THE EFFECTS OF EXEMPLAR PRIMING ON ATHLETIC PERFORMANCE SUCCESS

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by

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ABSTRACT

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The current study examines the effects of viewing positive and negative exemplars directly prior to an athletic performance task. It was hypothesized that participants who were given a positive exemplar (as opposed to the negative exemplar) would: perform worse in an athletic task, have lower levels of perceived control and state anxiety - positive, and higher levels of state anxiety - negative. Accordingly, it was predicted that greater perceived control would correlate with higher levels of performance, with recent findings supporting this view. Positive state anxiety was also studied to monitor how an athlete may use feelings of arousal to enhance performance. The participants included \( n = 269 \) undergraduate students from a local university who had a minimum level of previous basketball proficiency. Participants were asked to complete two sets of basketball free throws and given several questionnaires to fill out, including the Perceived Control scale (based on Otten, 2009), the Competitive State Anxiety Inventory-2 Revised (Cox et al., 2003), and a new Competitive State Anxiety – Positive inventory. Participants in the experimental groups were shown pictures and text of professional basketball players who shot over 80% (positive exemplar), 75% (control), or below 50% (negative exemplar). As in Dijksterhuis et al. (1998), participants transcribed their reactions regarding these exemplars, and then were asked here to shoot the second
of two rounds of free throws. Results were not demonstrative of differences across the exemplar conditions on performance, perceived control, or the state anxiety levels of the participants. There were positive correlations, however, between performance and perceived control, and perceived control and positive state anxiety. This study is intended to aid athletes, coaches, and trainers to better understand the antecedents of a successful performance under pressure.
INTRODUCTION

Athletes at the higher levels of sport today are inundated with images via game film. Coaches often manipulate this video to show only the most instructive and/or inspirational clips. Meanwhile, sport psychologists continue to emphasize the use of pre-competition imagery practices for successful performance. Surely, the images you see directly before an athletic event are impactful. But what if these images show a successful performance by a specific, familiar face (e.g., a friend, or Kobe Bryant)? Rather than deriving inspiration from such an image, might an athlete socially compare and thus suffer an ironic performance decline? Likewise, when presented a similar example of an inferior athlete, might one enjoy an ironic performance boost?

The purpose of this study was to explore the effects of priming through exemplars – both positive and negative – on athletes during an athletic task. Exemplars are defined in psychological research as “concrete instantiations of a given category” (Smith & Zarate, 1992). Meanwhile, priming refers to the “incidental activation of knowledge structures, such as trait concepts and stereotypes, by the current situational context” (Bargh, Chen, & Burrows, 1996).

Frequently, exemplar-priming techniques in psychology have been studied in non-athletic contexts. Psychologists Dijksterhuis and van Knippenberg (1998) attended a competitive soccer match and observed the effects nearby soccer hooligans had on one of their fellow researchers upon exiting the stadium. Apparently, primed by his surroundings, that researcher spontaneously kicked an alcoholic container a great distance. Later, he was left puzzled by his actions; the researchers questioned if the action was due to the abundant hooligan behavior nearby, or other unknown factors.
These authors went on to look at the effects of priming (with a generic professor and a generic secretary) on scores on a general intelligence test. Under varying time constraints within both conditions, participants were asked to imagine and list attributes associated with the two primes, and then given an intelligence task via the *Trivial Pursuit* retail game. Participants who were primed with the professor proceeded to perform better in the game (approximately 60% of questions answered correctly) than those who were primed with either the secretary or a control condition (40-50% of questions answered correctly). These results led the researchers to speculate whether the use of these primes might influence other areas of performance as well.

In a follow-up study, Dijksterhuis and colleagues investigated whether adding specific, named exemplars to a prime would produce a contrasting performance effect instead of one consistent with the prime shown (Dijksterhuis, Spears, Postmes, Stapel, Koomen, Knippenberg, & Scheepers, 1998). Primes were presented via a computer program, and participants received one of four primes: Albert Einstein (an exemplar), Claudia Schiffer (an exemplar), a generic professor, and a generic supermodel. Participants were asked to imagine the assigned prime and list the typical behaviors, lifestyle, and physical characteristics associated with it, and record their impressions on a sheet of paper for five minutes. Upon completion, participants took a 20-question multiple-choice general knowledge questionnaire sourced again from *Trivial Pursuit*.

