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Can Talking to Myself Help Me Win? The Impact of Two Dimensions of Self-Talk on Video Game Performance

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Abstract

While self-talk has been shown to improve sports performance, no research has examined its impact on sports-related video game performance. In Study 1, participants (n = 24) were asked to pilot a speed skating and snowboarding video game which would be used for Study 2. In Study 2 (n = 34), 2 three-way ANOVA's were conducted to look at valence, function, and gender for each video game to determine the feasibility, limitations, and piloting of self-talk sentences. The results from Study 2 informed materials and methodology for the Main Study. The Main Study (n = 81), investigated the impact of two dimensions of self-talk – valence (positive/negative) and function (motivational/instructional) – on video game performance. For the Main Study, a 3 (positive/negative/control) x 2 (motivational/instructional) mixed factorial ANOVA was used, and the study's preliminary results indicated that these self-talk dimensions did not impact performance. A key limitation of the research study included the self-talk sentences lacking adequate manipulation strength – potentially resulting in the lack of significant findings.

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Over the past decade, video games have evolved from being strictly a source of entertainment, to large professional competitions held in sold-out arenas where individuals vie for money and status. One such example is called eSports: a social event where competitive players come to play against one another for money and prizes. eSports share many similarities to real-life sports, with some individuals even classifying video games as a sport (Hallmann & Giel, 2018). For example, famous sports teams (e.g., Cleveland Cavaliers, the New York Yankees, and the Houston Rockets) have started to invest more in eSports due to the popularity of this rising sport compared to the traditional sports (Candela & Jakee, 2018). Prior literature on self-talk and performance has predominately focused on real-life sports performance, with very limited self-talk research being conducted outside of this domain (Hardy, 2006). However, with some video games potentially being classified as a type of sport, it would be reasonable to assume that self-talk may also improve performance in this newly emerging domain. Therefore, we asked the following question: Can self-talk improve sport-related video game performance as it has for traditional sports? If so, our research will be able to redefine the many ways we use cognitive perception to influence our performance.

Self-talk and Sports Performance

Self-talk is defined as an action where an individual is talking to themselves out loud (externally) or in private (internally) and serves as a mechanism to engage with oneself by analyzing a situation with the goal of achieving a task (Hardy, 2006). Some consider self-talk as a philosophical question about understanding how we communicate with ourselves to understand our situation (e.g., Geurts, 2018). Others explain self-talk as a cognitive ability to program our actions (e.g., Morin, Duhnych, & Racy, 2018). Taken together, they encompass the core ideological function (e.g., why, who, and how) seen in self-talk. While the definition of self-talk in the literature has been broad and unclear, recent efforts by Hardy (2006) have helped to operationally define self-talk as a general phenomenon and as a collection of different components.

With Hardy's (2006) definitions of self-talk, we are interested in understanding how it influences sports performance and our ability to move it out of the sports framework. A meta-analysis investigated the influence of self-talk on sports performance and discovered the

mechanics (e.g., sentences, words, and usages) related to self-talk that indicated a change in performance (Hatzigeorgiadis, Zourbanos, Galanis, & Theodorakis, 2011). Furthermore, the way athletes use self-talk can impact their performance, as some phrases (read or spoken) could have little or no effect on performance, and sentences with rational meaning to the situation were more impactful than those with irrational meaning (Turner, Kirkham, & Wood, 2018). Overall, the results of many studies have shown a change in performance within the sports domain, as athletes are able to attain an increase in performance by talking to themselves.

The Dimensions of Self-Talk

Hardy (2006) classified self-talk into six dimensions: valence, overtness, self-determined, motivational interpretation, function, and frequency. For the purpose of relevance, we will only be discussing the valence and function dimensions in the present study. Both dimensions will be discussed briefly below.

Valence. The most common self-talk dimension is valence, which is categorized as positive and negative (Hardy, 2006). Positive self-talk examines people's use of words to bring praise and satisfaction with performance. An example of positive self-talk might be when someone says "I'm doing great" after scoring a goal in a hockey game. Contrastingly, negative self-talk criticizes the outcome of performance (Sánchez, Carvajal, & Saggiomo, 2016). For instance, negative self-talk might be when someone says, "I'm doing horribly," after making a mistake on the ice. The happier an individual is with their performance, the more likely they will use positive self-talk (Hardy, 2006). Furthermore, positive self-talk is used to help control anxiety and improve self-regulation, while negative self-talk addresses the faults in our actions (Zetou, Nikolaos, & Evaggelos, 2014).

