

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

The Influence of Impression Formation in the Relationship between Competition, Goal Orientation, and Performance

Aaron Craig, H.B.Sc.

A thesis submitted to the Department of Psychology
in partial fulfillment of the requirements for the degree of
Master of Science in Psychological Science
Department of Psychology
Lakehead University
Thunder Bay, Ontario

Supervisory Committee:

Primary Supervisor: Dr. Rupert Klein

Second Reader: Dr. Beth Visser

External Examiner: Dr. Daniel Krupp

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

Abstract

Competition/competitiveness is a universal construct characterized as an individual trait, a result of a situation, and more recently, a cognitive and motivational factor. The purpose of the current investigation was to replicate Murayama and Elliot's (2012) competition and performance model and extend the model by introducing Fiske's stereotype content model (SCM) dimensions. One hundred and fifty participants were recruited and participated in the study by completing a series of online questionnaires and competing in an online anagram task against a series of competitors that were designed to elicit stereotypes reflecting Fiske's stereotype content model. Bivariate correlations and analysis of variance (ANOVA) were executed to analyze the relationships among the different variables. Early analyses demonstrated a partial replication of Murayama and Elliot's (2012) model. Subsequent analyses revealed Fiske's SCM dimensions were correlated with some elements of Murayama and Elliot's (2012) competition and performance model. Despite the overall model not being fully replicated or extended, results suggested that Fiske's SCM dimensions might further explain the competition-performance model depending on opponent stereotype and trait competitiveness.

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

Table of Contents

Abstract	ii
List of Appendices	vi
List of Figures	vii
Introduction.....	1
Conceptual Background of Competition	3
Trait Competition.....	3
State Competition.....	4
Recent Conceptualization of Competition	5
Competition Conceptualized.....	6
Performance Competition	8
Competition as Beneficial to Performance	9
Competition as Detrimental/Impartial to Performance.....	10
Opposing Process Model of Competition and Performance.....	11
Empirical Studies	14
Person Perception and Impression Formation	18
Intergroup Competition.....	19
Stereotype Content Model – Warmth x Competence	21
The Current Study.....	27
Objectives	27
Hypotheses	28
Hypothesis 1: Study Variable Correlations.....	28
Hypothesis 2: Replicating Murayama and Elliot (2012)	28
Hypothesis 3: Extending Murayama and Elliot (2012)	29
Method	33
Participants.....	33

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

Measures and Materials	35
Demographics Questionnaire.....	36
Work and Family Orientation (WOFO) Questionnaire (Spence & Helmreich, 1983).....	36
Sport Orientation Questionnaire (SOQ) (Gill & Deeter, 1988).....	37
Competitiveness Index (CI) (Smither & Houston, 1992).....	37
Achievement Goal Questionnaire-Revised (AGQ-R) (Elliot & Murayama, 2008)	38
Warmth & Competence Scale (Fiske, Cuddy, Glick & Xu, 2002).....	39
Anagram Task.....	40
Source of the Data.....	40
LabVanced	41
Pilot Study.....	43
Procedure	44
Statistical Analyses	47
Bivariate Correlations	47
Structural Equation Modeling.....	48
Hypothesis 1: Study Variable Correlations.....	48
Hypothesis 2: Replicating Murayama and Elliot (2012)	48
Hypothesis 3: Extending Murayama and Elliot (2012)	49
Results.....	50
Data Screening.....	50
Scale Characteristics and Internal Consistency	51
Replicating Murayama and Elliot (2012)	52
Reaction Time Means and Standard Deviation	54
SCM Profile Warmth and Competence Descriptive.....	55
Extending Murayama and Elliot (2012)	56
Ingroup.....	57
Contempt.....	58

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

Pity	58
Envy	59
Main Study Findings.....	60
Subsequent Analyses	61
Trait Competitive x Study Variables	61
Trait Competitiveness x Warmth and Competence Ratings	62
ANOVA	64
Discussion.....	66
Hypotheses Findings.....	68
Competition-Performance Relation	68
Social Perception as Causal Underlying Factor.....	71
Limitations	74
Future Research	75
Conclusion	76
References.....	78
Appendix A: Demographics	93
Appendix B: Work and Family Orientation Scale (WOFO)	95
Appendix C: Sports Orientation Questionnaire (SOQ)	97
Appendix D: Competitive Index (CI)	99
Appendix E: Achievement Goal Questionnaire-Revised (AGQ-R).....	101
Appendix F: The Warmth and Competence Scale.....	102
Appendix G: Stereotyped Group Profiles	103
Appendix H: Stereotyped Group Bivariate Correlations	107

List of Appendices

Appendix A: Demographics Questionnaire 93

Appendix B: Work and Family Orientation Scale (WOFO)..... 95

Appendix C: Sports Orientation Questionnaire (SOQ) 97

Appendix D: Competitive Index (CI) 99

Appendix E: Achievement Goal Questionnaire-Revised (AGQ-R)101

Appendix F: The Warmth and Competence Scale102

Appendix G: Stereotyped Group Profiles103

Appendix H: Stereotyped Group Bivariate Correlations 107

List of Figures

Figure 1. The relation between Competition and Performance12

Figure 2. The Opposing Process Model of Competition and Performance 14

Figure 3. Inclusion of Fiske’s SCM dimensions 26

Figure 4. Admiration Stereotype group 30

Figure 5. Contemptuous Stereotype group 31

Figure 6. Envy Stereotype group 32

Figure 7. Pity Stereotype group 33

Figure 8. LabVanced Procedures 43

Figure 9. Competitive Profiles 46

Figure 10. Procedure Outline..... 47

Figure 11. A Conceptual SEM..... 50

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

The Influence of Impression Formation in the Relationship between Competition, Goal Orientation, and Performance

Introduction

Competition is prevalent in many aspects of everyday life (Kilduff et al., 2010; Warner & Dixon, 2013). With the omnipresence of competition comes several operational definitions and theoretical explanations. We can compete against others, against ourselves, against the clock, against the record books, and against objects and elements (Weinburg & Gould, 2019).

Competition can occur across many *different contexts* and is particularly evident when considering athletic sports. Stemming from the sporting world, rival teams and individual players have motivated incentives to compete against each other (either gaining or losing advantage). At the *individual level*, students compete against their cohorts for research opportunities, citations, overall GPA, university admissions, and academic success. At the *group level*, managers develop incentives for employees to compete for bonuses and promotions. In the *social domain*, Facebook users seemingly increase their number of “friends” or “followers,” elevating the number of “likes” on a picture (Garcia et al., 2013). Broadly speaking, businesses and companies with similar product lines are pitted against each other by their consumers (i.e., Pepsi vs. Coke, Ford vs. GM). Competitiveness can even vary globally, such as in the United States, where competitive rigor appears to be an important nationalistic quality when compared to other countries. The American culture values competitiveness as a trait compared to more collectivistic nations (Garcia et al., 2013; Garcia & Gonzalez, 2006; Kilduff et al., 2010). Evidently, competition/competitiveness appears across multiple domains to which defining competition can become tricky.

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

The term competitiveness can be used universally, highlighting the importance of proper operationalization. Competition has several operational definitions and several theories that conceptualize competition as an individual trait (Horney, 1937; Ryckman & Butler, 1994; Spence and Helmreich, 1983; Triplett, 1897), a result of a situation (Deutsch, 1949; Gill & Deeter, 1988), as a cognitive and motivation factor (Fletscher et al., 2008; Klyeva, 2016; Mitina, 2003; Tjosvold, 2006; Tokareva, 2007) or as a moderator of one's achievement motivation (Murayama & Elliot, 2012). What is missing from these theoretical models, and the primary objective of this proposed thesis is to investigate how one's perception of their opponent impacts their performance in a competitive task.

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

Conceptual Background of Competition

The challenge with operationalizing competitiveness stems from the abundance of early research on competition. Competition research in Psychology can be traced back over 120 years ago to Norman Triplett. In 1897, he explored concepts such as competitive instincts and mental attitudes during a competitive task. Triplett (1897) used a combination of archival data on cycling times and laboratory experiments, which were considered among the first experiments in social psychology. In his research on speed recordings of cyclists, he found that people perform better when competing with others providing an early belief that competition facilitates increased performance. He partly duplicated this under laboratory conditions using children and a fishing rod apparatus to test performance speed. When children were competing, their performance often improved compared to when they were performing alone. Triplett's (1897) pioneering work in social, and sports psychology led researchers to believe competition/competitiveness as a social construct and a foundation for future research.

Trait Competition

The next line of research, spearheaded by Horney (1937), studied competition from dispositional trait differences. In this research line, competitiveness is seen as a personality trait and a form of social behaviour where people rise to the challenge of competition. Horney's (1937) theories of neurosis introduced *hypercompetitiveness*, which described extreme, unhealthy competition. Horney thought that people portraying this aggressive personality type would need to compete and win at all costs, subsequently maintaining their self-worth. Hypercompetitive people would likely behave competitively in most situations and feel threatened when losing. "Winning is not everything; it is the only thing" (Ryckman & Butler, 1994). Other traditional approaches to trait competitiveness similarly describe this sense of

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

competitive social behaviour as certain automatic responses and personality traits (Brown, 1998; Vaughn & Diserens, 1938).

Over time, the research on trait competitiveness resulted in differing interpretations of competitiveness, further complicating the conceptualization. Researchers have developed various instruments to assess competitiveness as a trait (Bing, 1999; Fletcher & Nusbaum, 2007; Houston et al., 2002; Ross et al., 2003). Ryckman et al. (1990) and Spence and Helmreich (1983) developed two well-researched trait competitiveness measures. Ryckman et al. (1990) expanded upon Horney's hypercompetitiveness theory by developing the Hypercompetitive Attitude Scale linking competitiveness to neuroticism (i.e., dysfunctional behaviours, exploitation, denigration of others, eating disorders). Alternatively, Spence and Helmreich (1983) developed a measure of achievement motivation since they saw competitiveness as related to aspects of achievement motivation such as competence and contentiousness. They define competitiveness as "the enjoyment of interpersonal competition and the desire to win and be better than others (Spence & Helmreich, 1983, pp. 41 as cited in Fletcher & Nusbaum, 2007). More recent research has labeled trait competitiveness as an opportunity for self-actualization and development by associating competitiveness with personal development (Klein, 2017).

State Competition

An alternative conceptualization of competitiveness came from Morton Deutsch (1949), who extended Triplett's early interest in this area. Whereas previous researchers had considered competitiveness as instinctive (Houston et al., 2002; Weinberg & Gould, 2019), Deutsch argued that competitors look at winning from a *goal relationship perspective* wherein success during competition acts as a reward for achieving a perceived goal. Simply, this line of research views competitiveness as playing a pivotal role in understanding and controlling social processes.

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

Researchers have since expanded this concept into a sport-specific domain. Gill and Deeter (1988) developed the Sport Orientation Questionnaire (SOQ) as a multidimensional, sport-specific measure of individual differences during a competitive achievement situation. More specifically, the three-factor structure includes competitiveness (drive to win), win (desire to outperform others), and goal orientation (improving person performance). Good support for the three-factor structure came from exploratory and confirmatory analyses of the SOQ. The SOQ scores differentiated students in competitive classes (i.e., physical activity) from students in non-competitive classes and competitive sport participants from non-competitive sport participants (Gill & Deeter, 1988). This investigation will further explore how the perception of one's competitor (e.g., competence, contentious, competitive) alters performance.

Recent Conceptualization of Competition

Recent studies allowed us to understand that the construct of competition is not limited to either the trait or social psychological literature and should include cognitive and motivational factors as important determinants of competitiveness. This line of research regards competitiveness as a set of individual traits that permits one to successfully self-develop in an irregular, ever-changing environment (Klyueva, 2016; Mitina, 2003; Tokareva, 2007). Fletscher et al. (2008) and Tjosvold (2006) both indicate that the internal motivation to compete can have ambivalent effects depending on the person and the environment. Simply, when individuals have a high internal motivation to compete, the act of competing tends to be beneficial in certain situations. This current, unrestricted conceptualization of competition allows us to branch out of our binary understanding and further specify competition.

Competition Conceptualized

The concept of competition shifts in meaning depending on the context (Medlin & Ellegaard, 2015). As previously mentioned, competition has many forms and is relevant to several fields, including economic, political, biological, and sports competitions. Along with past conceptualizations of trait, state, and motivational competitiveness, understanding an individual's goal when entering a competition is a critical component in the definition of competition. Individuals often adopt conscious aims or goals in competitive situations that help guide and direct behaviour regarding more specific competence-based tasks (Elliot & Church, 1997). Achievement goals are frequently used to strategically regulate general approach and avoidant behaviours.

One such goal would be the simple act of outperforming an opponent(s). Coakley (1994) conceptualizes competition as, "a social process that occurs when rewards are given to people based on how their performances compare with the performances of others doing the same task for participating in the same event" (pp. 78). According to this definition, competitors often compare themselves with their opponents to determine their likelihood of success or failure. Coakley's (1994) "win-at-all-costs" (desire-to-win) model will be used to conceptualize the understanding of competitiveness.

Multiple researchers have theorized similar conceptualizations of competition (Jones, 2015). According to Houston et al. (2002), competition and competitiveness are multidimensional constructs. In short, Houston et al.'s (2002) factor analyses of various competitiveness constructs provided evidence of the multidimensional definition of competition. Their first factor, Self-Aggrandizement, includes items portraying competition as a means of validating participant superiority and opponent inferiority. A simple example of this is the need

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

to be better than your opponent (i.e., performance competition). The second factor, Interpersonal Success, describes competition as a means of enjoyment and a way to benefit by being more successful than someone else (Houston et al., 2002). For example, some competitors see winning as not important; rather, they are interested in self-improvement and competition allows them the opportunity to measure improvement.

Similarly, Jones (2015) and Fletcher and Nusbaum (2008) argue that competition consists of having a strong desire to win and to do better than other people at the activity. In interpersonal situations, such desires can influence the individual's actual or perceived social environment (Smither & Houston, 1992). These descriptions explain how competition is conceptualized around performance level and winning in interpersonal situations while introducing their behavioural responses.

This desire-to-win mindset can appear in various competitive situations, which naturally elicit an array of behavioural responses. When individuals compete against each other during performance or head-to-head competition, they must ensure that they are outperforming their opponents (Coakley, 1994; Houston et al., 2002; Kurtus, 2018). At the most basic level, competition can be a valuable motivational technique related to individual players' needs. For example, participants may use practice drills in competitive sports to mimic the intensity and pressure of actual competition. This type of practice helps athletes stay focused during other competitive situations to maximize their performance (Davies & Armstrong 1989; Duina, 2011). Understanding behavioural responses of a “win-at-all-costs” model allow for an easier comprehension of the conceptualization of competition: trait, state, and motivational competitiveness.

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

Performance Competition

Since Triplett's work, numerous researchers have added further detail to our understanding of how competition influences our behaviour (Cooke, 2010). Competition is defined as a social process where one's performance is evaluated based on the person, or group one is competing against (i.e., performance standard) (Coakley, 1994; Gilbertson, 2016; Houston et al., 2002; Jones, 2015; Kurtus, 2018; Triplett, 1897; VandenBos, 2007; Weinburg & Gould, 2019). Performance standards are conceptualized as performance in interpersonal competitions (i.e., competition between individuals), intergroup competitions (i.e., competition between groups), or intrapersonal competitions (i.e., competition with oneself) (Murayama & Elliot, 2012; Portenga, Aoyagi, & Cohen, 2016). More specifically, comparisons can be made with three types of standards: athletes' previous performance (self-evaluation); performance of other competitors (social evaluation); and idealized standards (benchmark of superior performance) (Burton & Raedeke, 2008). Simply put, we can compete against ourselves, against others, against the clock or record books, and against other groups while being evaluated (Weinburg & Gould, 2019).

Where there is competition, there are opponents and rivals. Often, a certain standard of performance (e.g., learning and improving, winning or placing high, specific benchmark) is expected when competing against others. Performance competition implies the importance of performance when opposed to others (Worrell et al., 2016). This performance competition process against an opponent can be seen in each example of competition mentioned previously (i.e., individual, social, global domain) (Garcia & Gonzalez, 2006; Garcia et al., 2013; Kilduff et al., 2010). Common areas include sports competitions where individuals or teams compete against each other to be the better team (i.e., social evaluation performance standard). Likewise,

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

everyday activities, such as job interviews, academic testing, public speaking, medical surgeries, police work, and high-risk tasks, have each participant competing at their highest standard possible (Worrell et al., 2016).

Such performance competition examples often elicit benchmarking as a standard of performance, which can be used to judge the quality or level of similar things. Application of benchmarking contributes to the comprehension of critical performance processes, motivation, learning from others, and making participants aware of their strengths and weaknesses during their performance (Krishnamoorthy & D'Lima, 2014). Most studies that attempt to determine the relationship between competition and performance have found that competition appears to be neither entirely beneficial nor entirely detrimental to performance at the level of individual or group psychological process.

Competition as Beneficial to Performance

Having a performance standard (i.e., benchmarking) only enhances one's desire to give their best performance (Ettorchi-Tardy et al., 2012). Benchmarking makes it common for people to seek superiority against others in various circumstances (Dewar, Kavussanu & Ring, 2013; Elliot, Jury & Murayama, 2017; Stanne, Johnson, & Johnson, 1999). Having a good understanding of their opponents (compared to other competitors) will motivate competitors to continue improving or performing well.

According to Agaibi and Wilson (2005), losing a competition does not lead to prolonged negative concerns. Instead, Agaibi and Wilson (2005) found that adverse conditions, such as failure or losing in a competition, can be used as fuel for motivation to manage a range of emotions or behavioural responses, higher confidence, and self-esteem, positively influencing performance. Competitive outcomes act as the primary determinant of behaviours, which are

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

influenced during a competition. Competition promotes more effort to improve performance, altering behaviour accordingly (Worrell et al., 2016). For example, individuals alter their behaviours to stimuli more during a competitive event versus a non-competitive event, impacting their performance (Burnside & Ullsperger, 2020). More specifically, competition enhances behavioural responses such as adaptation, innovation, and creativity which leads to better performance (Worrell et al., 2016). When resources are low, people need to be aware of their performance competing against others to produce enough resources to survive (i.e., food, water, currency) (Harmison, 2011). Sports competition may facilitate increased performance by forcing the competitors to determine what skills and abilities are needed to have excellent performance, via benchmarking. One must be aware of how motivated they are to reach a given level of performance (i.e., competitive orientation) (Harmison, 2011).

Competition as Detrimental/Impartial to Performance

Alternatively, scholars have espoused the opposite theoretical views, arguing that competition undermines motivation and is detrimental to performance. According to Ives (2020) and Parton and Neumann (2019), competition may not differentially influence performance outcomes but instead influence the physiological process. Competition has been seen as a constraint on sports performance, negatively influencing the emergence of improvement. Competitive restrictions on performance result from a combination of situation, task, and personal constraints (i.e., inconsistencies in rules, spatial-temporal factors, or technicalities) (Ives, 2020; Murayama & Elliot, 2012). In 1975, Martens reviewed studies that looked at the effects of competition on motor performance. He found that competition could impair complex tasks' performance and those that were not learned well (Cooke, 2010). A more recent review of the literature by Peng and Hsieh (2012) compared the effects of competition on cooperation and

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

player relationships. After participants engaged in a competition condition and a cooperation condition balloon popping game, they concluded that cooperative activities led to greater motivation and effort, positively impacting performance.

There is also literature that claims a neutral relationship between competition and performance. Johnson et al. (1981) compared the influence of competitive and non-competitive participants on performance to conclude that there was no statistical difference between the participant group's performance level. Also, if the impact of the constraints mentioned above does not motivate the participant to improve, competition does not influence performance. Little consensus has been reached on this issue over the years, leaving the relationship between competition and performance cloudy at best. The convergence of this competition-performance relationship is concisely outlined in Murayama and Elliot (2012).

Opposing Process Model of Competition and Performance

The lack of consensus on the relationship between competition and performance remains an issue among researchers. To combat this, Murayama and Elliot (2012) conducted a systematic review and proposed a new model as an alternative approach (i.e., The opposing process model of competition (see Figure 1). In a meta-analysis of 179 studies, Murayama and Elliot (2012) organized the existing literature into three main conceptualizations of competition: trait competition (65 studies), perceived environmental competitiveness (33 studies), and structural competition (81 studies). Regardless of the conceptualization of competition, the analyses revealed no relationship between competition and performance. What statistically significant results emerged were very weak. This effect led to the conclusion that competition has no direct relation with performance (Murayama & Elliot, 2012).

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

Figure 1

The relation between Competition and Performance



Note: Murayama and Elliot determine a null direct relationship between Competition and Performance.

Murayama and Elliot (2012) then hypothesized that the relation between competition and performance-attainment was a mediational process. They contend that competitiveness can be both adaptive and maladaptive depending on the goal orientation of the individual competing. They hypothesized that competition evokes an inconsistent mediational process (i.e., one mediated effect has a different sign than the other mediated effect) that either facilitates performance (i.e., performance-approach) or undermines performance (i.e., performance-avoidance). Murayama and Elliot (2012) explain how performance-approach and performance-avoidance act as inconsistent mediators for competition-performance relation by introducing the opposing process model of competition and performance.

