bridges, K. R., & Roig, M. (1997). Academic procrastination and irrational thinking: re-examination with context controlled. *Personality and Individual Differences*, 22, 941- 944.
- Burns, L. R., Ditmann, K., Nguyen, N. & Mitchelson, J.K. (2000). Academic procrastination, perfectionism, and control: Associations with vigilant and avoidant coping. *Journal of Social Behavior and Personality*, 15, 35-46.
- Cautela, J. R., & Kearney, A. J. (1990). Behavior analysis, cognitive therapy, and covert conditioning. *Journal of Behaviour Therapy and Experimental Psychiatry*, 21, 83-90.
- Deci, E. (1971). Effects of externally mediated rewards on intrinsic motivation. *Journal of Personality and Social Psychology*, 18, 105-115.
- Denzin, N. K. (2006). *Sociological methods: A sourcebook*. Chicago: Addine Transaction Publishers.
- Dobson, K. S. (1988). *Handbook of cognitive-behaviour therapies*. New York: Guilford Press
- Fee, R., & Tangney, J. (2000). Procrastination: A means of avoiding shame or guilt? *Journal of Social Behaviour and Personality*, 15, 167-184.

Ferrari, J. R. (2004). Trait procrastination in academic settings: An overview of students who engage in task delays. In Shouwenburg, H. C., Lay, C. H., Pychyl, T. A., & Ferrari, J. (Eds), *Counseling the procrastinator in academic settings* (pp. 19-28). London: United Book Press.

Ferrari, J. R. (2001). Procrastination as self-regulation failure of performance: Effects of cognitive load, self-awareness, and time limits on 'working best under pressure'. *European Journal of Personality*, *15*, 391-406.

Ferrari, J. R., Driscoll, M., & Diaz-Morales, J. F. (2007). Examining the self of chronic procrastinators: Actual, ought, and undesired attributes. *Individual Differences Research*, *5*, 115-123.

Flavell, J. H. (1979). Meta-cognition and cognitive monitoring: A new area of cognitive-developmental inquiry. *American Psychologist*, *34*, 906-911.

Harrington, N. (2005). It's too difficult! Frustration intolerance beliefs and procrastination. *Personality and Individual Differences*, *39*, 873-883.

Jassen, T., & Carton, J. S. (1999). The effects of locus of control and task difficulty on procrastination. *The Journal of Genetic Psychology*, *160*, 436-442.

Kanter, J. W., Kohlenberg, R. J. & Loftus, E. F. (2002) Demand characteristics, treatment rationales, and cognitive therapy for depression. *Prevention & Treatment*, *5*, 1-16.

Kazdin, A. E. (2001). *Behaviour modification in applied settings* (6<sup>th</sup> Ed.). United Kingdom: London: Wadsworth Thomas Learning

Levine, F. M., & Fasnacht, G. (1974). Token rewards may lead to token learning. *American Psychologist*, *29*, 816-820.

Milgram, N., & Toubiana, Y. (1999). Academic anxiety, academic procrastination, and parental involvement in students and their parents. *British Journal of Educational Psychology*, *69*, 345-361.

Olafson, L., Schraw, G., & Wadkins, T. (2007). Doing the things we do: A grounded theory of academic procrastination. *Journal of Educational Psychology, 99*, 12-25.

Pajares, F. (1996). Self-efficacy beliefs in academic settings. *Review of Educational Research, 66*, 543-578.

Passer, M. W., & Smith, R. E. (2007). *Psychology: The science of mind and behaviour*. New York: McGraw-Hill

Rothblum, E. D., Soloman, L. J., & Murakami, J. (1986). Affective, cognitive, and behavioural differences between high and low procrastinators. *Journal of Counselling Psychology, 33*, 387-394.

Rosenthal, R. & Rosnow, R. L. (2008). *Essentials of Behavioral Research: Methods and data analysis*. New York, United States of America: McGraw-Hill.

Ryan, R. M. (1982). Control and information in the intrapersonal sphere: An extension of cognitive evaluation theory. *Journal of Personality and Social Psychology, 43*, 450-461.

Senecal, C., Koestner, R., & Vallerand, R. J. (1995). Self-regulation and academic procrastination. *Journal of Social Psychology, 135*, 607-619.

Schouwenburg, H. (1992). Procrastination and fear of failure: an exploration of reasons for procrastination. *European Journal of Personality, 6*, 225-236.

Schouwenburg, H., & Lay, C. (1995). Trait procrastination and the big-five factors of personality. *Journal of Personality and Individual Differences, 18*, 481-490.

Schouwenburg, H. C., & Groenewoud, J. T. (2001). Study motivation under social temptation; effects of trait procrastination. *Personality and Individual Differences, 30*, 229-240.

