Cardiff School of Sport

DISSERTATION ASSESSMENT PROFORMA:

Empirical [1]

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Programme:	Sport and Exercise Science		
Dissertation title:	The effect of pre-performance self-generated Happiness and Anxiety on sprinting performance		
Supervisor:	Dr. Tjerk Moll		

Comments	Section
	Title and Abstract (5%) Title to include: A concise indication of the research question/problem. Abstract to include: A concise summary of the empirical study undertaken.
	Introduction and literature review (25%) To include: outline of context (theoretical/conceptual/applied) for the question; analysis of findings of previous related research including gaps in the literature and relevant contributions; logical flow to, and clear presentation of the research problem/ question; an indication of any research expectations, (i.e. hypotheses if applicable).
	Methods and Research Design (15%) To include: details of the research design and justification for the methods applied; participant details; comprehensive replicable protocol.
	Results and Analysis (25%) [2] To include: description and justification of data treatment/ data analysis procedures; appropriate presentation of analysed data within text and in tables or figures; description of critical findings.
	Discussion and Conclusions (30%) [2] To include: collation of information and ideas and evaluation of those ideas relative to the extant literature/concept/theory and research question/problem; adoption of a personal position on the study by linking and combining different elements of the data reported; discussion of the real-life impact of your research findings for coaches and/or practitioners (i.e. practical implications); discussion of the limitations and a critical reflection of the approach/process adopted; and indication of potential improvements and future developments building on the study; and a conclusion which summarises the relationship between the research question and the major findings.
	Presentation (10%) To include: academic writing style; depth, scope and accuracy of referencing in the text and final reference list; clarity in organisation, formatting and visual presentation

[1] This form should be used for both quantitative and qualitative dissertations. The descriptors associated with both quantitative and qualitative dissertations should be referred to by both students and markers.
[2] There is scope within qualitative dissertations for the RESULTS and DISCUSSION sections to be presented as a combined section followed by an appropriate CONCLUSION. The mark distribution and criteria across these two sections should be aggregated in those circumstances.

CHAPTER FOUR

CHAPTER FIVE

CHAPTER FIVE

suggests an athlete's performance has the potential to be enhanced when a happy emotion is elicited prior to performance. If this study is to be successful, the results will need to be accurate to be applied in a real-life sporting context.

1.4.1 Study Implications

Practitioners and coaches will be able to utilise the results from this study to help mentally prepare their athletes both in training, and competition. By mentally preparing their athletes prior to training repetitions, athletes will be able to get the most out of training, subsequently, improving competition performance. Within training, coaches can use the results from this study to work on which self-generated emotional scenario aids their athlete's performance the greatest.

1.4.2 Study Aims

It is unclear what precisely happens within an athlete's mind moments before sporting performance. If sport psychology is to further its understanding of emotion, it must challenge itself on its perception of what emotions are and how they can influence performance. It has been suggested by Lazarus (2000a), that emotions are the reason we act in certain way. Subsequently, the first aim of this investigation is to examine self-generation of happiness and anxiety, and their direct influence on sprint performance. A secondary aim of this investigation, which hopes to build upon current literature (Mahoney & Avener, 1977; Jones *et al*., 1993; Jones, 1995; Jones & Hanton, 2001), is to analyse how the level of an athlete (elite or recreational) influences anxiety perception during the emotion induction. The following chapter has been designed to evaluate the current literature on emotion in sport, and how research can be further developed.

4.1 DATA ANALYSIS

Analysis examined self-generated emotions (anxiety and happiness) and its direct influence on the physical task of sprinting. The data set was analysed using a single factor repeated measure (anxiety vs. happiness vs. emotion-neutral) analysis of variance (ANOVA), to examine reported scores from participants on a 7-point Likert Scale. A second analysis to the latter of this results section, examines how each group (elite and recreational) interpreted anxiety, and was performed using an independent samples T-test. A descriptive analysis of the individual variables (sprint time, heart rate fluctuation, heart rate induction, manipulation checks before sprint and during sprint and athlete interpretation of anxiety) indicated that all normality coefficients fell between a range of -0.7 to +1.2. These values of skewness and kurtosis are considered to be normally distributed (Kline, 2015) and normality can be assumed.