The components of the opposing process model of competition and performance, performance-approach and performance-avoidance, are achievement goals that regulate one's general desires and apprehension about success and failure (i.e., outcomes) (Elliot & Church, 1997; Murayama & Elliot, 2012). Competitive situations tend to activate social comparison processes, which allow participants to evaluate their peers. These evaluations vary on three aspects of competence: (1) evaluating how one's opponent is doing compared to the task (task-based standard), (2) how one is doing compared to their expectations (self-based standard), (3)

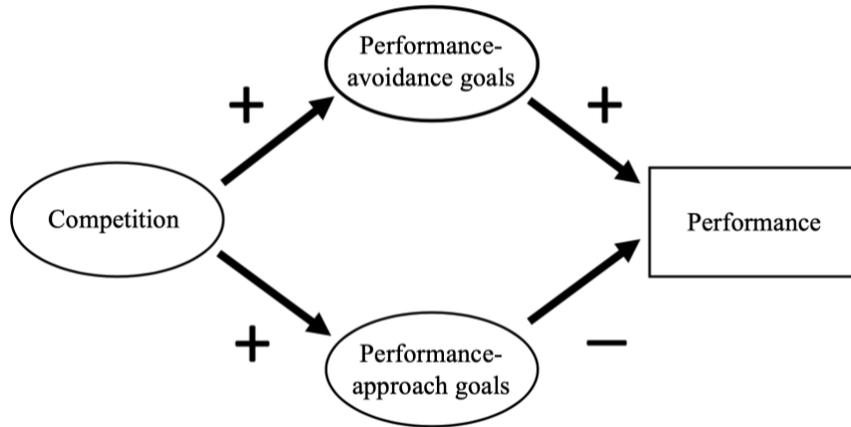
THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

how one is doing compared to their opponent (other-based standard), as well as its positive or negative focus resulting in success or failure, respectively (Elliot & McGregor, 2001; Murayama & Elliot, 2012). Murayama and Elliot (2012) suggest that these achievement goals represent different social evaluation methods when competing. More specifically, performance-approach goals symbolize trying to do well compared to others, and performance-avoidance goals symbolize avoiding doing poorly compared to others. Murayama and Elliot (2012) connected these social processes elicited by competitive situations to performance outcomes. They determined that performance-approach goals facilitate positive performance, whereas performance-avoidance goals facilitate negative performance, given their association with positive (challenge-based) and negative affect (threat-based effect), respectively.

Based on previous achievement goal orientation literature, Murayama and Elliot (2012) proposed that performance-approach goals positively predict performance, while performance-avoidance negatively predicts performance mediating the relation between competition and performance. More specifically, competition facilitates performance when the participant is prompted to use performance-approach goals and undermines performance when the participant is prompted to use performance-avoidance goals. Murayama and Elliot (2012) included these achievement goals to explain the absence of a direct effect between competition and performance found during the previous meta-analysis. The combination of these opposing processes is used to explain the critical impact that competition has on performance (see Figure 2).

Figure 2

The Opposing Process Model of Competition and Performance



Note. Murayama and Elliot’s model links competition and performance via a positive indirect effect of performance-approach and a negative indirect effect of performance-avoidance goals.

To test this opposing process model of competition and performance, Murayama and Elliot (2012) completed an additional meta-analysis. The meta-analytic structural equation model (MASEM) of 614 studies focused on the remaining five relations (i.e., competition and performance-approach goals, competition and performance-avoidance goals, performance-approach goals and performance-avoidance goals, performance-approach goals and performance, performance-avoidance goals and performance). Supporting their claim, the meta-analysis results indicated that competition is indirectly related to performance via mutually opposing achievement goals.

Empirical Studies

Three new empirical studies were then designed to test the opposing process model due to several limitations when using the meta-analytic approach (for review, Murayama & Elliot,

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

2012). Each of the studies tested the model using different competition conceptualizations (i.e., trait competitiveness, perceived environmental competitiveness, structural competitiveness).

Study 1 tested a college classroom using trait competitiveness as the independent variable, exam performance as the dependent variable, and achievement goals as the hypothesized mediator variable. Participants completed demographics and verbal SATs in a group setting, followed by trait competitiveness and perceived competence measures in a private setting. After three weeks, participants reported their achievement goal orientations (i.e., performance-approach/avoidance) and their perceived competence for the class in a group setting. Trait competitiveness was found to be an indirect predictor of exam performance mediated by achievement goals. Individuals high in trait competitiveness, who scored higher on performance-approach orientation, performed better on this task than those who were performance avoidant. This confirms that performance-avoidance and performance-approach are mutually opposing mediators of trait competitive-performance relation, which created the null direct relation (Murayama & Elliot, 2012).

Whereas Study 1 reflected the trait competitiveness approach, Study 2 extended the first study by conceptualizing competitiveness due to the perceived social environment rather than an inherent trait. Murayama and Elliot (2012) did this by testing college classrooms' *perceived class competitiveness* as the independent variable using measures of general competence, perceived class competence, achievement goal orientation at week 1 and again at week 8. Exam performance remained as the dependent variable and achievement goals as the mediator variable. Participants completed demographics and verbal SATs in a group setting, followed by trait competitiveness and perceived competence in a private setting. During week 2, participants completed a perceived class competitiveness measure. After two months, participants reported

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

their achievement goal orientations (i.e., performance-approach/avoidance) and their perceived competence for the exam in a group setting. Perceived class competitiveness was also found to be an indirect predictor of exam performance mediated by achievement goals. This adds confirmation that performance-avoidance and performance-approach are mutually opposing mediators of trait competitive-performance relation, which created the null direct relation (Murayama & Elliot, 2012). These findings also suggest that social perception is also involved in the competition-performance relations.

Study 3 further extended the first two studies by taking neither the trait nor perceived social environment competition approach but instead testing a college classroom using *structural competition* (i.e., competing in actual competition with others versus non-competitive practice with oneself) as the independent variable and anagram performance as the dependent variable. Achievement goals remained as the mediator variable. The participants completed a baseline (practice) anagram task for 5 minutes. In the experimental condition, the participant would proceed to the alternative, competitive version of the task. Participants were told they would be competing against the other person in the room and that they would be told their performance outcome (i.e., win, lose, tie). Participants in the control condition were told that they would complete another version of the anagram task. Participants would then report their achievement goal orientations (i.e., performance-approach/avoidance) and their perceived competence for the anagram task using Elliot and Murayama's (2008) achievement goal measure. Results determined that anagram performance was not significantly affected by competition manipulation, demonstrating the lack of direct effect between competition and performance. There was a positive predictor of anagram performance combined with goal orientation performance-approach goals, whereas performance-avoidance goals had a negative predictor.

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

After testing the significance of the indirect effects, it showed that the positive and negative indirect effects (i.e., performance-approach, performance/avoidance) were significant. This adds confirmation that performance-avoidance and performance-approach are mutually opposing mediators of trait competitive-performance relation, which created the null direct relation (Murayama & Elliot, 2012).

Overall, Murayama and Elliot's three studies looked at the trait, social, and situational aspects of competition (mentioned earlier). Given that this model demonstrates validity and utility, Elliot and Murayama (2012) assert that the next step in future research is to expand and further develop the model. To satisfy their objective of creating a straightforward interpretation for the null relation between competition and performance, Murayama and Elliot's (2012) conceptual model did not include various mediation variables that may influence the results. As mentioned in their study, the two poles of achievement goals (i.e., performance-approach and performance-avoidance) vary concerning the standard of evaluation (i.e., competence – task-based, self-based, other-based evaluations).

What is missing from Murayama and Elliot's (2012) model is why competition is related to those goals, and how they may generate the two achievement goals. This study attempted to further clarify the causal factor underlying the way in which competition results in specific achievement goal orientations. Further detail on how social perceptions of others is formed and the potential influence of these person perceptions on performance and achievement goals have yet to be studied. The current research will attempt to extend the opposing process model concerning person perception and group stereotype as mediator variables.

Person Perception and Impression Formation

Person perception is the process of perceiving those with whom we interact, and these impressions can determine subsequent social interactions (Greenlees, 2007). When people enter a social interaction, they actively understand and seek information to gauge their opponent's incoming behaviour. According to Fiske and Taylor (1991), the information obtained by impression formation manipulates participant behaviour to enhance the chances of a pleasant interaction (i.e., remaining in control, positive performance, defeating opponent). The importance of this preliminary subconscious action is currently missing in the Murayama and Elliot (2012) model. A review of the literature above appears to be an essential inclusion to determine competition-performance relations.

Several theories have been proposed to explain how person perceptions influence impression formation and subsequently alter behaviour (i.e., performance) (Lee et al., 2020; Neuberg & Fiske, 1987; Oh et al., 2020; Skowronski & Carlston, 1989; Wyer & Srull, 1989). Schema-driven impression formation was created to forward the understanding of how impressions form. According to the Schematic Model of Person Perception by Warr and Knapper (1968), there are three common consequences of person perception. Initially, perceivers use cues in early social interaction to judge individuals and categorize people based on their perceptions (i.e., attributive response). Such categorizations include attributes or qualities of a specific person (i.e., young, old, healthy, intelligence). These categorizations then produce an immediate affective reaction in which perceptions elicit a range of emotions, depending on the assigned schema (i.e., anger, anxiety, contempt, fear). Subsequent behavioural responses are likely to arise in certain situations stemming from the information they received while forming expectations (i.e., expectancy response). These responses influence the impression formation formed of

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

others, the expectations of opponent behaviours, and how perceivers behave, processing (encoding and evaluating) further information, evaluating others' performances, and behaviour – especially in competitive situations (Greenlees, 2007).

This early model of person perception outlines how the impression formation of other people influences social interactions. A more recent model on intergroup impression formation building on early models of person perception is the Stereotype Content Model (SCM) (2002; 2002; 2007; & 2009). Fiske et al. (2002) created the SCM, where stereotypes (impression formation) of groups are identified dimensionally on two axes – warmth and competence. This work by Fiske et al. (2002) has had considerable theoretical support from various researchers which has been fruitful in terms of generating further research (Caprariello et al., 2009; Cuddy et al., 2007; 2008; Russel & Fiske, 2009). Intergroup processes represent one of the most widely researched topics in social psychology. The majority of this research has focused on how members perceive different groups.

Intergroup Competition

Intergroup competition facilitates the categorization of others into distinct groups via person perception/impression formation. Based on their first impression, social identification is a process defining “us” and “them” (Cikara et al., 2011). Group conflict and competition are inevitable in human social behaviour, which are important concepts in social perception and competition. According to Van Vugt and Park (2009), group conflict and categorization can be explained as the tendency for people to categorize others based on group membership, naturally stereotyping them into groups. These categorizations influence how a group affectively responds to another group's pain or pleasure (e.g., witnessing an ally in distress typically elicits empathy). Consequentially, these responses can lead stereotype groups to specific behaviours (e.g., actively

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

harming, passive facilitation) by simply associating with the opposing group (Dovidio & Gaertner, 2010; Yzerbyt & Demoulin, 2010).

Group categorization stems from people naturally being social and cooperative to those most similar to themselves (i.e., ingroups). When there is a large and symbolic group, people tend to identify with them while displaying ingroup loyalty (Brewer, 2001; Brewer & Kramer 1985; North & Fiske, 2015). Many of these people prefer members of their ingroup relative to members of their outgroups. Humans naturally form groups and compete with other groups over tangible or intangible resources (Cikara, Botvinick, & Fiske, 2011; Cikara, Bruneau, & Saxe, 2011). For example, in moderately sized cities, local high schools tend to categorize themselves broadly between the different school boards (i.e., Catholic vs. Public), and then within the school boards as specific high schools (i.e., Saint Gonzaga vs. Saint John's College high school or Malden vs. Medford high school). According to Mead and Maner (2012) and Kilduff et al. (2010), this intergroup rivalry creates robust psychological processes that allow the members of each group to act in the best interest of their group. The psychological process creates negative appraisals of rival group members, which increases mutual competitive indifferences. This behaviour relates to various indicators of tribal alliances where humans evolve through the context of resources (i.e., food, reproduction, location).

These intergroup categorizations have been a significant part of society. Beginning with ancestral conflict (e.g., hunter-gatherer tribes), intergroup categorization has persisted into the modern era (e.g., sporting events, school cliques, workplaces) (Esses, Jackson, & Bennett-Abu Ayyash, 2010; Mead & Maner, 2012; Vugt & Park, 2009). According to Alexander (1987), early humans were threatened by other groups. Membership in each group activates innate psychological conflict forcing ingroups to subjugate and exploit their outgroup. Disputes also

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

arise within a group during unique situations when not all members are coordinated during intergroup action. These associations between groups are dynamic in any given intergroup situation, which gives rise to increased specificity between groups (i.e., homeless, elderly, competent). In modern times, multiple responses stem from skin colour, gender, age, eye colour/shape, speech, or location, which often occur from a change in baseline affect and subsequent behaviour (Kurzban et al., 2001; Vugt & Park, 2009).

Recent theorizing has focused on the perception of group competition central to prejudice and discrimination. More specifically, several scholars have been interested in the ideas that support group conflict and competition in society and how they maintain these common beliefs (Cikara et al., 2011; Esses et al., 2005; Schopler et al., 2001; Wittchen et al., 2013). Fiske et al. (2002) contributed to this research field with the development of the stereotype content model. Fiske et al. (2002) proposed this model to explain how people perceive social groups along two fundamental dimensions (i.e., warmth & competence) (Fiske, 2018; Fiske et al., 2002).

Stereotype Content Model – Warmth x Competence

Social perceptions require people to form impressions of and make inferences about other people. More specifically, they refer to identifying social cues and using them to make judgments about social roles, policies, interactions, relationships, context, or the characteristics of other people (Aronson et al., 2010). Widespread stereotypical knowledge about others results in people labeling others. For example, the stereotype for those who work hard to get straight A's is that they are competent, but perhaps not very warm or friendly and consequently labelled a 'nerd' and then less likely to then be invited to a party. In contrast, someone on the cheerleading team may not be seen as capable or competent but perhaps more sociable and more likely to be labeled as popular (Kervyn, Yzerbyt, & Judd, 2010). This example demonstrates how society

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

perceives and describes individual or group characteristics, similar to the framework for thinking about representing social groups provided by Fiske et al. (2002). The Stereotype Content Model (SCM; Fiske et al., 2002; Fiske, Cuddy, & Glick, 2007; Fiske, 2018; Cuddy et al., 2009) builds on this perspective.

Fiske based the SCM on universal stereotypes: (1) the basic survival needs to identify ‘friend’ or ‘foe,’ and (2) status differences influencing competition for resources (i.e., attributive response – characteristics and goals; Cuddy et al., 2009). Put simply, when encountering outgroup members, we first want to know the individual’s intent, “do they intend to harm me” (i.e., warmth), followed by whether they can act on their intent, “are they *capable* of harming me?” (i.e., competence) (Cuddy et al., 2009; Fiske, 2018). The warmth dimension is fundamental as it determines the valence of the stereotypic judgment, individual or collective intent, holding more weight in predicting affective and behavioural reactions. Second, the competence dimension is important to determine if an individual or group are capable of enacting on such intent (Bodenhausen et al., 2012; Cuddy et al., 2009; Fiske, 2018; Fiske et al., 2002; Fiske et al., 2007; Rousso & Dunham, 2016). In other words, warmth predicts whether an impression is positive or negative, whereas competence predicts the extent of that impression (i.e., *how* positive or negative) (Wojciske, Bazinska, & Jaworski, 1998). Perceivers often operate on these warmth/competence stereotypes, which are shared beliefs about common groups’ trustworthiness, friendliness, honesty, likability, sincerity (i.e., warmth) or how capable, competent, confident, and skillful the group appears (i.e., competence) (Abele et al., 2016; Cuddy et al., 2009).

The two-dimensional warmth-by-competence domain generates one societal ingroup and three kinds of outgroups that have been recognized in all countries that have been studied. When

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

these dimensions combine, people often judge social groups on warmth and competence in a negative fashion; many groups are high on one dimension (proficient) and low on the other (inferior) (Cuddy et al., 2009; Fiske, 2018; Fiske, Cuddy, & Glick, 2007; Fiske et al., 2002; Yzerbyt, Provost, & Corneille, 2005). Following these perceptions are specific emotions that stem from the specific stereotyped groups (i.e., affective response). Certain groups are known as reference groups (i.e., ingroup), which are evaluated relatively consistently as high on warmth and competence. Such people include white, middle class, heterosexual, Christian, and U.S. citizens. The consequent emotion that follows this reference group includes surveyed and self-reported pride and admiration. On the opposite side of the two-dimension combination lies the lowest. Groups low on warmth and competence are actively disliked, eliciting untrustworthy, incompetent, and unmotivated stereotypes: the homeless, drug addicts, welfare recipients, and immigrants. This group often receives contempt and disgust from others and are perceived to be less than human.

Fiske et al. (2002) also suggested that mixed stereotypes for outgroups include low perceived competence but high perceived warmth (i.e., paternalistic stereotypes) and high perceived competence with low perceived warmth (i.e., envious stereotypes). The SCM adds ambivalence in these two additional intergroup stereotypes that have been previously ignored. As mentioned, groups in the paternalistic stereotype groups are seen as warm but incompetent and include older adults, people with disabilities (mental and physical), young children, and housewives. These groups elicit pity or sympathy, which are ambivalent emotions; outgroups feel sorry for these people, if their status remains lower. The envious stereotyped group is the opposite type of ambivalence group, reported as threateningly competent but cold (and untrustworthy). Those that fall into this intergroup stereotype include rich people,

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

businesspeople, Asian and Jewish people, professional women (i.e., non-traditional women), and professional minorities. This low warmth, the high competent group, also elicits envy, an ambivalent emotion. Outgroups admire these people but also resent them as their adversaries with suspect intentions.

In sum, the SCM claims that older people are perceived as nice but not smart, rich people are perceived as smart but not nice, poor people are perceived as neither nice nor smart, and we perceived ourselves (ingroup) as nice *and* smart (Fiske et al.,2002).

The SCM adds ambivalence to the extremes of all-good ingroups and all-bad out-groups, which often result in distinct affective and behavioural responses (i.e., helping vs. attacking, association vs. neglect; Fiske et al., 2002). Social structure predicts stereotype content, explaining the variation between the two-dimensional warmth-by-competence domains (Fiske, 2015; Kervyn et al., 2010). Variation in warmth has been linked to perceived competition, whereas variation in competence is linked to social status. More specifically, competition negatively predicts warmth because it excludes groups with goals that conflict with those of the ingroup and includes groups as long as their status remains lower (if they are not nice, do not include them). Groups that are viewed as high status are deemed competent to the extent they are perceived as having prestige and power (Cuddy et al., 2009; Fiske, 2018). These social structures lead to intergroup perceptions and implications for emotional reactions that mediate stereotypic behavioural tendencies (i.e., expectancy response). Warmth predicts active behaviours: active facilitation vs. active harming (i.e., helping vs. attacking), while competence predicts passive behaviours: passive facilitation vs. passive harm (i.e., association vs. neglect). Each of the two-dimensional warmth-by-competence dimensions elicits unique, consistent behaviours (see Table 1).

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

Table 1

Combination of Warmth/Competence and Status/Competition

		COMPETENCE (passive behaviours)	
		High	Low
WARMTH (active behaviours)	High	<p>Admiration Stereotype</p> <p>high status, not competitive</p> <p>active/passive facilitation</p>	<p>Pity Stereotype</p> <p>low status, not competitive</p> <p>active facilitation/passive harm</p>
	Low	<p>Envious Stereotype</p> <p>high status, competitive</p> <p>passive facilitation/active harm</p>	<p>Contempt Stereotype</p> <p>low status, competitive</p> <p>active/passive harm</p>

Note. Fiske’s stereotype dimensions are displayed, combining Warmth/Competence, Status/Competition, and their corresponding behaviour outcomes.

More specifically, societal ingroups elicit both active and passive facilitation, which are associated with helping and associating. Contempt stereotyped groups (i.e., homeless people) receive both active attacks and passive neglect, which are two kinds of harm. On the other hand, the ambivalent groups (i.e., high warmth, low competence & low warmth, high competence) stimulate facilitation and neglect behavioural tendencies from their perceivers. Pitied groups (i.e., older, disabled people, housewives) elicit active facilitation and passive neglect where outgroups express pity or sympathy for these people, if their status remains lower. There is a sense of superiority focused on paternalistic care. Envied stereotyped groups (e.g.,

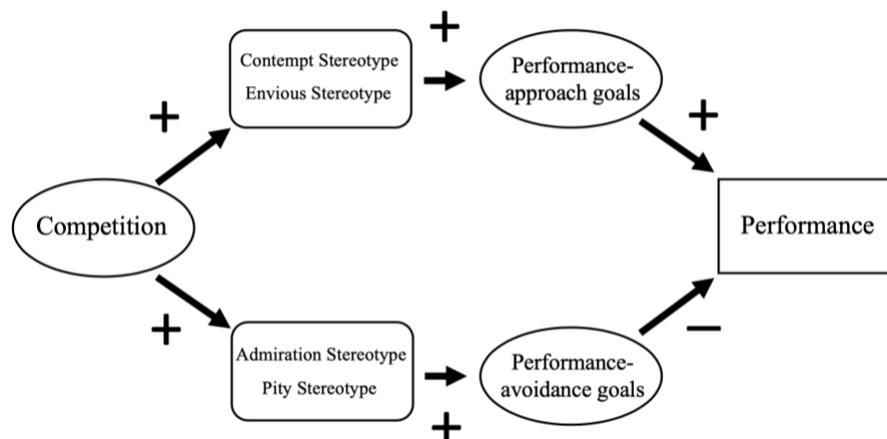
THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

businesswomen, Jewish people, Koreans) elicit passive association and active harm from their outgroups who express admiration and jealousy, resenting them as their opponents (Fiske et al., 2002).