Function. The function dimension of self-talk is divided into two aspects: instructional and motivational (Hardy, 2006). Instructional self-talk is used to evaluate one's actions and to set a task to overcome the situation. An example of this occurs when someone might say to themselves "move right" or "bend my knees." Motivational self-talk motivates one to achieve their desired outcome by praising confidence and effort (Kolovelonis, Goudas, & Dermitzaki, 2011). An example of this occurs when someone says, "don't give up" or "just a bit more." Although both motivational and instructional self-talk provides instructions to the individual, each serves a unique function. Motivational self-talk is often used to overcome challenges of endurance and gross motor skills, while instructional self-talk is used to deal with precise skills

(Kolovelonis et al., 2011). Some examples of endurance or gross motor skills with motivational self-talk can be long distance running or jumping, while precise skills for instructional self-talk can be aiming to shoot or focusing on precise hand movements.

Application of Self-Efficacy and Self-Regulation Theories to Self-Talk

There are two key theories that relate to self-talk: self-efficacy and self-regulation. Self-talk as a construct can be used to explain why self-efficacy and self-regulation can improve performance.

Self-efficacy is an individual's belief in their ability and efficiency to complete a task (Usher, Li, Butz, & Rojas, 2018). This theory is largely based on four constructs: performance accomplishments, vicarious experiences, verbal persuasion, and emotional arousal (Bandura, 1997). These constructs act as a collective engine that helps explain the theory in a more realistic view. However, out of the four constructs, verbal persuasion is the most relevant to the current research, as this relates to the belief in words (Wallace & Kernozek, 2017). Research from a past meta-analysis has shown that efficacy has contributed to performance and motivation (Bandura & Locke, 2003). Overall, how does self-talk relate to self-efficacy? Self-talk is about talking to ourselves and creating a plan on how to improve our actions, and self-efficacy achieves this by demonstrating the mechanical thought process of self-talk. People are verbally talking about their situation, and by doing so, they are preparing to tackle their next goal. By believing in the sentences or the action of talking to themselves, participants may see an improvement in their confidence and experience with the situation. However, Hardy (2006) talks in great length about the shortcomings of self-talk. He explains that finding a proper and in-depth theory for self-talk is difficult, but self-efficacy provides additional information on self-talk by explaining the mechanical thought process behind it.

Self-regulation theory is a goal related process that involves a person being aware of the actions needed to accomplish their goals and then regulating their behaviour to complete the goal (Hofmann, Schmeichel, & Baddeley, 2012). Self-regulation occurs in three stages: (1) critically thinking about the goal, (2) motivating oneself to achieve the goal, and (3) possessing the capacity to achieve that goal (Hofmann et al., 2012). Failure to implement the three stages of self-regulation is associated with lower goal achievement. A common example of self-regulation failure occurs in dieting (Heatherton & Wagner, 2011); dieters may be unable to think critically about the long-term plan, motivate themselves to reach their goal, and/or set a reasonable goal

(e.g., lose 2 pounds per week). Self-talk is an important aspect of self-regulation, as it applies the same cognitive ability to critically think about one's goals, but also adding the extension of talking it out.

Purpose of the Present Study

We propose investigating a new area in self-talk by exploring positive and negative self-talk (valence), combined with instructional and motivational self-talk (function) as they relate to video game performance. Competitive video game players rely on performing their best via consistency and seeking to improve their performance to maintain and gain a competitive edge. We believe that a person's own discussion with themselves via self-talk is the best enhancement for improving performance and aim to test if self-talk can be applied to video game sports. We propose the following hypotheses:

1) Positive self-talk will result in a better time performance followed by the control, then followed by negative self-talk.
2) Instructional self-talk will result in a better time performance followed by motivational self-talk, then followed by control.
3) Positive instructional self-talk will result in a better time performance compared to the other groups of self-talk.

