

DO THE COMMENTS WE RECIEVE ON OUR PER FORMANCE CHANGE OUR
MOTIVATION? A LOOK AT HOW FEEDBACK AFFECTS OUR LEVEL OF
MOTIVATION TO COMPLETE A TASK.

by

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A Senior Honors Project Presented to the

Honors College

East Carolina University

In Partial Fulfillment of the

Requirements for

Graduation with Honors

by

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May 2022

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The Link Between Exercise Framing and Motivation

Introduction

Motivation is a key factor in making someone successful. When someone is motivated, it gives them a boost that allows them to set goals, make plans, and achieve those goals.

Motivation is determined by many internal and external factors, which is why studying motivation and how it is affected by numerous variables is important.

Currently, there are many studies that have been done looking at motivation. Research has been done on what affects motivation as well as what motivation affects (Legault, 2016; Pelletier et al., 2001). There has been research done on how an individual's motivation is affected by changes in their environment, mental health, and developmental changes (Adie et al., 2012; Filak & Sheldon, 2008; Gagne, 2003). Most of the research done on motivation looks at how the individual's motivation is changed by changes to their life. The gap in the research found was that although the relationship between feedback and motivation was investigated, these studies were descriptive questionnaire forms that were made of open-ended questions and did not experimentally change any one aspect (Kaymaz, 2011). The main goal was then to produce a study that could investigate feedback and motivation directly through quantitative measures. The topic investigated was how an individual's motivation is affected by the feedback they are given on their performance at the task at hand. Specifically, I wanted to explore how an individual's base form of motivation (external, internal, or amotivated) influences how their level of motivation is subject to change whether they are told they are performing well or poorly. There were three hypotheses formed at the beginning of this study. Hypothesis 1 was that the participants that were in the high-performance feedback group would relay an increase in their motivation level and those that were in the low-performance feedback group would relay a

decrease in their motivation level. The other two hypotheses were indicated by the base form of motivation participants reported having. Hypothesis 2 was that the relationship between condition of feedback and the trial motivation levels would be significant for those that were externally motivated; the feedback given would affect level of motivation. Hypothesis 3 was that the relationship between condition of feedback and the trial motivation levels would not be significant for those that were internally motivated or amotivated; the feedback given would not affect level of motivation.

The topic I looked at is extremely important because without motivation, people fail to produce any desired outcomes of various tasks and fail to perform optimally. To continue to perform at their best, people need to be motivated to do such things. Finding out how the feedback one receives on their performance outcome affects their level of motivation will tell you how to encourage and keep that person motivated despite their previous performances. Since people interact with each other constantly on a day-to-day basis, knowing how those interactions can change motivation allows you to better motivate individuals based on their background. Knowing one's base type of motivation (internal, external, amotivated), which remains steady, and the outcomes of these interactions will enable us to set up people to be successful by creating teams, groups that inherently motivate each other.

Literature Review

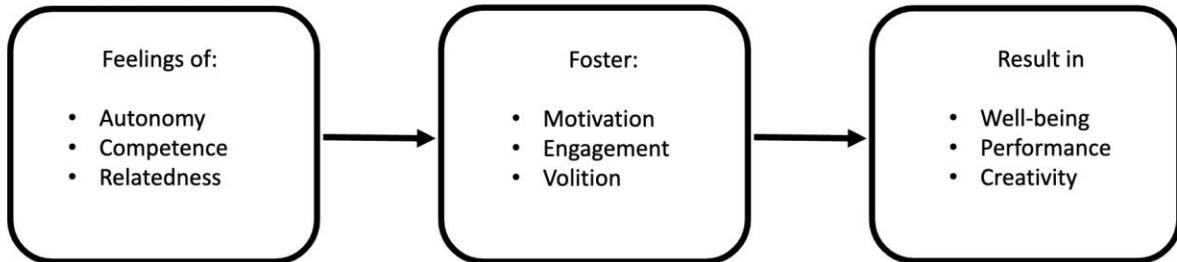
The review done to better understand and form this study took a deeper look into Self Determination Theory, the three basic psychological needs, and types of motivation. While investigating these topics, both the definitions within theories and research that has been done on these topics were discussed.