The SCM model is used to define two fundamental dimensions of social perceptions (i.e., warmth and competence). These dimensions generate distinct emotions of admiration, contempt, envy, and pity, which predict distinct behaviours (active and passive, facilitative, and harmful). This model allows us to understand how competitors perceive their opponents and emotional and behavioural consequences in a systematic, general, and pragmatic way. Like the Opposing process model of competition and performance, Fiske et al.'s (2002) straightforward conceptualization of how people relate as individuals and as a group, and the subsequent systematic impressions that people form have yet to be empirically tested, specific to competitive performance included in Murayama and Elliot (2012). Fiske et al.'s (2002) stereotype content model was used in tandem with Murayama and Elliot's (2012) opposing process model in this study to explain the relationship between competition and performance (see Figure 3.)

Figure 3

Inclusion of Fiske's SCM dimensions



THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

Note. Fiske's stereotype dimensions (i.e., contempt/envious, admiration/pity) are inserted into Murayama and Elliot's Opposing Process Model of competition and performance to explain the relation between competition and performance better.

The Current Study

This study aimed to replicate Murayama and Elliot's (2012), opposing process model of competition and performance (competition-performance model). Additionally, this investigation attempted to replicate Murayama and Elliot's (2012) competition-performance model by folding in elements of Fiske et al.'s (2002; 2007), Stereotype Content Model (SCM) to further understand the relationship between competition and performance.

Objectives

The first objective was to determine the relationship between competition and performance by replicating Murayama and Elliot's (2012) opposing processing model of competition and performance. The second objective was to extend Murayama and Elliot's model by determining how impression formation (described in Fiske et al., 2002) profiles influence the competition-performance relation. More specifically, we used Fiske et al.'s SCM to create four stereotyped opponent groups to observe how they influenced a perceiver's achievement goal orientation (performance-approach/performance-avoidance, described in Murayama & Elliot, 2012) and subsequent performance.

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

Hypotheses

Hypothesis 1: Study Variable Correlations

The first hypothesis claimed that each main variable (i.e., trait competitiveness, group stereotype, achievement goal orientation, and reaction time) would be correlated to replicate findings from Murayama and Elliot (2012) and Fiske et al. (2002).

Hypothesis 1a. It was hypothesized that trait competitiveness would be associated with warmth and competence for each stereotyped group (i.e., ingroup, contempt, pity, envy), achievement goal orientations (i.e., performance-approach), and performance outcome. We predict that those participants with more trait competitiveness will adopt a more stereotyped lens when perceiving their opponents.

Hypothesis 1b. It was also hypothesized that ingroup and pity stereotyped groups would be positively correlated with performance-avoidance. In contrast, contemptuous and envious stereotyped groups will be positively correlated with the performance approach orientation.

Hypothesis 1c. Lastly, it was hypothesized that achievement goal orientation (performance-approach and performance-avoidance) would be correlated with quicker and slower response times, respectfully.

Hypothesis 2: Replicating Murayama and Elliot (2012)

Next, we hypothesized that a successful replication of Murayama and Elliot's (2012) opposing process model of competition and performance would be completed.

Hypothesis 2a. More specifically, we first hypothesized that baseline anagram performance would be a positive predictor of post manipulation anagram performance (Murayama & Elliot, 2012).

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

Hypothesis 2b. Additionally, we hypothesized that the competition manipulation would not significantly affect post manipulation anagram performance (Murayama & Elliot, 2012).

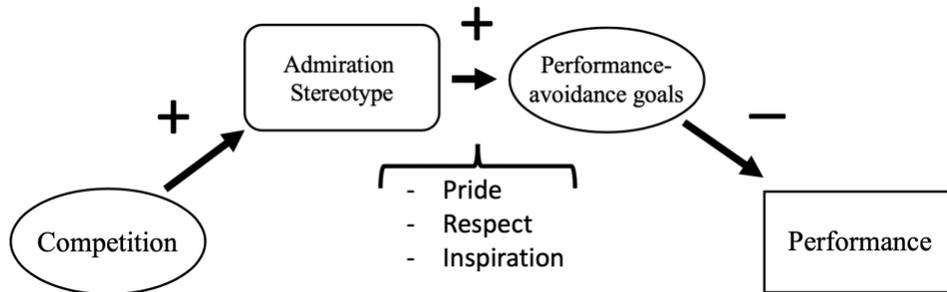
Hypothesis 2c. Lastly, we hypothesized that the opposing process model in which performance-approach (positive predictor of performance) and performance-avoidance (negative predictor of performance) goals would serve as joint mediators of the indirect competition-performance relation (Murayama & Elliot, 2012).

Hypothesis 3: Extending Murayama and Elliot (2012)

Hypothesis 3a: Admiration Stereotype Group. Hypothesis 3a claims that the admiration stereotype group (i.e., high warmth, high competence) will correspond with performance-avoidance, which will elicit negative predictors of subsequent performance. According to Carver (2004), Carver and Sheier (1990), Friesen et al. (2013), Laborde, Raab, and Dosseville (2012), Lazarus (2000), Vast, Young, & Thomas (2010), affective responses to competing against an ingroup (i.e., pride, respect, upward inspiration) enhance one's social and self-esteem. Perceivers are motivated to live up to this ego ideal (i.e., status striving), promoting a movement towards incentives and goal attainment. Lazarus (2000) claims the perceivers often feel optimistic about others' success when experiencing pride and admiration if they identify their opponent as extensions of themselves (i.e., ingroup) (see Figure 4). Therefore, to maintain feelings of pride and optimism by being in the Admiration Stereotype group, members will likely adopt performance-avoidance goals to prevent their ingroup opponents from viewing them differently (i.e., low warmth), maintaining their ingroup identity.

Figure 4

Admiration Stereotype group

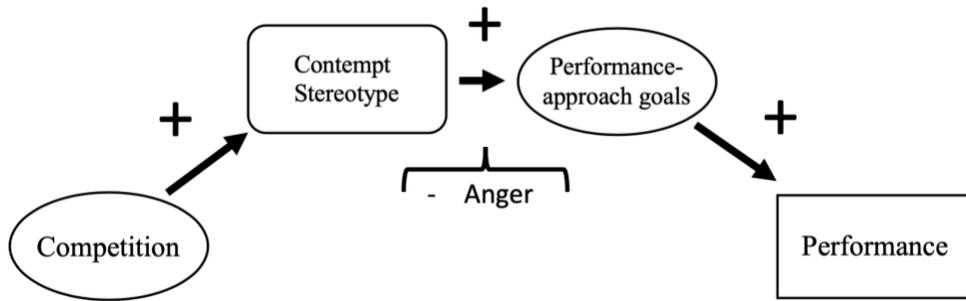


Note. Positive indirect effect of admiration stereotype on performance goals via social emotions (i.e., pride, respect, inspiration).

Hypothesis 3b: Contemptuous Stereotype Group. Hypothesis 3b claimed that the contemptuous stereotype group (i.e., low warmth, low competence) will correspond with performance-approach, which will elicit positive predictors of subsequent performance. The affective response when competing against the contemptuous group is anger, and according to Larazus (2000) and Laborde et al. (2012), the behavioural tendency when eliciting anger is to counterattack to gain revenge or self-esteem, positively influencing performance (Davis, Woodman & Callow, 2010; Woodman et al., 2009). According to Cikara et al. (2011) and Cikara et al. (2011), when the contempt stereotype is perceived, individuals elicit approach behaviours, like Murayama and Elliot’s (2012) performance-approach. When performing against stereotyped contempt groups, perceivers look to harm them after accusing them of using up societal resources competing with other societal priorities (Fiske et al., 2002). When perceivers experience anger, they are motivated to mobilize energy, try harder, and prove something – improve performance (Carver & Harmon-Jones, 2009; Tamir, Chiu, & Gross, 2007) (see Figure 5).

Figure 5

Contemptuous Stereotype group

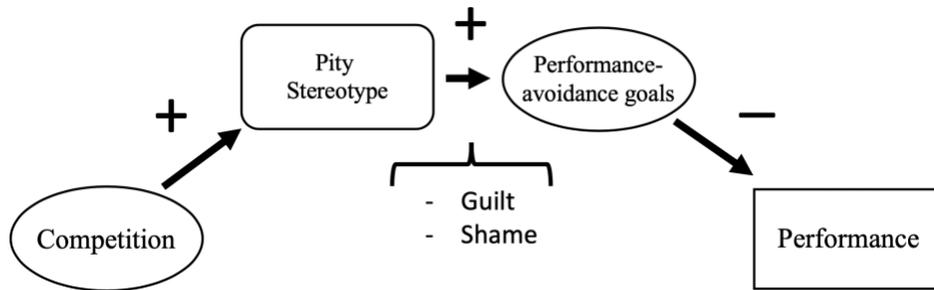


Note. Positive indirect effect of contemptuous stereotype on performance goals via social emotion (i.e., anger).

Hypothesis 3c: Pity Stereotype Group. Hypothesis 3c claimed that the first ambivalent group, the pity stereotype group (i.e., high warmth, low competence), will correspond with performance-avoidance, which will elicit negative predictors of subsequent performance. According to Cuddy, Fiske, and Glick (2007), Fiske et al. (2002), and Lazarus (2000), perceivers elicit guilt and shame when faced with the pity stereotype, which holds little room for competition. Perceivers are motivated by social, moral values and seek forgiveness for moral failure of outperforming a group that cannot control the cause (Lazarus, 2000). The influence on performance and achievement goal orientation is the balance between combining assumed superiority with potential caretaking. Perceiver’s morals and paternal characteristics prevent them from pummeling their opponents. However, their superiority holds them to a standard of outperforming. The only logical achievement orientation would be performance-avoidance, which is the act of avoiding poor performance against opponents (Murayama & Elliot, 2012) (see Figure 6).

Figure 6

Pity Stereotype group



Note. Negative indirect effect of pity stereotype on performance goals via social emotions (i.e., guilt and shame).

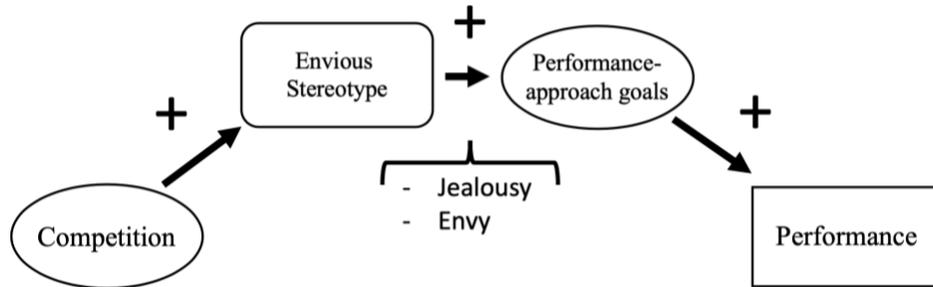
Hypothesis 3d: Envious Stereotype Group. Hypothesis 3d claimed that the second ambivalent group, the envious stereotyped group (i.e., low warmth, high competence), will correspond with performance-approach, which will elicit positive predictors of subsequent performance. In response to low-warmth, high-competence, the SCM differentiates hostile (approach) emotions (i.e., jealousy, envy) that are most likely to lead to an attack. Cikara et al. (2011; 2017) claimed that this stereotype group’s perceivers often harm, leading to increased motivation to outperform them in competitive situations. According to Fiske et al. (2002), both envy items (i.e., envious, jealous) make perceivers believe that their opponent possesses something (intrinsic or extrinsic) that they self-desire but do not have. DeSteno and Salovey (1996) stated that performance moderates’ threats to self-evaluation – the quality of the behaviour in question ascribed to the comparison other (i.e., envious stereotype group). The greater the performance level from the comparison group, the more threatening the comparison to self-evaluation (i.e., jealousy/envious). These threats to self-evaluation motivate behaviour designed to recoup the resulting loss. In short, the hostile emotions and the intrinsic/extrinsic motivations caused by the distress the perceiver experiences from the envious group was

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

hypothesized to lead them to adopt the performance-approach goal orientation, subsequently improving performance from baseline (see Figure 7).

Figure 7

Envy Stereotype group



Note. Negative indirect effect of envious stereotype on performance goals via social emotions (i.e., jealousy, envy).

Method

Participants

Participants for this investigation were recruited at Lakehead University in Thunder Bay, Ontario. Data was collected from March 2021 to April 2021 with a total of 150 participants, 67% of whom were students, and 33% were MTurk participants (see Table 1 for sample characteristics). After examining the data for data-entry errors, missing data, and outliers, 17 MTurk participants were removed as they were the same individual, five participants with >60% missing response time data, 27 participants with >60% missing W/C data, and one participant with both latter restrictions were removed. Therefore, the final sample comprised 100 participants, 72% of whom were female and 28% were male, ages ranging between 18 to 58 years ($M = 25.23$, $SD = 6.844$). Two-thirds (66%) of the sample were of Caucasian/White ethnicity and predominately undergraduate students (74%), with a majority enrolled in full-time

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

education (86%) (see Table 2 for full reporting). For the student sample, 30% were in their fourth year of study, 29% in third year, 24% in first year, and 17% in second year.

Participants were given two measures to screen for physical (i.e., football, soccer, baseball, hockey) and cognitive (i.e., puzzles, word searches/games, crosswords) task competence. Physical competence was normally distributed across the 5-point Likert scale – most participants appeared to be moderately incompetent (26%), followed by moderately competent (25%) across tasks. Overall, it appeared that more participants rated themselves as physically incompetent (45%) rather than physically competent (38%). Two-thirds (67%) of the sample rated themselves as being competent at cognitive tasks. Only 6% of the sample rated themselves as incompetent at cognitive tasks. All undergraduate participants who complete this study were offered course credit for participation. This study took approximately 90 minutes to complete and MTurk respondents were compensated one dollar for completing the study (Amir et al., 2012; Casler et al, 2013; Sheehan, 2018).

Table 2

Characteristics of the Sample (N = 100)

Demographic	Frequency	%
Sex		
Male	28	28%
Female	72	72%
Ethnicity		
Caucasian (white)	66	66%
African Canadian/American (Black)	5	5%
Indigenous (First Nation, Métis, Inuit)	7	7%
East Indian (India)	6	6%
Asian	13	13%
Hispanic	3	3%

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

Education Level		
Highschool	11	11%
Undergraduate	74	74%
Graduate	14	14%
Doctoral	1	1%
Education Status		
Full-time	86	86%
Part-time	14	14%
Year Level		
First year	24	24%
Second year	17	17%
Third year	29	29%
Fourth year	30	30%
Employment Status		
Full-time	21	21%
Part-time	49	49%
Casual	5	5%
N/A	25	25%
Physical Task Competence		
Incompetent	45	45%
Neutral	17	17%
Competent	38	38%
Cognitive Task Competence		
Incompetent	6	6%
Neutral	27	27%
Competent	67	67%

Measures and Materials

Participants were first asked to read an information sheet outlining the study and complete informed consent to begin the online study. Participants also completed a series of questionnaires targeting their demographic information, competitiveness, achievement

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

motivation, and performance goal orientation (i.e., AGQ-R, Elliot & Murayama, 2008; Gill & Deeter, 1988; CI, Smither & Houston, 1992; WOFO, Spence & Helmreich, 1983). The participants performed a series of anagram tasks (i.e., five baselines, 20 competition) and complete a brief questionnaire before each round. After the rounds of competition, the participants received a debriefing form.

Demographics Questionnaire

The demographics questionnaire asked the participants their background information, such as their gender, age, ethnic identity, employment status, and year in university. Participants also reported their perceived competence in physical (i.e., football, soccer, baseball, hockey) and cognitive tasks (i.e., puzzles, word searches/games, crosswords).

Work and Family Orientation (WOFO) Questionnaire (Spence & Helmreich, 1983)

The WOFO (Appendix B) is a 19-item scale that measured three components of achievement motivation; work orientation (6 items, e.g., “*There is satisfaction in a job well done.*”), mastery (7 items, e.g., “*I prefer to work in situations that require a high level of skill.*”), and competitiveness (5 items, e.g., “*I try harder when I am in competition with other people.*”) (Adams, 1985; Spence & Helmreich, 1983). Responses on the WOFO were rated on a 5-point Likert-type scale on three facets of achievement motivation [ranging from 1 (*strongly disagree*) to 5 (*strongly agree*)]. The WOFO has been found to have satisfactory reliability for each of the three subscales (WOFO mastery $\alpha = .63$, WOFO competition $\alpha = .78$, WOFO work $\alpha = .63$), as well as adequate construct validity, correlating sensibly between college students, athletes, and scientists (Gill, 1986; Orosz et al., 2018). For the current study, participants were instructed to answer the questions by rating themselves on each item. The WOFO was included in this study to obtain the participants’ self-reported rating of their intrinsic motivation representing the work

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

factor (“the desire to work hard”), the mastery factor (“preference for difficulty/challenge”), and the competitiveness factor (“the enjoyment of interpersonal competition) (Adams, 1985).

Sport Orientation Questionnaire (SOQ) (Gill & Deeter, 1988)

The SOQ (Appendix C) is a 25-item self-report measure which assessed three components of individual difference in sport achievement orientation across diverse sport and activities; Competitiveness (13 items, e.g., “*I want to be the best every time I compete.*”), Goal (6 items, e.g., “*Reaching personal performance goals is very important to me.*”), and Win (6 items, e.g., “*The only time I am satisfied is when I win.*”) (Gill & Deeter, 1988). Responses on the SOQ were rated on a 5-point Likert-type scale on three facets of achievement motivation (ranging from 1 (*strongly agree*) to 5 (*strongly disagree*). The SOQ was found to have good internal consistency for each of the three subscales, and high individual item-to-total correlations (Competitiveness $\alpha = .94$, Win $\alpha = .86$, Goal $\alpha = .80$). Adequate construct validity is most notable between the SOQ scores and the WOFO competitiveness scores. Higher scores on competitiveness were more likely to enroll in competitive classes and compete in competitive sports than those lower on competitiveness (Gill & Deeter, 1988). For the current study, participants were instructed to answer the questions by rating themselves on each item. The SOQ was included in this study to obtain the participants’ self-reported rating of their sports achievement orientation using a logical three-factor structure – competitiveness (the desire to enter and strive for success in a sports competition), win orientation (a focus on interpersonal standards and winning), and goal orientation (a focus on personal standards) (Smither & Houston, 1992).

Competitiveness Index (CI) (Smither & Houston, 1992)

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

The CI (Appendix D) is a 20-item true-false self-report measure which assessed the desire to win in interpersonal situations (Houston et al., 2015; Smither & Houston, 1992). Items on the CI are rated using a true-false response format. The CI has good internal consistency for the 20-item scale ($\alpha = .90$). Due to the high degree of similarity between the conceptual definitions of competitiveness, the CI displayed moderately high correlations with the competitiveness subscales for both the WOFO ($r = .47; p < .001$) and the SOQ ($r = .61; p < .001$) (Smither & Houston, 1992). For the current study, participants completed this measure of competitiveness by rating themselves on each item. The CI was included in this study to obtain the participants' self-reported rating of their competitiveness in a wide variety of situations, demonstrating the need for achievement is not a unitary dimension.

Achievement Goal Questionnaire-Revised (AGQ-R) (Elliot & Murayama, 2008)

The AGQ-R (Appendix E) is a 12-item scale that measured four components of achievement goal orientation; Mastery-Approach goals (3 items, e.g., “*My aim is completely master the material presented in this class*”), Mastery-Avoidance goals (3 items, e.g., “*My aim is to avoid learning less than I possibly could*”), Performance-Approach goals (3 items, e.g., “*My aim is to perform well relative to other students.*”), and Performance-Avoidance goals (3 items, e.g., “*My aim is to avoid doing worse than other students.*”) (Elliot & Murayama, 2008). Responses on the AGQ-R were rated on a 5-point Likert-type scale on four components of achievement goal orientation (ranging from 1 (*strongly disagree*) to 5 (*strongly agree*)). While addressing the original study's measurement problem, the internal consistency for all four goals was enhanced ($\alpha > .80$) without sacrificing structural validity and predictive utility.