Schouwenburg, H. C. (2004). Procrastination in academic settings: General introduction. In Schouwenburg, H. C., Lay, C. H., Pychyl, T. A., & Ferrari, J. (Eds), *Counseling the procrastinator in academic settings* (pp. 3-18). London: United Book Press.

Solomon, L. J., & Rothblum, E. D. (1984). Academic procrastination: Frequency and cognitive –behavioral correlates. *Journal of Counselling Psychology*, *31*, 503-509.

Spada, M., Hiou, K., & Nikcevic, A. (2006). Metacognitions, emotions and procrastination. *Journal of Cognitive Psychology*, *20*, 319-326.

Steel, P. (2007). The nature of procrastination: A meta-analytic and theoretical review of quintessential self-regulatory failure. *Psychological Bulletin*, *133*, 65-94.

Stober, J., & Joormann, J. (2001). Worry, procrastination, and perfectionism: Differentiating amount of worry, pathological worry, anxiety, and depression. *Cognitive Therapy and Research*, *25*, 49-60.

Tharp, R. G., & Wetzel, R. J. (1969). *Behaviour modification in the natural environment*. New York: Academic Press.

Thomson, T. (2004). Failure avoidance: parenting the achievement environment of the home and strategies for reduction. *Learning and Instruction*, *4*, 3-26.

Tuckman, B. W., & Schouwenburg, H.C. (2004). Behavioral interventions for reducing procrastination among university students. In Shouwenburg, H. C., Lay, C. H., Pychyl, T. A., & Ferrari, J. (Eds), *Counseling the procrastinator in academic settings* (pp. 91-104). London: United Book Press.

Van Essen, T., van den Heuvel, S., & Ossenbaard, M. (2004). A student course on self-management for procrastinators. In Shouwenburg, H. C., Lay, C. H., Pychyl, T. A., & Ferrari, J. (Eds), *Counseling the procrastinator in academic settings* (pp. 59-74). London: United Book Press.



Van Hoorebeek, W., Michielsen, S., Neysken, A., & Depreeuw, E. (2004). A cognitive-behavioral approach in group treatment of procrastination in an academic setting. In Shouwenburg, H. C., Lay, C. H., Pychyl, T. A., & Ferrari, J. (Eds), *Counseling the procrastinator in academic settings* (pp. 105-118). London: United Book Press.

Wolters, C. (2003). Understanding procrastination from a self-regulated learning Perspective. *Journal of Educational Psychology*, 95, 179-187.

Wolpe, J. (1982). *The practice of behaviour therapy*. New York: Pergamon.

**APPENDIX A****Baseline Sheet**

DATE:

**Time Worked**

From	To

**Comments**

**APPENDIX B****Intervention Weekly Schedule**

	<b>Time</b>						
<b>MONDAY</b>							
<b>Work covered</b>							
<b>TUESDAY</b>							
<b>Work covered</b>							
<b>WEDNESDAY</b>							
<b>Work covered</b>							
<b>THURSDAY</b>							
<b>Work covered</b>							
<b>FRIDAY</b>							
<b>Work covered</b>							
<b>SATURDAY</b>							
<b>Work covered</b>							
<b>SUNDAY</b>							
<b>Work covered</b>							

**Record of thoughts and feelings during intervention phase**

<b>MONDAY</b>	
<b>TUESDAY</b>	
<b>WEDNESDAY</b>	
<b>THURSDAY</b>	
<b>FRIDAY</b>	
<b>SATURDAY</b>	
<b>SUNDAY</b>	

## APPENDIX C

### Consent form

**Title of research project:** Procrastination and behaviour modification

**Name of principal researcher:** Claudia Colarossi

**Telephone number:** 082 550 3456

**Email:** claudiacolarossi@gmail.com

**Name of participant:**

### Nature of research

#### *Description of study*

This research project will analyse and modify the study behaviour of a small sample of UCT students. It specifically looks at their study habits and their concern with their procrastinating behaviour.

Participants will voluntarily apply to participate in this study. They will then be selected and invited to engage with behaviour modification strategies under the supervision of Terry Dowdall and Claudia Colarossi. A token system will be used to administer the change in behaviour. This token system will be backed up with a chosen value resource to the participant, which will be delivered according to their behaviour. The study will use a within subject ABAB design with each subject.

#### *Requirements from participants*

- Initial interview with researcher.
- Documentation of ordinary study patterns, i.e. number of study hours per week over a maximum of a three week period on a time sheet provided by the researcher.
- Personal history interview with researcher.
- A meeting explaining the intervention strategy agreed upon by participant.
- Documentation of study hours during the intervention period over a maximum of a six week period.
- The student will be required to document their ordinary study hours again over a maximum of a three week period.
- The intervention strategy will terminate.
- The student will be required to show hard copies of academic course work constructively worked on as proof of study throughout the duration of the study.
- The student needs to demonstrate that they are willing to commit themselves to this study.