Self Determination Theory

Self-Determination Theory (SDT) originated in attempting to explain how intrinsic and extrinsic rewards impact behavior. SDT is a broad meta-theory for motivational studies (Deci & Ryan, 2012). Within the SDT, intrinsic and varied extrinsic sources of motivation are defined and a description of the roles of intrinsic and types of extrinsic motivation are identified. Sources of SDT are known as the basic psychological needs, which contain an individual's experience of autonomy, competence, and relatedness. The six mini theories that SDT is comprised of are Cognitive Evaluation Theory, Organismic Integration Theory, Causality Orientations Theory, Basic Psychological Needs Theory, Goal Contents Theory, and Relationship Motivation Theory (Ryan & Deci, 2002). SDT is a key theory within psychology that branches into many other theories and is present within all activities throughout human development.

In the classical view of human development, people are assumed to possess an active tendency toward building themselves and their skills. Moreover, the experiences that an individual has can provide steppingstones to their sense of self. SDT states that there are clear factors that support an individual's need to grow, reversely, there are also clear factors that can hinder an individual's growth. SDT predicts resulting behavior based on levels of the three basic needs being met. The needs for competence, relatedness, and autonomy provide the basis for categorizing interactions as either supportive or antagonistic to an individual's behavior outcomes. Social environments that allow satisfaction of the three basic needs are then predicted to support positive results in an individual's performance (Deci & Ryan, 2012). These environments that create feelings of autonomy, competence, and relatedness in turn foster higher motivation and result in better performance; as seen in Figure 1. Defining SDT allowed the study

to determine that to test how motivation can be affected, it was necessary to find a way to influence one's feelings of either autonomy, competence, and or relatedness.



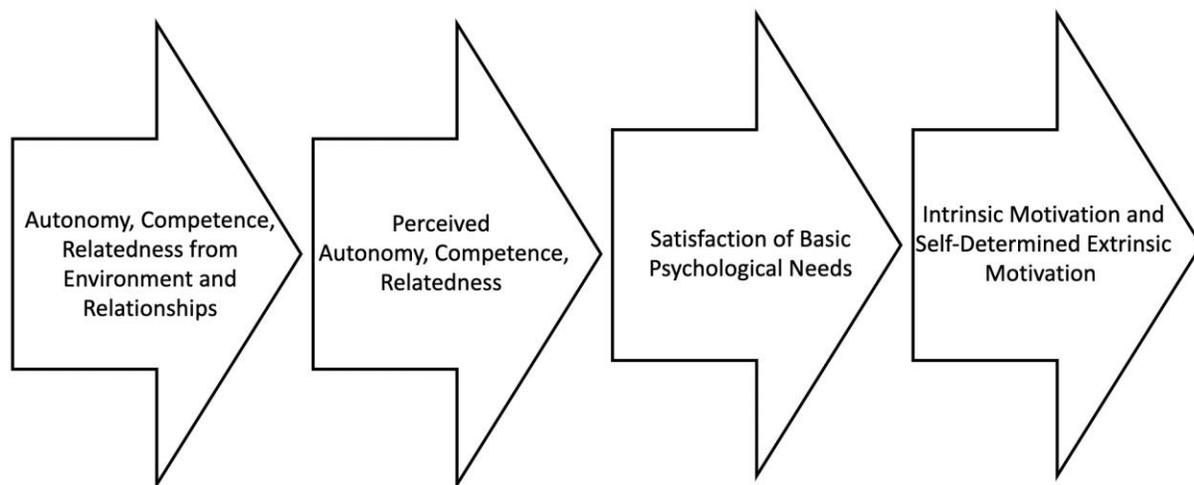
Self-Determination Theory, Figure 1. (Engbers, 2017).

Basic Psychological Needs

The three basic psychological needs are competence, relatedness, and autonomy.

Competence refers to feeling effective in one's interactions with the social environment and experiencing opportunities to exercise and express one's abilities. The need for competence leads people to seek challenges that are optimal for their abilities and to persistently attempt to maintain and enhance those skills through activity. Competence is not, then, an attained skill or capability, but rather a felt sense of confidence and effectiveness in action. *Relatedness* refers to feeling connected to others, to caring for and being cared for by those others, to having a sense of belonging both with other individuals and with one's community. Relatedness reflects the tendency to connect with and be accepted by others. Finally, *autonomy* refers to being the perceived origin or source of one's own behavior. Autonomy concerns acting from interest and integrated values. Autonomy is often confused with, or melded together with, the quite different concept of independence (which means not relying on external sources or influences), but the SDT view considers there to be no necessary antagonism between autonomy and dependence.