For the current study, participants were only given items that measured performance-approach (i.e., 1 global item, e.g., “*My goal is to perform better than all other participants in*

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

this study”, 2 specific items, e.g., “*I want to outperform the profile I just read about*”) and performance-avoidance (i.e., 1 global item, e.g., “*My goal is to avoid performing poorly compared to all other participants in this study*”, 2 specific items, e.g., “*My aim is to not perform worse on the next anagram task*”) items. The AGQ-R was included in this study to obtain the participants’ self-reported rating of their performance-approach and avoidance while highlighting the value of precision in the area of achievement goal orientation (Elliot & Murayama, 2008).

Warmth & Competence Scale (Fiske, Cuddy, Glick & Xu, 2002)

To test the warmth and competence in describing out-groups, we modified the warmth and competence scale initially used by Fiske et al. (2002). The warmth and competence scale (W/C) (Appendix F) is a 4-item scale measuring four stereotype groups: Admiration group ($\uparrow W + \uparrow C$), Contempt group ($\downarrow W + \downarrow C$), Pity group ($\uparrow W + \downarrow C$), Envious group ($\downarrow W + \uparrow C$). Responses on the warmth and competence scale are rated on a 11-point Likert-type scale on four groups representing stereotype perception (ranging from 1 (*cold or incompetent*) to 11 (*warm or competent*)). Participants were asked to complete two warmth (e.g., “As viewed by society, please indicate how Cold or Warm your opponent appears”) and two competence question (e.g., “As viewed by society, please indicate how Inept (Incapable) or Competent your opponent appears”). Participants were asked to report their opponent’s warmth and competence as viewed by society versus a personal impression to avoid potential social desirability responses. For the current study, participants were to complete this scale for each opponent. The warmth and competence scale was included in this study to obtain the participants’ perceived warmth and competence of their opponent (Elliot & Murayama, 2008).

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

Anagram Task

Anagram task was designed to replicate the task used by Murayama and Elliot (2012) in their investigation of the influence of competition on performance. An anagram is a word or phrase formed by rearranging the letters of different words or phrases. Anagrams consist of a string of scrambled letters that create alternative lexical forms (e.g., *reading* is an anagram of *grained*) (Vincent et al., 2006). Anagram tasks were used for this experiment because they have been frequently used in research to investigate a wide range of cognitive and behavioural experiences and have been shown to be sensitive to motivational manipulation (i.e., problem-solving, reading, metacognitive awareness during learning, personality-related changes in cognition) (Elliot et al., 2007; Vince et al., 2006). In Murayama and Elliot (2012) baseline anagram performance was a positive predictor of performance-approach/avoidance manipulation. We developed two different sets of anagram tasks (one set for baseline and one for competition) – baseline/practice set consisted of 5 anagram tasks, whereas the competition set consisted of 20 anagram tasks. The anagram baseline/practice task consisted of each participant attempting to beat their prior score, and the anagram competitive task had participants compete against an opponent to solve 20 five-letter, single-solution anagrams. The anagram sets were derived from a published list using relevant Bigram statistics which ranked anagrams based on the frequency of correct responses (Gilhooly, 1978).

Source of the Data

An extensive database was necessary to obtain precise and generalizable estimates of perceived warmth and competence. The profile photographs for each competitor were collected from the 49-image dataset provided by Brain Bridge Lab. We considered it essential that the sample of profiles be large and heterogeneous in its representation of diverse traits forming

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

varied impressions (i.e., according to Fiske's SCM) (see Appendix G). The faces provided by Bainbridge et al. (2013) are ideal for this purpose because they were curated from a wide variety of sources. Each face showed both eyes and has been cropped with an oval around the face to reduce background effects (Bainbridge et al., 2013). This dataset comes with memorability scores and attributes scores for the 49 images, including demographic information, attributes from preliminary studies using attributes and thesaurus-based antonyms (i.e., cold/warm, aggressive/caring, confident/humble). The faces represented a wide range of facial variation as it typically studied in psychological experiments and images as encountered in real life or when competing against an opponent (Bainbridge et al., 2013) (see Figure 8).

LabVanced

This investigation was hosted through a novel, online-based research program known as LabVanced. LabVanced is a JavaScript web application that offers an easy-to-use online editor allowing for a variety of research to be implemented. LabVanced uses psychological terminology to create a clear understanding of its abilities. More specifically, the study design allows researchers to define subject-groups, sessions, blocks, and tasks, as well as a nested function that allows tasks to be grouped into blocks and blocks to be grouped into sessions. Additionally, the experimenter content (e.g., text, images, videos) creates tasks that elicit complex participant interactions.

In this study, LabVanced introduced each participant to the cover letter, consent form, and the battery of questionnaire measures (see Appendices A, B, C, D, E, F). LabVanced transitioned each participant into the five baseline/practice anagram tasks, followed by the twenty competition anagram tasks. During the competitive rounds, participants are shown an instruction slide telling them they are about to see whom they are competing against. Once they

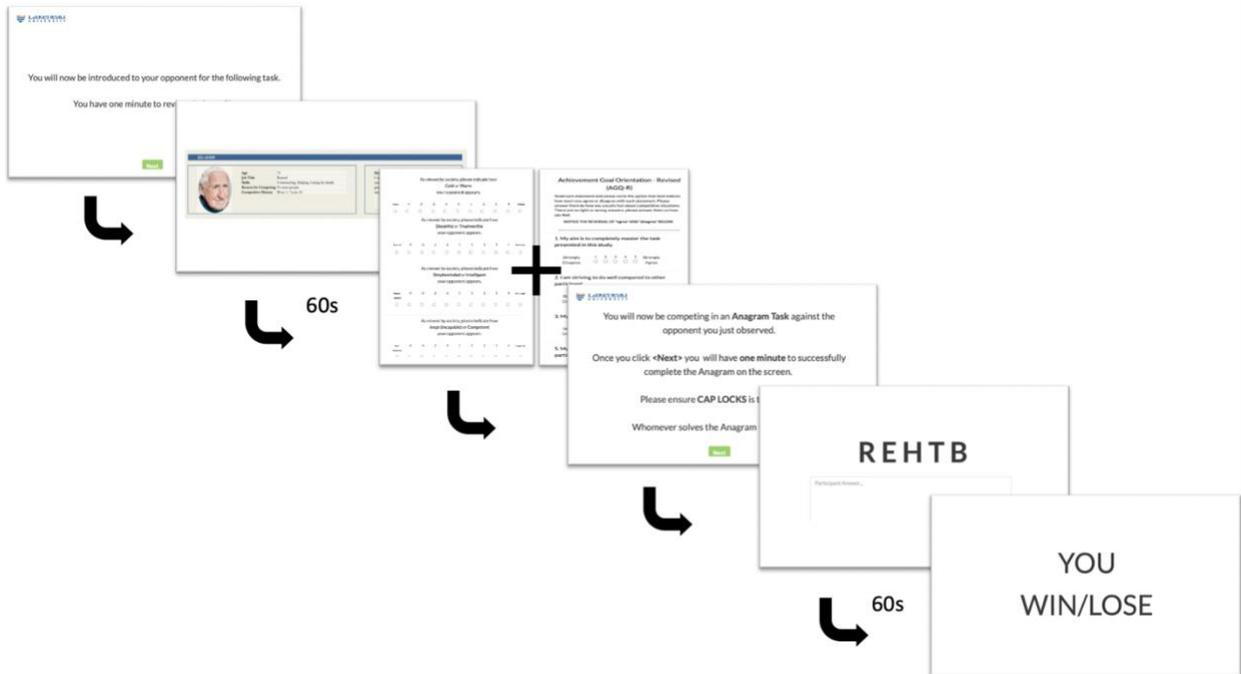
THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

click <OK>, their opponent's profile appears and remains for 45 seconds, allowing the participants to read their opponent's information, while not permitting them to advance the frame. After 45 seconds, LabVanced transitioned to the Warmth and Competence Scale, followed by the Achievement Goal Orientation measure, where participants recorded their opponent's perceived warmth and competence and their subsequent goal orientation. Participants are then shown another instruction slide indicating the logistics of the competitive task (i.e., time, typing, win/loss) and that hitting <NEXT> will start the round (see Figure 8). The final performance outcome indicated whether the participant has won (i.e., first to solve anagram) or lost (i.e., second to solve anagram OR timed out). Each participant was programmed to win 11/20 anagram rounds if they solved the anagram correctly. This was based on past literature and Bigram frequency statistics. Additionally, the win/loses was determined based on the opponent (i.e., 3/4 wins against HWLC, 1/4 wins against LWHC) . This procedure is repeated 20 times against 20 different opponents.

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

Figure 8.

LabVanced Procedure



Note. LabVanced frames that aimed to replicate a competitive performance situation

Pilot Study

Before implementing the main experiment, a pilot study was completed to evaluate the accuracy of the Warmth and Competence Scale and the stereotyped opponent profiles. More specifically, the proposed pilot study aimed to extend Fiske's SCM by creating four distinct stereotyped groups using Fiske's descriptions and to create a measure (i.e., Warmth & Competence Scale) to record warmth and competence. This pilot study consisted of randomly selected participants ($N = 10$) who were asked to rate sixteen (16) stereotyped profiles on perceived warmth and competence (according to Fiske et al., 2008). The Warmth and Competence Scale consisted of four 11-point Likert questions (i.e., two warmth, two competence), allowing participants to rate their stereotyped opponent profiles on a continuum

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

from low (-5) to high (+5) warmth and competence. The stereotyped opponent profiles were created using Fiske et al., (2008) description of major social groups' traits and warmth/competence interactions.

After running simple descriptive statistics, each stereotyped group appeared to reflect Fiske et al. (2008) findings. This pilot study confirmed that the ingroup was rated as having the highest combination of warmth ($M = 2.1$) and competence ($M = 2.6$). In contrast, the contemptuous group was rated as having the lowest warmth ($M = -1.0$) and competence ($M = -2.1$). For the ambivalent groups, the pity group had the highest warmth rating ($M = 3.6$) paired with a low competence rating ($M = 0.6$), and the envy group had the highest competence rating ($M = 3.0$) paired with a low warmth rating ($M = -0.3$). This study's positive outcome suggests that the Warmth and Competence Scale accurately defines perceived warmth and competence and that each stereotyped group elicited appropriate warmth and competence, as seen in Fiske et al., 2008). This pilot study ensured that the main study would be feasible with close monitoring.

Procedure

To start the main experiment, participants entered the online LabVanced study through their Lakehead University Sona account. Participants were presented with a cover letter and consent form and informed that they will be completing a series of questionnaires and multiple rounds of a competitive anagram. Participants were also informed that the anagram tasks will be against past participants whose profiles will be presented before competing against them. Participants then completed a demographics document and various other measures (i.e., WOFO, SOQ, CI) before beginning their practice anagram round (see Appendices B, C, D).

Participants then proceeded to five practice rounds consisting of a series of single-answer anagram tasks over 1 minute [performance recorded – response time (ms)]. The purpose of

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

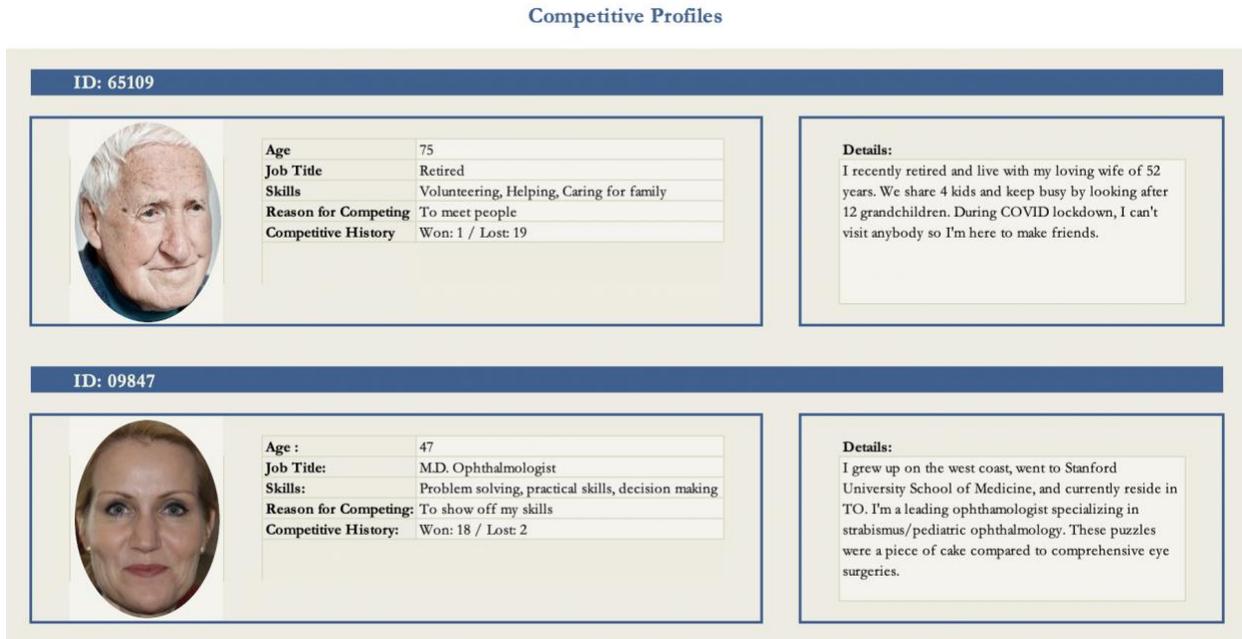
multiple baselines was to allow participants to understand the instructions and for researchers to gauge their performance ability. After the first baseline, participants were asked to practice again and beat their last performance. These five scores were aggregated to represent their baseline score.

Participants were then informed that they will perform against a series of competitors who have completed the same anagram tasks and whose scores the researcher has collected (along with a profile description and picture). One of twenty profiles appeared on the screen for 45 seconds, informing participants of their opponents' appearance, demographics (i.e., age, gender) and a brief description (corresponding to Fiske's warmth x competence dimensions). Specifically, participants were exposed to four stereotyped groups highlighted in Fiske's SCM and a neutral group. After 45-second observation time, participants completed an 11-point Warmth and Competence measure indicating their opponent's perceived warmth and competence and a 5-point Achievement Goal Orientation Questionnaire (AGQ) rating their performance goal orientation (i.e., performance-approach/performance-avoidance) (see Appendix F). This procedure was repeated for each opponent.

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

Figure 9

Competitive Profiles



Note. These two profiles represent the paternalistic stereotype group and envious stereotype group.

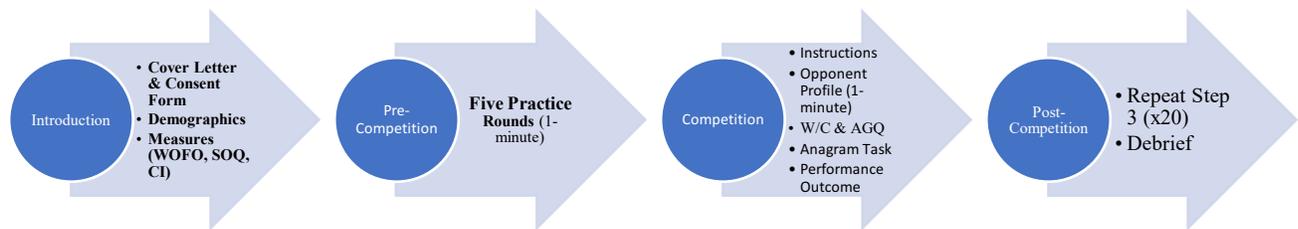
Participants then began the real-time competition against their opponents in a circuit-style procedure. Participants competed against eight males, eight females, and a four neutral opponent representing Fiske's dimensions of social perception (i.e., high warmth/high competence, low warmth/low competence, high warmth/low competence, low warmth/high competence, neutral). After each 1-minute competitive round, participants were shown the performance outcome of whether they won or lost ("You Win" in the positive social comparison information condition or "You Lose" in the negative social comparison information condition) (see above). Social comparison information condition and order of opponent profile was randomly assigned (see Figure 8 for LabVanced outline).

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

Participants replicated this procedure 20 times, participating in the same competitive tasks against other opponents (i.e., 4 x $\uparrow W + \uparrow C$, $\downarrow W + \downarrow C$, $\uparrow W + \downarrow C$, $\downarrow W + \uparrow C$, neutral). Again, they were exposed to their opponents' demographics, record their goal orientation, and told the performance outcome. Finally, participants were notified that the experiment is over and, subsequently, debriefed and consent to data use form. (see Figure 10).

Figure 10

Procedure Outline



Note. Flow chart indicating steps of the procedure.

Statistical Analyses

The Statistical Package for the Social Sciences (SPSS, Version 25) was used to analyze the data in this investigation. Raw data (i.e., demographics, WOFO, SOQ, CI, AGQ-R, Competence and Warmth Scale) was obtained using LabVanced: Online Experiment Creator and entered directly into SPSS.

Bivariate Correlations

Simple bivariate correlations were the first analyses used to determine relationships between two different variables (i.e., X and Y). This analysis demonstrated how much X will change when there is a change of Y and the strength of linkage between these variables ranging from -1 and +1 (i.e., correlation coefficient). Bivariate correlations between the global variables representing the constructs “Trait Competitiveness” (i.e., WOFO, SOQ, CI), “Achievement Goal

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

Orientation” (i.e., performance approach, avoidance), “Response Time” (i.e., RT in ms), and “Warmth & Competence” (i.e., warmth, competence) were computed to explore the relationships between their dimensions. In the second set of bivariate correlations, correlations between these variables for each stereotyped group (i.e., ingroup, contempt, pity, envy, neutral) were computed to explore how stereotyped perception influenced the main variables.

Structural Equation Modeling

Structural equation modeling (SEM) was then intended to explore the relationships between our variables (see Figure 11). We planned to perform separate SEM analysis for each of the four stereotype groups (highlighted in Fiske et al., 2002). Despite SEM allowing for the examination and explanation of multiple complex relationships in a single model, preliminary requirements to perform SEM were not met. After performing intercorrelations, the major assumptions associated with SEM were not met – multivariate normality and variable correlations (Kumar & Kumar, 2017). According to McDonald and Ho (2002), goodness of fit is acceptable if the correlations explaining the relationships are larger. Therefore, an SEM analysis was not performed.

Hypothesis 1: Study Variable Correlations

We explored the relationships between trait competitiveness, perceived warmth and competence, achievement goal orientation (performance approach/avoidance), and response time using bivariate correlations. We predicted significant positive correlations between these variables.

Hypothesis 2: Replicating Murayama and Elliot (2012)

We planned to use SEM to conceptually replicate Murayama and Elliot’s (2012) competition-performance relation by linking baseline anagram performance and post-

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

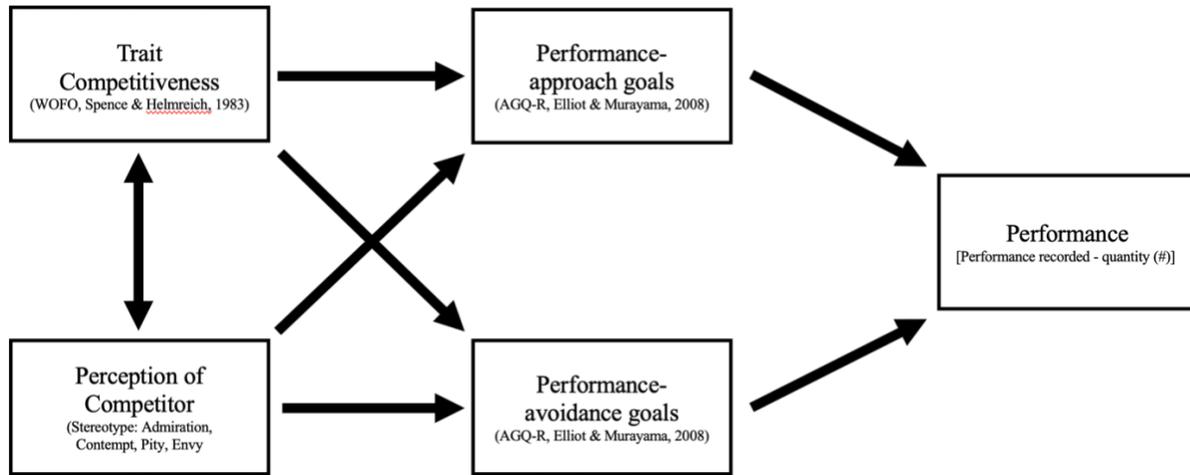
manipulation anagram performance. SEM was also intended to replicate how achievement goal orientation influences the competition performance relationship as an indirect mediator. Due to SEM assumptions not being met, subsequent analyses (i.e., bivariate correlations, ANOVA) were performed in lieu of SEM.