Table 1.
Reported Pre-Sprint Manipulation Scores; LS Happiness, LS Anxiety, LS Angry, LS Sad, LS Calm, LS Tens and LS Excited for the Three Self-Generated Emotion Conditions

	Emotion induction condition		
Variable	**Happiness** *M (SD)*	**Neutral** *M (SD)*	**Anxiety** *M (SD)*
Happiness	6.25 (.71)	2.88 (.35)	1.63 (.52)
Anxiety	2.00 (.76)	1.50 (.76)	6.38 (.52)
Angry	1.25 (.46)	1.62 (.74)	3.13 (1.64)
Sad	1.25 (.46)	1.50 (.76)	2.38 (1.50)
Calm	3.50 (1.30)	4.50 (1.31)	2.13 (.99)
Tense	2.00 (.76)	1.75 (.89)	4.75 (1.16)
Excited	4.36 (.92)	2.62 (1.06)	2.75 (1.04)

4.5 HEART RATE FLUCTUATION (beats·min^{-1})

The repeated measures ANOVA revealed a significant difference across all emotion conditions for heart rate fluctuation, F (1.16, 8.11) = 41.51, p < .001; *see table 3*. Follow-up Bonferroni pairwise correction analysis showed participant's heart rate significantly increased when inducing the emotion of anxiety (M = 8.93, SD = 4.10, p < .01) compared to the happiness condition (M = -2.68, SD = 1.86, p < .01), and the neutral condition (M = 0.31, SD = 1.57, p < .01.) Within the happiness condition, the participants' heart rate successfully decreased. Results revealed that both happiness, via heart rate decrease, and anxiety, via heart rate increase, were successfully induced (*see table 3*).

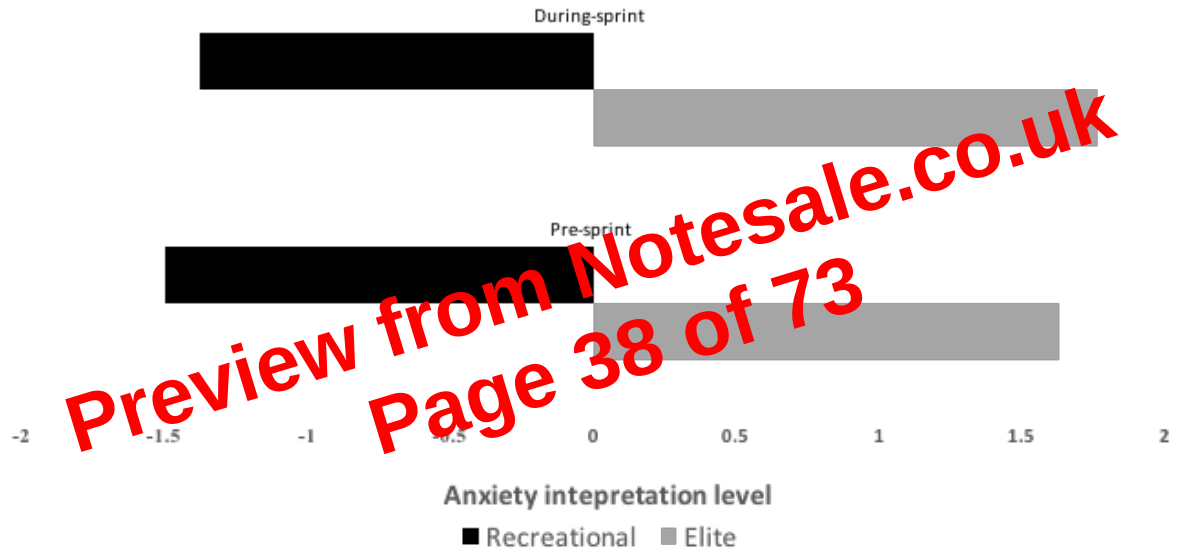


Figure 1: Athlete Anxiety Level both Pre-Sprint and During-Sprint between Groups

technique for sprint athletes to induce happiness and anxiety. If the emotion induction was not successful, the results from this study would have been invalid. Although the induction scenario was a major part of this research, the pilot study revealed that induction length could potentially be an interesting area to analyse in future research.

5.5 EMOTION INDUCTION LENGTH

The emotion induction length analysis revealed no significant difference between any emotion conditions (happiness, anxiety and emotion-neutral). This result showed that there is no specific time needed to induce the emotion of happiness and anxiety prior to performance. An interesting result that can be taken from the induction length is that to induce happiness or anxiety prior to performance, on average, no more than 21 seconds was needed by the participant. In a study by Rathschlag and Memmert (2014), participants were given one minute their respective emotions. The findings from the current study reveal that one minute would be excessive, and could potentially lead to the induced emotion becoming less salient. In the present study, once the emotion induction began heart rate response was recorded, which as essential to measure whether the emotion was successfully induced.