As was expected based on prior research, results from Dijksterhuis and colleagues indicated that those who were given the generic intelligent prime outperformed the other three priming conditions. However, the authors identified a new contrasting effect occurring in the participants’ performance scores as they related to a specific exemplar.
Those given the priming exemplar of Einstein, rather than improving their performance, answered fewer questions correctly; in contrast, those subjects primed with Claudia Schiffer excelled. Adoption of the given primes was evidence of the malleability of the participant to take on those suggested traits (Banfield, et al, 2003; Sassenberg, & Moskowitz, 2005; Marx & Stapel, 2006). Likewise, this study suggests that similar contrasting effects may occur for athletic performance when an exemplar (positive or negative) is presented to a participant prior to a competitive task. The current thesis is based on this premise.

LeBoeuf and Estes (2004) further investigated the contrasting effect found by Dijksterhuis et al. (1998). In this study, participants were asked to list their own personal attributes, thereby contrasting themselves to the priming conditions. Whereas Dijksterhuis et al. (1998) asked the participant to list attributes associated with the given exemplar/prime, LeBoeuf and Estes (2004) allowed participants to self-prime. For example, the instructions for one condition read: “Think about a professor. On the lines below, please list three ways in which you are similar to a professor” (615). This prompt allowed participants to embrace the newly identified traits they self-selected, if they chose, and perhaps approach the trivia test with more effective strategies.

Results indicated that those participants who self-primed with attributes suggesting themselves to more dissimilar to the professor and Einstein exemplars actually answered more quiz questions correctly. The authors concluded that the extent to which a prime or exemplar is considered personally relevant may determine the direction of its impact on behavior. In the case of athletics, then, suppose a basketball player views a great performance by LeBron James. If the player judges James as dissimilar to him or
herself, then he/she will be primed to give a better performance. If James is judged as similar, however, then the player is more likely to socially compare and self-evaluate, and performance may falter. Similar contrasting effects appear in other recent studies on priming in non-athletic contexts (e.g., Anik & Norton, 2012).

The current thesis aims to test a new hypothesis that exemplar priming may influence an athlete’s ability to perform under stress. Competitive game situations engender pressure in athletes, which can cause them to either rise to the occasion or falter at a crucial moment. This failure in the moment is what has been termed in the literature “choking under the pressure” by Baumeister (1984), who defined it as “performance decrements under pressure circumstances” (p. 610). Otten (2009) investigated the difference between choking and clutch performances in a free throw shooting task. Clutch performance was defined as “any performance increment or superior performance that occurs under pressure circumstances” (p. 584). Participants shot free throws under the presence of pressure, in the form of being videotaped. Here, greater feelings of perceived control were associated with increased performance and reduced anxiety, respectively. Such feelings of intuition and control, while presumably important for performance regardless of pressure, have most often been studied in the context of pressure as of late (Cheng, Hardy & Markland, 2009; Otten, 2009).

As implied by this research, one athlete might interpret a situation as stressful, while another may view it as exhilarating. Research from Zajonc analyzed the social facilitation of learned behavior – an increase in performance in the presence of others due to greater arousal (Zajonc, 1965). Alternatively, other research has suggested that evaluation apprehension may also exist when in the presence of an audience (Cottrell,
Wack, Sekerak, Rittle, 1968). Those performing in front of an audience were more likely
to give their dominant response (i.e., the skill they learned first; Cottrell et al., 1968).
Thus, one may conclude that sometimes an audience aids in improving performance, and
other times it does not.

