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Investigating e-Sport from a sport psychological perspective

A mixed method, cross-case, intervention study.

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Author Notes

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“You use a glass mirror to see your face; you use works of art to see your soul.” – G. Shaw

27th of May, 2014
Robert Szasz

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Abstract

Given the similar conditions that e-Sport participant and athletes face during competition, it becomes challenging to scientifically test if traditional applied sport psychological techniques could affects e-Sport participants in their practice. Altogether, eight participants (age 22-25) participated in the study based on a convenience sample localized in the southwestern region of Sweden. Each participant was randomly assigned to one of three training techniques (i.e. PETTLEP, concentration or physical activity) or placed as a control. The instrument in use was the CSAI-2 survey combined with a brief semi-structured qualitative interview. The study ranged from 7th till 23rd of April, 2014. The hypothesis suggested that the participant assigned to PETTLEP and concentration training would increase more in (a) self-perceived performance and (b) self-confidence while decreasing in (c) cognitive and somatic state anxiety, compared to the participants assigned to physical activity or as control. The result indicates that PETTLEP and concentration training could, to a certain extent, be beneficial to enhance self-perceived performance and self-confidence within e-Sport practice. The result is discussed especially in relation to the IZOF-multidimensional model. The thesis also includes discussions regarding methodological issues (e.g. bias effect) followed by suggestions for future research.

Keywords: electronic gaming, e-Sport, intervention, mixed-method, PETTLEP, pilot study.

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Abstrakt

Sedan likartade konditioner finns mellan vad en e-Sport utövare och atlet bemöter utmed tävling, blir det utmanande att vetenskapligt testa huruvida traditionellt tillämpade idrottspsykologiska tekniker skulle inverka på e-Sport utövare i dess utövade. Åtta deltagare (ålder 22-25) deltog i studien baserat på ett bekvämlighetsurval lokaliserade i sydvästra regionen av Sverige. Varje deltagare var randomiserat anförd till en av tre tränings tekniker (i.e. PETTLEP, koncentration eller fysisk aktivitet) eller placerade som kontroll. Det använda instrumentet var CSAI-2 enkäten kombinerat med en kort semistrukturerad kvalitative intervju. Studien pågick från 7'e till 23'e april, 2014. Den föreslagna hypotesen var att de deltagare som var anförda till PETTLEP och koncentrations träning skulle öka mer i (a) självuppskattad prestation och (b) självförtroende samt uppvisa minskning i (c) kognitiv och somatisk tillstånd av oro, vid jämförelse med de deltagare som var anförda till fysisk aktivitet eller som kontroll. Resultatet indikerar att PETTLEP och koncentrations träning kan, till en viss grad, vara fördelaktig för att öka självupplevd prestation samt självförtroende inom e-Sport utövande. Resultatet är diskuterats synnerligen i relation till IZOF-multidimensionela modellen. Uppsatsen innehåller även diskussion gällande metodologiska problem (t.ex. fördoms effekter) följt av förslag till framtida forskning.

Nyckelord: elektroniska spel, e-Sport, intervention, mixed-metod, PETTLEP, pilot studie.

Several studies indicate that electronic gaming has had a rapid growth during the last decade (e.g. Hutchins, 2008). For instance, Guo, Savoy, Byrd and Salvendy (2009) argue that American game developing companies' revenue was approximately US$7.4 billion during the year of 2004, while Thiborg (2011) state that the 'World Cyber Game' event (WCG-event) was followed by 15 million spectators during the year of 2009. Moreover, several studies have investigated electronic gaming based on different psychological factors such as motivation (Papastergiou, 2009), aggression (Krahé & Möller, 2004) and cognitive flexibility (Glass, Maddox & Love, 2013). However, contradictive results have been found regarding the impact extensive use of electronic games could have on psychological factors such as aggression (e.g. Ferguson, 2007) and social support (e.g. Trepte, Reinecke & Juechems, 2012).

The rapid growth of electronic gaming has also contributed to an increasing development of a relatively new phenomenon named: electronic sport (e-Sport; Taylor, 2012). Some researcher argues that e-Sport should be viewed within the concept of sport when comparisons are made to sports such as bowling and dart (e.g. Jonasson & Thiborg, 2010; Witkowski, 2012). Furthermore, Murphy (2009) argues that a close relation exist between e-Sport and the research field of 'Sport Psychology', due to psychological effects that can arise through electronic gaming exertion such as flow and motivation. Given the close relationship e-Sport have in regards to sport psychology, the purpose with this forthcoming thesis is to examine whether applied sport psychological techniques (i.e. imagery training and concentration training), that have proved beneficial to enhance performance within more traditional sports (e.g. Post, Muncie &Simpson, 2012; Guillot, Genevois, Desliens, Saieb & Rogowski, 2012), would have similar impact on electronic gaming performance when tested on Valve Cooperation (2014) most popular game: *Defense of the Ancients 2* (DotA 2).

Theoretical Frameworks

Three models have been employed for the forthcoming thesis. The first model is the 'Individual Zones of Optimal Functioning–Based Multidimensional Model' (Hanin, 2000), which explains the structure and function of emotions and how these emotions could invoke successful or less-successful performance. The second model is the 'Physical Environmental Task Timing Learning Emotion Perspective model' (Holms & Collins, 2001), which accentuate different aspects that imagery training should emit in order to enhance performance. The third model is the 'Framework of Self-Talk' (Hardy, Oliver & Todd, 2009) which presents how self-talk could affect performance in various ways.

Individual Zones of Optimal Functioning (IZOF)–Based Multidimensional Model

Within sport psychology, Humara (1999) argue that the 'IZOF model' is preferable to implement in order to review the athletes' perceived emotions in relation to performance. For instance, Bortoli, Bertollo, Hanin and Robazza (2012) argue that the IZOF model does not only present an emotion such as rage to be debilitative for a task, but rather argues that it could be facilitative as well. In other words, the IZOF model could be seen as an integrative framework that should be employed in studies involving emotions in order to produce a subjective performance-related experience (Hanin, 2000). Moreover, Hanin (2000) challenge the ineffectiveness of unidimensional approaches, leaving the 'IZOF-Based Multidimensional

model' the most suitable framework for this forthcoming thesis. Hanin (2000) present the IZOF-based multidimensional model to be grounded in five dimensions (form, intensity, content, time and context) which works as foundation to explain the 'pshychobiosocial states' relationship with 'emotion-performance'. These dimensions provide information regarding how emotions are perceived differently depending on an individual's experience. Moreover, the model also suggest that the interference between the dimensions determines whether the performance outcome will be successful or less-successful (Hanin, 2000).

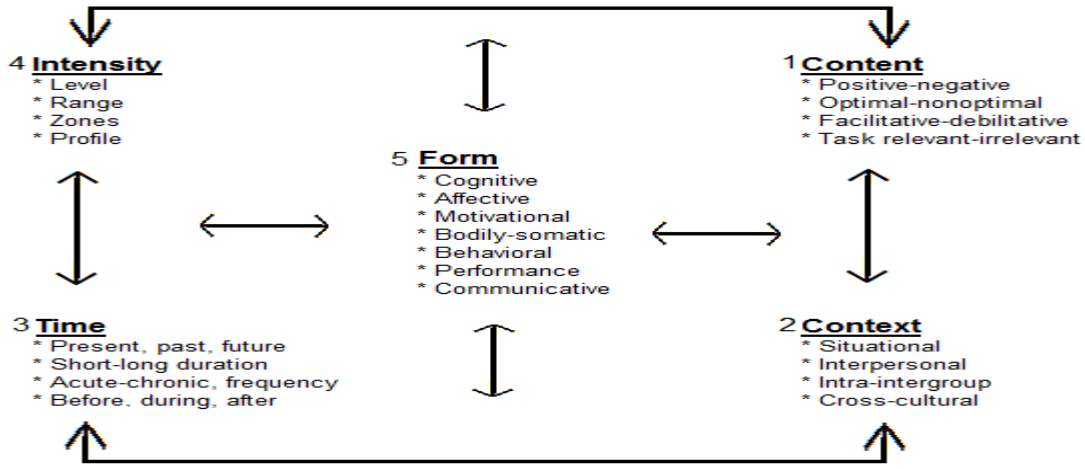


Figure 1:"The five dimensions of a systems description for performance psychobiosocial state and emotion-performance relationships."(Hanin, 2000, p. 76).

Within the model, the (1) content dimension explains that emotions can be perceived differently depending on an individual (Hanin, 2000; 2007). Hanin (2000) describes that the content of emotions varies depending on 'global affect approach', meaning that emotions are divided into 'hedonic tones' (pleasure-displeasure versus positivity-negativity) and 'performance functionality' (optimal versus dysfunctional). It is therefore important to understand how an individual perceive his/her emotions in order to understand how these emotions could influence competitive performance (Hanin, 2000). Hanin (2000) and Bortoli et al. (2012) explains that the (2) context of emotions can alter depending on situation. Similarly, Hanin (2000) argue that emotions can be perceived differently depending on the (3) time that a task is executed (i.e. before, during or after performance).

The (4) intensity dimension explains what shifting results on an individual's anxiety levels but also emotional based labels can contribute to. Still, the dimension is generally discussed in terms of zones that an athlete can adapt to (Hanin, 2000). The zones are divided into (a) 'optimal intensity' and (b) 'dysfunctional intensity', and the zones explain the athletes unique set of resources that may help them cope with current demands (Hanin, 2000). Both Oluasson and Vallmark (2013) and Williams (2001) argue that an individual who adapt into his/her optimal function of zone would increase the possibility for peak performance.