Pilot Study 1

The purpose of Pilot Study 1 was to test four sports games from the Mario & Sonic at the Olympic Games (2007) and Mario & Sonic at the Olympic Winter Games (2009) on the Nintendo Wii U, selected by the authors, as possible games for inclusion in Pilot Study 2. These games were selected because they matched three requirements: They were easy to learn, took less than two minutes to complete, and more than one person could play at once. The four games were 500-m speed skating, 110 m hurdles, snowboard cross, and trampoline. A total of 24 participants took part in Pilot Study 1: 9 (38%) males and 15 (62%) females. The participants were recruited from the psychology research pool at Kwantlen Polytechnic University (KPU). Participants played the four games identified above on a Nintendo Wii U using a 60-inch projector screen. They played against themselves or up to three other players, depending on the number of participants signed up per session. Most participants found speed skating and snowboarding to be the most entertaining games; thus, these were selected as the games for Pilot Study 2.

Pilot Study 2

The purpose of Pilot Study 2 was to test the feasibility of the design for the main study. The design for this study was a 3 (valence: positive self-talk, negative self-talk, and control) x 2 (function: instructional self-talk and motivational self-talk) x 2 (gender: male and female) mixed ANOVA. The dependent variable was the average time it took to complete the games. Pilot Study 2 had 34 participants; 8 (24%) males and 26 (76%) females. The participants were once again gathered through the psychology participant research pool at KPU, and the participants were compensated with 0.5% extra course credit for eligible psychology courses or entry to a gift card draw. Participants played the 500-m speed skating and snowboard cross on a Nintendo Wii U using a projector and 60-inch project screen. Participants were asked to read three sentences from a list of six self-talk sentences from their assigned group. We manipulated the between and within variables by getting participants to read those sentences aloud. Counterbalancing was employed to control for order effects for each variable. After each game, their completion times were recorded on a scoring sheet. Participants played against another player or themselves. Each group of participants was randomly assigned to either the positive self-talk, negative self-talk, or control groups. After random assignment, participants completed the snowboard cross and 500-m speed skating five times in a row. Participants were randomly assigned to snowboard or speed skating first. After the first round, which acted as a practice round, participants read three of their assigned structured sentences prior to starting each of the remaining four rounds. Participants were also permitted to read the same sentence three times in a row. After completing the last round of the game, a survey was presented to ask questions related to experience and previous gaming history. We conducted 2 three-way ANOVAs for both the speed skating and snowboarding games. Both analyses met the assumption of equal variances. For the speed skating game, there was a statistically significant main effect with the valence self-talk groups, and there was an interaction between self-talk groups and function self-talk (see Table 1). A follow-up Tukey post hoc analysis for the main effect of valence showed that the negative self-talk group had a faster time than the positive self-talk group; the control group was not different from the other two groups. We did not follow up on the interaction of self-talk group and function due to an insufficient sample size (Table 1). For the snowboarding game, there were no statistically significant main effects or interactions (see Table 2). Given the

lack of significant results for gender and feasibility with regards to time, the main study excluded the gender variable.

Main Study

Design

The main study used a 3 (valence: positive self-talk, negative self-talk, and pure control) x 2 (function: instructional self-talk and motivational self-talk) mixed factorial ANOVA design. The valence was a between groups variable and function was a within groups variable. The dependent variable was the time it took to complete the snowboard cross game. Participants played against a ghost time, which is a transparent character who competes against the player with a fixed time that never changes.

Participants

A total of $N = 81$ participants were recruited for the main study. Table 3 and Table 4 present the demographic data for this sample. All participants were recruited from the psychology participant research pool at KPU. By partaking in the study, participants had an option to acquire 0.5% extra course credit for eligible psychology courses or enter a draw for a chance to win one of two $50 gift cards. If the participants beat the ghost's time, they were entered into a separate draw for a $50 gift card.

Materials

Participants played snowboard cross on a Nintendo Wii U that was shown on a projector screen. After each round, the scores based on time were collected and recorded on a scoring sheet. Afterwards, participants were provided with a list of six sentences from their assigned group and asked to read off their choice of three sentences.

Procedure

During the game, participants were told to race to the bottom of the hill as quick as possible. To help participants visualize the acquired time needed to do well, they played against a time trial in the form of a ghost; the ghost plays along with the player by showing them the speed and time needed to beat the selected time. The ghost time, and ultimately the time participants had to beat, was set at 65 seconds. The ghost was used to engage the participant in playing the game. Participants were randomly assigned to either the positive self-talk, negative self-talk, or control groups before playing the game. After being assigned to a group, participants completed the snowboard cross game six times in a row, and after the second round, participants

in the experimental conditions would select three self-talk sentences from their assigned list of six items. We manipulated the between and within variables by asking participants to read those sentences out loud, and there was counterbalancing for each variable to account for order effects. Participants were also able to read the same sentence three times in a row. After completing the game, participants completed a set of questions related to their current game experience, whether they said anything else to themselves, and their previous gaming history.