Hypothesis 3: Extending Murayama and Elliot (2012)

Structural equation modeling was also planned to explore the relationship between trait competitiveness, perceived opponent warmth and competence (W/C), achievement goal orientation, and performance outcomes. Using SEM, hypothesis 3 intended to look at the relationship between trait competitiveness, performance-approach/avoidance (AGQ-R), and subsequent performance outcome (RT) with Fiske's SCM as a mediator. More specifically it was hypothesized that the perceptions of one's competitors as an ingroup (i.e., $\uparrow W + \uparrow C$) or pity stereotyped group (i.e., $\uparrow W + \downarrow C$) would elicit performance-avoidance behaviour, which will worsen subsequent performance. Additionally, it was hypothesized that the perceptions of one's competitors as an envy stereotyped group (i.e., $\downarrow W + \uparrow C$) or contemptuous stereotyped group (i.e., $\downarrow W + \downarrow C$) would elicit performance-approach behaviour, which will improve subsequent performance. Again, due to relevant SEM assumptions (multivariate normality and variable correlations) not being met subsequent analyses were performed instead (i.e., bivariate correlations, ANOVA).

Figure 11.

A conceptual SEM



Note. A conceptual SEM of the relationship between stereotype perception, competition, and performance.

Results

Data Screening

Before conducting the data analysis, raw data were examined and screened for data-entry errors, missing data, and outliers. Mean imputation was used for each variable to account for missing data. Mean imputation was chosen to limit the reduction in sample size and to reproduce the relation between the average value of response time (RT) and its predictors (i.e., trait competitiveness, warmth and competence, and achievement goal orientation) (Mittag, 2013). A manual inspection of the participant’s RT data resulted in few atypical responses. The relevant assumptions of an SEM were tested, and after examining the normal probability of the RT scores, normal distribution did not exist (Kumar & Upadhaya, 2017). Therefore, RT outliers were determined using absolute cut-offs, which involved an absolute upper- and lower- limit on RTs to include in the final analyses. Using the global standard deviation (SD) trim method, any

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

RTs that fell outside 2 SDs from the global mean for each task were replaced with the mean score (Van Selst & Jolicoeur, 1994).

Scale Characteristics and Internal Consistency

The mean, standard deviation, and internal consistency were examined for each main scale used in the analysis, shown in Table 3. The internal consistencies for most measures were acceptable, ranging from .88 to .99, with one measure showing insufficient internal consistency. The exception was the CI ($\alpha = .42$) due to the dichotomous nature of the measure which was exceptionally low and was excluded in the main analyses. According to this measure, our sample had a higher mean conscientiousness score than the competitiveness score. The competitiveness measure in both the SOQ and WOFO appears similar, with a mean of 2.5 indicating average competitiveness. An examination of the bivariate correlation between these trait competitiveness scales revealed that they were moderately correlated (see Table 4). There appeared to be similar AGQ Approach and Avoid scores across our sample and slightly above neutral Warmth and Competence ratings which were also expected (Barron & Harackiewicz, 2001; Johnson et al., 2012; Pintrich, 2000; Wolters, 2004). We also determined composite scores for each primary variable (i.e., trait competitiveness, achievement goal orientation, warmth/competence, reaction time), including multiple subscale composite scores.

Table 3

Scale Means, Standard Deviations, and Internal Consistencies (N = 100)

Measure	Internal Consistency	M(SD)
Competitiveness Index (CI)	.419	
Competitiveness		.40 (.31)
Conscientiousness		.59 (.29)
Sports Orientation Questionnaire (SOQ)	.946	

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

Competitiveness		2.51 (.92)
Goal		2.14 (.79)
Win		2.66 (.92)
Work and Family Orientation (WOFO)	.881	
Competitiveness		2.59 (.90)
Work		1.85 (.96)
Mastery		2.72 (.61)
Achievement Goal Orientation Questionnaire (AGQ)	.987	
Approach		1.86 (.74)
Avoid		1.87 (.79)
Warmth & Competence Scale	.926	
Warmth		7.16 (.86)
Competence		7.50 (.81)

Replicating Murayama and Elliot (2012)

This study aimed to conceptually replicate the competition-performance relation introduced by Murayama and Elliot (2012) using structural equation model (SEM) (see Figure 2). A preliminary examination of the correlations between the study variables were executed before attempting the SEM (see Table 4). It was revealed that the latent variables, trait competitiveness (i.e., SOQ Competitiveness, WOFO Competitiveness) and global achievement goal orientation (i.e., AGQ Approach, AGQ Avoid), were moderately correlated (Approach x SOQ, $r(98) = .33, p < .01$; Avoid x SOQ, $r(98) = .28, p < .01$; Approach x WOFO, $r(98) = .29, p < .01$; Avoid x WOFO, $r(98) = .27, p < .01$). There were no correlations between the latent variables (i.e., trait competitiveness and achievement goal orientation) and the observed variable (i.e., reaction time, RT) (CI, $r(98) = -.01, p > .01$; SOQ, $r(98) = .02, p > .01$; WOFO, $r(98) = .01,$

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

$p > .01$; AGQ, $r(98) = .10, p > .01$). Similar findings were found for each stereotyped group (see Table 5).

Overall, the bivariate correlational analysis revealed a partial replication of the competition-performance relation; trait competitiveness was correlated with achievement goal orientation. However, achievement goal orientation was not significantly correlated with performance (RT). Therefore, given the lack of correlation, an SEM analysis was not performed.

Table 4

Descriptive Statistics and Correlations for Study Variables (N = 100)

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8
1. CI Competitiveness	0.40	0.31	—							
2. SOQ Competitiveness	2.51	0.92	-.56**	—						
3. WOFO Competitiveness	2.59	0.90	-.38**	.62**	—					
4. AGQ Approach	1.89	0.74	-.44**	.33**	.29**	—				
5. AGQ Avoid	1.88	0.78	-.41**	.28**	.27**	.93**	—			
6. RT Total	51779.4	2328.1	-.01	-.03	-.01	.05	.08	—		
7. W/C Warmth	7.16	0.86	.06	-.07	.25*	.04	.03	-.13	—	
8. W/C Competence	7.50	0.80	.09	.04	-.10	-.07	-.02	.02	.72**	—

Note. CI = Competitiveness, SOQ = Sports Orientation Questionnaire, WOFO = Work and Family Orientation, AGQ = Achievement Goal Orientation, RT = Reaction Time, W/C = Warmth/Competence, **. $p < 0.01$ level, *. $p < 0.05$ level

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

Table 5

Descriptive Statistics and Correlations for Ingroup Study Variables (N = 100)

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8
1. CI Competitiveness	0.40	0.31	—							
2. SOQ Competitiveness	3.39	0.95	-.38**	—						
3. WOFO Competitiveness	3.41	0.90	-.56**	.62**	—					
4. AGQ Approach	4.14	0.76	-.48**	.33**	.38**	—				
5. AGQ Avoid	4.12	0.79	-.42**	.26**	.31**	.86**	—			
6. RT Total	52673.9	3620.2	.05	.19	-.06	.07	.07	—		
7. W/C Warmth	8.52	1.12	-.13	-.01	.17	.20*	.19	.04	—	
8. W/C Competence	9.32	0.93	-.05	.02	.10	.21*	.25*	.20*	.66**	—

Note. CI = Competitiveness, SOQ = Sports Orientation Questionnaire, WOFO = Work and Family Orientation, AGQ = Achievement Goal Orientation, RT = Reaction Time, W/C = Warmth/Competence, **. $p < 0.01$ level, *. $p < 0.05$ level

Reaction Time Means and Standard Deviation

Descriptive statistics (*M*, *SD*) for the reaction time (RT) of each stereotyped group were generated (see Table 6). As expected, each group elicited different RTs from the sample. However, the range of mean RT scores between the groups was not robust enough to suggest a significant between-group (i.e., stereotype group) difference. Contrary to hypothesis 3, this finding suggests that Fiske’s stereotyped groups and achievement goal orientation does not influence anagram performance and average response time.

Table 6

Descriptive Statistics of Reaction Time (RT) x Stereotype Group (N = 100)

RT Group	<i>M (ms)</i>	<i>SD (ms)</i>
Ingroup	52673.889	3620.238
Contempt	51179.593	4240.944
Pity	50337.968	4362.578
Envy	51798.121	3214.495
Neutral	50786.076	4230.660
Practice	53476.738	4759.902
Total Score	51779.451	2328.032

SCM Profile Warmth and Competence Descriptive

Descriptive statistics were calculated to determine any group differences between warmth and competence (W/C) ratings based on the Warmth and Competence Scale (see Table 7) ($\alpha = .926$). As expected, mean scores indicated ingroup opponents were rated highest on warmth and competence ($M = 8.7$), contemptuous opponents were rated lowest on warmth and competence ($M = 5.6$), and the ambivalent group ratings, pity, and envy, fell in between ($M = 8.5$ and $M = 7.9$, respectively). These findings support Fiske et al. (2002) Stereotype Content Model and reflected findings from our pilot study, demonstrating that different groups elicit *unique* social perceptions requiring people to form impressions.

Individual W/C means provided further support for the opponent profiles. Both ambivalent group profiles, pity, and envy elicited the highest ratings of warmth ($M = 9.6$) and competence ($M = 9.6$), respectively, followed by the ingroup profiles (Warmth = 8.5, Competence = 9.3). The ambivalent group profiles elicited the second-lowest ratings of their opposing trait (i.e., Envy warmth = 6.2, Pity competence = 7.5), followed by the contempt group

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

with the lowest ratings on both W/C (see Table 7). However, despite the opponent profiles eliciting similar social perception/impression formation patterns as in Fiske et al. (2002), W/C in this investigation was less polarizing than expected.

Table 7

Warmth & Competence Scale Means, Standard Deviations, and Internal Consistencies (N = 100)

Measure	<i>M(SD)</i>
Warmth Competence Scale	
Ingroup	8.66 (.91)
Contempt	5.56 (1.63)
Pity	8.54 (1.14)
Envy	7.88 (1.21)
Warmth	
Ingroup	8.52 (1.13)
Contempt	5.91 (1.63)
Pity	9.59 (1.18)
Envy	6.17 (2.09)
Competence	
Ingroup	9.32 (.93)
Contempt	5.20 (1.86)
Pity	7.49 (1.57)
Envy	9.60 (1.19)

Extending Murayama and Elliot (2012)

This study then aimed to extend the competition-performance relationship by inserting Fiske et al. (2002) SCM opponent profiles (warmth/competence) into the competition-performance SEM introduced by Murayama and Elliot (2012). Before performing the SEM, an examination of the correlations between the study variables and warmth/competence (W/C) were executed (see Table 5). Upon the inclusion of Fiske's SCM into Murayama and Elliot's competition-performance model the global latent variables warmth and competence had no

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

correlation with SOQ and CI trait competitiveness. However, warmth had a small negative correlation with WOFO trait competitiveness [Warmth x WOFO, $r(98) = -.25, p < .01$] suggesting that more competitive participants rated their opponents as less warm. Additionally, there was no correlation between warmth or competence and global performance approach or avoidance, as well as no correlation with the global observed variable (i.e., response time, RT) (see Table 5). Overall, it appeared that there was no consistent relationship between the study variables with or without Fiske's SCM. Due to relevant SEM assumptions not being met, SEM was not performed.

We then decided to determine these associations for each stereotyped group (i.e., ingroup, contempt, pity, envy). As a brief reminder, hypotheses 1b, 3a, 3b, 3c, and 3d predicted that each stereotyped group would be associated with a certain achievement goal (i.e., performance-approach, -avoidance) and performance outcome. To accomplish this, bivariate correlations were executed for each stereotyped group. There was significant positive correlation between trait competitiveness (i.e., SOQ, WOFO) and achievement goal orientation (i.e., performance-approach and avoidance) for each stereotyped group (see Appendix H).

Ingroup

For the ingroup (i.e., $\uparrow W + \uparrow C$), there were no significant correlations between trait competitiveness and perceived ingroup warmth or ingroup competence. There were significant positive correlations between performance-approach goal orientation and ingroup warmth, $r(98) = .20, p < .05$, and ingroup competence, $r(98) = .21, p < .05$. Performance-avoidance was also positively correlated with ingroup competence $r(98) = .25, p < .05$ (see Table 5). This suggests that participants who rated their ingroup opponents as having higher warmth and competence may have adopted higher performance goal orientations (see Table 5).

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

Additionally, there was a positive correlation between response time (RT) and ingroup competence, $r(98) = .20, p < .05$, suggesting that participants responded slower after perceiving their ingroup opponents as more competent.

Contempt

For the contemptuous stereotyped group (i.e., $\downarrow W + \downarrow C$), there were no significant correlations between trait competitiveness and perceived contempt group warmth or competence. There were, however, significant negative correlations between both performance-approach goal orientation and contempt group competence, $r(98) = -.25, p < .05$, as well as performance-avoidance goal orientation and contempt group competence, $r(98) = -.26, p < .05$. It appeared that participants who rated their contemptuous opponents as having lower competence adopted higher approach/avoidance performance goal orientations. Lastly, there were no significant correlations between perceived contempt group warmth and competence and response time (RT). See Appendix H for descriptive statistics and correlations for contemptuous group study variables.

Pity

For the pity stereotyped group (i.e., $\uparrow W + \downarrow C$), there was a significant negative correlation between trait competitiveness and perceived pity group competence, $r(98) = -.24, p < .05$. It appeared that higher competitive participants rated their pity group opponents as being less competent.

There were no significant correlations between achievement goal orientation and perceived opponent warmth and competence, suggesting that participants did not adopt a goal orientation approach when competing against the pity group. Lastly, there were no significant correlations between perceived pity group warmth and competence and response time (RT). See Appendix H for descriptive statistics and correlations for pity group study variables.

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

Envy

For the envious stereotyped group (i.e., ↓W + ↑C), there was a significant positive correlation between trait competitiveness (SOQ) and perceived envy group competence, $r(98) = .20, p < .05$], as well as a significant negative correlation between trait competitiveness (WOFO) and perceived envy group warmth, $r(98) = -.32, p < .01$. This suggests that higher competitive participants rated their envy group opponents as being more competent and less warm – identical to Fiske’s SCM. Additionally, there was a significant positive correlation between performance-avoidance goal orientation and perceived envy group competence, $r(98) = .26, p < .01$, suggesting that participants who rated their envy opponents as being more competent (i.e., higher competitive participants) adopted high a performance-avoidance orientation, contrary to hypothesis 3d. See Appendix H for descriptive statistics and correlations for envy group study variables.

Overall, there were no consistent correlations between trait competitiveness, achievement goal orientation, warmth/competence, and response time. Therefore, the SEM analysis was not completed.

Table 8

Social Perception Correlations

	Positive Correlations	Negative Correlations	No Correlations
Ingroup	Ingroup Warmth x Approach/Avoid Ingroup Competence x Avoid Ingroup Competence x Reaction Time	N/A	Ingroup Warmth & Competence x Trait Competitiveness

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

Contempt	N/A	Contempt Competence x Approach/Avoid	Contempt Warmth & Competence x Trait Competitiveness Contempt Warmth & Competitiveness x Reaction Time
Pity	N/A	Pity Competence x Trait Competitiveness	Pity Warmth & Competence x Approach & Avoid Pity Warmth & Competence x Reaction Time
Envy	Envy Competence x Trait Competitiveness Envy Competence x Approach & Avoid	Envy Warmth x Trait Competitiveness	Envy Warmth & Competence x Reaction Time

Main Study Findings

Overall, it was hypothesized that trait competitiveness, stereotyped perception (warmth/competence), achievement goal orientation (performance-approach, -avoidance), and response time would be correlated. Additionally, we hypothesized that SEM would replicate Murayama and Elliot's (2012) opposing process model of competition and performance. Lastly, we hypothesized that trait competitiveness would elicit social perception/impression formation of four distinct social groups (i.e., ingroup, contempt, pity, envy). Social perceptions would then trigger either performance approach or avoidance goal orientation and subsequently effect performance (RT).

The bivariate correlations only allowed for a partial replication of Murayama and Elliot's (2012) competition-performance model by only showing a relationship between trait competition and achievement goal orientation. Also, adding a stereotyped group into this model had

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

inconsistent correlations with different variables depending on which stereotyped group was used in the analysis (see above). Therefore, the addition of Fiske's SCM was only slightly successful in extending Murayama and Elliot's competition-performance relationship. We did not find that different stereotyped groups were related to different performance outcomes, therefore, finding inconsistent correlations between our variables negates performing an SEM. Subsequent analyses were performed instead.

Subsequent Analyses

Trait Competitive x Study Variables

We made three departures from the planned SEM method of statistical analysis used in Murayama and Elliot's (2012) competition-performance model for the subsequent analyses. First, to understand the impact of trait competitiveness on stereotype perception, achievement goal orientation, and performance outcome, we categorized our sample into three groups (i.e., high, average, low competitiveness). Specifically, we completed a tertile split using trait competitiveness which created three groups of high, moderate, and low trait competitiveness. We then took the high and low competitiveness groups to determine if this trait is associated with or influences the other main variables. Based on these two groups and our lack of consistent correlations in the main analysis, we hypothesized that higher competitiveness groups would show more association between the study variables (i.e., trait competitiveness, warmth/competence, achievement goal orientation, and performance outcome) compared to low competitiveness group.

Participants with scores at one extreme tertile of the SOQ competitiveness distribution formed the High Competitiveness Group ($N = 30$, $M = 3.6$). Participants with scores at the other extreme tertile of the distribution formed what is referred to as the Low Competitiveness Group

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

($N = 30$, $M = 1.4$). Participants with competitiveness scores ranging from 2 to 2.9 were removed from the analysis as they represented average competitiveness. Bivariate correlations between the subscales showed that the high competitiveness group correlated with SOQ competitiveness and WOFO competitiveness subscales, $r(28) = .45$, $p < .05$. Additionally, the higher competitive group showed a high correlation between warmth/competence (W/C) ratings of stereotyped groups ranging from $r(28) = .52$, $p < .01$ to $r(28) = .74$, $p < .01$. This suggests that higher competitive participants rated each stereotyped group higher in warmth/competence than low, competitive participants (i.e., perceived more stereotyped differences). Higher competitive participants also had higher approach goal orientation correlations, $r(28) = .91$, $p < .01$, indicating that the more competitive the participants were, the more likely they were to adopt performance-approach goal orientation. There were no correlations between trait competitiveness and reaction times.

Overall, the main study variables appeared to have more robust correlations among highly competitive participants, indicating the level of competitiveness of our total sample was too weak to detect significant associations.

Trait Competitiveness x Warmth and Competence Ratings

In this section, further bivariate correlations were executed to determine if high/low trait competitiveness influenced individual warmth and competence perceptions differently. More specifically, rather than combining these ratings, we separated them (i.e., warmth and competence) to clarify if high/low trait competitiveness influences warmth and competence ratings for each stereotyped group separately. We expected the high competitiveness group to have higher correlations between perceived warmth and competence for their ingroup and contemptuous group opponents (Fiske et al., 2008). Additionally, we expected the high

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

competitiveness groups to have lower correlations between perceived warmth and competence for their ambivalent group opponents (i.e., pity, envy). Further bivariate correlations between the warmth and competence ratings confirmed that higher competitiveness groups perceived similar warmth and competence stereotypes for each group compared to Fiske et al., (2002) (supporting Fiske's SCM).

High competitiveness group, $r(28) = .84, p < .01$ had a stronger significant correlation between ingroup warmth and competence than Low Competitiveness group $r(28) = .57, p < .01$. We performed Fisher's z-test to test the significance of the difference between two correlation coefficients, $z = 2.11, p = 0.035$. Since the p -value of .035 is statistically significant at an alpha level of .05, we can conclude that the difference in the effect of high and low competitiveness on ingroup warmth and competence is significant. This finding suggests that more competitive participants perceived their ingroup opponents as being higher in warmth and competence. High competitiveness group also had no significant correlation between the ambivalent group warmth and competence ratings [Pity, $r(28) = .29, p > .05$; Envy, $r(28) = .34, p > .05$]. No correlation between the ambivalent group's warmth and competence indicates that more competitive participants perceived these groups as having contrasting warmth and competence, supporting Fiske et al. (2008).

Overall, the subsequent analyses were intended to demonstrate that higher competitive participants perceive stronger stereotyped perceptions. After splitting our sample into tertiles and running the same bivariate correlations above for the higher competitiveness group, stronger correlation between trait competitiveness and W/C ratings emerged. Specifically, the highly competitive subsample had stronger warmth/competence ratings that were more consistent with each of Fiske's stereotyped groups compared to neutral and lower competitiveness participants

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

(e.g., highly competitive participants perceived ingroup opponents higher in both warmth and competence, $\uparrow W + \uparrow C$). The stronger correlations between stereotyped groups and W/C ratings in the high competitiveness group demonstrated that we are on the right track with our opponent profiles. These results suggest that Fiske's SCM might have a stronger impact on the competition-performance model if the population was highly competitive or perhaps there was a different manipulation of competition – our low competitive sample and anagram task prevented this from happening.

ANOVA

To ensure the use of extreme groups (upper and lower tertile) in this analysis, a comparison between high and low competitiveness was completed using an analysis of variance (ANOVA). In this ANOVA, group membership (i.e., high/low competitiveness) was the independent variable, and competitiveness measures, AGQ score, W/C score, and RT were the dependent variable.