On the other hand, one can rely on others for directions or opinions in such a way that autonomy is not experienced, as is the case with mere compliance or conformity (Ryan & Deci, 2002). The presence of all three of the basic psychological needs must be present and perceived by the person at hand for these needs to create a healthy environment that allows for whichever task or goal is at hand to be completed or performed optimally. Having gained an in-depth look at the three basic needs that impact motivation, it was determined that feedback on one's own performance could be used to alter perceived autonomy and competence.



Self-Determination Theory, Figure 2. (Legault, 2017a)

Motivation

Motivation is considered a continuum. Within the continuum of motivation, there is a range from amotivation (lack of motivation) to extrinsic motivation and intrinsic motivation; this is displayed in Figure 3. *Intrinsic motivation* refers to engagement in behavior that is inherently satisfying or enjoyable. Conversely, *Extrinsic motivation* refers to performance of behavior that is contingent upon the attainment of an outcome. While intrinsic motivation is fulfilled by performing an action out of interest or enjoyment, extrinsic motivation arises from an externally

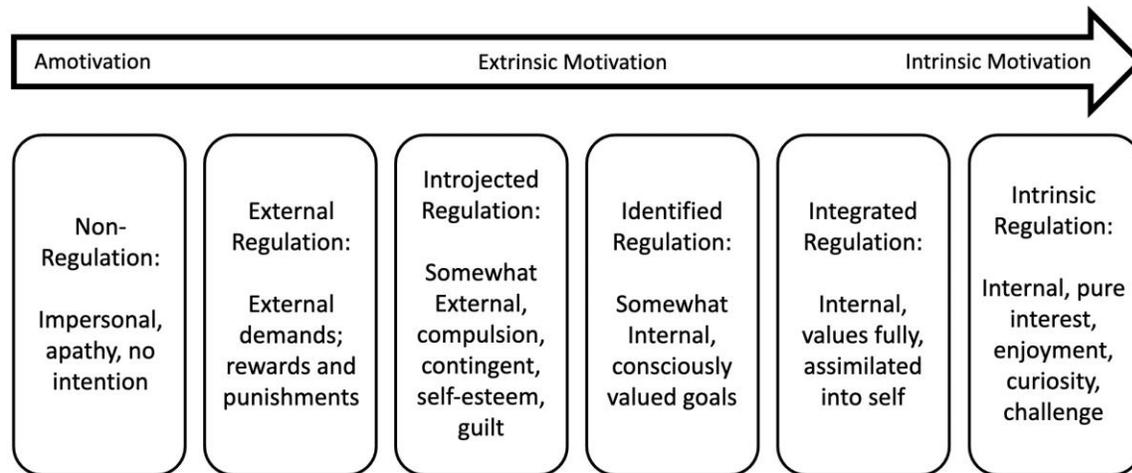
or socially created reason to perform that action. Extrinsic motivators can consist of money or other rewards and produce extrinsic motivation since they generate desire for the result of the activity; they do not produce desire to engage in the activity for its own sake. When people engage in activities for extrinsic rewards, their motivation is completely reliant on the reward for completing the activity. Intrinsic motivation underlies people's natural desire to seek novelty and challenge, as well as to learn, develop, and grow (Deci & Ryan, 2012). Depending on the environment created from the presence/perception, or lack thereof, from each basic psychological need, the type of motivation can be predicted.

Intrinsic motivation is a natural human tendency. In other words, people will actively strive toward doing the things they find interesting or enjoyable. However, for intrinsic motivation to flourish, the social environment must nurture it. Social interactions influence the experience of intrinsic motivation by affecting perceived autonomy and competence. In general, when the social environment supports autonomy by increasing an internal perceived locus of causality, then intrinsic motivation is enhanced. In contrast, when the social environment neglects autonomy by increasing external rewards or punishments, then intrinsic motivation is undermined. Thus, to the extent that the social environment uses controlling behavioral strategies and external constraints, reinforcers, and punishments, then motivation will become less intrinsic and more extrinsic because personal autonomy is compromised. Perceived competence also affects intrinsic motivation. When the social environment undermines perceived competence, intrinsic motivation decreases; in contrast, when the social environment increases perceived competence in an activity, then intrinsic motivation rises (Legault, 2016). When looking at intrinsic motivation, it is clear as to whether it can be defined as intrinsic or not; this is not the case with extrinsic motivation.