The (5) form dimension explains that performance outcome depends on the athletes psychbiosocial state (Hanin, 2000). This means that an individual can differ in performance outcome depending on different psychical (e.g. motivational), physical (e.g. bodily-somatic) and social (e.g. communicative) states (Hanin, 2000).

Physical Environmental Task Timing Learning Emotion Perspective (PETTLEP)
Proportionate studies indicates that PETTLEP training is more efficient than 'traditional imagery' training when it comes to enhancing performance (Cumming & Ramsey, 2009; Holms & Collins, 2001; Smith, Wright, Allsopp&Westhead, 2007; Wakefield &Smith, 2009; Wright & Smith, 2007). The PETTLEP model is based upon seven different elements (environment, task, timing, learning, emotion, perception and physical), where exerting these elements could enhance the imagery training effect upon performance (Holms & Collins, 2001). Holms and Collins (2001) state that the model does not have to be applied in its full form, but rather argued that scholars who applied the model should contemplate the different elements in order to emit better imagery training.

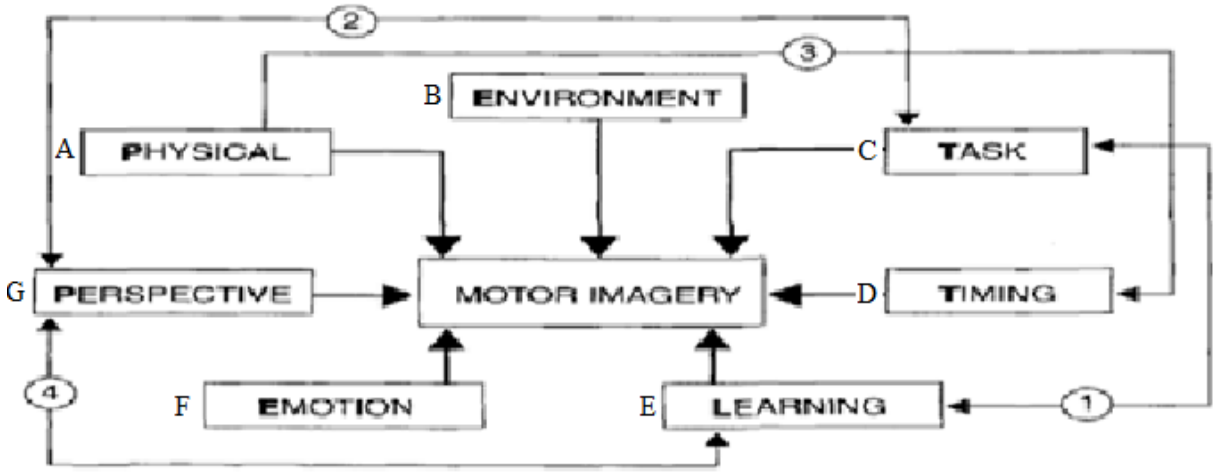


Figure 2: "PETTLEP model." (Holms & Collins, 2001, p. 70).

The figure (see Figure 2) presents the different elements of Holms and Collins (2001) PETTLEP model, as well as how the elements interfere (see Figure 2, 1-4). The elements that are presented by the researcher (Holms & Collins, 2001) in the model utilize:

The (a) physical element explains that motor image enhance the shares of brain regions which could strengthen the individuals' memory trace. Therefore the imagery training should be focused on involving the participant in the experience rather than trying to 'calm the mind' trough exercises such as viso-motor behavior rehearsal. The (b) environment element explains that a participant could differ in performance depending on new venues, it is therefore important that the scholar stimulate multisensory environmental cues to increase the imagery process. The (c) task element explains that individuals differ depending on level of practice. For instance an individual who practice upon elite level within a sport will visualize different aspects of a competition, compared to a novice. It is therefore important to customize the focus of imagery, depending on individual. The (d) timing element enforces the scholar to conduct the imagery training in a realistic manner in order to enhance performance.
The element of (e) learning explains that a participant who becomes exposed to imagery training will successively improve in motor learning. It is therefore important to continuously adjust the form and design of the imagery training in relation to the advancement that the participant shows during the ongoing venture. The (f) emotion element explains that only the execution of a specific task, can affect the physical states of an individual (e.g. increase of heart rate). Therefore the scholar should attempt to stimulate the emotions that will be

perceived through the competition and not conduct imagery on e.g. ‘a hyper-relaxed state’. At last, the (g) perspective element is to remind the scholar that imagery is a cognitive production where the participant image self-estimated images. It is therefore important to understand that a participant can shift between different perspectives under short amount of times in order to capture essential information that they are told to image.

A framework for the study of self-talk

Greenlees, Thelwell and Holder (2006) state that the ability to concentrate is one of the most important psychological skills to obtain in order to achieve athletic success. Still, within sport psychological literature (e.g. Hardy et al., 2009; Weinberg & Gould, 2007; Williams, 2001), the phrase: ‘self-talk’ is commonly cited combined with the phrase: ‘concentration’. The usage of self-talk has been considered central in order to both decrease anxiety (e.g. Conroy & Metzler, 2004; Weiss, 2009), but also to enhance performance (e.g. Hatzigeorgiadis, Theodorakis & Zourbanos, 2004; Miles & Neil, 2013). One of the frameworks within self-talk is Hardy’s et al. (2009) model which summarizes previous work within self-talk regarding antecedents and consequences (see Figure 3).

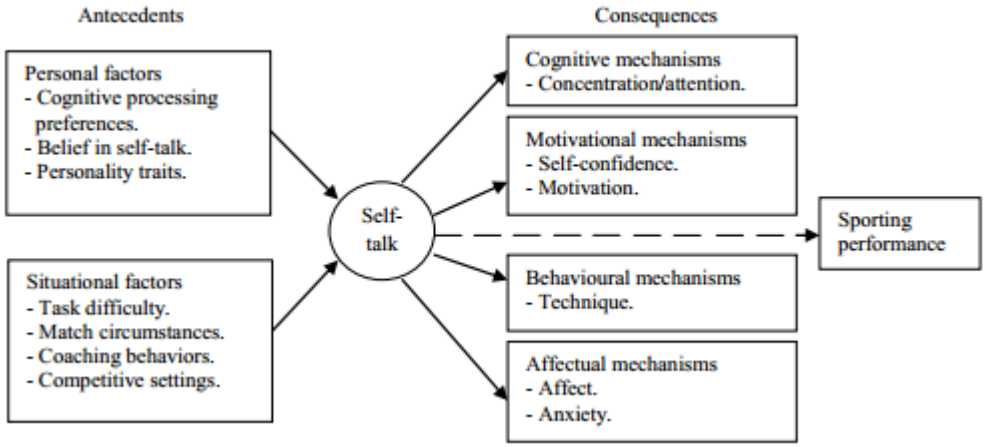


Figure 3: “A framework for the study of self-talk.” (Hardy et al., 2009, p. 39).

The framework utilizes two dimensions of antecedents of self-talk (Hardy et al., 2009). The first dimension utilizes ‘personal factors’ (such as cognitive processing preferences) while the second dimension utilize ‘situational factors’ (such as task difficulty). These two dimensions then discharges into four levels of consequences (which involve different approaches of self-talk techniques, e.g. verbal cues) which then most likely forwards into a positive alteration in sport performance outcome (Hardy et al., 2009; Linnér, 2011).

Previous Research

Electronic games/gaming and Electronic Sport (e-Sport)

The interest of electronic gaming has shown a rapid growth during the last decade (e.g. Hutchins, 2008). For instance Hutchin (2008) provided information that an approximately 400% increase had occurred in both (a) numbers of participators and (b) representative countries, during the WCG-event from 2000 till 2007. Moreover, Berger (2002) presented data showing that electronic gaming developing companies had a turnover at US$6 billion

during the year of 2000. Other studies indicate that the growth has continued during the following years, for instance Guo et al. (2009) provided data showing that American game developing companies' evaluated revenue was US$7.4 billion during the year of 2004. Some of the genre of games that are eminent within electronic gaming are 'Real Time Strategy-games' (RPG-games, such as "Age of Empires"; e.g. Mora & Héas, 2003), 'First Person Shooting-games' (FPS-games, such as "Counterstrike"; e.g. Taylor, 2012) and 'Massive Multiplayer Online-games' (MMO-games, such as "World of Warcraft"; e.g. Trepte et al., 2012). Withal, other researcher state that more genre of games classify under the umbrella term of electronic games such as 'Action-Arcade games' like "Mortal Kombat" (Berger, 2002) or 'Sport-Games' like "FIFA" (Hebbel-Seeger, 2012).

The rapid growth of electronic gaming has also contributed to an increasing development of a relatively new phenomenon named: e-Sport (e.g. Taylor, 2012; Jonasson & Thiborg, 2010). Some researcher (e.g. Jonasson and Thiborg, 2010; Witkowski, 2012) have suggested that e-Sport should be considered as an accepted sport (i.e. viewed within the concept of sport) when comparing it to sports such as NASCAR, chess, pool and bowling.

Psychological perspective on electronic gaming and e-Sport. Lieberman (2006; ref in Murphy, 2009) argue that electronic games should be considered within the concept of sport psychology due to the different psychological factors that could arise through electronic game exertion, such as: 'motivation', 'teamwork', 'competition', 'flow' and 'leadership'. Murphy (2009, p. 490) state: "Sport psychologists interested in behaviors such as teamwork, aggression and concentration may well find competitive online video games to be at least as influential as sports in these areas".