5.6 HEART RATE FLUCTUATION (beats·min^{-1})

5.6.1 Anxiety Heart Rate Fluctuation

Heart rate was measured during the entire length of the emotion induction prior to all sprints. Results revealed that during the anxiety induction, the participants heart rate (beats·min^{-1}) significantly increased in comparison to the recorded heart rate fluctuation in the pre-sprint emotion-neutral and happiness induction. As stated by Hackfort and Spielberger (1989, p.5), when anxiety is induced, physiological changes occur, subsequently, this study has reported that the physiological change is heart rate. Previous research has shown that an increased heart rate increases oxygen consumption, and subsequently can improve cognitive functioning (Scholey *et al*., 1999). Research also suggests that when heart rate is increased, more adrenaline is pumped around the body making for an improved performance (Pyne *et al*., 2004, p.618). This could be a potential reason as to why there was no recorded significant difference in sprint times between the happiness and the anxiety

5.8 APPLIED IMPLICATIONS

5.8.1 Applied Implications for the Sprint Athlete

This study presents numerous practical implications for sports performers (specifically sprint athletes) and sports coaches. This study highlights the importance of inducing a positive emotion prior to performance, which is significant for the sprint athlete due to the transferability of the elicitation technique, which is suitable for use in the time an athlete has before a training repetition or competition race. It has been reported in this study and previous literature (Kavanagh & Hausfeld, 1986; Fredrickson & Branigan, 2005; Ratchschlag & Memmert; 2014) that happiness has the potential to enhance a subsequent action. If an athlete is not already sensing a positive emotion prior to performance, this study highlights an induction technique that could help facilitate a positive emotion elicitation. Recall of a positive sprinting specific experience moments prior to a physical performance can subsequently aid the forthcoming action. This study also enforces the point that having an emotion (specifically happiness or anxiety) is more beneficial to performance than having no emotion.

5.8.2 Applied Implications for the Sports Coach

For sports coaches, this study highlights the importance of working on self-generation of emotions in a training and competitive environment. The results from this study reveal that an individual induced into a positive emotion (happiness), has the potential to significantly enhance performance in comparison to having no emotion. A sports coach could work with their athletes to trial certain positive emotional scenarios until one scenario is consistently producing an enhanced performance. It is recommended that the coach allows the athlete to recall an emotional scenario that link directly to the sport they are currently competing in, for example, a sprint athlete should recall an experience where they felt significantly happy in the context of sprinting. This study revealed that coaches should give their athletes as much time as needed to significantly induce this emotion. Although this study used recreational and elite sprint athletes, there is no evidence to suggest self-generation of happiness does not work for other sports. It would be hypothesised that any sport that involves a sprinting action (e.g. tennis, rugby, football) would benefit from a positive mind state prior to performance. Based on the results from this study, sports coaches who work with recreational athletes should steer away

This chapter concludes this thesis by evaluating the key findings of the investigation. The intention of the investigation was to analyse the influence of self-generated emotion, specifically happiness and anxiety, on the sprint performance of currently competitive sprint athletes. It was predicted that a pre-sprint emotion induction of happiness would facilitate the subsequent 30-metre sprint performance, which would build upon previous research (Rathschlag & Memmert, 2014). It was revealed that a successfully elicited happiness emotion prior to performance does positively impact sprint performance, reflected in a reduced sprint time. The study primarily utilised Lazarus' CMR (1991a, 2000b) theory, which proposed that if an emotion's action tendency is coupled with a physical task, a subsequent action has the potential to be facilitated. This study adds support for the CMR theory as both the reported happiness and anxiety sprint times were quicker than the emotion-neutral sprint times. Contrary to previous literature (Rathschlag & Memmert, 2014), this study reveals that the physical task of sprinting can trigger both the action tendency for happiness (i.e. to approach), and anxiety (i.e. to escape). Another important finding from this study revealed that the level of an athlete (elite or recreational) could potentially differentiate between whether an athlete perceives anxiety as facilitative or debilitative to performance. This result builds upon previous literature (Mahoney & Avener, 1977; Jones *et al*., 1993; Jones, 1995; Jones & Hanton, 2001; Mellalieu *et al*., 2006; Neil *et al*., 2011; Wagstaff *et al*., 2012), which adds support to the notion that elite athletes can channel their anxiety to aid performance. This finding suggests that practitioners who work with elite sprint athletes may wish to trial self-generated anxiety in training to inevitably aid competition. Contrastingly, practitioners who work with recreational sprint athletes should avoid an anxious emotion and concentrate on self-generating solely happiness at this stage of their career. One final proposition of this research which builds upon previous literature (Sanderson & Reilly, 1983; Martens *et al*., 1990), revealed that heart rate could be a potential indicator of behaviour change. It was reported that an increased heart rate is an indicator of induced anxiety, and a decreased heart rate is an indicator of induced happiness. This result is significant for practitioners working with athletes of all sports to potentially use heart rate within training to analyse how their athletes are feeling prior to performance. This type of research is crucial to the development of emotion understanding in an array of sports, and together, researchers can build upon the already prosperous knowledge surrounding the performance-emotion relatio

would be advised that you do not partake in the study. In all cases, you should not do anything that you do not want to. If you experience any issues, please speak to us.