Extrinsic motivation is multidimensional and varies from completely external to completely internal. Rather than being a one-dimensional construct, extrinsic motivation is a broad class of motivations that range in the extent to which they are autonomous, that is, the extent to which they stem from an internal perceived locus of causality and sense of personal volition. Therefore, even if an activity is not fun or enjoyable, it may nonetheless be internally regulated as opposed to externally controlled. Self-determination theory (Deci & Ryan, 1985) proposes a continuum of extrinsic motivation within motivation that ranges in terms of the level of internalization, which is visualized in Figure 3.

The most external form, external regulation, refers to behavior that is controlled through external factors (e.g., deadlines, rewards, directives, punishers). This type of behavior serves mostly to satisfy external demands, and so the source of motivation and causality for behavior is external rather than internal. Introjected regulation refers to behavior wherein external pressures have been partially deflected inward, but not truly adopted or internalized. This type of motivation feels quite controlling, but more from a sense of internal rather than external pressure. Identified regulation is a more autonomous form of extrinsic motivation and denotes the point at which behavior becomes internally governed and self-endorsed. This type of regulation occurs when the individual values or identifies with the outcome of the activity. Although identifications feel autonomously chosen, they may nonetheless be separate from the individual's other values and beliefs and thus may not reflect the person's core self or overarching value system. Finally, the most autonomous form of extrinsic motivation, integrated regulation, refers to behavior that is fully internalized. At this point, identifications have been merged with other deeply held beliefs, values, and needs. Integrated motivation feels consonant with the self; such behavior serves a means of self-expression and identity. Because of this, integrated behavior is

associated with feelings of self-integration and psychological well-being. Despite being highly internalized, integrated regulation is nonetheless extrinsic because it serves the expression of something other than pure enjoyment or interest (Legault, 2016).



Motivation Continuum, Figure 3. (Deci & Ryan, 2012).

Key Research

There was an exploration done into the most relevant research done in our area of interest. The three main aspects within this study that were investigated were SDT, the basic psychological needs, and motivation.

Self-Determination Theory

One study that we looked at connected SDT, and motivation was done in 2006 and tested Self-Determination Theory within exercise. The study found that the fulfillment of the 3 basic psychological needs (i.e., competence, autonomy, and relatedness) related to more self-determined motivational regulations (Edmunds et al., 2006). Edmunds et al. also reported that for participants engaged in organized fitness classes, perceptions of autonomy support provided by

exercise class leaders predicted psychological need satisfaction. Furthermore, competence needs satisfaction partially mediated the relationship between autonomy support and intrinsic motivation; these findings support SDT in the exercise domain (Edmunds et al., 2006). From the study it was determined that outside sources of autonomy support have a significant impact on overall need satisfaction.

In 2014, Berghe et al. took a closer look at Self-Determination Theory in physical education; the included studies confirmed the motivational sequence as proposed by SDT (Berghe et al., 2014). Teixeira et al. (2012) conducted a study focused on the relationships between exercise, physical activity, and Self-Determination Theory. The results showed consistent support for a positive relation between more autonomous forms of motivation and exercise, with a trend towards identified regulation predicting initial/short-term adoption more strongly than intrinsic motivation, and intrinsic motivation being more predictive of long-term exercise adherence (Teixeira et al., 2012). This clearly showed that the type of motivation one has plays a role in how perceived support affects the resulting motivation and performance.

Basic Psychological Needs

In 2018, Verner-Filion and Vallerand conducted a longitudinal study to look at changes in youth soccer athletes over the course of three seasons. Within-person variations in all three needs (i.e., autonomy, relatedness, and competence) were positively related with positive affect and athletic satisfaction over time (Verner-Filion & Vallerand, 2018). All three needs are thus key in allowing athletes to experience a positive, healthy engagement in soccer over time. The findings of Verner-Filion and Vallerand are in line with past research showing that changes in the satisfaction of autonomy, relatedness and competence are all associated with positive changes in the quality of emotional experiences in athletes (Adie et al., 2012; Gagne, 2003; Quested et al.,

2013; Ivarsson et al., 2015). A study that focused on the relationships between teacher support, college student motivation, and student needs had results in line with Self-Determination Theory (Filak & Sheldon, 2008). The primary finding was that all three basic psychological needs positively predicted instructor/course ratings. Within this research, Study 1 evaluated the impact of class size upon need satisfaction and found that students felt more autonomy, competence, and relatedness in smaller classes. Study 2 focused on instructor characteristics and found evidence for course-burnout effect in instructors who teach courses too many times may begin to ignore student's autonomy and relatedness needs. When applying Self-Determination Theory in education, this study helped to determine what makes for a good educational experience; teacher characteristics such as fairness, choice-provision, openness, encouragement, and class characteristics including group interaction and cooperative teaming (Filak & Sheldon, 2008). This helped us to understand that using an online study where there is no interaction between participants allows us to have results free from bias.