Within the field of electronic gaming, a contradiction has been found in results when the field is investigated in relation to psychological effects and factors. For instance, Krahé and Möller (2004) found a relationship between playing 'violent video game' and 'enhancement of violent behavior'. On the other hand Ferguson (2007) reviewed several studies that investigated electronic gaming in relation to aggression. The researcher debated that many of the studies had methodological issues, for instance participants were manipulated to become more violent. Therefore some researchers debate a non-existing relation between enhanced aggression and consumption of violent video games (e.g. Ferugson, 2007; Falkner, 2007). Within the field of MMO-games, the psychological factor 'social support' has been widely investigated (e.g. Trepte et al., 2012). For instance, Colwell and Payne (2000) argued a non-existing relation between 'social isolation' and 'exertion of electronic games' while other researcher (e.g. Trepte et al., 2012) argues that social support could be enhanced through MMO-game practice, both during online playtime but also during offline-time. Contrary to that standpoint other researchers challenged the viewpoint and argue that individuals who practice MMO-games become more appealed to online social support, leading to an absence of social desirability in real life (Liu & Peng, 2009; Longman, O'Connor & Obst, 2009). Researcher (Cole & Hooley, 2013; Liu & Peng, 2009) also suggest that MMO-games increase the risk of addiction since the virtual world would become more appealing than the real world.

Furthermore, electronic games have also been investigated in relation to other areas, for instance education (e.g. Papastergiou, 2009). Papastergiou (2009) argue that electronic games

had shown to be beneficial for (1) education, (2) motor skills and (3) motivation to exercise. Moreover, Murphy (2009) state that electronic gaming which involve interactive communication have shown to be favorable for social learning while Williams (2001) state that athletes who exert video games have reported the usage to be beneficial to enhance their sport performance.

Real-Time Strategy Games (RTS-games)

Several different games are emitted within the concept of electronic gaming (Berger, 2002), while the psychological effects alter depending on the genre of game (e.g. Ferguson, 2007; Trepte et al., 2012). The aim of the thesis is to investigate the RTS-game: 'DotA 2', therefore a brief summarization of the game along with research concerning the genre reviewed from a psychological perspective has been added.

Some of the cited games within the genre of RTS-games are: 'Age of Empire' (e.g. Mora & Héas, 2003), 'Starcraft' (e.g. Taylor, 2012) and 'DotA' (Gou & Iosup, 2012). Jonasson and Thiborg (2010) explain that RTS-games are playoffs between participators where each participant controls an army from a 'hawk-eye view'. Anderson, Zeng, Christensen and Tran (2009) states that the phrase comes from the game itself, since the participant are in need to make real time decision while playing against opponent.

In previous studies conducted by Claypool (2005) and Witkowski (2012), the research argued that FPS-games are one of the more popular games within electronic gaming. However, according to Valve Cooperation (2014) the RTS-game 'DotA 2' has shown significantly higher player count (March, 2014) than other popular FPS-game such as 'Counter Strike' (approximately 650-750.000 unique players per day, respectively 100-200.000 unique players per day). DotA 2 has also shows significant higher unique player count per day (Valve Cooperation, 2014) when compared to other FPS-games such as 'Battlefield 4' (BF4stats, 2013) or 'Left 4 Dead 2' (Valve Cooperation, 2014).

Psychological perspective on RTS-games/gaming. Within the field of RTS-games, previous research has noted that strategic thinking is essential to enhance performance (Andersen et al., 2009). In a study conducted by Glass et al. (2013), the researcher tested RTS-games in laboratory settings and found that participants who engaged in the RTS-games improved in cognition (i.e. cognitive flexibility). Claypool (2005) investigated the latency between reaction-time (i.e. mouse clicks) and performance (i.e. winning a game). The researcher (Claypool, 2005) concluded that latency had a small effect upon end performance and rather argued that participants who could strategically adjust under short amount of time would benefit more seen through the end performance outcome. Other researcher Buro and Churchill (2012) discussed the advancement of 'Artificial Intelligence' (AI, i.e.the opponent is a computer) within RTS-games, arguing that the technological advancement have improved the AI to respond better upon human based tactics, making it more challenging for participants to play versus AI seen through an strategic thinking perspective.

Intervention studies and sport psychology

Within applied sport psychology proportionate studies have investigating whether there is an existing connection between different types of (a) interventions (e.g. Stress Inclusion

Training) in relation to (b) psychological changes (e.g. changes in levels of self-perceived stress) that could occur among athletes (e.g. Kerr & Leith, 1993). Therefore, some interventions types (e.g. Stress Inclusion Training and Multimodal training) which accumulates different sport psychological techniques (such as imagery and self-talk) has been presented followed by studies concerning these techniques separately, in order to review what intervention effect that has been found within both the different training programs (i.e. interventions) but also within the techniques on their own right, when tested on athletes.

Several interventions (e.g. stress management and imagery training) has been conducted upon traditional sports such as tennis (Guillot et al. 2012) and swimming (Post et al., 2012) in order to enhance performance, but also to reduce self-perceived levels of stress (e.g. Runeke & Szasz, 2013). Rumbold, Fletcher and Daniels (2012) state that one of the most common methods in pursuing reduced levels of stress is by providing 'Mulitmodal' training programs (MS-program), which has also been shown to be beneficial to enhance performance (Rumbold et al., 2012). The MS-program is mainly built upon self-talk and imagery training, but the program also contemplates with other sport psychological programs (e.g. learning muscular relaxation) in order to reduce the self-perceived levels of stress (Rumbold et al., 2012). Another intervention program that has been used by researchers in order to pursue lower levels of stress and enhancing performance is the 'Stress Inclusion Training' (SIT) which also assembles of imagery and concentration techniques (e.g. Kerr and Leith 1993; Whitmarsh & Alderman, 1993). Both Keith and Leith (1993) and Whitmarsh and Alderman (1993) indicate that participants who had carried out the SIT-program had shown a positive intervention effect on performance.

Imagery training, on its own right, has shown to be useful to improve physical performance (e.g. Fontani et al., 2007), but also improve an individual's cognition (e.g. Wright & Smith, 2007). For instance, Morris, Spittle and Watt (2005) indicated that the usage of imagery had shown a positive effect on improving bowling performance. Additionally, Cumming and Ramsey (2009) argue that the imagery training outcomes could be: (1) facilitating learning, (2) regulate anxiety and (3) modify cognitions. Withal, other research indicates that PETTLEP-training can improve participants 'cognitive task ability' in a more functional mode when compared to 'traditional imagery' (e.g. Wright & Smith, 2007). Similarly, other researcher (e.g. Holms & Collins, 2001; Smith et al., 2007) argues that PETTLEP training is more efficient than 'traditional imagery' training.

Within self-talk training, several studies indicate a positive correlation between enhanced performance and exertion of self-talk (e.g. Hardy et al., 2009; Zourbanos, Hatzigeorgiadis, Bardas & Theokorakis, 2013).

Moreover, both PETTLEP training and self-talk training has shown to be beneficial to enhance performance through short term trials (Wright & Smith, 2007; Zourbanos et al., 2013). For instance, Zourbanos et al. (2013) intervention ranged over one day, where the researcher concluded that execution of self-talk exercises had enhanced performance seen through the result of a Cohen's d test. Wright and Smith (2007) conducted their intervention during a three week period, finding that the PETTLEP group and the group that executed the physical task improved most in performance in relation to the other groups (i.e. 'traditional imagery' and control).

E-Sport has shown a rapid enlargement during the last decade (e.g. Thiborg, 2011), while the field of applied sport psychology have gradually extended the last 30-40 years (Smith, 1989; Weinberg & Gould, 2010). Withal, several interventions have been conducted within the field of applied sport psychology (i.e. SIT-programs and MS-programs) in order to (a) reduce high levels of self-perceived stress and to (b) enhance athletic performance (e.g. Rumbold et al., 2012; Kerr & Leith, 1993). Since Murphy (2009) argues that electronic gaming could be considered in the research field of 'Sport Psychology', the question arises whether applied sport psychological techniques (i.e. self-talk and imagery) that have been shown beneficial on athletes within more traditional sports such as martial arts (Runeke & Szasz, 2013) and tennis (Guilott et al., 2012), could have similar impact upon electronic gaming participants. Thus, given the similar conditions that e-Sport participant and athletes face during competition it would be challenging to scientifically test if traditional applied sport psychological techniques also affects e-Sport practice within the electronic game of DotA 2.

Objective

The objective with the thesis is to implement intervention programs based on sport psychological techniques (i.e. concentration and PETTLEP) and then evaluate the effectiveness of these techniques when exerted by electronic game participants. In order to provide more validity, a placebo program (i.e. physical activity) and control program (i.e. no treatment) will be added. The interventions will evaluated through reviewing changes in (a) perceived performance, (b) self-confidence and (c) state anxiety (i.e. cognitive and somatic).

Hypothesis.

1a) The individuals who are assigned to PETTLEP and concentration training will improve more in self-perceived performance, in contrast to individuals who are assigned to physical activity or as control.

1b) The individuals who are assigned to PETTLEP and concentration training will report reduced levels of cognitive and somatic state anxiety and increased levels in self-confidence, in contrast to individuals who were assigned to physical activity or as control.

Method

Participants'

The inclusion criteria for this study was that the participants had to be above the age of 18 to partake. Eight participants were retrieved based on a convenience sample. All the participants were male. The participants ranged from the age 22 till 25 (M = 23.75, SD = 1.39). The participants were localized in the south western region of Sweden and all volunteered to participate in the study. One participant dropped out on the start of the study (7^{th} of April) due to personal reasons.