Indeed, research has suggested that a performer’s response to pressure may be
determined by whether one interprets it as a threat or a challenge (Blascovich, Mendes,
Hunter & Salomon, 1999). Here, a challenge was defined as a moment when an
individual had sufficient resources to meet a particular demand; a threat was defined as a
situation wherein resources were insufficient. In this study, participants learned one of
two tasks (pattern recognition or number-categorization) to a mastery level. Once
cardiovascular baselines were recorded, participants were asked to perform this mastered
task or an unlearned task (but similar in nature) either alone or in the presence of
researchers. Those in the researchers’ presence more accurately demonstrated mastery of
the assigned task than those who were tested alone, in both accuracy and distinct
cardiovascular patterns.

Furthermore, Blascovich et al. (1999) concluded that one’s ability to determine if
a situation was a threat or a challenge hinged on his/her conscious or unconscious
appraisal of the demands of resources. The participants who had enough resource
appraisal to deal with the demand of being observed then outperformed those who did
not. The current study applies these findings to the realm of sport performance. When an
athlete feels pressure (e.g., performs in front of an audience), he or she may experience a
general increase in arousal. Thus, performance success may hinge upon an athlete’s
appraisal of this arousal as helpful or exciting, as opposed to threatening.
In recent research, the concept of competitive state anxiety in sports has been represented by three dimensions: cognitive anxiety, somatic anxiety, and (a lack of) self-confidence (Cox, Martens & Russell, 2003). Cheng et al. (2009) also recommended the addition of a regulatory component to anxiety. Blascovich et al.’s (1999) challenge-threat interpretation is indeed not measured by Cox et al.’s popular Revised Competitive State Anxiety Inventory-2. Thus, extending research suggesting that under the right conditions, pressure may benefit performance, two new dimensions of state anxiety – positive – are proposed here (cognitive and somatic). These components are theorized as direct counterparts to Cox et al.’s somatic and cognitive dimensions. As such, it is hoped that this new positive construct may exhibit many of the same distinct qualities as the CSAI-2R.

Current Study

This present study will investigate the effects of using exemplar priming on participants performing a basketball free throw task under pressure. This study is unique in that exemplar priming has not previously been studied in the context of competitive sport, nor sport performance under pressure. Participants will be randomly assigned into one of three conditions (negative, positive, or control). Depending on the condition the participant is randomly assigned, he or she will read a prepared description beneath a photo of a professional basketball player, with his free throw percentage from the 2013-2014 NBA season serving as the priming stimulus.

For this thesis, the aim is to recruit basketball players with a minimum of experience: those who have played on a recreational, junior varsity or varsity team
currently or in the past for at least one year. Thus, we will assume for this study that the participants see themselves as at least somewhat similar to the exemplar primes. As a result, the following hypotheses are consistent with the results from LeBoeuf and Estes (2004), who found that when participants were given a personally relevant prime, performance contrasted with the exemplar. That is, performance suffers under the influence of a positive exemplar prime if the participant sees him/herself as similar to that exemplar. It is hypothesized that:

a.) Participants who are given the positive exemplar will perform worse in the athletic task, have lower levels of perceived control, higher levels of state anxiety, and lower scores on state anxiety - positive.

b.) Participants who are given the negative exemplar will perform better in the athletic task, have higher levels of perceived control, lower levels of state anxiety, and higher scores on state anxiety - positive.
METHOD

Participants

The participants included in the study came from the California State University, Northridge psychology research pool. The pool consists of students in the department’s introductory classes, who must complete a certain amount of studies for credit in a semester. 269 participants were collected in total, with \( n = 87 \) in the positive prime condition (see below), \( n = 88 \) in the negative prime condition, and \( n = 94 \) in the control condition. These students ranged from 17 to 33 years of age (\( M = 19.58, SD = 2.29 \); 107 were female (39.8%) and 162 were male (60.2). 120 of these students were Latino/a (44.6%), 47 were white/Caucasian (17.5%), 28 were of Asian descent (13.4%), 27 were African American (10.0 %), and 31 were either of mixed or “other” ethnicity, or did not disclose this info (14.8%). Participants self-reported an average of 6.08 years (\( SD = 4.43 \)) of past experience playing basketball, and averaged 6.57 successful out of their initial 15 free throws (43.8%; \( SD = 2.93 \)).