Motivation

The main purpose of Gillet et al.'s (2010) study was to test a model that posited that coaches' support of their athletes' autonomy positively related to their self-determined motivation toward judo. In turn, contextual self-determined motivation was hypothesized to be associated with athletes' self-determined motivation at the situational level prior to a competition that was hypothesized to subsequently predict higher levels of sport performance during the competition. Results from structural equation modeling analyses supported the hypothesized model and revealed that all hypothesized paths were significant (Gillet et al., 2010). Results also revealed that perceptions of autonomy support were positively associated with contextual self-determined motivation (Gillet et al., 2010). In other words, the more the athletes perceived their coach to be

autonomy-supportive, the more their motivation for practicing their sport activity was self-determined. These results are consistent with previous research in sport (Conroy & Douglas Coatsworth, 2007; Pelletier et al., 2001) and exercise (Edmunds et al., 2006) settings which have shown that perceived autonomy support was positively linked to self-determined motivation. Results demonstrated that situational self-determined motivation was significantly and positively predicted by athletes' self-determined motivation toward their sport activity. This means that the more self-determined one's motivation in a specific context the more self-determined one's motivation will be in a specific situation relevant to this setting (Gillet et al., 2010). In relation to the study at hand, these findings explained how one's base form of motivation is connected to their level of motivation to complete various tasks.

Methods

Participants

The participants were pulled from students at East Carolina University. There were originally 134 participants. 63 participants were taken out of the study due to incompleteness of the whole study and 6 participants were removed because they guessed what the manipulation was. After the participants were reviewed, the data looked at consisted of 57 participants within phase I of the study. The participants for phase I were recruited through email. The Participants ages ranged from 18 to 31. The proportion of males and females that participated in phase I was 40% males and 59.6% females. The ethnicity of the participants consisted of 75.4% white, 10.5% African American, 5.3% Latino, 3.5% Asian, and 3.5% other. The academic year of the participants ranged from high school education to 4-year college. Of the participants, 91.2% play sports currently or have played sports in the past. Of the participants, 29.8 percent played video games. When asked how many hours of sleep the participants had received the previous night,

participants averaged 7.1 hours. The participants were asked how drowsy or alert they were, and phase I participants stated having an average feeling of being a 6.2 on the scale of 0 (extremely drowsy) to 10 (extremely alert).

Measures

The Behavioral Regulation in Exercise Questionnaire (BREQ) was modified from its original form of 24 questions, to 5 questions, with two questions for external and internal motivation and one for amotivation based on applicability to study. There was also a 1-item measure that asked the level of motivation to do well at the task, 0 being not motivated at all to 100 being completely motivated.

On a scale of 1 to 7, 1 being not at all true to 7 being very true and 4 being somewhat true, rate each of the following sentences based on how they describe your reason for participating in tasks like these

I participate in tasks like these...

	Not true at all 1	2	3	Somewhat true 4	5	6	Very True 7
Because it's fun	<input type="radio"/>						
Because I value the benefits	<input type="radio"/>						
Because I would feel ashamed if I quit	<input type="radio"/>						
Because I feel pressure from others	<input type="radio"/>						
But I question why I am putting myself through this	<input type="radio"/>						

How motivated are you to do well in the upcoming 36 round competition trial?