Instrument

Competitive State Anxiety Inventory-2 (CSAI-2). CSAI-2 (Lundqvist & Hassmén, 2005) is one of the most commonly used surveys in research that investigates competitive state anxiety. The survey consists of 27 statements that classify into three sub categories. The

categories are: (1) somatic state anxiety, (2) cognitive state anxiety and (3) self-confidence (Ivarsson & Sönnerstedt, 2007). The questioner is answered on a 4 grade scale, ranging from 1 (“Not at all”) to 4 (“Very much so”). Since the survey was used on Swedish participants, a translated version was retrieved. The Swedish translated version was retrieved from Hassmén who have used the translated transcript in previous studies (see Lundqvist & Hassmén, 2005). The translated transcript has also shown to have an acceptant coefficient (α0.83-0.90; Lundqvist & Hassmén, 2005).

Qualitative interview. A brief semi-structured interview (see Appendix 1) was employed. The questions found in the interview were concerning the participants own thoughts regarding an eventual intervention effect, asked through two till five open-ended questions (e.g. ‘How do you think that went?’). The amount of questions asked was depending on the date of the meeting (see Appendix 1). The interview also consisted of one closed-ended questions (i.e. ‘If you were to grade your performance on a scale 1-100, where 100 equals perfect performance and 1 equals total failure, how would you grade your own performance?”).

Procedure

Poster advertisement was conducted at a university localized in south western region of Sweden. An oral presentation was also given during the start of numerous lectures containing general information regarding the study. Potential participants were remitted to contact the scholar through e-mail. Upon this contact the participant received a survey regarding ‘Background Information’ (see Appendix 2) along with a ‘Letter of Content’ (see Appendix 3). The participant who replied was then submitted to a list of potential participants. The list of potential participants was then used to randomly choose the participants who were given the opportunity to attend in the study. Each participant who had been enrolled to the study was then randomly assigned to one of three training techniques: (1) PETTLEP training, (2) concentration training, (3) physical activity training, or placed as (4) control.

The scholar and participant decided suitable meeting times between 14:00 to 20:00 o’clock during the 7th, 9th, 14Th and 23rd of April (2014), through continuous electronic contact. Each meeting consisted of the scholar and two of the participants. Four meetings were held on each of the presented dates. The participants were asked to answer a CSAI-2 survey, pre-test. The participants were also presented with three different ‘heroes’ (i.e. game characters). Each participant then had the possibility to remove (‘ban’) one of the stated heroes. The remaining hero was then the one which was played during the meeting. At the end of each meeting a brief semi-structured interview was conducted separately with each participant.

The first meeting served the purpose of a baseline (7Th of April). During the first meeting general information was given concerning ethics, thereafter the participants were asked to re-read the ‘Letter of Content’ (see Appendix 3) and then sign an ‘Approval of Compliance’ (see Appendix 4) before answering the CSAI-2 survey and facing each other in the electronic game of DotA 2.

During the second (9Th of April), third (14Th of April) and fourth (23rd of April) meeting, the participants assigned to PETTLEP training, concentration training and physical activity training were gathered 25 minutes earlier than control. During these 25 minutes, the participants had to complete exercises concerning their specific techniques (for intervention

content, see Appendix 5). The study followed suggested guidelines from Campbell-Yeo, Ranger, Johnston and Fergusson (2009) in order to reduce the risk of an eventual bias effect. For instance, the PETTLEP and concentration training was lead by freshmen students studying 'Sport Psychology'. The freshmen students underwent specific training regarding the project plan along with lectures regarding each technique. The physical activity group was lead by a personal trainer, who had also undergone similar lectures and training.

On the 9th of April, the participants assigned to PETTLEP training received a brief lecture regarding how imagery training could inflict performance (see Appendix 5). The participants assigned to PETTLEP was also directed to complete different imagery task in relation to various less-successful scenarios (e.g. being the first one to die), throughout each intervention meeting (9th, 14th and 23rd). These less-successful scenarios were produced by the scholar who had observed earlier performances (see Appendix 5). The content of the PETTLEP exercises was specifically designed after the guidelines set for the PETTLEP model by Holms and Collins (2001), for instance several of the elements were emitted such as emotional state re-calling instead of viso-motor behavior rehearsal (for more content, see Appendix 5).

On the 9th of April, the participants who were assigned to concentration training received a brief lecture regarding the how concentration affects performance (see Appendix 5). During the second meeting, the participants were also assigned to complete a 'concentration grid' test (Greenlees et al., 2006; Williams, 2001). During the following meetings (14th and 23rd of April) the participants assigned to concentration training continuously worked with self-talk exercises (for more content, see Appendix 5).

The participant assigned to physical activity was implemented in order to review eventual placebo effects that the intervention could endure. On the 9th of April, the participants within physical activity training received a brief lecture regarding the positive psychological effects that physical activity could contribute to (see Appendix 5). Thereafter, the participant received information regarding different functional training methods (e.g. 'squat'). The participants were also assigned to complete several of these training methods during the meetings from 9th till 23rd of April (for more content, see Appendix 5).

The participants in control did not receive any external information regarding performance enhancing techniques. The participants assigned to control was given the opportunity to undergo PETTLEP training after the study had ended (20th of May, 2014), as thanks for their contribution (for more content, see Appendix 5).

Ethics

During the first meeting (7Th of April), the participants were asked to re-read the 'Letter of Content' (see Appendix 3). Afterwards, the participants were asked to sign an 'Approval of Compliance' (see Appendix 4). The APA ethical standards as well as the guidelines from Vetenskapsrådet (2002) and Milton (2002) were followed in the conduct of the study. For instance, all gathered data that was retrieved throughout the study was encoded. If any participant would to reported mental illness on health due to the intervention, psychological counseling would be provided free of charge.

Data analysis

The data retrieved through the CSAI-2 survey was analyzed through recommendation of

Forsyth and Finaly (2001) and Nock, Michael and Photos (2007), regarding how data should be analyzed when using 'Single Subject Design'. The analysis of the qualitative interviews was performed in the following steps:

1) The script from the semi structure interview was transcribed.
2) The transcribed interviews were read and re-read.
3) The most essential information retrieved from the interview was then highlighted.
4) The highlighted material was summarized.
5) The summarization of text was sent out to each participant individually in order to validate the summarizations. Each participant that had partaken in the study retrieved their own summarizations of result on the 26th of March and had until the 30st of March to reply if they wanted to make any changes.

Result

All data retrieved through the CSAI-2 survey was summarized into a separated table for each participant. Each summarization of the qualitative interviews (see Method), was added below the tables as well as quotations (e.g. subjectively graded perceived performance and speculation regarding an eventual intervention effect) from each of the participants.

PETTLEP Group

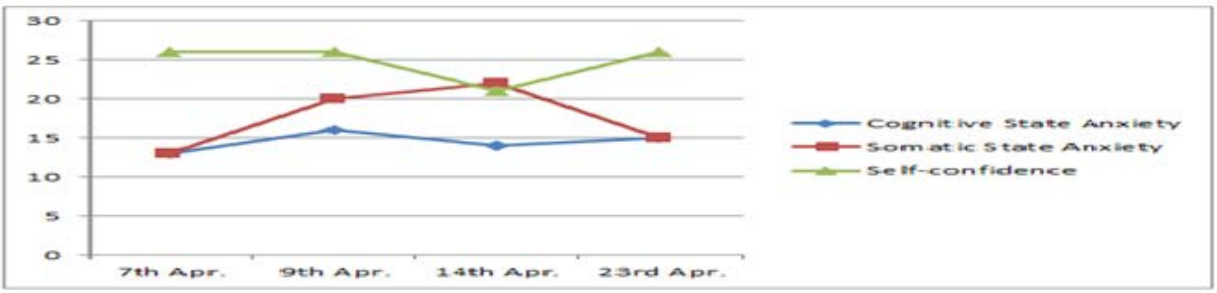
Code 4002.

Figure 4. Summarized data retrieved from the CSAI-2 survey. 7th Apr.: Cognitive State Anxiety (C) = 15, Somatic State Anxiety (S) = 12, Self-confidence (SC) = 26. 9th Apr.: C = 13, S = 14, SC = 28. 14th Apr.: C = 9, S = 11, SC = 30. 23rd Apr.: C = 12, S = 10, SC = 30.

Code 4002 increased 11.1% in self-confidence while reducing cognitive state anxiety by 8.3% and somatic state anxiety by 5.6% (baseline compared to post-test, see Figure 4).

Code 4002 reported successive growth of self-perceived performance by subjectively grading perceived-performance throughout the study (7th: 85, 9th: 87, 14th: 87, 23rd: 90). However, Code 4002 reported that the meeting on the 9th of April had no relevance or impact upon his performance. During the following meetings (14th and 23rd), Code 4002 announced that the PETTLEP training could had influenced positively on his performance. When Code 4002 was asked to speculate regarding how the PETTLEP training had altered his performance in general, Code 4002 stated: "I think it helped me much… because I thought in a whole new way… or, not in another way but instead in a less risk prone way" (23rd of April). Code 4002 also announced that imagery training could be beneficial to enhance performance but also mentioned that the randomization (i.e. not being informed pre-

PETTLEP training regarding positioning on the game map, 14th of April) of the intervention contributed to problems when applying the PETTLEP training.



Code 4003.

Figure 5. Summarized data retrieved from the CSAI-2 survey. 7th Apr.: C = 13, S = 13, SC = 26. 9th Apr.: C = 16, S = 20, SC = 26. 14th Apr: C = 14, S = 22, SC = 21. 23rd Apr.: C = 15, S = 15, SC = 26.

Code 4003 reported no alteration in level of self-confidence, while a 5.6% increase was reported in both cognitive state anxiety and somatic state anxiety (baseline compared to post-test, see Figure 5).