To ensure that the study included experienced athletes, the online sign-up management system asked the participant, “Have you played basketball in high school, college, and/or an adult/recreational league?” If a participant responded with a “no” to this question, then he/she was excused from the study. The participants also filled out a demographic questionnaire to gather information on age, gender, number of years playing basketball, and the amount of time per month playing basketball. These were completed, along with three of the following questionnaires, via online submission after registration for the experiment but before live participation.

Measures
The following questionnaires were administered in a two parts (see Figures 1 and 2 for the sequence). Participants were instructed to fill out the Perceived Control Scale, Competitive State Anxiety Inventory 2- Revised, and the Competitive State Anxiety – Positive inventory via the online survey service to record baselines prior to showing up for the live portion of the study.

The *Perceived Control Questionnaire* (PC-10) is a 10-item questionnaire to assess how in-control the athlete feels while reflecting on shooting free throws (based on Otten, 2009). Participants are asked to rate themselves on a seven point Likert scale with a range from “not at all true” (1) to “very true” (7) on such questions as “When I shoot basketball free throws, I feel as if I am in control.”

The *Competitive State Anxiety Inventory – Revised* (CSAI-2R) is a 12-item inventory is used to measure an athlete’s cognitive and somatic anxiety (Cox, et al. 2003). Participant rate their current feelings on a Likert scale from “not at all” (1) to “very much so” (4) on questions such as “I feel jittery” and “My heart is racing.”

The *Competitive State Anxiety – Positive* (CSAI-P) inventory is a new 11-item questionnaire derived from the CSAI-2R for the current study to measure how an athlete feels positively-interpreted arousal/anxiety symptoms before the athletic task. The participants then rate their feelings on a Likert scale from “not at all” (1) to” very much so” (4) on questions such as “I am hopeful about being clutch under pressure” and “I feel an adrenaline rush.”

*Procedure*

Participants filled out the demographic information and three self-reported measures (PC, CSAI-P, and CSAI-2R) via the online survey website prior to attending
the live portion session in the gymnasium (see again Figures 1 and 2). They were put into one of the three conditions through simple random assignment prior to the second round of basketball free throws: two experimental condition groups and one control group.

Next, the participants were greeted by the experimenter, verified by participant number, and read the process of the experiment. The experimenter read from a prepared script (see Appendix B) to ensure that all participants would receive the same information about the study. Participants were informed that they would be participating in a basketball free throw experiment, and would be asked to fill out a series of questionnaires. They were asked not to communicate with the other participants or use cell phones during the duration of the experiment.

Once the instructions were given, participants were then escorted outside of the gym area by an additional experimenter and reminded to refrain from cell phone use or speaking to others. The experimenter monitored the participants outside of the gym area to ensure that this rule was enforced. The participants were then called individually to shoot free throws by their participant number, and inside the gym attempted a set of 15 shots. The experimenter recorded each attempt and coded it according to what occurred (0 = complete miss, 1 = backboard and out, 2 = rim and out, 3 = backboard and in, 4 = rim and in, 5 = clean basket; Hardy & Parfitt, 1991). Additional research assistants served as rebounders for the participant. The experiment was conducted by a lead experimenter and up to three additional research assistants during each study time slot. The lead researcher and assistant positions rotated in hopes of avoiding an experimenter effect, or any related treatment effects that might occur.

Once each participant completed the initial set of free throws, they were then
randomly assigned into one of the three exemplar conditions, and shown a corresponding photo and short description of an NBA player (see Figures 3-5). The positive exemplar condition showed and briefly described Damian Lillard (87.1% free throws). The negative exemplar condition showed and described DeAndre Jordan (42.8% free throws). Finally, the control condition showed and briefly described Brandon Jennings (75.1% free throws). These players were selected due to their approximate similarity in ethnicity and facial expression. All free throw percentages were taken from the 2013-2014 season. Afterward, the participant was given five minutes to complete a free write on the exemplar description they were given. The five-minute length was modeled after the exemplar task given by Dijksterhuis et al. (1998).