Competitiveness x Competitiveness Measures. Overall, the high competitiveness group on average rated themselves as having higher competitiveness on SOQ ($M = 3.41$) and WOFO ($M = 2.86$) followed by the average competitiveness group (SOQ, $M = 2.37$; WOFO, $M = 2.33$) and the low competitiveness group (SOQ, $M = 1.61$; WOFO, $M = 2.05$). The ANOVA concluded that both the high and low competitiveness domains had a significant difference in competitiveness ratings. This seemingly common-sense conclusion confirmed that the competitiveness groups used in this ANOVA show significant differences in competitiveness.

Competitiveness x Warmth/Competence. The high competitiveness group on average rated their opponents as being higher in warmth and competence ($M = 7.41$), followed by the average competitiveness group ($M = 7.32$) and the low competitiveness group ($M = 7.23$).

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

Although the ANOVA highlighted no significant difference in W/C ratings, $F(1, 59) = .31, p = .734$, between high and low competitiveness groups, there were significant differences between the variances in each competitiveness group ($p < .05$). This suggests that participants' level of competitiveness did not significantly affect how warm or competent they rated their opponents.

Competitiveness x Achievement Goal Orientation. The high competitiveness group also had strong achievement goal orientation ratings ($M = 3.71$) followed by the average competitiveness group ($M = 4.28$) and the low competitiveness group ($M = 4.37$) (low value represents stronger AGQ rating). Both high competitiveness and low competitiveness domains had significant differences in response variation for performance approach, $F(1, 59) = 8.30, p = .000$ and performance-avoidance, $F(1, 59) = 7.02, p = .001$. This suggests that achievement

Table 9

Means, Standard Deviations, and One-Way Analyses of Variance in High and Low Competitiveness

Measure	High		Low		F(1, 59)	η^2	p
	Competitiveness		Competitiveness				
	M	SD	M	SD			
Competitiveness Scales							
CI	.67	.28	.23	.23	2.585	.42**	.000
SOQ	3.64	.48	1.48	.25	12.734	.88**	.000
WOFO	3.32	.79	1.97	.79	.363	.43**	.000
Warmth and Competence							
Global	7.41	.90	7.26	.87	.310	.006	.734
Warmth	7.28	.91	7.05	1.06	.545	.011	.582
Competence	7.55	.96	7.46	.83	.079	.002	.924
Achievement Goal							
Global	3.71	.84	4.36	.70	8.192	.145**	.001
Approach	3.73	.84	4.38	.68	8.303	.146**	.000

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

Avoidance	3.72	.89	4.37	.75	7.02	.126**	.001
Reaction Time (ms)	5160 3.09	1882.85	51760. 09	1918.31	.104	.001	.748

Note. CI is Competitiveness Index, SOQ is Sports Orientation Questionnaire, WOFO is Work and Family Orientation, ** $p < .001$, * $p < .05$

goal orientation is influenced by whether the participants have high or low competitiveness.

Competitiveness x Response Time. Finally, the high competitiveness group on average had faster response times ($M = 51603.1$) followed by the low competitiveness group ($M = 51760.10$) and the average competitiveness group ($M = 51934.52$). Despite this distinction, both the high competitiveness and low competitiveness domains had no significant difference in response time variance, $F(1, 59) = .10, p = .748$. This suggests that level of competitiveness does not influence individual performance. Additionally, this suggests that response time is perhaps not a sensitive measure of performance for this competitive task.

Discussion

The present study first intended to replicate previous findings regarding the established relationship between competition and performance and to further these findings by examining this relationship in a competitive task. An additional aim of this study was to extend the competition-performance model corresponding to the association between competition, achievement goal orientation, and performance outcome to establish the possible role that social perception plays within this association.

We first intended to replicate and extend Murayama and Elliot's (2012) opposing process model of competition and performance by having our participants compete against opponents on anagram tasks. Results corresponding to the relationship between competition and performance

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

appear to partially support previous findings (e.g., Elliot, 2005; Hulleman et al., 2010; Kaplan & Maehr, 2007; Murayama & Elliot, 2012). The results of this investigation suggested an apparent indirect effect of achievement goal orientation on performance outcome (i.e., anagram response time). More specifically, there was a positive indirect effect of performance-avoidance and a negative indirect effect of performance-avoidance on performance outcome.

We then intended to extend Murayama and Elliot's (2012) competition-performance model by having our participants compete against stereotyped opponents. Upon inclusion of social perception/stereotyped groups into the model, results suggested that these social cognitive characteristics of competition do not strongly influence the competition-performance relationship. More specifically, when Fiske's stereotyped profiles (ingroup, contempt, pity, envy) were inserted into the competition performance model, there were varying associations between perceived warmth/competence, trait competitiveness, achievement goal orientation, and performance outcome (see Table 8). These varying associations were not robust enough to conclude that social perception/stereotyped groups had an impact on the competition-performance relationship. Despite not fully replicating or extending Murayama and Elliot's (2012) opposing process model of competition and performance, this study supported the competition-performance null relationship, partially supported achievement goal orientation as indirect mediators, and supporting Fiske's SCM via warmth/competence ratings. These findings confirmed that the study objectives were along the right lines.

Another primary purpose of this study was to replicate and extend Fiske et al. (2002) stereotype content model (SCM). Fiske's SCM theoretically showed qualitative differences in stereotypes and prejudices directed towards different groups at the level of two binding domains – competence and warmth. Stereotype differences attempted to be replicated using opponent

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

profiles and extended through competitive social conditions altering groups' relative status and power. Participants in this study were shown 20 opponent profiles to compete against, which reflected visual and demographic traits of Fiske et al.'s (2008) SCM. Overall, the results of this investigation revealed similar warmth/competence ratings seen in Fiske et al.'s (2008) SCM, suggesting there was a perceived difference in warmth and competence between the stereotyped groups.

However, despite the idea of these social structural perceptions determining the quality of relationships between groups, these changes in perception across opponent groups did not significantly influence Murayama and Elliot's (2012) competition performance relation (Allport, 1954; Dovidio, Gaertner, & Validzic, 1998; Dovidio, Kawakami, & Gaertner, 2000; Gonzalez & Brown, 1999; Sheriff, 1966). When inserting the stereotyped groups into the competition-performance model, they appeared to be inconsistently related to trait competition, achievement goal orientation, and response time, showing no influence of the stereotyped group on competition/performance. Therefore, we were not able to successfully extend Murayama and Elliot's (2012) opposing process model of competition and performance. We were, however, able to replicate Fiske's SCM stereotype groups using opponent profiles.

Hypotheses Findings

Competition-Performance Relation

Each hypothesis supported there being no direct relationship between trait competitiveness and performance outcome. The results also partially supported the positive relationship between trait competitiveness and achievement goal orientation (seen in Murayama and Elliot, 2012). Plenty of research has suggested that competition influences performance, with some theorists claiming a positive influence and others claiming the influence is negative,

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

however little consensus has been reached (Agaibi & Wilson, 2005; Dewar, Kavussanu & Ring, 2013; Elliot et al., 2017; Harmison, 2011; Ives, 2020; Johnson et al., 1981; Parton and Neumann, 2019; Stanne et al., 1999; Worrell et al., 2016). Since our study showed no correlations between trait competitiveness (SOQ, CI, WOFO) and performance outcome (i.e., anagram response time), we confirmed the lack of direct association between competition and performance. The results of this investigation supported Murayama and Elliot's (2012) meta-analysis by firmly concluding that the relationship between competition and performance is minimal and not statistically significant.

Additionally, a previously reported inconsistent mediational relationship in the competition-performance relation was partially replicated in this investigation. Several studies have suggested that competition positively predicts the adoption of achievement goals (i.e., performance-approach/avoidance) in achievement settings. Achievement goals are associated with performance facilitation and performance detriment as the normative standard for competence evaluation (i.e., adaptive/maladaptive form of self-regulation) (Alhadabi & Karpinski, 2020; Harackiewicz & Elliot, 1998; Kaplan & Maehr, 2007; Senko & Harackiewicz, 2005). While there is a scarcity of research on the indirect effects of achievement goals in the relationship between competition and performance, there is evidence suggesting that achievement goals play a strong role in Murayama and Elliot's competition-performance model (Damon et al., 2009). In fact, the current investigation contributed to this evidence indicating a strong, positive relationship between trait competition and achievement goals, $r(98) = .40, .35, .42, p < .01$. However, despite a strong association with trait competitiveness, there was no statistically significant relationship between achievement goals and performance outcome, $r(98) = .01, p > .01$. Therefore, this study suggests that being in a competitive situation and being trait

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

competitive will elicit achievement goal orientations but adopting certain achievement goal orientations does not influence performance outcome. To our knowledge, Murayama and Elliot's (2012) opposing processing model was the first study to apply this indirect effect to the competition-performance relation and was partially reflected in this investigation.

One possible explanation for this partial replication is the RT task (i.e., single-solution anagram). Despite an abundance of past research supporting achievement goals and performance (Gaudreau & Braaten, 2016; Senko & Harachiewicz, 2006; Van Mierlo & Van Hooft, 2020), some tasks are not robust enough to detect different goal orientations (Johnson et al., 2012). For example, Murayama and Elliot argued that performance-approach goals enhance performance, and performance-avoidance goals decrease performance. However, Alexander et al. (1998) argued that "fear of failure," that performance-avoidance elicits, may enhance physical tasks more than cognitive tasks. This process occurs because physical reactions tend to bypass cognitive processes leading to immediate physical response. In relation to this investigation, participants' cognitive ability to answer single-solution anagrams may have been reduced when competing against an opponent that elicits performance-avoidance.

Additionally, Donovan et al. (2016) reported a moderating effect of task complexity on the motivational outcomes of task enjoyment, mental focus, and exerted effort. They found that simple task conditions enhanced performance-approach goals and minimized the negative impact of performance-avoidance goals, while more complex tasks amplified mastery goals.

Additionally, Martens (1975) reviewed studies that looked at the effects of competition on motor performance. He found that competition could impair complex tasks' performance and tasks not learned well (Cooke, 2010). Result of the current investigation show this by suggesting that participants may have considered some anagrams to be highly complex, amplifying mastery

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

goals instead of performance goals. Moving forward, performance-approach/avoidance goals in a competitive setting must be supplemented with interventions designed to ensure that these goals are consistent with one's competence and overall interest.

Overall, achievement goals were correlated with trait competitiveness (i.e., those higher in competitiveness elicited higher performance goal orientating) but not with anagram RT (i.e., performance unaffected by performance goal orientating). By analyzing these examples, we can support the claim that the anagram task used in this investigation may not be sensitive enough to pick up on competitiveness or goal orientation. This finding may explain why there was only partial replication of Murayama and Elliot (2012). Nonetheless, our investigation partially supports the moderating effects of achievement goal orientation in the competition-performance relation.

Social Perception as Causal Underlying Factor

Studies have shown that the mediating role of performance-approach and avoidance goals can help explain the inconsistent findings regarding the relationship between competition and performance (Biddle et al., 2003; Darnon et al., 2006; Elliot & Church, 1997; Meijen et al., 2020). However, Murayama and Elliot (2012) added little clarity on why competition is related to those goals. Murayama and Elliot could not suggest any causal factors underlying the way competition results in specific performance goals. Therefore, this investigation focused on this gap by introducing Fiske et al.'s (2008) SCM into Murayama and Elliot's (2012) competition-performance model.

The results of this investigation did support the replication of Fiske's SCM groups. However, despite several studies highlighting an association between competition and social perception, the results did not support the hypothesized indirect relationship between trait

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

competitiveness and performance goals with stereotyped social perception as a mediator between these variables (Abele et al., 2016; Fiske, 2018; Fiske et al., 2002; Garcia et al., 2013; Greenlees, 2007; Warr & Knapper, 1968). It appears that stereotyped social perception (i.e., Fiske's SCM) did not consistently relate to trait competitiveness, performance goals, or performance outcome (see Table 8).

Detailed investigations have been conducted highlighting the presence and absence of opponents/spectators within the competition-performance relation (Anderson-Hanley, 2011; Baca et al., 2009; Lee et al., 2012; Murayama & Elliot, 2012; Murray et al., 2016; Snyder et al., 2012). For example, Anderson-Hanley et al. (2011) asked older participants to cycle in a virtual reality environment, and the presence of competitive avatars were shown to increase cycling intensity. Our study attempted to show this by introducing each participant to one of five opponent groups. However, the impression formation experiences by the presence of opponents did not appear to manipulate behaviour (Fiske & Taylor, 1991) consistently. Therefore, one possible explanation could be that the opponent profiles used in this investigation were not robust enough to trigger achievement goal orientation.

According to Van Vugt and Park (2009), group conflict is an inevitable component of competition where participants categorize their opponents based on group membership and stereotype them into groups. These categorizations ultimately influence how a group member affectively responds to another group's pain (i.e., lose) or pleasure (i.e., win). Consequently, these responses lead to group-specific behaviour by actively harming, helping, or associating (Dovidio & Gaertner, 2010; Yzerbyt & Demoulin, 2010). According to our results, group conflict and group categorization did not appear to be strongly elicited from the opponent profiles, potentially due to the sample characteristics (i.e., primarily white and educated). A

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

multiracial analysis on the impact of education on intergroup attitudes concluded that education is associated with the rejection of racial stereotypes among whites, Hispanics, and black people (Wodtke, 2012). This finding suggests that advanced education can be a protective factor against racial stereotypes and stigmatization, potentially explaining our lack of social perception manipulation.

In addition to the lack of elicited group conflict/categorization, another factor that could substantially affect social perception and performance outcome is participant competitiveness. Overall, those with moderate trait competitiveness tend to elicit enjoyment of interpersonal competition and the desire to win and outperform others (Spence & Helmreich, 1983). Competition promotes more effort to improve performance, consequently altering behaviour accordingly (Worrell et al., 2016). For example, individual behaviours during a competitive event versus a non-competitive event often change, impacting their performance. More specifically, competition can enhance behavioural responses such as adaptation, innovation, and creativity, leading to better performance (Worrell et al., 2016). Snyder et al. (2012) found that performance outcomes did not differ between live and virtual conditions for low, competitive participants. In contrast, the live competitive situation resulted in higher performance than the virtual competitive situation for high trait competitive participants. These studies suggest that participant competitiveness could explain the lack of consistent associations between trait competitiveness, warmth/competence, achievement goal orientation, and performance. Based on the results of the subsequent analysis of the current investigation, our sample's level of competitiveness was too low.

Overall, there is empirical evidence supporting our claim that mild opponent profiles and low participant competitiveness.

Limitations

The first limitation of this investigation is the level of trait competitiveness shown by our sample. It is within routine human nature to have differences in trait competitiveness in the general population and individual trait competitiveness. This trend was apparent in our sample and further explored with subsequent analyses. After concluding that the general sample rated themselves as having average trait competitiveness, tertile splits showed that higher competitive participants rated their opponents higher in warmth and competence and adopted higher performance goal orientations. Therefore, the lack of competitiveness seen in our sample prohibited the full replication and expansion of Murayama and Elliot's competition-performance relation. Moving forward, if our sample was an accurate representation of the general population and said population is not competitive, then potentially most competitiveness studies have highly competitive samples, which would need to be considered for future research.

Another limitation of the current study involves the method utilized, particularly with the competitive task. The baseline/practice task and the competitive task both used single-solution anagram puzzles to measure performance. Despite anagrams' sensitivity to motivational manipulation, few studies have reported on single-solution anagram tasks response time or some measure of difficulty. The article used in this study was from 1978 and used bigram statistics to determine each anagram's frequency distribution (i.e., difficulty). Likely, some participants were not familiar with common words that were used over 40 years ago.

Furthermore, the inability to offer multiple types of competitive tasks may have limited the engagement and effort of the participants. A third of the participants rated their competency at anagrams as incompetent and neutral, with over half indicating they are more competent at physical tasks. Essentially providing task variation may allow for more accurate performance

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

outcomes as not everyone is cognitively competent. Additionally, word familiarity of our sample was not determined which may have been a barrier for some participants.

Due to the inability to perform an SEM analysis, multiple bivariate correlations were required to determine the influence of stereotype impressions on the competition-performance relation. However, if multiple outcomes are tested for statistical significance, one or more outcomes may emerge significant ($p < .05$) because of chance. Therefore, a potential for type 1 errors (aka false positives) is another limitation of this study occurring when there are many statistical tests performed, increasing the risk for some significant findings to be of chance (Andrade, 2019) To protect against this for future studies, Bonferroni or the Hochberg correction can be used which set a more stringent threshold for statistical significance than $p < 0.05$.

Finally, a limitation of this study includes the environment in which participants competed. Due to COVID-19, in-lab data collection was prohibited. Instead, our investigation moved online, where participants observed their opponent and competed through a screen. This ease of administration limited our ability to offer a controlled environment. Controlled test environments are designed to reduce distractions, confusion, and fatigue so the participants can provide their “best performance.” Precise control of extraneous and independent variables was impossible; therefore, a cause-and-effect relationship was challenging to establish. Despite this limitation, our study established various correlations between the variables, potentially reflecting more ecological validity – warranting future research.

Future Research

This investigation attempted to replicate and extend Murayama and Elliot’s opposing process model of competition and performance. One examined hypothesis included whether competition and performance were mediated by achievement goal orientation and if social

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

perception could influence this relationship. Due to COVID-19 protocols, live in-person competitions could not be facilitated. Future research could benefit from replicating this procedure using live competitors in a naturalistic setting to delineate the relationship further.

In addition, this was the first study to apply Fiske's SCM to a competitive situation by creating opponent profiles. Therefore, future research is first warranted to replicate our findings regarding these profiles' perceived warmth and competence. Furthermore, this study could not identify social perception (i.e., warmth, competence) as a possible mechanism in the competition-performance relationship. Thus, future research would benefit by focusing on other characteristics of social perception.

Finally, a more competitive population could be used in future investigations to improve the overall associations between our variables. It was shown in this study that trait competitiveness, social perception, achievement goal orientation, and the performance had more correlation with the high competitiveness sample versus the low competitiveness sample. Directly targeting athletes or high academic achievers might help explain the inconsistent associations seen in our general population.

Conclusion

This investigation aimed to analyze the relationship between competition and performance with social perception and achievement goal orientation as indirect mediators. The results suggested a positive relationship between trait competition and achievement goal orientation and no relationship between trait competition and performance during a competitive task. Overall, the current study provided support for Murayama and Elliot's (2012) competition-performance relationship as well as the adoption of goal orientation as indirect mediators in the

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

competition-performance model. Both relationships are replications of previous research and therefore provide further support for those findings.

Additionally, there were inconsistent associations between trait competition, achievement goal orientation, and response time when analyzing stereotype groups, suggesting the extension of Murayama and Elliot's (2012) competition-performance model was partially supported. By linking stereotype groups to the competition-performance relationship, some findings suggest prejudice is likely to affect performance within a competitive environment. The finding that the competition-performance relationship showed higher (inconsistent) correlations upon including social perception and highly competitive participant could be further explained in future investigations that intend to alter the competitive tasks. Future research should also allow for investigation into other social influences of competitive performance.