***Benefits to participant***

- Potential increase academic performance and grades obtained by student.
- Less stress and worry about academic assignments and test.
- Insight gained into how postgraduate research projects are conducted.
- Insight gained into personal behaviour patterns, cognitive thought processes and study habits.

***Costs***

- Time: meetings, documentation of hours
- The intervention mechanism through a token system which will “benefit” or “cost” the participant.

***Level of Commitment***

This statement expresses that the participant is committed to working with the researcher on the research project, covering behaviour modification and procrastination. The participant will adhere to the standards and requirements of the study. The participant, at any time, will be free to terminate their involvement if they feel indisposed to continue within the study and will let the researcher know immediately.

I, ..... hereby agree with the above

information pertaining to the described study, and am choosing to volunteer my services.

Participant signature: .....

Researcher signature: .....

Supervisor signature: .....

## **APPENDIX D**

### **Interview Questions**

1. What does procrastination mean to you?
2. When do you think you first started procrastinating? Describe this time in your life.
3. How do you cope with the academic tasks you receive?
4. What do you do to avoid task engagement?
5. Describe your thoughts when you delay a task.
6. How do you feel when you see your academic books, tasks waiting for you on your desk?
7. What do you think the day or night before the task deadline.
8. How do you feel the day or night before the task deadline?
9. Who are the people you interact with in your study environment?

## APPENDIX E

### Behaviour Contract

#### Instructions:

- The participant needs to be honest about recording her study times accurately.
- The study time-table will be drawn up in advance on a weekly basis with the researchers.
- The start of the study period starts exactly on the hour – not a minute later. The end of the study period must be not end a minute too early. Thus the study hour is a full designated hour.
- The times of study, once agreed upon, cannot be changed for the week ahead.
- In order for the study time to count the participant must sit at the desk for the full, complete duration of the study hour and work on academic assignments/essays/test preparation.
- For the hour to qualify the participant may not get up from her chair for anything, other than a life threatening emergency.
- Any interference with the hour renders the hour invalid.
- The participant does not have to complete the hours assigned for studying.
- If the participant does not complete the hours assigned then the incomplete hours will not be counted as official study time.
- The consequence of incomplete study hours is that the money assigned to that hour will not be paid out to the student.
- If the student does not complete the hour she must be prepared to face the consequence of receiving no money for the incomplete hour/s of study.
- If she completes the full hour she will be awarded the assigned amount of money for that hour.
- The participant is required to record her feelings and thoughts regarding her study behaviour once a day.
- The money will be handed over to the researchers at the beginning of the month.
- Every week the participant will receive her earnings form the study hours she has completed.

I, ..... , hereby agree to abide by the rules of this behaviour contract.

Signature .....



## **APPENDIX F**

### **Participant evaluation of study**

Please answer the following questions as honestly as you can.

1. Why did you want to be part of the research project on procrastination?
2. Please describe what the first intervention phase was like for you?
3. Please describe what the second baseline phase was like for you?
4. Please describe what the last intervention phase was like for you?
5. What was it like having to record your thoughts and feelings on a daily basis?
6. What was it like having to commit to a number of hours per week?
7. What was the most challenging aspect of the programme for you?
8. How did you benefit from this study, if at all?
9. What did you enjoy most about the programme?
10. What did you enjoy least about the programme?
11. How did you experience the weekly meetings with the researcher?
12. Did the programme increase your awareness of your procrastinatory habits? If so how?
13. Did the programme decrease your procrastinatory habits? If so how?

14. If your studying time increased during this programme, what do you think were the main factors motivating you? Please put them in order from strongest to weakest, with a brief discussion of each.
  
15. How did you experience the researcher?
  
16. How would you improve this research study?

## **APPENDIX G**

### **Ethical implications**

All data was kept confidential to respect the participants' identity and privacy. This research study has neutrally named the participants, Participant 1, Participant 2, and Participant 3. Participants were aware that they were able to resign at any point during the programme if they felt uncomfortable with the requirements. The consent form stipulated what the costs and benefits of partaking in the study were. The money that participants invested in the programme was handed back to them at the end, and thus no final financial losses were incurred. The participants were at no physical and psychological risk, or subjected to any harm while participating in the study.

## APPENDIX H

### Transcribed excerpt of interview with Participant 1

Researcher: So you get up and actually sit at your desk?