Your rights
It is completely up to you whether or not you want to take part in the study. If you decide to, we will appreciate it very much. If you decide to for any reason, you may withdraw from the study. No legal right will be given up for taking part, and in the unlikely event something does go wrong Cardiff Metropolitan University full indemnifies its staff, and participants are covered by insurance.

What happens to your results of the experiment?
All data collected will be taken and stored on a private file which can only be accessed by myself, the researcher. All data files will be coded so that we can remove participant names, but we will keep a record of the codes for measurement comparison. We will present this information together for all of the subjects, but there will be no presented description that would identify participants taking part.

Are there any benefits from taking part?
There will be no benefit when taking part in the study. However, the data collected and findings from your contribution may contribute to knowledge emotional states and more importantly self-generation of emotional states and their direct influence on sprinting performance. We will be more than happy to provide you with an overview of the findings after the data has been collected and analysed

What to do now?
On the following page there is a consent form outlining that you agree to participate in the present study. Once that has been signed and delivered, you will be contacted in the near future to arrange a suitable time period to conduct the study in. Its important to note that you are under no obligation to participate.

Further Information:
If you have any questions about the research or how we will conduct the study, please do not hesitate to ask.

Appendices C – Physical Activity Readiness Questionnaire

Physical Activity Readiness Questionnaire - PAR-Q (revised 2002)

PAR-Q & YOU

(A Questionnaire for People Aged 15 to 69)

Regular physical activity is fun and healthy, and increasingly more people are starting to become more active every day. Being more active is very safe for most people. However, some people should check with their doctor before they start becoming much more physically active.

If you are planning to become much more physically active than you are now, start by answering the seven questions in the box below. If you are between the ages of 15 and 69, the PAR-Q will tell you if you should check with your doctor before you start. If you are over 69 years of age, and you are not used to being very active, check with your doctor.

Common sense is your best guide when you answer these questions. Please read the questions carefully and answer each one honestly: check YES or NO.

YES	NO	
☐	☐	1. **Has your doctor ever said that you have a heart condition and that you should only do physical activity recommended by a doctor?**
☐	☐	2. **Do you feel pain in your chest when you do physical activity?**
☐	☐	3. **In the past month, have you had chest pain when you were not doing physical activity?**
☐	☐	4. **Do you lose your balance because of dizziness or do you ever lose consciousness?**
☐	☐	5. **Do you have a bone or joint problem (for example, back, knee or hip) that could be made worse by a change in your physical activity?**
☐	☐	6. **Is your doctor currently prescribing drugs (for example, water pills) for your blood pressure or heart condition?**
☐	☐	7. **Do you know of any other reason why you should not do physical activity?**

If you answered

YES to one or more questions

Talk with your doctor by phone or in person BEFORE you start becoming much more physically active or BEFORE you have a fitness appraisal. Tell your doctor about the PAR-Q and which questions you answered YES.

- You may be able to do any activity you want — as long as you start slowly and build up gradually. Or, you may need to restrict your activities to those which are safe for you. Talk with your doctor about the kinds of activities you wish to participate in and follow his/her advice.
- Find out which community programs are safe and helpful for you.

NO to all questions

If you answered NO honestly to all PAR-Q questions, you can be reasonably sure that you can:

- start becoming much more physically active – begin slowly and build up gradually. This is the safest and easiest way to go.
- take part in a fitness appraisal – this is an excellent way to determine your basic fitness so that you can plan the best way for you to live actively. It is also highly recommended that you have your blood pressure evaluated. If your reading is over 144/94, talk with your doctor before you start becoming much more physically active.

DELAY BECOMING MUCH MORE ACTIVE:

- if you are not feeling well because of a temporary illness such as a cold or a fever – wait until you feel better; or
- if you are or may be pregnant – talk to your doctor before you start becoming more active.

PLEASE NOTE: If your health changes so that you then answer YES to any of the above questions, tell your fitness or health professional. Ask whether you should change your physical activity plan.