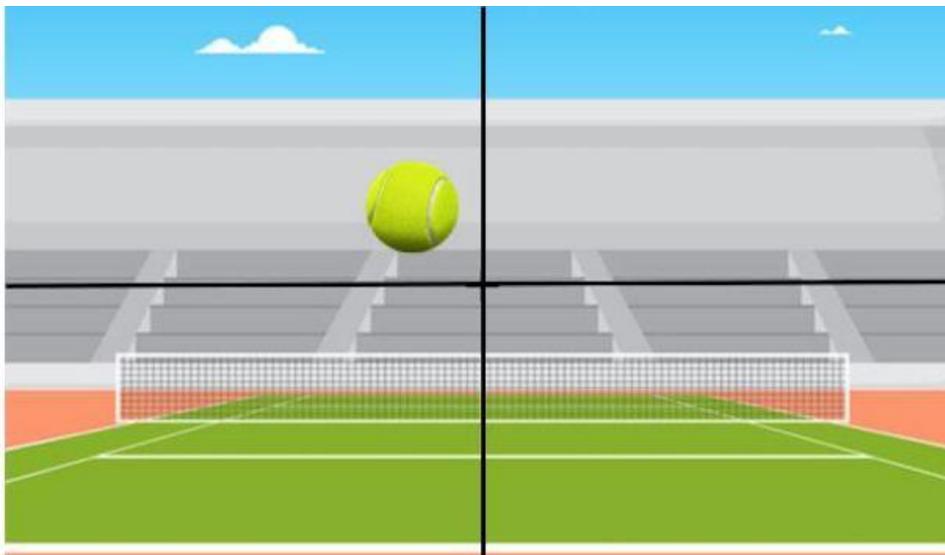


Motivation Questionnaire, Figure 4.

Procedure

The TORT study consisted of individuals completing a reaction time task. The participants began by answering the questions given asking about their reasons for being

motivated to complete the study and their level of motivation for doing well in the task given. The participants then completed a practice trial of the reaction time task. The task had the participants look at a screen and when a tennis ball appeared on the screen the participants had 5 options of where the ball would show on the screen. The screen showed a tennis court that was split into four quadrants. The 5 options of where the ball could appear were within any of the four quadrants or on a quadrant line. Once the ball appeared on the screen, the participants hit the corresponding key on their keyboard as fast as they could. After the participant finished practicing, they answer a 5-item measure which was a modified version of the BREQ-3 (Cid et al., 2018) which assess their base form of motivation, a 1-item measure asking their level of motivation to complete the task was also answered. The participant then completed 36 trials of the reaction time task. The participants then received bogus feedback on their performance. After seeing their bogus feedback, the participants answered the same 1-item measure asking their level of motivation to complete the task. The participant then completed another 36 trials of the reaction time task.



Ball Placement Image, Figure 5.

Where the Ball Appears on the Screen	Corresponding Key
Upper Left	S
Upper Right	K
Lower Left	X
Lower Right	M
Middle or Line	Space Bar

Table 1. Instructions for Tennis Task

Analysis

Using SPSS, the means and standard deviations of level of motivation were found for each feedback group both before trial 1 and before trial 2, after given feedback. A 2 x 2 ANOVA was conducted to examine differences in the 2 conditions across the two trials. Follow up t-tests were then done to check significance.

Results

Feedback Group	Mean Trial 1	SD Trial 1	Mean Trial 2	SD Trial 2
High-performance 93 rd percentile	73	24	85	12
LOW performance 37 th percentile	72	21	74	22

Table 2. Level of Motivation Before and After Feedback. Motivation was on a scale from 0 (not motivated at all) to 100 (completely motivated). Between trials 1 and 2, participants received bogus feedback.

From the means found, a change can be seen between the two trials of the participants within the high-performance feedback group. Between the two trials for the low-performance feedback group, little change was seen.

Base Motivation	Feedback Group	N	Trial Motivation Level	M
Intrinsic	High	21	1	76.81
			2	84.76
	Low	21	1	78.90
			2	78.62
Extrinsic	High	4	1	71.75
			2	86.00
	Low	2	1	50.00
			2	50.00
Amotivated	High	3	1	45.33
			2	84.33
	Low	0		

Table 3. Base Motivation and Level of Motivation Before and After Feedback. Motivation was on a scale from 0 (not motivated at all) to 100 (completely motivated). Between trials 1 and 2, participants received bogus feedback.

The division of the participants based on their base form of motivation unfortunately was too uneven to get reliable results. There were also 6 participants who rated all 5 items the same, so their base form of motivation could not be determined. Since we could not truly look at the relationship between base form of motivation, feedback, and level of motivation the analysis changed to only focus on the relationship between feedback and level of motivation; table 2.

ANOVA results

The main effect for trials was significant ($F(1, 55) = 8.589, p = 0.005$). This indicated that everyone increased their level of motivation. The main effect for the feedback group was not significant ($F(1, 55) = 0.956, p = 0.332$). This indicates that the high and low conditions were

not different regardless of trial. The interaction between trial and feedback was significant ($F(1, 55) = 5.757, p = 0.020$). This indicates that while both groups began with a similar motivation (73 and 72) in trial 1, there was a significant difference between the high (85) and low (74) groups for trial 2.