The second set of free throws proceeded as exactly the same procedure as the first set, but under the influence of the priming conditions. During this second set of attempts, all participants were video recorded to add the element of pressure (Otten, 2009), and state anxiety questionnaires were re-administered to check the manipulation. To achieve this, participants were given an Apple iPad to fill out the CSAI-P and CSAI-2R again, immediately prior to shooting. After participants had completed these free throw attempts, they were asked to complete the perceived control questionnaire again on the iPad. This procedure resembles prior research that suggests that a link between performance and perceived control as assessed directly after the manipulation (see Otten, 2009). The experimenter then debriefed the participants after the questionnaires were completed; participants were told that the video would be used only for research purposes.
RESULTS

To check the manipulation, participants’ free responses to the experimental prompt were reviewed first. None of the 269 responses were left blank or were so irrelevant as to call for exclusion from analyses. An example response by a participant given the positive exemplar prime was:

He is a very clutch shooter, when he is at the line he always makes majority of his shots. Seeing his training videos, he always practices his form and release which makes him an excellent free throw shooter. Having a good form and practicing his free throws, he can be commonly fouled towards the end to make free throws. In addition, he can pull up from nearly anywhere besides the mid range. He is a very important asset for Portland. (Participant 118246)

Another participant responded by writing:

Damian has practiced enough hours making free throws and he probably plays center. He can contribute to the team more by shooting free throws. His form must be near perfect to get a high percentage. If he got that percentage during games it shows that he can perform well under pressure unlike most other players. He has to have great accuracy and great hand eye coordination to make that many shots. (Participant 11457)

An example response from a participant given the negative exemplar prime was:

Deandre Jordan plays for the Los Angeles Clippers and he is known for his horrendous free throw shooting. You expect professional basketball players to shoot well from 15 feet away from the basket, especially with no defense.
However, many centers or "big men" has had difficulties shooting free throws. People say its because their hands are too big or they are too nervous or get easily distracted and are not focused. (Participant 117985)

Another participant wrote:

I have no idea who he is. All I know is that his free throw average is less than 50% he probably works hard on the court but then collapses under the pressure of a freethrow. Basketball players work very hard and have to be extremely skilled in many areas in order to be sucessfull or professional player so the fact that he cracks under pressure causes me to be live that he is exceptional elsewhere on the court. He probably is practicing free throws like crazy ensuring that he gets better (Participant 11776)

An example of a response from a participant in our control group was:

He is a moderately good free throw shooter and has practiced shooting repeatedly. He obviously has been playing basketball for awhile and with his statistics it shows that he may feel under pressure during basketball games and does not shoot as well as he could. Also with the statistics, I think he is just a more than average professional basketball player not necessarily a terrific one. (Participant 116338)

Another participant explained:

He could have had a higher free throw percentage since he is a professional basketball player. Because he is getting paid to play basketball I feel that he could at least make more free throws. (Participant 111745)
Analyses of variance (ANOVA), independent-samples t-tests, and analyses of covariance (ANCOVA) were then used to compare the positive and negative exemplar groups on free throw shooting performance, perceived control, competitive state anxiety, and competitive state anxiety – positive. SPSS (version 22) was used to run and compile the data analysis of the study. No participants were excluded from analysis, resulting in a final sample of \( n = 269 \). Table 1 includes the complete descriptive statistics, with performance means based on Hardy and Parfitt’s (1991) scale (see above).