References

- Abele, A. E., Hauke, N., Peters, K., Louvet, E., Szymkow, A., Duan, Y. (2016). Facets of the fundamental content dimensions: Agency with competence and assertiveness
Communion with warmth and morality. *Frontiers in Psychology*, 7, 1810.
Doi:10.3389/fpsyg.2016.01810
- Adams, J., Priest, R., & Prince, H. (1985). Achievement Motive: Analyzing the Validity of the WOFO. *Psychology of Women Quarterly*, 9(3), 357–369. <https://doi.org/10.1111/j.14716402.1985.tb00886.x>
- Agaibi, C. E., & Wilson, J. P. (2005). Trauma, PTSD, and resilience: A review of the literature. *Trauma, Violence & Abuse*, 6, 195-216. Retrieved from <http://dx.doi.org/10.1177/1524838005277438>
- Alexander, R. D. (1987). *The Biology of Moral Systems*. London: Aldine.
- Alhadabi, A., & Karpinski, A. C. (2020). Grit, self-efficacy, achievement orientation goals, and academic performance in university students. *International Journal of Adolescence and Youth*, 25(1), 519-535.
- Amir, O., Rand, D. G., & Gal, Y. A. K. (2012). Economic games on the internet: The effect of \$1 stakes. *PloS one*, 7(2).
- Andrade, C. (2019). Multiple testing and protection against a type 1 (false positive) error using the Bonferroni and Hochberg corrections. *Indian journal of psychological medicine*, 41(1), 99-100.
- Aronson, E., Wilson, T. D., & Akert, R. M. (2010). *Social Psychology*, 7, 83-115. Pearson Education.
- Barron, K. E., & Harackiewicz, J. M. (2001). Achievement goals and optimal motivation:

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

- Testing multiple goal models. *Journal of Personality and Social Psychology*, 80, 706-722. Doi:10.1037/00223514.80.5.706
- Biddle, S., Wang, C. J., Kavussanu, M., & Spray, C. (2003). Correlates of achievement goal orientations in physical activity: A systematic review of research. *European Journal of sport science*, 3(5), 1-20.
- Bing, M. N. (1999). Hypercompetitiveness in academia: Achieving criterion-related validity from item context specificity. *Journal of Personality Assessment*, 73, 80–99. Doi:10.1207/S15327752JPA730106.
- Bodenhausen, G. V., Kang, S. K., & Peery, D. (2012). Social categorization and the perception of social groups. In Fiske, S. T., Macrae, C. N. (Eds.), *Sage Handbook of Social Cognition* (pp. 311–329). Thousand Oaks, CA: SAGE.
- Brewer, M. B., & Kramer, R. M. (1985). The psychology of intergroup attitudes and behavior. *Annual Review of Psychology*, 36(1), 219–243. Retrieved from <https://doi.org/10.1146/annurev.ps.36.020185.001251>
- Brown, S. P., Cron, W. L., & Slocum, J. W. Jr. (1998). Effects of trait competitiveness and perceived intraorganizational competition on salesperson goal setting and performance. *Journal of Marketing*, 62, 88-92
- Buckingham, J. T., & Alicke, M. D. (2002). The influence of individual versus aggregate social comparison and the presence of others on self-evaluations. *Journal of Personality and Social Psychology*, 83, 1117-1130.
- Burnside, R., & Ullsperger, M. (2020). Social comparison impacts stimulus evaluation in a competitive social learning task. *Plos one*, 15(6). Retrieved from <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0234397>

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

- Burton, D., & Raedeke, T. D. (2008). Sport psychology for coaches. *Understanding Competition and Using it Correctly* (pp. 9). Human Kinetics.
- Caprariello, P. A., Cuddy, A. J. C., Fiske, S. T. (2009). Social structure shapes cultural stereotypes and emotions: A causal test of the stereotype content model. *Group Processes & Intergroup Behavior*, 12, 147–155.
- Carver, C. S. (2004). Negative affects deriving from the behavioural approach system. *Emotion*, 4, 3–22.
- Carver, C. S., & Harmon-Jones, E. (2009). Anger is an approach-related affect: Evidence and implications. *Psychological Bulletin*, 135, 183–204.
- Carver, C. S., & Scheier, M. F. (1990). Origins and functions of positive and negative affect: A control-process view. *Psychological Review*, 97, 19–35.
- Casler, K., Bickel, L., & Hackett, E. (2013). Separate but equal? A comparison of participants and data gathered via Amazon's Mturk, social media, and face-to-face behavioral testing. *Computers in human behavior*, 29(6), 2156-2160.
- Cikara, M., Botvinick, M. M., & Fiske, S. T. (2011). Us Versus Them: Social Identity Shapes Neural Responses to Intergroup Competition and Harm. *Psychological Science*, 22(3), 306–313. <https://doi.org/10.1177/0956797610397667>
- Cikara, M., Bruneau, E., & Saxe, R. (2017). Us and Them: Intergroup Failures of Empathy. *Current Directions in Psychological Science: a Journal of the American Psychological Society*, 20(3), 149–153. <https://doi.org/10.1177/0963721411408713>
- Coakley, J. J. (1990). *Sport in society: Issues and controversies* (No. Ed. 4). CV Mosby Company.

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

- Cooke, A. M. (2010) Effects of competition on performance, and the underlying psychophysiological mechanisms. *School of Sport and Exercise Sciences College of Life and Environmental Sciences*. The University of Birmingham.
- Cuddy, A. J. C., Fiske, S. T., & Glick, P. (2007). The BIAS map: Behaviors from intergroup affect and stereotypes. *Journal of Personality and Social Psychology*, 92(4), 631-648. <https://doi.org/10.1037/0022-3514.92.4.631>
- Cuddy, A. J. C., Fiske, S. T., Kwan, V. S. Y., Glick, P., Demoulin S., Leyens, J-Ph., & Ziegler, R. (2009) Is the stereotype content model culture-bound? A cross-cultural comparison reveals systematic similarities and differences. *British Journal of Social Psychology*. 48, 1–33.
- Davis, P. A., Woodman, T., & Callow, N. (2010). Better out than in: The influence of anger regulation on physical performance. *Personality and Individual Differences*, 49, 457-460. <https://doi.org/10.1016/j.paid.2010.04.017>
- Deutsch, M. (1949). A theory of cooperation and competition. *Human Relations*, 2, 129-152.
- DeSteno, D., & Salovey, P. (1996). Jealousy and the Characteristics of One's Rival: A Self Evaluation Maintenance Perspective. *Personality and Social Psychology Bulletin*, 22(9), 920–932. <https://doi.org/10.1177/0146167296229006>
- Darnon, C., Harackiewicz, J. M., Butera, F., Mugny, G., & Quiamzade, A. (2007). Performance approach and performance-avoidance goals: When uncertainty makes a difference. *Personality and Social Psychology Bulletin*, 33(6), 813-827.
- Dewar, A. J., Kavussanu, M., & Ring, C. (2013). The effects of achievement goals on emotions and performance in a competitive agility task. *Sport, Exercise, and Performance Psychology*, 2(4), 250–264. <http://dx.doi.org/10.1037/a0032291>

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

- Dovidio, J. F., Gaertner, S. L. (2010). *Intergroup bias*. In Fiske, S. T., Gilbert, D. T., Lindzey, G. (Eds.), *Handbook of Social Psychology* (pp. 1084-1121). Hoboken, NJ: Wiley.
- Duina, F. (2011). *Winning: reflections on an American obsession*. Princeton University Press.
- Elliot, A. J. (2005). *A conceptual history of the achievement goal construct*. In A. J. Elliot & C. S. Dweck (Eds.), *Handbook of Competence and Motivation* (pp. 52–72). New York, NY: Guilford Press.
- Elliot, A. J., & Church, M. A. (1997). A hierarchical model of approach and avoidance achievement motivation. *Journal of Personality and Social Psychology*, *72*, 218–232. <https://doi.org/10.1037/0022-3514.72.1.218>
- Elliot, A. J., Jury, M., & Murayama, K. (2018). Trait and perceived environmental competitiveness in achievement situations. *Journal of Personality*, *86*, 353–367.
- Elliot, A. J., & McGregor, H. A. (2001). A 2 x 2 achievement goal framework. *Journal of Personality and Social Psychology*, *80*, 501–519. <https://doi.org/10.1037/0022-3514.80.3.501>
- Elliot, A. J., & Murayama, K. (2008). On the measurement of achievement goals: Critique, illustration, and application. *Journal of Educational Psychology*, *100*(3), 613-628.
- Esses, V. M. Jackson, L. M. Dovidio, J. F. Hodson, G. (2005). *Instrumental relations among groups: Group competition, conflict, and prejudice*. On the nature of prejudice: Fifty years after Allport. (pp. 227–243), Malden, MA Blackwell.
- Ettorchi-Tardy, A., Levif, M., & Michel, P. (2012). Benchmarking: a method for continuous quality improvement in health. *Healthcare policy*, *7*(4).
- Fiske, S. T. (2015). Intergroup biases: A focus on stereotype content. *Current Opinion in Behavioral Sciences*, *3*, 45–50.

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

- Fiske, S. T. (2018). Stereotype Content: Warmth and Competence Endure. *Current Directions in Psychological Science*, 27(2), 67–73. <https://doi.org/10.1177/0963721417738825>
- Fiske, S. T., Cuddy, A. J. C. & Glick, P. (2007) Universal dimensions of social cognition: Warmth and competence. *Trends in Cognitive Sciences*, 11, 77–83
- Fiske, S. T., Cuddy, A. J. C., Glick, P. & Xu, J. (2002) A model of (often mixed) stereotype content: Competence and warmth respectively follow from perceived status and competition. *Journal of Personality and Social Psychology*, 82, 878– 902.
- Fiske, S. T. & Taylor, S. E. (1991). *Social Cognition*. McGraw-Hill.
- Fletcher, T. D., & Nusbaum, D. N. (2008). Trait competitiveness as a composite variable: Linkages with facets of the big five. *Personality and Individual Differences*, 45, 312–317. <http://doi.org/10.1016/j.paid.2008.04.020>.
- Franken, R., & Brown, D. (1995). Why do people like competition? The motivation for winning, putting forth effort, improving one's performance, performing well, being instrumental, and expressing forceful/aggressive behavior. *Personality and Individual Differences*, 19(2), 175–184. [https://doi.org/10.1016/0191-8869\(95\)00035-5](https://doi.org/10.1016/0191-8869(95)00035-5)
- Garcia, S. M., Tor, A., & Gonzalez, R. (2006). Ranks and Rivals: A Theory of Competition. *Personality and Social Psychology Bulletin*, 32(7), 970–982. <https://doi.org/10.1177/0146167206287640>
- Garcia, S. M., Tor, A., & Schiff, T. M., (2013). The Psychology of Competition: A Social Comparison Perspective. <https://journals.sagepub.com.ezproxy.lakeheadu.ca/doi/full/10.1177/1745691613504114>
- Gaudreau, P., & Braaten, A. (2016). Achievement goals and their underlying goal motivation: Does it matter why sport participants pursue their goals? *Psychologica Belgica*, 56(3),

244.

- Gilhooly, K. J. (1978). Bigram statistics for 205 five-letter words having single-solution anagrams. *Behavior Research Methods & Instrumentation*, *10*(3), 389-392.
- Gill, D. L. (1986). Competitiveness among females and males in physical activity classes. *Sex Roles*, *15*, 233- 257.
- Greenlees, I. (2007). Person Perception and Sport Performance. In S. Jowett & D. Lavallee (1), *Social psychology in sport* (pp. 197-202). Human Kinetics.
- Harmison, R. (2011). Peak Performance in Sport: Identifying Ideal Performance States and Developing Athletes' Psychological Skills. *Sport, Exercise, and Performance Psychology*, *1*, 3–18. <https://doi.org/10.1037/2157-3905.1.S.3>
- Horney, K. (1937). *The neurotic personality of our time*. New York: Norton.
- Houston, I. M., McIntire, S., Kinnie, I., & Terry, C. (2002). A factor analysis of scales measuring competitiveness. *Educational and Psychological Measurement*, *62*, 284–298.
- Houston, J. M., Queen, J. S., Cruz, N., Vlahov, R., & Gosnell, M. (2015). Personality traits and winning: Competitiveness, hypercompetitiveness, and Machiavellianism. *North American Journal of Psychology*, *17*, 105–112.
- Hulleman, C. S., Schragar, S. M., Bodmann, S. M., & Harackiewicz, J. M. (2010). A meta analytic review of achievement goal measures: Different labels for the same constructs or different constructs with similar labels? *Psychological Bulletin*, *136*, 422–449. <https://doi.org/10.1037/a0018947>
- Johnson, D., Murayama, G., Johnson, R. T., Nelson, D., & Skon, L. C. (1981). Effects of cooperative, competitive, and individualistic goal structures on achievement: A meta analysis. *Psychological Bulletin*, *89*(1), 47–62. <https://doi.org/10.1037/0033-2909.89.1.47>

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

- Jones, T. (2015). Our Conception of Competitiveness: Unified but Useless? *Journal of the Philosophy of Sport*, 42(3), 365-378.
- Kaplan, A., & Maehr, M. L. (2007). The contributions and prospects of goal orientation theory. *Educational Psychology Review*, 19, 141–184. <https://doi.org/10.1007/s10648-006-90125>
- Kervyn, N., Yzerbyt, V., & Judd, C. (2010). Compensation between warmth and competence: Antecedents and consequences of a negative relation between the two fundamental dimensions of social perception. *European Review of Social Psychology*, 21(1), 155–187. <https://doi.org/10.1080/13546805.2010.517997>
- Kilduff, G. J., Elfenbein, H. A., & Staw, B. M. (2010). The Psychology of Rivalry: A Relationally Dependent Analysis of Competition. *Academy of Management Journal*, 53(5), 943–969. <https://doi.org/10.5465/amj.2010.54533171>
- Klein, R. (2017). Competitiveness. *Encyclopedia of Personality and Individual Differences*, 1056-1, 1-6.
- Klein, W. M. P. (2003). Effects of objective feedback and “single other” or “average other” social comparison feedback on performance judgments and helping behaviour. *Personality and Social Psychology Bulletin*, 29, 418-429.
- Klyueva, O., A. (2016). Competitiveness of personality as a psychological phenomenon: The content of the construct and its typology. *Psychology in Russia: State of the Arts*, 9(2), 151-166.
- Krishnamoorthy, B., & D’Lima, C. (2014). Benchmarking as a measure of competitiveness. *International Journal of Process Management and Benchmarking*, 4(3). 342-59.
- Kumar, S., & Kumar, S. (2017). Structure equation modeling basic assumptions and concepts: A Novice’s guide. *Asian Journal of Management Sciences*, 3(7), 25-28.

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

Kurtus, R. (2020, August 23). Individual Competitions. *School for Champions*.

https://www.school-for-champions.com/competition/individual_competition.htm#.X0gd4i-z3GI

Kurzban, R., Tooby, J., & Cosmides, L. (2001). Can race be erased? Coalitional computation and social categorization. *Proceedings of the National Academy of Sciences*, 98, 15387–15392.

Laborde, S., Dosseville, F., & Allen, M. S. (2016) Emotional intelligence in sport and exercise: A systematic review. *Scandinavian Journal of Medicine & Science in Sports*, 26(8). 862–874. <http://doi.org/10.1111/sms.12510>

Lazarus, R. (2000). How Emotions Influence Performance in Competitive Sports. *The Sport Psychologist*, 14(3), 229–252. <https://doi.org/10.1123/tsp.14.3.229>

Lee, A., Ji, L., Li, Y., & Zhang, Z. (2020). Fear Goliath or David? Inferring Competence From Demeanor Across Cultures. *Personality & Social Psychology Bulletin*, 46(7), 1074–1089. <https://doi.org/10.1177/0146167219893999>

McCleery, A., & Green, M. F. (2019). Social Cognition and Metacognition in Schizophrenia. *Science Direct*.

McDonald, R. P., & Ho, M. R. (2002). Principles and practice in reporting structural equation analyses. *Psychological Methods*, 7(1), 64–82. <http://dx.doi.org/10.1037/1082-989X.7.1.64>

Mead, N. L., & Maner, J. K. (2012). On keeping your enemies close: Powerful leaders seek proximity to ingroup power threats. *Journal of Personality and Social Psychology*, 102(3), 576–591. <https://doi.org/10.1037/a0025755>

Medlin, C., & Ellegaard, C. (2015). Conceptualizing competition and rivalry in a networking

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

- business market. *Industrial Marketing Management*, 51, 131–140.
<https://doi.org/10.1016/j.indmarman.2015.05.009>
- Meijen, C., Turner, M., Jones, M. V., Sheffield, D., & McCarthy, P. (2020). A theory of challenge and threat states in athletes: A revised conceptualization. *Frontiers in psychology*, 11, 126.
- Mitina, L. M. (2003). The psychology of developing a competitive personality. Moscow Psychology and Sociology Institute.
- Murayama, K., & Elliot, A. (2012). The Competition–Performance Relation: A Meta-Analytic Review and Test of the Opposing Processes Model of Competition and Performance. *Psychological Bulletin*, 138(6), 1035–1070.
<https://doi.org/10.1037/a0028324>
- Neuberg, S. L., & Fiske, S. T. (1987). Motivational influences on impression formation: Outcome dependency, accuracy-driven attention, and individuating processes. *Journal of Personality and Social Psychology*, 53(3), 431–444. <https://doi.org/10.1037/00223514.53.3.431>
- North, M., & Fiske, S. (2015). Modern attitudes toward older adults in the aging world: A cross cultural meta-analysis. *Psychological Bulletin*, 141(5), 993–1021.
<https://doi.org/10.1037/a0039469>
- Oh, D., Shafir, E., & Todorov, A. (2019). Economic status cues from clothes affect perceived competence from faces. *Natural Human Behaviour*.
- Orosz G, Tóth-Király I, Büki N, Ivaskevics K, Bőthe B and Fülöp M (2018) The Four Faces of Competition: The Development of the Multidimensional Competitive Orientation Inventory. *Front. Psychol.* 9, 779. <https://doi.org/10.3389/fpsyg.2018.00779>

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

- Ota, K., Tanae, M., Ishii, K., & Takiyama, K. (2020). Optimizing motor decision-making through competition with opponents. *Scientific reports*, *10*(1), 1-14.
- Parton, B. J., & Neumann, D. L. (2019). The effects of competitiveness and challenge level on virtual reality rowing performance. *Psychology of Sport & Exercise*, *41*, 191–199.
- Pintrich, P. R. (2000). Multiple goals, multiple pathways: The role of goal orientation in learning and achievement. *Journal of Educational Psychology*, *92*, 544–555. <https://doi.org/10.1037/00220663.92.3.544>
- Portenga, S. T, Aoyagi, M. W., & Cohen, A. B. (2016). *Helping to build a profession: A working definition of Sport & Performance Psychology*. Manuscript submitted for publication.
- Ross, S. R., Rausch, K. M., & Canada, K. E. (2003). Competition and cooperation in the five factor model: Individual differences in achievement orientation. *The Journal of Psychology*, *137*, 323–337. Retrieved from <http://ezproxy.lakeheadu.ca/login?url=http://>
- Roussos, G., & Dunham, Y. (2016). The development of stereotype content: The use of warmth and competence in assessing social groups. *Journal of Experimental Child Psychology*, *141*, 133–144. <https://doi.org/10.1016/j.jecp.2015.08.009>
- Russell, A. M., & Fiske, S. T. (2008). It's all relative: Social position and interpersonal perception. *European Journal of Social Psychology*, *38*, 1193–1201.
- Ryckman, R. M., Hammer, M., Kaczor, L. M., & Gold, J. A. (1990). Construction of a hypercompetitive attitude scale. *Journal of Personality Assessment*, *55*, 630–639.
- Ryckman, R. M., Thornton, B., & Butler, J. C. (1994). Personality correlates of the Hypercompetitive Attitude Scale: Validity tests of Horney's theory of neurosis. *Journal of Personality Assessment*, *62*(1), 84–94. https://doi.org/10.1207/s15327752jpa6201_8
- Schopler, J., Insko, C. A., Wieselquist, J., Pemberton, M., Witcher, B., Kozar, R., Roddenberry,

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

- C., & Wildschut, T. (2001). When groups are more competitive than individuals: The domain of the discontinuity effect. *Journal of Personality and Social Psychology*, *80*(4), 632–644. <https://doi.org/10.1037/0022-3514.80.4.632>
- Senko, C., & Harackiewicz, J. M. (2006). Achievement goals, task performance, and interest: Why perceived goal difficulty matters. *Personality and Social Psychology Bulletin*, *31*(12), 1739-1753.
- Sheehan, K. B. (2018). Crowdsourcing research: data collection with Amazon’s Mechanical Turk. *Communication Monographs*, *85*(1), 140-156.
- Skowronski, J., & Carlston, D. (1989). Negativity and Extremity Biases in Impression Formation: A Review of Explanations. *Psychological Bulletin*, *105*(1), 131–142. <https://doi.org/10.1037/0033-2909.105.1.131>
- Smither, R., & Houston, J. (1992). The nature of competitiveness: The development and validation of the competitiveness index. *Educational and Psychological Measurement*, *52*, 407–418.
- Spence, J. T., & Helmreich, R. L. (1983). Achievement-related motives and behaviors. *Achievement and achievement motives: Psychological and sociological approaches*, 7-74.
- Stanne, M. B., Johnson, D. W., & Johnson, R. T. (1999). Does competition enhance or inhibit motor performance: A meta-analysis. *Psychological Bulletin*, *125*(1), 133-154. <http://dx.doi.org.ezproxy.lakeheadu.ca/10.1037/0033-2909.125.1.133>
- Tamir, M., Chiu, C. Y., & Gross, J. J. (2007). Business or pleasure? Utilitarian versus hedonic considerations in emotion regulation. *Emotion*, *7*, 546–554.
- Tokareva, E. V. (2007). Individual psychological characteristics for developing competitive-

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

- ness of personality. (Unpublished doctoral dissertation). Psychological Institute, Russian Academy of Education.
- Triplett, N. (1897). The dynamogenic factor in pacemaking and competition. *America Journal of Psychology*, 9, 507-533
- Van Mierlo, H., & Van Hooft, E. A. (2020). Team achievement goals and sports team performance. *Small Group Research*, 51(5), 581-615.
- Van Selst, M. & Jolicoeur, P. (1994). A solution to the effect of sample size on outlier elimination. *Quarterly Journal of Experimental Psychology*, 47, 631-650.
- Van Vugt, M., & Park, J. (2009). Guns, Germs, and Sex: How Evolution Shaped Our Intergroup Psychology. *Social and Personality Psychology Compass*, 3(6), 927–938.
<https://doi.org/10.1111/j.1751-9004.2009.00221.x>
- VandenBos, G. R. (2007). Competition. In *APA dictionary of psychology* (p. 204). Washington, DC: American Psychological Association.
- Vast, R., Young, R., & Thomas, P. (2010). Emotions in sport: Perceived effects on attention, concentration, and performance. *Australian Psychologist*, 45(2), 132–140.
<https://doi.org/10.1080/00050060903261538>
- Vaughn, J., & Diserens, C. M. (1938). The Experimental Psychology of Competition. *The Journal of Experimental Education*, 7(1), 76–97. JSTOR.
- Vincent, R., Goldberg, Y., & Titone, D. (2006). Anagram software for cognitive research that enables specification of psycholinguistic variables. *Behavior Research Methods*, 38(2), 196–201. <https://doi.org/10.3758/BF03192769>

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

- Warner, S., & Dixon, M. (2013). Competition, gender and the sport experience: An exploration among college athletes. *Sport, Education, and Society*, 20, 1–19.
<https://doi.org/10.1080/13573322.2013.774273>
- Warr, P.B., & Knapper, C. (1968). *The perception of people and events*. London: John Wiley & Sons.
- Weinburg, R. S., & Gould, D. (2019). *Foundations of sport and exercise psychology* (7ed.), 104–122. Champaign, IL: Human Kinetics.
- Witthen, M., Krimmel, A., Kohler, M., & Hertel, G. (2013). The two sides of competition: Competition-induced effort and affect during intergroup versus interindividual competition. *British Journal of Psychology*, 104(3), 320–338.
<https://doi.org/10.1111/j.2044-8295.2012.02123.x>
- Wodtke, G. T. (2012). The impact of education on intergroup attitudes: A multiracial analysis. *Social Psychology Quarterly*, 75(1), 80–106.
- Wolters, C. (2004). Advancing achievement goal theory: Using goal structures and goal orientations to predict students' motivation, cognition, and achievement. *Journal of Educational Psychology*, 96, 236–250. <https://doi.org/10.1037/0022-0663.96.2.236>
- Woodman, T., Davis, P. A., Hardy, L., Callow, N., Glasscock, I., & Yuill-Proctor, J. (2009). Emotions and Sports Performance: An Exploration of Happiness, Hope, and Anger. *Journal of Sport & Exercise Psychology*, 31, 169–188.
- Worrell, F. C., Knotek, S. E., Plucker, J. A., Portenga, S., Simonton, D. K., Olszewski-Kubilius, P., Schultz, S. R., & Subotnik, R. F. (2016). Competition's role in developing psychological strength and outstanding performance. *Review of General Psychology*, 20(3), 259–271.