Discussion

Originally, we hoped to compare the motivation levels of both trials by feedback group and base form of motivation. With the data collected, 84.7% of participants answered as being internally motivated, because there was not an equal distribution of the base forms of motivation we decided to only focus on the level of motivation. It was seen that the feedback group did not indicate the motivation level before feedback, but it did after the feedback was given. Hypothesis 1 was partially correct because the high-performance feedback group motivation level did increase after given the feedback. However, the low-performance feedback group motivation also increased after given the feedback, which conflicted with hypothesis 1. Hypothesis 2 was based on having an extrinsic base form of motivation and was partially correct since the high-performance feedback group motivation level changed but the low-performance feedback group motivation level did not change. Hypothesis 3 was based on both intrinsic and amotivated base forms of motivation and was incorrect because the feedback given saw an increase in the motivation level between trials.

In connection with the literature that was reviewed, the main point of interest is the relationship between feedback and motivation level. According to SDT and the previous research done on the topic, those given high-performance feedback will have greater feelings of autonomy and competence which will result in higher motivation levels (Deci & Ryan, 2012; Edmunds et al., 2006; Engbers, 2017). The results of this study supported previous findings (Edmunds et al.,

2006; Teixeira et al., 2012) related to participants given high-performance feedback. However, SDT states that when given low-performance feedback, individuals will have lesser feelings of autonomy and competence which will result in lower motivation levels (Deci & Ryan, 2012). This study did not coincide with the framework of the SDT. Although SDT states that high-performance feedback will increase level of motivation, it also states that low-performance feedback will decrease level of motivation. This study saw a marginal increase in level of motivation for the low-performance feedback group which indicates that there are more factors at play that were not accounted for within this study.

The strengths of this study included the program being used having previously been tested. Since this study experimentally changed the aspect of feedback, it allowed for a controlled environment compared to previous studies that consisted strictly of surveys. Having the design of the study being quantitative obtained more objective measurements that were able to go through statistical analysis, compared to using a qualitative study design which is subjective. This study also had various limitations. The biggest limitation to this study was the small sample size. The study originally had over 130 participants but after the data was cleaned the participant pool dropped to 57, mostly because participants ended the study before completing it. It is hypothesized that those who dropped out during the study were those who were amotivated or extrinsically motivated to complete the study. If we had a larger number of participants, we would hopefully get enough amotivated and extrinsically motivated individuals to complete the study to get a true comparison of base form of motivations. The small number of participants is more useful for summarizing the available information and making future hypotheses rather than making reliable conclusions and assumptions for populations.

Looking ahead, the next goal for this study is to begin working on creating and piloting the next phase of the study. This study showed us that there is something significant occurring between feedback given and how it affects motivation levels. From this study we have decided to only focus on the level of motivation questions and not include the base motivation questions. More importantly, the next phase will switch to a dyad version where the participants will be given partners. The next phase of the TORT study will have participants completing the same reaction time task, with different keys and options, but now playing with a partner. This next phase will have the same demographics, practice trial, and 1-item scale on motivation level. In the next phase, the screen will look the same but since the participant will believe they are playing with a partner they will only “hit” the ball if it appears on the left side of the screen. If the ball appears on the right side, then the participant would hit the spacebar signaling a “no hit,” the other options will be the upper left quadrant and the lower left quadrant.

The findings of this study can be applied within work, team, and personal relationships. From the results provided by this study, feedback was highlighted in terms of its key role within individuals' level of motivation. Since the understandings of low-performance feedback are not consistent between previous research and this study, it is not recommended that low-performance feedback be used to increase motivation. This study indicates that to increase another's motivation level it is important to give them feedback that encourages them, this will in turn increase their perception of autonomy and competence which results in increased motivation. Since the findings of this study were preliminary, further studies must be done to further understand the relationship between feedback and motivation.

Conclusion

The results of this study showed the significant increase that resulted between feedback and motivation level. The takeaway from this study is that providing high-performance feedback will result in increased levels of motivation. The continuation of this study will be to look further into the effects of low-performance feedback and its interactions, discover how base form of motivation plays a role in the relationship between feedback and level of motivation, and investigate how partner work will affect the relationship between feedback and level of motivation.

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