Code 4003 reported successive growth of self-perceived performance by subjectively grading perceived-performance throughout the study (7th: 80, 9th: 85, 14th 85, 23rd: 90). When Code 4003 was asked to speculated regarding how the PETTLEP training had altered his performance in general, Code 4003 stated: "I believe that I enhanced my own performance by remaining positive while facing set-back instead of dwelling in it" (23rd of April). Code 4003 also acknowledges that several of the imaged scenarios had accrued throughout the meetings which had enabled him to cope better with the situations, when faced with these.

Concentration Group

Code 4004.

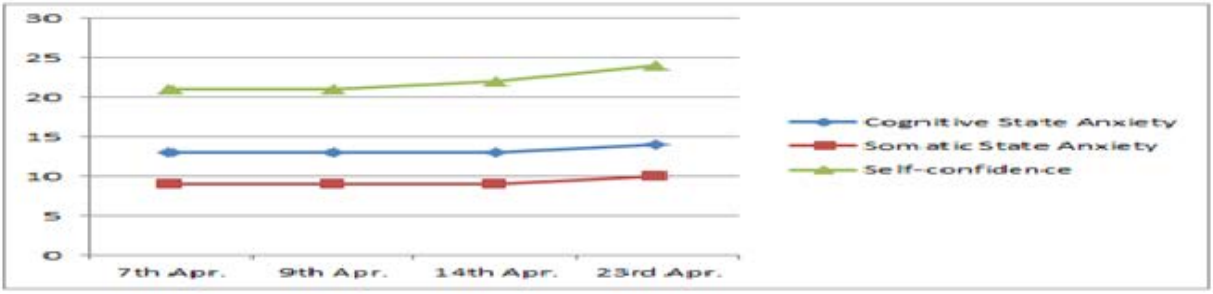


Figure 6. Summarized data retrieved from the CSAI-2 survey. 7th Apr.: C = 13, S = 9, SC = 21. 9th Apr.: LOCF[1]. 14th Apr.: C = 13, S = 9, SC = 22. 23rd Apr.: C = 14, S = 10, SC = 24.

Code 4004 increased 8.3% in self-confidence and 2.8% in both cognitive state anxiety and somatic state anxiety (baseline compared to post-test, see Figure 6).

Code 4004 reported reduction in self-perceived performance by subjectively grading perceived-performance throughout the study (7th: 70, 9th: 90, 14th: 50, 23rd: 30). Code 4004 announced that the concentration training on the 9th of April did not have any relevance or impact on his performance. Code 4004 also reported misuse of the self-talk exercises

throughout the study. To specify, Code 4004 mentioned that he had not applied the techniques which had been presented and rather argued that he had forgotten (14th and 23rd of April). When Code 4004 was asked to speculate regarding how the concentration training had altered his performance in general, Code 4004 stated: "I don't think that it have had any effect" (23rd of April).

Code 4005.

Figure 7. Summarized data retrieved from the CSAI-2 survey. 7thApr.:C = 17, S = 20, SC = 26. 9th Apr.: C = 16, S = 19, SC = 27. 14th Apr.: C = 12, S = 17, SC = 26. 23rd Apr.: C = 14, S = 15, SC = 35

Code 4005 increased 25% in self-confidence while reducing cognitive state anxiety by 8.3% and somatic state anxiety by 13.9% (baseline compared to post-test, see Figure 7).

Code 4005 reported growth of self-perceived performance by subjectively grading perceived-performance throughout the study (7th: 30, 9th: 80, 14th: 50, 23rd: 60). Code 4005 announced that the concentration training on the 9th of April did not have any relevance or impact on his performance. When Code 4005 was asked to speculate regarding how the concentration training had altered his performance in general, Code 4005 stated: "Better, because I have understood the importance of… being prepared before, be mentally stable the entire competition and continue to be positive" (23rd of April).

Physical Activity Group

Code 4006.

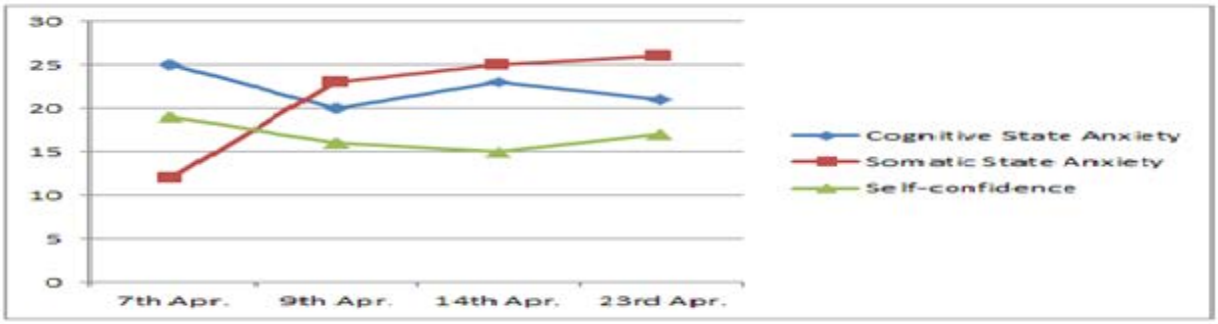


Figure 8. Summarized data retrieved from the CSAI-2 survey. 7th Apr.: C = 25, S = 12, SC = 19. 9th Apr.: C = 20, S = 23, SC = 16. 14th Apr.: C = 23, S = 25, SC = 15. 23rd Apr.: C = 21, S = 26, SC = 17.

Code 4006 decreased 5.6% in self-confidence and 11.1% in cognitive state anxiety while increasing 38.9% in somatic state anxiety (baseline compared to post-test, see Figure 8).

Code 4006 reported decreasing numbers in self-perceived performance by subjectively

grading perceived-performance through the study (7th: 30, 9th: 5-10, 14th: 10, 23rd: 30). Exceptions were however made on the 23rd of April when Code 4006 reported similar numbers in self-perceived performance as reported during the baseline meeting. When Code 4006 was asked why his performance was perceived higher during the meeting of 23rd, Code 4006 stated that the familiarity with the surrounding and the knowledge of going through the physical training had made him more mentally prepare for the last meeting. When Code 4006 was asked to speculate regarding how physical activity training had altered his performance in general, Code 4006 stated: "I believe it affected me relatively much, since I focused on… uhm, revitalizing my breath while trying to breath" (9th of April). Code 4006 also stated: "In whole… the first time it was exhausting, second time as well, this time it was pretty OK… but I would not go out for a run before an important competition" (23rd of April).

Control Group

Code 4007.

Figure 9. Summarized data retrieved from the CSAI-2 survey. 7th Apr.: C = 12, S = 9, SC = 26. 9th Apr.: C = 11, S = 9, SC = 24. 14th Apr.: LOCF[1]. 23rd Apr.: C = 10, S = 13, SC = 24.

Code 4007 decreased 5.6% in self-confidence and 5.6% in cognitive state anxiety while increasing 11.1% in somatic state anxiety (baseline compared to post-test, see Figure 9).

Code 4007 did not indicate any notable pattern in self-perceived performance when asked to subjectively grade perceived-performance throughout the study (7th: 70, 9th: 65, 14th: 65, 23rd: 70).When Code 4007 was asked to speculate regarding how the ongoing intervention had altered his performance in general, Code 4007 stated; "You become sort of more comfortable in the surrounding, sort of… that might lead to enhanced performance" (23rd of April).

Code 4008.

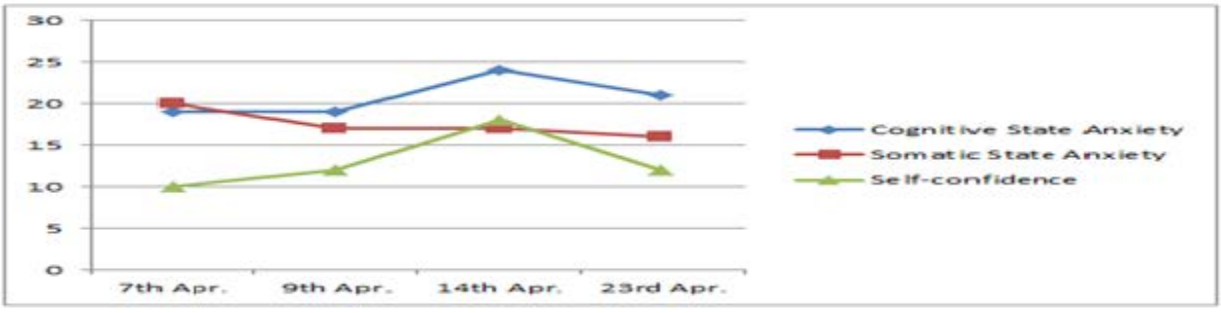


Figure 10. Summarized data retrieved from the CSAI-2 survey. 7th Apr.: C = 19, S = 20, SC = 10.

9th Apr.: C = 19, S = 17, SC = 12. 14th of Apr.: C = 24, S = 17, SC = 18. 23rd Apr.: C = 21, S = 16, SC = 12.

Code 4008 increased 5.6% in self-confidence and 5.6% in cognitive state anxiety while decreasing somatic anxiety by 11.1% (baseline compared to post-test, see Figure 10).

Code 4008 did not indicate any notable pattern in self-perceived performance when asked to subjectively grade perceived-performance throughout the study (7th: 40, 9th: 45, 14th: 40, 23rd: 35-40).When Code 4008 was asked to speculate regarding how the ongoing intervention had inflicted his performance in general, Code 4008 stated; "I think I play as I always done… like nothing have changed" (23rd of April).