Participant 1: I actually get up and sit at my desk and I look around and I feel overwhelmed, and I, I can't bare it, and I like start getting my, chest like, I have to start taking my inhaler, and I'm like I can't, I can't. And then I'm like, oh gosh what am I going to do (panic), and that's how it is every time. You would think I would learn, I never ever learn, 'cause then the next week, politics, psychology and like on my law subjects, like all of this stuff are due, but like Sunday nigh comes and I look around and I just get so overwhelmed I just walk out my room and close my room door, and I just walk away.

Researcher: So what do you do before that? You've got the week before. What happens in that week? You've put up all your lists and you dates and everything. Now there's a week. What happens the next day, and the next day, and the next day, before that last day?

Participant 1: Before that last day. Nothing. Absolutely nothing. I would come home from varsity and I would watch TV.

Researcher: Do you think about the work?

Participant 1: I think about it.

Researcher: And then what do you say to yourself?

Participant 1: I say, well, I still have some time. I still have to do this and I, wait. But I'm going to leave that now, I'm going to do my politics. But I won't do the politics.

Researcher: But what do you do instead then?

Participant 1: I'll watch TV, or I'll go on facebook. I will, I will, pack my cupboard, I will sweep, I will mop. To me it's like when I have something due I start cleaning, that it my. I

don't know why. But my mother knows that when she starts seeing me cleaning then she know I have something due and I can't handle it so I just close my door and I walk out and I start cleaning something else in the house. Like I try to avoid, or what I do is, like I know my mom is on my case about my school work, so when she goes out, she'll like ask, "Participant 1 do you have homework?" 'Cause like she's still in school mode where she thinks that teachers actually check your homework every single time, and like I get so irritated. I'm like, "Mommy you don't get homework everyday I don't have to hand everything in." But then she'll say, "Participant 1, go read over your work." I'll go sit in my room, I won't read over, I'll just put all my books out. And then my mom and my dad usually go for the evening, so then I'll go and watch TV and stuff. And then my mom comes back, I will just like, lay all my books out, and I'll take old papers, like from a month ago, and I'll just put it there, so it looks like I've studied. And then like, when she comes back I'll be like, five minutes afterwards, I'll start packing up, and pretend I'm so tired and that I've been doing this work for so long, and then I'll put everything away. My mom thinks that for the three hours that she's been gone I've been studying - I've been doing my work. But I haven't I've been watching TV or something. 'Cause like they have a diesel car so you can hear when they come up the drive way, so when I hear the driveway, or see the headlights, I know it's too my room and I just spread everything out, and I always have to put my radio on, because my mom knows that I don't study without music, so I put the radio on and like I'll put it a bit soft, and just position everything like I've been having an intense, like working session.

### **Self-documented report of panic attack from Participant 3**

The night before my Sociology exam I had what I think was a mild panic attack. The week before the exam I had been focussing mostly on history because that was the subject that I had paid least attention to during the semester. I wrote history the afternoon before I wrote sociology. The night before my sociology exam I opened my books to start studying (at about 8.30pm) and paged through my readers and lecture notes and got into a bit of a panic because I had absolutely no idea how I was going to cover all of that work when my exam was less than 12hours away. I obviously did not cover the work. In fact I must have read about one page in total because I just kept staring at the page thinking that it was impossible. I started to beat myself up about leaving it so late, which it felt like I had done almost subconsciously because I just hadn't planned my studying at all. In the end I decided

to go to sleep because I couldn't focus on what I was reading. I then couldn't get to sleep because I was so stressed about failing the course. I tossed and turned, feeling guilty, useless and a little desperate. I tried to get up to study again but that didn't help either. It was then that my heart started beating furiously and I broke out into a bit of a cold sweat. I was panicking and the panic was disabling me to do anything about my situation. Eventually I remembered that I had some Rescue Remedy which I took and felt calmed almost immediately (which is strange because they've never worked for me before this) and I was able to have a fair night's rest. I woke up the next morning early and read as much of my work as I could. I went into the exam feeling calm.

Other:

Tonight I felt the same way I always do when I procrastinate. I start off with the best intentions to start working but always end up leaving my work to the last second. As time goes on and it gets later and later I start feeling more and more anxious and insecure. Instead of working I organise my week or tonight I watched the 8 o'clock movie. The whole time I'm doing these things I'm worrying about all of the work that I have to do. So much so that starting it seems an almost impossible task. I just get scared and when I get scared it seems easier to run than face the challenge.

**Plagiarism Declaration**

1. I know that plagiarism is wrong. Plagiarism is to use another's work and pretend that it is one's own.
2. I have used the SAJP convention for citation and referencing. Each contribution to, and quotation in, this research project, from the work(s) of other people has been attributed, and has been cited and referenced.
3. This research project is my own work.
4. I have not allowed, and will not allow, anyone to copy my work with the intention of passing it off as his or her own work.
5. I acknowledge that copying someone else's assignment or research project, or part of it, is wrong, and declare that this is my own work.

Signature .....