Results

Prior to running statistical analyses, we assessed the data for the assumptions of normality and equal variances. While the assumption of equal variances was met, there were concerns regarding the normality of some of the subgroups. The values for asymmetry and kurtosis between -2 and +2 are considered acceptable in order to prove normal univariate distribution (George & Mallery, 2010). A total of 10 outliers were detected and analyses run with and without these individuals showed no difference in results. Therefore, we are reporting results with all participants included. We also examined whether there may have been a difference between the groups in terms of gaming experiences. The results of a chi-square test indicated that participants that were experienced gamers did not differ by self-talk group, X^2 (1, n = 81) = 3.10, p = .212, Cramer's V = 0.20.

We then analyzed the data using a repeated mixed-design ANOVA with a within-subjects factor of function (instructional and motivational) and a between-subject factor of self-talk groups (positive, negative, and control). Both main effects were not statistically significant (see Table 5). Furthermore, the interaction between function and self-talk groups was not statistically significant. All effect sizes were in the very small range.

Overall Discussion

Although we had predicted main effects for the valence and function dimensions, with positive and instructional self-talk leading to improved performance, this was not supported in the main study. Furthermore, the interaction between function and valence was not significant; however, this was the first study of its kind to combine the valence and function dimensions together to promote a new form of self-talk. This form of self-talk may not have an impact on one's video game performance.

Initially, the reasons for our curiosity in video game eSports and self-talk was the previous research done in the sports domain. A vast amount of research on sports has been

associated with self-talk, and we believed that the link shared by these two could be applied to video games. However, our results indicated that self-talk did not impact video game performance. The results suggested that self-talk may not play an important part with performance in video games. However, due to the diverse genres of sports video games (e.g., hockey, Olympic sports, and racing) further research is needed to discover what specific type of sports games can be impacted by self-talk. For example, motivational self-talk improved the endurance of those cycling, which helps explain how self-talk plays an important feature in improving performance with athletes (Blanchfield, Hardy, de Morree, Staiano, & Marcora, 2014). However, we believed that the transferring of increased performance would be applicable to similar sports types video games. However, our failure to replicate the increase in performance can potentially be related to the cognitive overload that occurs as a participant plays the game. Participants might not have been able to focus on the sentences because the video game requires the full attention of participants and does not allow any breaks.

Drawing from self-regulation theory, the motivational investment aspect is the area we expected to explain how self-talk can increase a participant's performance. However, our results have shown there to be no difference between groups. This failure to improve performance by using self-talk could potentially be related to the sentences themselves, causing failure with self-regulation. Hofmann et al. (2012) made it clear that failure in any area of the three stages of self-regulation can influence and hinder the development of a successful self-regulation process. Therefore, the reason for not producing any form of performance change for self-regulation could be the failure of the self-talk sentence on the motivating investment. It is also possible that the participants might not have believed that the sentences or effort would help improve their performance. According to self-efficacy theory, if people do not believe in their actions and skills, then their confidence will not be boosted, and their performance will not be impacted. We can assume that participants might not have faith or belief that these sentences were going to work for them.

Strengths

The study provides many different benefits: novelty, insight, and experimental benefits. Firstly, our study is the first to explore the effects of self-talk on video games and the interaction between valence and function. Secondly, the study provides further insight into the range of applicable sources for self-talk and the usages of self-talk on video game performance. The last

important strength of the study is the experimental design since it provides us with more control over the self-talk conditions. Past research on self-talk has used both qualitative and quantitative methods, and with our design we are able to control for other variables and investigate cause and effect relationships between the variables. Overall, the study provides information for future research on developing self-talk, video games, and the combination of valence and function.