Discussion

The objective with the thesis was to implement intervention programs based on sport psychological techniques (e.g. self-talk and PETTLEP) and then evaluate the effectiveness of these techniques when exerted by electronic game participants. In order to provide more validity, a placebo program (i.e. physical activity) and control program (i.e. no treatment) was added. The interventions were evaluated through reviewing changes in (a) perceived performance, (b) self-confidence and (c) state anxiety (i.e. cognitive and somatic). The thesis indicates, to a certain extent, that PETTLEP (i.e. imagery) and concentration training could be beneficial in order to increase both self-confidence and self-perceived performance when comparing the results of the participant assigned to PETTLEP and concentration training in relation to the participants assigned to physical activity or as control. The result is specifically discussed in relation to the IZOF-multidimensional model.

The result of study can be viewed from several different perspectives. One perspective (objective 1) is to enforce credibility to the brief interviews that were conducted with the participants. Based on the result of the interviews, the participants that received PETTLEP training (inspired by Holms & Collins, 2001) were also the participant that reported most increasing advancements in self-perceived performance. In other words, the participants who were assigned to PETTLEP training were also the participants that indicated the most progressive growth in self-perceived performance when compared to the other participants (i.e. participants assigned to physical activity training or as control). The data from the interviews also reveal that Code 4005 (who were assigned to concentration training inspired by Hard et al., 2009; Greenlees et al., 2009) also reported progressions in self-perceived performance. Code 4005 stated growth in self-perceived performance but also indicated (i.e. through announcements) to understanding of the need to be mentally prepared and stable in order to achieve more successful performance.

By reviewing the announcements retrieved from the qualitative interviews, the result can (partly) be discussed in relation to the IZOF-multidimensional model presented by Hanin (2000). For instance, the participants who were assigned to PETTLEP training had to contemplate with different less-successful scenarios (i.e. imagine emotional state) in order to contra produce these scenarios (as recommended by Holms & Collins, 2001). Hanin (2000) state that it is important to understand how an individual perceives his/her emotions in order to understand how these emotions could influence competitive performance. Therefore it might seem reasonable that the increased grading of self-perceived performance found in the

result of the participant assigned to PETTLEP training, might occur due to the fact that they exceeded in understanding how various emotions could inflict their performance while they also (pre-game) visualize how to cope with the suggested scenarios seen through an emotional state. Moreover, the result from the PETTLEP training could for example be viewed through the content, context and time dimension that the model uses. More specifically, the participants within PETTLEP training had to work with emotions that could occur during the different phases of the competition (i.e. time/context), as well as imagine how these emotions could inflict performance (i.e. content). Therefore, if the result of higher grading of self-perceived performance is compared to the IZOF-multidimensional, the time, content and context dimensions could be considered as explaining factors to why self-perceived performance was graded progressively within the participant assigned to PETTLEP training, while these progressions were not found within the participant assigned to either physical activity or as control. Similarly, the result of Code 4005 who exerted concentration training (e.g. positive verbal cues; Hardy et al., 2009) also indicates growth in self-perceived performance. However, Code 4004 (i.e. concentration training) did not report similar result but rather argued that he did not use the assigned technique (see Method discussion). A tentative conclusion made when comparing the result from Code 4005 in relation to the IZOF-multidimensional model, is that the increased in self-perceived performance might occurred due to enhanced understanding of how emotions could inflict performance. More specifically, Code 4005 was assigned to both contemplate with positive emotions (i.e. content) and understanding the need of focusing and concentrating throughout the various phases and situations of the games (i.e. time/context). Therefore the content, context and time dimension could also, similarly to the PETTLEP training argumentation, be reviewed as possible explaining factors for why these progressions are shown in self-perceived performance. The reasoning regarding how PETTLEP and concentration training (i.e. Code 4002, 4003 and 4005) might increased the participants in self-perceived performance when reviewed the result in relation to the IZOF-multidimensional model, also gains credibility since none of the of the participant partaking in physical activity or in control, announce similar progressions.

A second perspective (objective 2) to view the result from is by examining the data retrieved from the CSAI-2 survey. For instance, Code 4006 (i.e. physical activity) reported lower levels of self-confidence and increased levels somatic state anxiety throughout the study (see Figure 8), while Code 4002 (i.e. PETTLEP training) reported the opposite (see Figure 4) and some (e.g. Code 4007, control) remained relatively stable (e.g. see Figure 9). Therefore, the result could partly be discussed through different notions when reviewing the data derived from the CSAI-2 survey. One notion is that two participants (Code 4002 from PETTLEP and Code 4005 from concentration) reported reduction in levels of state anxiety (somatic and cognitive) while increasing in levels of self-confidence relatively continuously throughout the study. However, these notions are not as visible within the result of the remaining two participants (Code 4003 and 4004) who contemplated with the training techniques (i.e. PETTLEP and concentration training), leading to question the effectiveness of the intervention (see Method discussion). Still, the results of Code 4002 and 4005 indicate, to a certain extent, that PETTLEP and concentration training could be advantageous in order to reduce levels of state anxiety and increasing self-confidence. However, the design form of the study brings problems regarding producing specific conclusions because of the low amount of

participants that partook in the study. Another notion that becomes revealed in the result found from the CSAI-2 survey is the possibility to debate regarding an eventual 'Hawthorne effect' (e.g. Brannigan & Zwerman, 2001). Moreover, Code 4006 was assigned to physical activity in order to enable a discussion regarding this specific effect. Code 4006 was to report decreasing levels of self-confidence along with increasing levels of state anxiety in order to emit a discussion regarding the 'Hawthorne effect'. These foretold patterns are also relatively visible when reviewing the result of Code 4006 (further discussion, see Method discussion).

A third perspective (Objective 1 and 2) to assess the result is by reviewing the mixture of the retrieved data (i.e. interviews combined with CSAI-2). The mixture of the retrieved data reveals that both Code 4004 and 4005 (who were assigned to concentration training) indicated that the first intervention meeting (9th of April) did not have any relevance or impact on performance. These statements add further credibility to the conclusions of Greenlees et al. (2006) who state that 'concentration grid' exercise might not be as effective for concentration/focus as noted in earlier studies. However, Code 4005 reported increased levels of self-confidence as well as grading self-perceived performance higher during the following meetings (i.e. 14th and 23rd of April) when the result is compared to baseline. Code 4005 also reported the usage of self-talk exercises to be beneficial which partly strengthen the positive aspect that Hardy et al. (2009) stated regarding how self-talk could invoke on performance. Withal, the result of the Code 4005 leads to the question whether the assigned techniques could be viewed as favorable to increase self-confidence and self-perceived performance while decreasing levels of state anxiety, or not. The reason this question arises is since Code 4004 did not reveal similar effects on performance or state anxiety. Withal, Code 4004 reported misuse of the self-talk exercises. The misuses of the assigned techniques could be considered as an explaining factor for why these progressions (i.e. increased self-perceived performance and reducing state anxiety) were not found in the result retrieved from the participant.

Furthermore, both participants who were assigned to PETTLEP training indicated that the training technique had been advantageous for their performance to a certain extent. For instance, the results from CSAI-2 survey reveals that Code 4002 progressively increased self-confidence while reducing in state anxiety (i.e. somatic and cognitive). These results were however not found in the result retrieved from Code 4003. Withal, Code 4003 announced that the PETTLEP training had been beneficial to his performance along with continuously reporting subjective growth in self-perceived performance. The continuous growth in self-perceived performance reported from Code 4003 could therefore be discussed in relation to whether the participant might have adapted to a more optimal zone of function (Hanin, 2000; Williams, 2001). For instance, Bortoli et al. (2012) argue that an emotion does not only be debilitative for a task but rather argues that it could be facilitative as well. Therefore, the result of state anxiety reported by Code 4003 (i.e. higher levels of state anxiety) leads to question whether state anxiety have been an functional attribute which have made the participant adapt to a closer zone of optimal function.

If the result is reviewed through the mixture of interviews combined with the results retrieved from the CSAI-2 survey, a speculative conclusion would suggest that PETTLEP training and concentration training could be applied in order to increase both self-confidence and self-perceived performance. However, it is important to highlight that the participant have

to work with the suggested technique (i.e. PETTLEP and self-talk) to retrieve a possible (if any) effects.

Summing up, the result indicates to a certain extent that applied sport psychological techniques (i.e. imagery and concentration training) could be beneficial to enhance performance within the RTS-game: DotA 2, as well as self-confidence. Due to the suggested conclusion, the study brings further possibilities to the debate whether e-Sport should be categorized within the research field of 'Sport Psychology. This possibility mainly arises since the applied sport psychological techniques could be reviewed as advantageous to apply in order to enhance e-Sport performance, therefore it might become more appealing to accept e-Sport within the concept of sport psychology to enable the possibility for further research if this conclusion is truthful, but also to improve e-Sport participant in their practice if the conclusion were to be credible. Small patterns has also been discussed regarding state anxiety, for instance the result of Code 4003 has been discussed in relation to an eventual adaption to a more optimal zone of function while Code 4006 has contributed to a discussion regarding an eventual Hawthorne effect (Method discussion). However, since there is an absence of a stable pattern when reviewing the result regarding state anxiety (see Result), no tentative conclusions were to be made.

Method discussion

There are several aspects that should be mentioned in regards to methodological issues that can be summarized to six aspects. A first aspect is the drop-out rate that occurred. The dropout rate was 12.5% (n =1) which lead to an alteration within the design of the intervention, leaving only one participant to be placed within the physical activity group.