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

- Wojciszke, B., Bazinska, R., & Jaworski, M. (2016). On the Dominance of Moral Categories in Impression Formation. *Personality & Social Psychology Bulletin*, 24(12), 1251–1263.
<https://doi.org/10.1177/01461672982412001>
- Wyer, R. S., & Srull, T. K. (1989). Memory and cognition in its social context. *Psychological Review*, 93, 322-359.
- Yzerbyt, V., & Demoulin, S. (2010). Intergroup relations. Fiske, S. T., Gilbert, D. T., Lindzey, G. (Eds.), *Handbook of Social Psychology* (pp. 1024- 1083). New York, NY: Wiley.
- Yzerbyt, V., Provost, V., & Corneille, O. (2005). Not competent but warm... really? Compensatory stereotypes in the French-speaking world. *Group Processes & Intergroup Relations*, 8(3), 291-308.

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

Appendix A: Demographics

Participant ID: _____

Date: _____

<p>1. Age: _____</p>
<p>2a. Sex (please circle):</p> <p>Male Female Non-binary</p> <p>2b. If neither, please indicate your preferred gender (ex. gender fluid, trans, etc.):</p> <p>_____</p>
<p>3a. Ethnicity (please check):</p> <p><input type="checkbox"/> Caucasian (White)</p> <p><input type="checkbox"/> African Canadian/American (Black)</p> <p><input type="checkbox"/> Indigenous (First Nation, Métis, Inuit)</p> <p><input type="checkbox"/> East Indian</p> <p><input type="checkbox"/> Asian</p> <p><input type="checkbox"/> Hispanic</p> <p>3b. Other (please specify): _____</p>
<p>4. Employment status (please circle):</p> <p>Full-time Part-time N/A</p>
<p>5a. Current Education level (please circle):</p> <p>High school Undergraduate Graduate Doctoral</p> <p>5b. Education status (please circle):</p> <p>Full-time Part-time</p> <p>5c. Year level (please check):</p>

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

Appendix B: Work and Family Orientation Scale (WOFO)

Participant ID: _____

Date: _____

Read each statement and please circle the option that best indicates how much you agree or disagree with each statement. Please answer them by how you usually feel about competitive situations. There are no right or wrong answers; please answer them on how you feel.

The following statement describes reactions to competitive situations:	Strongly Agree	Slightly Agree	Neither Agree or Disagree	Slightly Disagree	Strongly Disagree
1. I would rather do something at which I feel confident and relaxed than something which is challenging and difficult	1	2	3	4	5
2. It is important to me to do my work as well as I can even if it is not popular with my coworkers	1	2	3	4	5
3. I enjoy working in situations involving competition with others	1	2	3	4	5
4. I try harder when I am in competition with other people	1	2	3	4	5
5. I like to be busy all the time	1	2	3	4	5
6. Part of my enjoyment in doing things is improving my past performance	1	2	3	4	5
7. When a group I belong to plans an activity, I would rather direct it myself than just help out and have someone else organize it	1	2	3	4	5
8. It is important to me to perform better than others on a task	1	2	3	4	5
9. It annoys me when other people perform better than I do	1	2	3	4	5
10. I more often attempt tasks than I am not sure I can do than tasks that I believe I can do.	1	2	3	4	5
11. I like to work hard	1	2	3	4	5

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

12. There is satisfaction in a job well done	1	2	3	4	5
13. I would rather learn easy, fun games than difficult, thought games	1	2	3	4	5
14. I feel that winning is important in both work and games	1	2	3	4	5
15. If I am not good at something, I would rather keep struggling to master it then move on to something I may be good at	1	2	3	4	5
16. I find satisfaction in exceeding my previous performance even if I don't outperform others	1	2	3	4	5
17. Once I undertake a task, I persist	1	2	3	4	5
18. I find satisfaction in working as well as I can	1	2	3	4	5
19. I prefer to work in situations that require a high level of skill	1	2	3	4	5

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

Appendix C: Sports Orientation Questionnaire (SOQ)

Participant ID: _____

Date: _____

Read each statement and please circle the option that best indicates how much you agree or disagree with each statement. Please answer them by how you usually feel about competitive situations. There are no right or wrong answers; please answer them on how you feel. **PLEASE NOTICE THE REVERSAL OF “agree” AND “disagree” BELOW.**

The following statement describes reactions to competitive situations:	Strongly Agree	Slightly Agree	Neither Agree or Disagree	Slightly Disagree	Strongly Disagree
1. I am a determined competitor.	1	2	3	4	5
2. Winning is important.	1	2	3	4	5
3. I am a competitive person.	1	2	3	4	5
4. I set goals for myself when I compete.	1	2	3	4	5
5. I try my hardest to win.	1	2	3	4	5
6. Scoring more points than my opponent is very important to me.	1	2	3	4	5
7. I look forward to competing.	1	2	3	4	5
8. I am most competitive when I try to achieve personal goals.	1	2	3	4	5
9. I enjoy competing against others.	1	2	3	4	5
10. I hate to lose.	1	2	3	4	5
11. I thrive on competition.	1	2	3	4	5
12. I try my hardest when I have a specific goal.	1	2	3	4	5
13. My goal is to be the best athlete possible.	1	2	3	4	5
14. The only time I am satisfied is when I win.	1	2	3	4	5
15. I want to be successful in sports.	1	2	3	4	5

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

16. Performing to the best of my ability is very important to me.	1	2	3	4	5
17. I work hard to be successful in sports.	1	2	3	4	5
18. Losing upsets me.	1	2	3	4	5
19. The best test of my ability is competing against others.	1	2	3	4	5
20. Reaching personal performance goals is very important to me.	1	2	3	4	5
21. I look forward to the opportunity to test my skills in competition.	1	2	3	4	5
22. I have the most fun when I win.	1	2	3	4	5
23. I perform my best when I am competing against an opponent.	1	2	3	4	5
24. The best way to determine my ability is to set a goal and try to reach it.	1	2	3	4	5
25. I want to be the best every time I compete.	1	2	3	4	5

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

Appendix D: Competitive Index (CI)

Participant ID: _____

Date: _____

Read each statement and please circle the option that best indicates how valid each statement is for you. Please answer them by how you usually feel about competitive situations. There are no right or wrong answers; please answer them on how you feel.

The following statement describe reactions to competitive situations:	True	False
1. I am a competitive individual.	T	F
2. I dread competing against other people.	T	F
3. I don't enjoy challenging others even when I think they are wrong.	T	F
4. I often try to outperform others.	T	F
5. When I play a game, I like to keep score.	T	F
6. Competition destroys friendship.	T	F
7. I like competition.	T	F
8. I will do almost anything to avoid an argument.	T	F
9. I often try to outperform others.	T	F
10. I don't like games that are winner-take-all.	T	F
11. I will do almost anything to avoid an argument.	T	F
12. I find competitive situations unpleasant.	T	F
13. Games that have no clear-cut winner are boring.	T	F
14. I don't enjoy challenging others even when I think they are wrong.	T	F
15. I enjoy competing against an opponent.	T	F
16. I would like to be on a debating team.	T	F
17. It's usually not important to me to be the best.	T	F
18. In general, I will go alone with a group rather than create conflict.	T	F

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

19. I often remain quiet rather than risk hurting another person's feelings.	T	F
20. I get satisfaction from competing against other people.	T	F

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

Appendix E: Achievement Goal Questionnaire-Revised (AGQ-R)

Participant ID: _____

Date: _____

Read each statement and please circle the option that best indicates how much you agree or disagree with each statement. Please answer them by how you usually feel about this competitive situation. There are no right or wrong answers; please answer them on how you feel.

The following statement describe reactions to competitive situations:	Strongly Agree	Slightly Agree	Neither Agree or Disagree	Slightly Disagree	Strongly Disagree
1. My aim is to improve my performance on the next anagram task	1	2	3	4	5
2. My aim is to not perform worse on the next anagram task	1	2	3	4	5
3. I want to outperform the profile I just read about	1	2	3	4	5
4. I want to avoid performing worse than the profile I just read about	1	2	3	4	5

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

Appendix F: The Warmth and Competence Scale

Participant ID: _____

Date: _____

As viewed by society, please indicate how Cold or Warm your opponent appears										
Cold	-4	-3	-2	-1	0	1	2	3	4	Warm
As viewed by society, please indicate how Deceitful or Trustworthy your opponent appears										
Deceitful	-4	-3	-2	-1	0	1	2	3	4	Trustworthy
As viewed by society, please indicate how Simpleminded or Intelligent your opponent appears										
Simpleminded	-4	-3	-2	-1	0	1	2	3	4	Intelligent
As viewed by society, please indicate how Inept (Incapable) or Competent your opponent appears										
Inept (Incapable)	-4	-3	-2	-1	0	1	2	3	4	Competent

Appendix G: Stereotyped Group Profiles

Ingroup Competitive Profiles

Matthew Beragine



Age	23
Gender	Male
Job Title	Student
Culture	Canadian
Skills	Conscientious, curious, passionate
Reason for Competing	To win and to have fun
Competitive History	Won: 15 / Lost: 5

Details:

I am a student at Lakehead University and I am studying Nursing. I look forward to getting a job at TBRHSC as a registered nurse. At home, I have two golden retrievers, Max and Ella who love going for walks. In my spare time, I enjoy reading, word searches, and hanging out with friends.

Justin Tremblay



Age	31
Gender	Male
Job Title	Accountant
Culture	Canadian
Skills	Good with numbers, decisions, communication
Reason for Competing	To win and to have fun
Competitive History	Won: 16 / Lost: 4

Details:

I grew up in Fort Frances, ON, working in a grocery store. I enjoy being outdoors, puzzles, and spending time with my friends and family. Currently, I work as an accountant providing financial advice to a range of clients - my clients always recommend me.

Jessica Turner



Age	28
Gender	Female
Job title	Dental Assistant
Culture	Caucasian
Skills	Punctual, humorous, dedicated
Reason for Competing	To win and to have fun
Competitive History	Won: 15 / Lost: 5

Details:

I'm Jessica and I live a pretty average life. I currently work at Northwest Dental as a dental assistant and I've been working there for 4 years. I love to bingewatch Netflix - especially shows that make me think. I enjoy spending time with my boyfriend and playing board games with friends (I usually win).

Andrew King



Age	22
Gender	Female
Job Title	Business student
Culture	Canada
Skills	Intelligent, creative, memorization
Reason for Competing	To win and to have fun
Competitive History	Won: 16 / Lost: 4

Details:

Studying is my life! I am currently finishing my Honours Bachelors in Psychology and don't really have time to do anything else. I enjoy staying cozy with my pets and reading books and textbooks. When I'm not studying, I enjoy visiting my grandparents which makes their day!

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

Contempt Group Competitive Profiles

Rebecca Townsend



Age	28
Gender	Female
Job Title	Unemployed
Culture	Indigenous
Skills	N/A
Reason for Competing	N/A
Competitive History	Won: 4 / Lost: 16

Details:

My name is Becca and I am currently unemployed and living with my sisters. I don't think I have hobbies that I know of. I just got my High School english credit after dropping out of highschool in grade 11.

Paul Butkus



Age	41
Gender	Male
Job Title	Unemployed
Culture	Caucasian
Skills	N/A
Reason for Competing	N/A
Competitive History	Won: 4 / Lost: 16

Details:

Hello I'm Paul. I like Nascar and WWE. I used to drive Truck but I'm on unemployment and living with my parents.

Malik Kanumba



Age	32
Gender	Male
Job Title	Taxi Driver
Culture	African American
Skills	Fast Driver
Reason for Competing	N/A
Competitive History	Win: 5 / Lost: 15

Details:

I recently immigrated to Canada and have a job as a taxi driver. Canadian culture is different than my countries beliefs making it hard to adjust. I plan to bring my wife and kids for free healthcare.

Peggy Smith



Age	29
Gender	Female
Job Title	Janitor
Culture	White
Skills	Cleaning
Reason for Competing	N/A
Competitive History	Win: 5 / Lost: 15

Details:

I work as a Janitor in a highschool since I was a teen. I live at my friends house and watch TV when I'm not at work.

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

Pity Group Competitive Profiles

Paul McMillan



Age	75
Gender	Male
Job Title	Retired
Culture	Scottish
Skills	Volunteering, Helping, Caring for Others
Reason for Competing	To have fun
Competitive History	Won: 1 / Lost: 19

Details:

I recently retired and live with my loving wife of 52 years. We share 4 kids and keep busy by looking after 12 grandchildren. I dedicate my life to make sure my grandchildren have the best life.

Michael Nowak



Age	31
Gender	Male
Job Title	Bus-boy
Culture	Belgian
Skills	Sense of humour, Patient, Cleaning
Reason for Competing	To try my best
Competitive History	Won: 3 / Lost: 17

Details:

I work as a bus-boy for a local restaurant where I clear and clean tables. I recently moved back in with my parents after unsuccessfully completing college. I enjoy being funny - every time I make someone laugh, it feels like a mini-vacation

Anne Baker



Age	35
Gender	Female
Job Title	Walmart Greeter
Culture	English
Skills	Friendly, Polite, Positive
Reason for Competing	To get better at anagrams
Competitive History	Won: 2 / Lost: 18

Details:

Hi! I am a dedicated worker/greeter at Walmart for the past 15 years. I started this job when I completed highschool at age 19. I enjoy playing with my pets and calling my sister every day.

Doris Koivi



Age:	67
Gender:	Female
Job Title:	Cashier
Culture:	Finnish
Skills:	Creative, Thoughtful, Mature
Reason for Competing	To enjoy the game
Competitive History	Won: 2 / Lost: 18

Details:

I love crafts, knitting, and other activities to keep me occupied throughout the day. I work at a craft store on the weekends where I get to chat with other members of the community who enjoy crafting. I enjoy helping those in the crafting community with their projects!

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

Envy Group Competitive Profiles

Mohammad Kiv



Age	25
Gender	Male
Job Title	Software development manager
Culture	East Indian
Skills	Self Confidence, Strategic, Reading
Reason for Competing	To win
Competitive History	Won: 19 / Lost: 1

Details:

I have recently become the manager at a software development company where I oversee the systems behind computer programs. I live in Thunder Bay at the Marina Condos with my new wife. I like reading and writing games in my spare time.

Xi-Wang Hsiung



Age	53
Gender	Male
Job Title	Lawyer
Culture	Chinese
Skills	Written Communication Skills, Problem Solving
Reason for Competing	To win
Competitive History	Won: 18 / Lost: 2

Details:

Besides the thrill of winning a court case, I enjoy thoroughly reading through case notes, procedures, and outcomes, to understand how to improve my performance. I am very competitive and always like to perform well no matter what I am doing.

Karen Flemming



Age :	47
Gender:	Female
Job Title:	Physician
Culture:	North American
Skills:	Problem solving, practical skills, decision making
Reason for Competing	To win
Competitive History:	Won: 18 / Lost: 2

Details:

I grew up in Kelowna, BC and have a doctor of medicine degree from Stanford University School of Medicine. I currently reside in Toronto, ON striving to be one of the best ophthalmologist at the Toronto General Hospital. I enjoy meditation and mindfulness, and travelling.

Michelle Johnson



Age:	35
Gender:	Female
Job Title:	Strategy Manager
Culture:	Italian
Skills:	Hard-working, Quick-thinking, Determined
Reason for Competing	To win
Competitive History:	Won: 19 / Lost: 1

Details:

For my job, I oversee a company's plan to develop partnerships, facilitating growth, and launch new profit-driving initiatives. In my personal life, I like to run and work out which keeps my body and brain healthy. I enjoy reading and playing strategy games on my phone - I seem to always do well.

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

Appendix H: Stereotyped Group Bivariate Correlations

Table 8

Descriptive Statistics and Correlations for Contempt Study Variables (N = 100)

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8
1. CI Competitiveness	0.40	0.31	—							
2. SOQ Competitiveness	3.39	0.95	-.56**	—						
3. WOFO Competitiveness	3.41	0.90	-.38**	.62**	—					
4. AGQ Approach	4.26	0.74	-.41**	.28**	.26**	—				
5. AGQ Avoid	4.28	0.82	-.38**	.25**	.26**	.91**	—			
6. RT Total	51779.6	4240.9	-.08	-.03	-.04	.01	-.01	—		
7. W/C Warmth	5.91	1.63	.00	-.02	-.07	-.10	-.09	.10	—	
8. W/C Competence	5.21	1.86	-.01	.07	-.04	-.25*	-.26	-.01	.75**	—

Note. CI = Competitiveness, SOQ = Sports Orientation Questionnaire, WOFO = Work and Family Orientation, AGQ = Achievement Goal Orientation, RT = Reaction Time, W/C = Warmth/Competence, **. $p < 0.01$ level, *. $p < 0.05$ level

Table 9

Descriptive Statistics and Correlations for Envy Group Study Variables (N = 100)

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8
1. CI Competitiveness	0.40	0.31	—							
2. SOQ Competitiveness	3.39	0.95	-.56**	—						
3. WOFO Competitiveness	3.41	0.90	-.38**	.62**	—					
4. AGQ Approach	4.19	0.84	-.43**	.30**	.28**	—				
5. AGQ Avoid	4.16	0.88	-.38**	.21*	.24*	.91**	—			
6. RT Total	51798.1	3214.5	-.02	.02	-.01	.09	.14	—		
7. W/C Warmth	6.17	2.09	.08	-.11	-.32**	-.18	-.18	.00	—	
8. W/C Competence	9.60	1.19	-.01	.20*	.08	.19	.26*	.03	.02	—

*

THE RELATIONSHIP BETWEEN COMPETITION AND PERFORMANCE

Note. CI = Competitiveness, SOQ = Sports Orientation Questionnaire, WOFO = Work and Family Orientation, AGQ = Achievement Goal Orientation, RT = Reaction Time, W/C = Warmth/Competence, **. $p < 0.01$ level, *. $p < 0.05$ level

Table 10

Descriptive Statistics and Correlations for Pity Group Study Variables (N = 100)

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8
1. CI Competitiveness	0.40	0.31	—							
2. SOQ Competitiveness	3.39	0.95	-.56**	—						
3. WOFO Competitiveness	3.41	0.90	-.38**	.62**	—					
4. AGQ Approach	4.17	0.76	-.41**	.30**	.24**	—				
5. AGQ Avoid	4.18	0.83	-.36**	.25**	.24**	.90**	—			
6. RT Total	50337.9	4362.6	-.03	.04	.02	.07	.07	—		
7. W/C Warmth	9.59	1.18	.07	-.01	-.03	.11	.19	-.05	—	
8. W/C Competence	7.50	1.57	.18	-.09	-.24*	-.17	-.12	-.09	.37**	—

Note. CI = Competitiveness, SOQ = Sports Orientation Questionnaire, WOFO = Work and Family Orientation, AGQ = Achievement Goal Orientation, RT = Reaction Time, W/C = Warmth/Competence, **. $p < 0.01$ level, *. $p < 0.05$ level