Limitations

There are two key limitations to this study: sample size and self-talk sentences. A simple reason for not producing similar results to the past research can be related to the sample size not being adequate, lacking power. We did not reach the intended number of participants (120) which would provide us with adequate power, but even if the power was reached, we do not believe there would be a difference in results. We can confirm this by observing the effect sizes of each variable, which were very small. Furthermore, with small effect sizes, the cause might be related to the manipulation of the self-talk sentence, meaning that the sentences we developed did not impact or influence the change in performance we expected. The sentences might have been too weak or ineffective to provide any source of effect on video game performance. The self-talk sentences were developed with the collaboration of other research students and the observation of past self-talk sentences used in literature. Furthermore, we saw a trending effect size in Pilot Study 2 with the sentences, so we expected that the self-talk sentences were working.

We should have included a manipulation check at the end of the survey, asking if participants could recall any of the sentences that they were asked to say to themselves. By adding that manipulation check, we would have been able to gauge if any of the sentences had the participant's full attention. If the sentences did not grasp the participant's attention, it can be assumed that they found the sentences too robotic, boring, or not motivating. A lack of motivation would be an issue if participants did not take the task seriously.

Conclusion

With our research, we investigated the effects of self-talk on video game performance and combining two different dimensions of self-talk together: function and valence. Our results have shown that there was no effect or significant differences between our groups, but an interesting discovery from the research is how equal each group was to one another. While self-talk may truly not impact video game performance, it is also possible the self-talk sentences did not represent a strong enough manipulation for the four group combinations. Further research will

need to be conducted to create stronger self-talk sentences and to continue to study the combination of function and valence together.

Tables

Table 1

Speed Skating Results for Pilot Study 2

Source	*df*	*SS*	*MS*	*F*	*p*	η_p^2
Valence	1	325.35	324.35	5.57	.026*	.18[a]
Gender	1	63.44	63.44	1.09	.308	.04[b]
Function	1	27.67	27.67	0.47	.498	.02[b]
Valence x Gender	1	35.58	35.58	0.61	.443	.02[b]
Valence x Function	1	412.21	412.21	7.05	.014*	.22[c]
Function x Gender	1	67.86	67.86	1.16	.292	.04[b]
Valence x Function x Gender	0	0.00	-	-	-	.00[b]
Error	25	1461.52	58.46	-	-	-

Note. [a]Medium effect size. [b]Small effect size. [c]Large effect size.
* $p < .05$

Table 2

Snowboarding Results for Pilot Study 2

Source	*df*	*SS*	*MS*	*F*	*p*	η_p^2
Valence	1	147.43	147.43	2.39	.135	.09[a]
Gender	1	9.16	9.16	0.15	.703	.01[b]
Function	1	4.99	4.99	0.08	.778	.00[b]
Valence x Gender	1	0.56	0.56	0.01	.925	.00
Valence x Function	1	65.56	65.56	1.06	.313	.04[b]
Function x Gender	1	55.48	55.48	0.90	.352	.04[b]
Valence x Function x Gender	0	0.00	-	-	-	.00
Error	25	1542.65	61.71	-	-	-

Note. [a]Medium effect size. [b]Small effect size.

Table 3

Descriptive Statistics for the Main Study

		Positive			Negative			Control		
Function	Gender	*M*	*SD*	*n*	*M*	*SD*	*n*	*M*	*SD*	*n*
Instructional Self-Talk	Male	69.44	3.73	7	67.29	3.28	9	69.39	1.69	7
	Female	74.39	5.28	17	75.16	6.71	20	75.04	7.53	21
Motivational Self-Talk	Male	68.34	2.40	7	67.66	4.37	9	70.32	1.83	7
	Female	75.51	7.49	17	75.01	7.19	20	74.09	7.09	21

Table 4

Demographic Information on Gender, Ethnicity, and Age for the Main Study

Sources	*n*	Females %	Ethnicity %[1]	Age *M*	Age *SD*
Positive	24	70	(25%) White (58%) Other	23.08	6.41
Negative	29	69	(24%) White (41%) Other	20.59	4.99
Control	28	75	(32%) White (46%) Other	22.00	3.98

Note. [1]The two highest percentages were used.

Table 5

Between and Within-Subject Results for the Main Study

Source	*df*	*SS*	*MS*	*F*	*p*	η_p^2
			Between Subject			
Valence	2	13.22	6.61	0.08	.924	.00
Error 1	78	6479.80	83.07	-	-	-
			Within-Subject			
Function	1	8.31	8.31	0.00	.998	.00
Valence x Function	2	5.90	2.95	0.33	.722	.01
Error 2	78	703.84	9.02	-	-	-

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