A second aspect is the different forms of biases that might have occurred. It is withal important to highlight that the following discussion about biases is not presented to emit critic towards the study design, but rather to critically review the suggested intervention effect (i.e. PETTLEP and concentration training could be beneficial to e-Sport practice) that has been presented. Moreover, several different biases could be discussed in combination to the study, for instance 'egocentric biases' (Takizawa & Yamashita, 2013) such as 'above-average effect' (Kruger, 1999) or an eventual 'false consensus effect' (Engelmann & Strobel, 2000). However, the most notable feature seen through the result of the brief interviews was an eventual learning bias that could have occurred. Moreover, Herzog, Aberg, Frémaux, Gerstner, and Sprekeler, (2012) investigated perceptual learning and unsupervised bias. In similarity to the findings from Herzog et al. (2012) a discussable notion is that two of the participant (i.e. Code 4006 and 4007) reported familiarity and exposure of the setting (i.e. training) as a possible explaining factor for the alternation in grading their performance. However, the familiarity in the settings was not announced in the answers retrieved from the participants assigned to PETTLEP and concentration training. This leads to the question whether that the improvements in self-performance should be viewed only as an effect of the intervention, or if it's the mixture of the training techniques (i.e. PETTLEP and concentration training) along with the exposure of the setting (i.e. training). A more general perspective on biases is discussed by Snowden (2003) who argue that a bias can occur when normative beliefs are shared with participators, or that one group receives greater amount of attention

than another. Therefore the study undertook guidelines proposed by Campbell-Yeo et al. (2009) in order to reduce eventual bias that could occur. To exemplify, Campbell-Yeo et al. (2009) argue that research could reduce the possibility of biases by reviewing aspects such as, *selection of appropriate comparisons* (e.g. comparing more groups than just experiment and control) or *integrity of intervention* (e.g. course of study remains stable over time). Therefore, precautions were taken to reduce eventual bias effect (e.g. (a) intervention was held by 'blinded' freshmen students and (b) physical activity was implemented in order to overview placebo effects). However, the study still undertook a design form of a short term pilot intervention which leads to a problematic viewpoint when discussing an eventual bias effect.

A third aspect is the personal characteristic that occurred in the study. For instance, one of the participants within the concentration group (Code 4004) did not seem cooperative to invoke self-talk based on announcements that occurred during the brief interviews, post-test. To specify, Code 4004 mentioned that he had not applied the techniques which had been presented and rather argued that he had forgotten or didn't want to apply them (14th and 23rd of April). Another personal factor that might invoke on the result is Code 4006, who reported physical illness (i.e. problems with breathing) through the physical activities (e.g. doing 15 push-ups). This lead to the question if the high levels of reported somatic state anxiety and lower levels of self-confidence depends on the low physical endurance rather than the physical activities on its own.

A fourth aspect is the implementation of 'blinded' (i.e. unaware of the other groups) scholars (i.e. freshmen students/personal trainer) who were assign to carry out the PETTLEP, concentration and physical activity training. Even if an eventual reduction in bias is possible to discuss due to this approach, the discussion of knowledge still remains debatable. Moreover, since the PETTLEP and concentration training was held by the previously mentioned scholars, the question that arises is if the result of the study could have shifted if individuals who had expertise knowledge (e.g. PhD-graduates) in the psychological techniques (i.e. imagery and concentration) would have been appointed.

A fifth aspect is the 'Hawthorne effect' that could be discussed through the data retrieved from Code 4006 (i.e. participant assigned to physical activity). Code 4006 was told that physical activity was to be advantageous for both performance and reducing levels of stress. However Code 4006 reported a reduced grade of both self-perceived performance and self-confidence while increasing in levels in somatic state anxiety (see Figure 8). Therefore, the conclusion that PETTLEP and concentration training could be beneficial to performance and self-confidence could be argued to be results of the interventions itself rather than an eventual placebo effect by only partaking in the study. It is however important to highlight that the discussion regarding an eventual placebo effect should be viewed with caution since only one participant was assigned to physical activity.

A sixth aspect is that none of the participant report changes in the sent out material regarding the summarization of the result (see Method). Therefore the result presented within the study could be considered as credible.

Conclusion

No matter how the result is bent, the main finding within this thesis is the given possibility to debate whether performance and self-confidence can be enhanced through sport psychological

techniques (i.e. imagery and concentration training) within e-Sport practice. The thesis indicates, to a certain extent, that PETTLEP and concentration training could be beneficial for enhancing performance. However, the study is constructed as a short-term pilot study, meaning that there is a need to further investigate the field in order to determine if the suggested intervention effect found in this thesis mirrors reality.

Future Research

There is a need to further explore the field of e-Sport before enabling it within the concept of 'Sport Psychology'. Withal, the thesis indicates to a certain extent that applied sport psychological techniques could be beneficial for e-Sport practice, meaning that future research should increase in the investigation of the concept (i.e. e-Sport) in order to possibly enable the concept to become accepted within the research field of 'Sport Psychology'.

In the current moment, the definition of the term e-Sport could be reviewed as vague since the concept is relatively new and unrevealed. For instance, the guidelines to qualify as a 'professional soccer player' are fairly clear involving standard criteria. Such clear criteria are absent within the realm of e-Sport, leading to question if exertion of electronic games automatically makes an individual to be categorized within the concept of e-Sport. However, ought to there not be a difference between an e-Sport participant, in terms of psychological factors (e.g. level of stress) and a participant who exert electronic gaming merely for amusement? In the same way as a professional soccer player can differ from a soccer player who plays merely for amusement? Therefore future research is also recommended to more extensively investigate the terminology of the phrase in order to enable correct labeling of future research concerning the term.

Finally, it is also of interest to investigate psychological aspects within the field of e-Sport since cognitive aspects (e.g. memory) would be more likely to be revealed. In other words, since e-Sport involves minimal physical activity, it could be profitable to test applied sport psychological tools (e.g. PETTLEP training) in order to study possible cognitive effects that could arise by applying these programs. These recommendations are based on a similarity with previous research conducted on chess players where mainly cognitive processes have been tested such as information processing (Saariluoma, 2001) and memory (Gobet & Simon, 1996).

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End Notes

1: **LOCF** = Last observation carried forward, meaning that the last retrieved result that has been copied and re-used in the meeting where the CSAI-2 data were not collecting data. More specifically, LOCF was carried out on Code 4007 due to absence (i.e. personal reasons) of the meeting held on the 14th of April while LOCF was carried out on Code 4004 since he showed up later to the meeting of 9th of April (i.e. approximately 20 minutes) which made the scholar to forgot to collect (i.e. CSAI-2 survey) from the participant.

2: **CENSUR** = The location has been censored to protect the anonymity of the participant.

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Due to circumstances such as (1) copyright and (2) ethical principles, appendixes such as *transcribed interviews* and the *CSAI-2 survey* has been removed from this list of appendix. For further investigation within the result, please commerce: *robsza89@gmail.com*

Appendix 1: Semi-structured Qualitative Interview Guide

Baseline (7’e April):
Q1) Hur kändes det att det gick?
Q2) Om du skulle gradera dig på en skala 1-100, där 100 motsvarar perfekt prestation och 1 motsvarar totalt misslyckande, vart hade du graderat dagens prestation?
Q3) Om du hade fått möjligheten att spela om dagens spelomgång, hade du gjort något annorlunda?

Intervention 1-2 (9’e och 14’e April):
Q1) Hur kändes det att det gick?
Q2) Om du skulle gradera dig på en skala 1-100, där 100 motsvarar perfekt prestation och 1 motsvarar totalt misslyckande, vart hade du graderat dagens prestation?
Q3) Om du hade fått möjligheten att spela om dagens spelomgång, hade du gjort något annorlunda?
Q4) Hur kändes det att få genomföra de övningar som du gjorde med (ange namn)?
Q5) Skulle du vilja resonera lite granna huruvida övningarna som du fick genomföra påverkat dig?

Intervention 3 (23’e April):
Q1) Hur kändes det att det gick?
Q2) Om du skulle gradera dig på en skala 1-100, där 100 motsvarar perfekt prestation och 1 motsvarar totalt misslyckande, vart hade du graderat dagens prestation?
Q3) Om du hade fått möjligheten att spela om dagens spelomgång, hade du gjort något annorlunda?
Q4) Hur kändes det att få genomföra de övningar som du gjorde med (ange namn)?
Q5) Skulle du vilja resonera lite granna huruvida övningarna som du fick genomföra påverkat dig?
Q6) Skulle du vilja spekulera kring hur interventionen har påverkat din prestation i helhet?

Appendix 2: Background Information

Bakgrundsfrågor (Intresseanmälan)

Namn:	Efternamn:
Födelseår (ex. 1989):	Kön (Man/Kvinna):
Telefon numer:	E-post adress:
MMR (Solo) ranking:	MMR (Team) ranking:

Sysselsättning (Var god och **fet markera** det alternativt som passar dig bäst):
1) Student (Gymnasium) 2) Student (Högskola/Universitet)
3) Arbetande (Deltid) 4) Arbetande (Heltid)
5) Övrig

Jag önskas bli kontaktad via (Var god och **fet markera** det alternativ som passar dig bäst):
1) Telefon nummer 2) E-post

Appendix 3: Letter of Content

Syftet med denna studie är att undersöka prestation bland e-Sport utövare, under titeln: ’Base-studyfocusing E-Sport – ***defining, mapping and testing E-sport as a sport psychological term.’***

Denna interventionsstudie avser att undersöka egenupplevd prestation bland e-Sport utövare och kommer genomföras av en magisterstudent på Högskolan i Halmstad. Studien avser att åtta individer kontinuerligt möts i det elektroniska spelet: ’DotA 2’, utmed en tidsplan på tre veckor (fyra tillfällen). Varje träff kommer ske i ***CENSUR***[2]. Vid varje träff kommer Du ombes att besvara diverse enkätformulär samt intervjufrågor. Intervjuerna kommer även spelas in med hjälp av elektronisk utrustning. Utmed studietiden kan Du även ombes att genomföra vissa aktiviteter/lösa diverse uppgifter. Varje möte uppskattas vara cirka 60 minuter. All information som Du bidrar med (enkätsvar samt intervjusvar) kommer att kodas för att värna om din anonymitet (motion 1998:20). Personliga utsagor kan däremot presenteras i den fullständiga rapporten, däremot kommer kodningen och diverse omskrivningar medföra yttersta svårigheter att kunna identifiera Dig som deltagare. Ditt deltagande i studien är helt frivilligt och du kan när som helst avbryta ditt deltagande utan angiven orsak. All information du lämnar kommer behandlas konfidentiellt. Du kommer efter avslutad studie ha möjlighet att erhålla den färdigställda produkten, elektroniskt, för att kunna läsa om resultatet som studien medfört. Artikeln kommer att publiceras på DivA-portalen samt försöka publiceras i en vetenskaplig tidsskrift. Ifall du anser att ditt deltagande medfört psykisk ohälsa kommer möjlighet till psykologisk rådgivning att finnas.