Informed Use of the PAR-Q: The Canadian Society for Exercise Physiology, Health Canada, and their agents assume no liability for persons who undertake physical activity, and if in doubt after completing this questionnaire, consult your doctor prior to physical activity.

No changes permitted. You are encouraged to photocopy the PAR-Q but only if you use the entire form.

NOTE: If the PAR-Q is being given to a person before he or she participates in a physical activity program or a fitness appraisal, this section may be used for legal or administrative purposes.

"I have read, understood and completed this questionnaire. Any questions I had were answered to my full satisfaction."

NAME _____

SIGNATURE _____ DATE _____

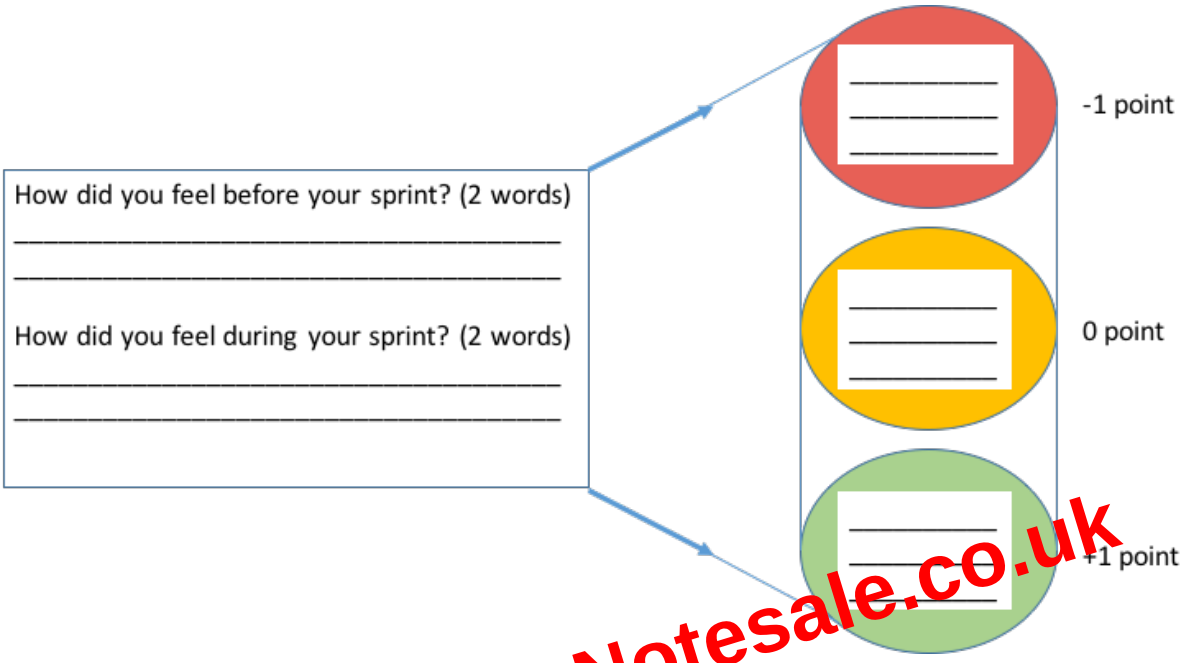
SIGNATURE OF PARENT or GUARDIAN (for participants under the age of majority) _____ WITNESS _____

Note: This physical activity clearance is valid for a maximum of 12 months from the date it is completed and becomes invalid if your condition changes so that you would answer YES to any of the seven questions.

CSEP | SCPE

Appendices F – Athlete Feedback Tool

(anxiety perception)



Appendices G6:

Measure: Pre-sprint Emotion Induction Length

Descriptive Statistics

	Mean	Std. Deviation	N
MeanHRIndAnx	20.3750	11.31923	8
MeanHRIndNeut	15.9375	6.29307	8
MeanHRIndHap	19.8750	6.84914	8

Pairwise Comparisons

(I) HRinduction	(J) HRinduction	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	
					Lower Bound	Upper Bound
Happiness	Neutral	4.438	2.781	.464	-4.261	13.136
	Anxiety	.500	2.596	1.000	-7.620	8.620
Neutral	Happiness	-4.438	2.781	.464	-13.136	4.261
	Anxiety	-3.938	1.542	.114	-8.761	.886
Anxiety	Happiness	-.500	2.596	1.000	-8.620	7.620
	Neutral	3.938	1.542	.114	-.886	8.761

Based on estimated marginal means

a. Adjustment for multiple comparisons: Bonferroni.