Datumet för varje träff är: 7’e april, 9’e april, 14’e april samt 23’e april. Tiderna för varje träff kommer variera mellan 14:00-20:00, detta beroende på separat överkommelse mellan Dig, som deltagare, och projektledaren (Robert Szasz).

Vid övriga frågor, var god och kontakta:

Kontaktuppgifter Magisterstudent:
Namn: Robert Szasz
Telefon Nr: 0761622447
Mail: robsza08@student.hh.se

Kontaktuppgifter Huvudforskare:
Namn: Urban Johnson
Telefon Nr: 035-167261
Mail: urban.johnson@hh.se

_____ _____

Appendix 4: Approval of Compliance

Härmed lämnar jag ett skriftligt samtycke till min medverkan inom studien; ’Base-studyfocusing E-sport – ***defining, mapping and testing E-sport as a sport psychological term’.***

Jag har informerats gällande syftet med denna studie samt mottagit information om hur den information som jag medför kommer behandlas och distribueras. Jag har även informerats om att mitt deltagande är helt frivilligt och jag när som, utan angiven orsak, kan välja att avsluta mitt deltagande. Jag samtycker härmed till att delta i studien som handlar om att mäta den egenupplevda prestation hos e-Sport utövare.

Ort/Datum/År

_____

Namnunderskrift

_____

Namnförtydligande

_____

Magisterstudentens underskrift

_____

Namnförtydligande

_____

Appendix 5: Intervention Content

Pre-Information

Observations

The participant's (i.e. all except control) plays were observed by the scholar (Robert Szasz) continuously throughout the study. The scholar noted less-successful scenarios that occurred throughout these plays (i.e. "Code 400X starts to sing and focus on other things then the task after he faced one major backset"). The scholar and freshmen student meet 15 minutes pre-meetings with the participants to address these observations. The freshmen student was then exposed to the material gathered through the observation and were told to highlight some of these issues/less-successful situations on the upcoming meetings with the participants.

Important notes

The scholar were absent of the meetings held by the freshmen student along with the participants. The freshmen student within PETTLEP training had also discussed the model (i.e. 'PETTLEP model') with the scholar pre-intervention. The freshmen student within concentration training had also discussed the model (i.e. 'Framework of Self-talk') with the scholar pre-intervention. The observations was noted by paper and pen by the scholar (Robert Szasz). The quotations are re-told by the scholar meaning that the phrases could alter on the meetings that were held, these quotations are however still presented in order to receive a better over view regarding how the intervention was designed and what was approximately said.

Intervention

PETTLEP

9th of April. The participants (Code 4002 and 4003) received a brief lecture regarding the positive effects that imagery training could contribute to. The lecture consisted of result presentation concerning previous research that has indicated a positive correlation between imagery training and enhanced performance (e.g. Morris et al., 2005). The lecture also consisted of several quotations regarding the techniques (i.e. imagery training) impact on performance announced by famous athletes (similar to the approach used by: Runeke & Szasz, 2013). Thereafter the participants were placed in front of the computers they were to play on (in order to stimulate environmental cues as recommended by Holms & Collins, 2001). When seated, the participants were asked (by the freshmen student) to visualize a strategy that they would implement in their play-style during the forthcoming game (i.e. play). The freshmen student was told to interrupt the visualization on several occasions in order to discuss what the imaged scenarios were. This interruption occurred in order to make the freshmen student able to understand the different elements that the participant visualized, for instance the perspective element (e.g. "What do you see?"), the physical element (e.g. "Really try to re-call how these emotions feel like and how they affect you") and timing element (i.e. "How clear do you see the images?"), these elements are also described in the PETTLEP model (Holms & Collins, 2001). The answers on the elements was then noted by the freshmen student and post-meeting discussed with the scholar. In whole, the freshmen students were told to let the participant visualize the situations during 1-3 minute intervals (i.e. 1 minute

minimum and 3 minutes maximum).

14th and 23rd of April. The notes that had been taken regarding the elements were added with the observed 'less-successful situations'. The scholar noted (i.e. in the meeting held 15 minutes before the meeting with the participants) adjustment that should be conducted at the participant contemplating with PETTLEP training, for instance one adjustment could be to make a participant who had reported vague images to become more realistic within his visualization (e.g. Scholar: "Try to stimulate Code 400x to re-call emotions in a more realistic manner"). During the meeting (i.e. 14th and 23rd), the participant were asked by the freshmen student to visualize the noted less-successful situations. The participants were also told to visualize different possible solutions to the situation as they took part. The participants were also asked to re-call emotions that occurred through these situations, thereafter the participants were asked to visualize how these emotions inflicted their performance (e.g. "I would like you to close your eyes and feel the emotions that you felt in this situation, I would also like you to see how these emotions could inflict your performance"). Overall, the freshmen students were told (by the scholar) to let the participant visualize 4 minutes minimal for each given situation and 10 minutes maximum. The situations were also graded in importance, leaving the freshmen student to follow specific schedules regarding what were to be visualized and noted on the meetings.

Concentration

9th of April. The participants (Code 4004 and 4005) received a brief lecture regarding concentration. The lecture consisted of result presentation concerning previous research that has indicated a positive correlation between concentration training and enhanced performance (e.g. Allen, Jones, McCarthy, Sheehan-Mansfield & Sheffield, 2013; Hardy et al., 2009). The lecture also consisted of information regarding selective attention and focus seen through a psychological perspective (Weinberg & Gould, 2007). After the lecture, the participants were then asked to complete the 'concentration grid' test (Greenlees et al., 2006), the test time was set to be one minute and was conducted twice. The participant completed the first test in silent (i.e. trying to find numbers in chronological order starting from X). During the second test the freshmen student who held the training was told to (a) play dart, (b) tell a story and to (c) show strange images on his phone throughout the test (i.e. trying to distract). After the tests, the participant and scholar discussed what factors that could invoke negatively on concentration during the upcoming play (i.e. "How do you think your focus is going to be affected when the scholar will sit behind you and observe?"), parallels were discussed in relation to the previously completed grid test.

14th and 23rd of April. When the participant arrived, the freshmen student were to ask the participant regarding their previous plays but also note the less-successful situations that had been discussed with the scholar. The freshmen student was then assigned to involve the participant in a discussion regarding these less-successful situations. The freshmen student was also told to ask how the participant perceived his focus throughout these situations. The most notable concentration shift (that the participant noted) were then to be highlighted by the freshmen student (e.g. "Ok, if you feel like you lost focus here, then we should do like this...". The recommendation that the freshmen student was told to implement was assignment of verbal cues (e.g. "every time you come into a situation you start to think about irrelevant

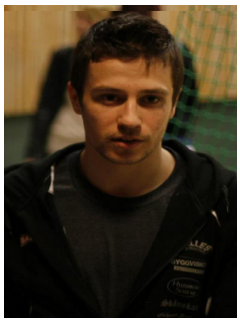
things, just think ‘FOCUS’”), these verbal cues were recommended following suggestions on self-talk application of Hardy et al. (2009). To specify; the freshmen student were to identify situations where to participant lost focus, to start these discussions the freshmen student was told to ask regarding the situations that had been noted less-successful from the scholar. When the freshmen student had identified situations where focus decreased, the freshmen student was to recommend the participant to implement verbal cues. E.g.: “When you die, you lose concentration, but don’t you think that your opponent becomes more relaxed believing his closer to victory? What if you where to stay positive and use words such as ‘now he thinks he gone win’, ‘I can do this’, etc. Do you believe that this would enhance your focus and how do you think the end result would be”? The freshmen student was also told to assign the participant to use verbal cues in other aspects of the play in order to remain focused. For instance: “Each time you last hit a creep, think ‘good’, ‘awsome’ and so forth, in order to remain focused on the task”.

Physical Activity

9th of April till 23rd of April. During the first meeting (i.e. 9th of April), general information was given regarding how physical activity could positively invoke on well-being (inspired by: Fox, 1999). The participant contemplating with physical activity was also told that physical activity was to be beneficial for his play performance. Thereafter the personal trainer introduced the participant to several different training methods (e.g. squat and push-ups), the introduction was conducted in order to prevent eventual damage to the participant if executing the task poorly. The participant then had to complete several of these methods. The aim with each meeting was to retrieve an evaluated (i.e. personal trainers own interpretation) heart-rate increase to over 110.

Control

9th of April till 23rd of April. The participant assigned to control did not receive any external information regarding performance enhancing techniques. The participants assigned to control was given the opportunity to undergo PETTLEP training after the study had ended (20th of May, 2014), as thanks for their contribution.



“Test us with test, but the finals are never final, because they never prepare us for the biggest test which is survival” – S. Breaks

Thank You for reading!

Best Regards,
/Robert Szasz

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