First, an ANOVA was performed and did not show a significant difference in performance on the second set of free throws between the positive exemplar condition (\( M = 2.81, SD = 0.79 \)), negative exemplar condition (\( M = 2.91, SD = 0.84 \)), and the control condition (\( M = 2.80, SD = 0.79 \)), \( F (2, 266) = 0.46, MSE = 0.65, p = .63 \). A follow-up independent-samples t-test was conducted and did not show a significant difference in performance on the second set of free throws between the positive and negative exemplar conditions, \( t (173) = 0.75, p = .46 \), Cohen’s \( d = .12 \). An ANCOVA was done to repeat the ANOVA while controlling for pre-prime free throw performance, resulting in still no significant difference across conditions, \( F (2, 264) = 1.12, MSE = 0.29, p = .33 \).

Another ANOVA was performed in order to investigate the differences on perceived control across these three conditions. Cronbach’s \( \alpha \) was strong for this construct composite at both pre-test (.81) and post-test (.88). Again, significant differences were not found between the positive (\( M = 4.77, SD = 1.12 \)), negative (\( M = 4.54, SD = 1.37 \)), and control (\( M = 4.56, SD = 1.19 \)) conditions, \( F (2, 266) = 0.97, MSE = 1.52, p = .38 \). Another follow-up independent-samples t-test was performed and again, there was a lack of significant differences between the positive and negative conditions, \( t \)
An ANCOVA was conducted to repeat the ANOVA while controlling for pre-test perceived control, yielding still no significant difference across conditions, $F(2, 265) = 0.95, MSE = 1.52, p = .39$.

A similar ANOVA was performed to check for differences in post-test state anxiety (negative) across the three conditions. Cronbach’s $\alpha$ was very strong for this state anxiety composite at both pre-test (.90) and post-test (.92). Again, significant differences were not found between the positive ($M = 1.85, SD = 0.73$), negative ($M = 1.80, SD = 0.59$) and control ($M = 1.89, SD = 0.65$) conditions, $F(2, 266) = 0.40, MSE = 0.44, p = .67$. A similar follow-up independent-samples $t$-test was performed and again, significant differences were not found between the positive and negative conditions, $t(173) = 0.46, p = .65$ Cohen’s $d = .08$. An ANCOVA was conducted to repeat the ANOVA while controlling for pre-test state anxiety, yielding still no significant difference across conditions, $F(2, 262) = 0.60, MSE = 0.44, p = .55$. Across all conditions here, the pre-test state anxiety survey did not reveal a significantly different mean ($M = 1.92, SD = 0.64$) than the post-test anxiety survey ($M = 1.85, SD = 0.66$), $t(265) = 1.26, p = .21$, Cohen’s $d = .08$.

Another ANOVA was performed to test for differences in post-test state anxiety (positive) across the three conditions. To support this analysis, Cronbach’s $\alpha$ was strong for the positive state anxiety composite at both pre-test (.82) and post-test (.82). Significant differences were not found between the positive ($M = 2.60, SD = 0.62$), negative ($M = 2.45, SD = 0.56$), and control ($M = 2.53, SD = 0.54$) conditions, $F(2, 266) = 1.40, MSE = 0.33, p = .25$ Another follow-up independent-samples $t$-test was performed, and significant differences were not found between the positive and negative
conditions, $t(173) = 1.62, p = .11$, Cohen’s $d = .26$. An ANCOVA was done to repeat the ANOVA while controlling for pre-test positive state anxiety, resulting in still no significant difference across conditions, $F(2, 262) = 1.34, MSE = 0.33, p = .27$.

Meanwhile, across all conditions the pre-test positive state anxiety survey yielded a significantly larger mean ($M = 2.81, SD = 0.56$) than did the post-test anxiety survey ($M = 2.52, SD = 0.58$), $t(265) = 6.05, p < .001$, Cohen’s $d = .37$. 
DISCUSSION

The purpose of the study was to determine if athletes, when primed with a positive or negative exemplar, would see their performance contrast to the exemplar as in Dijksterhuis et al. (1998) and LeBoeuf and Estes (2004). Comparisons were made to determine if differences existed across these conditions in performance, perceived control, and state anxiety (positive and negative). A negative relationship was proposed to occur between the positive prime condition and task performance; however, no such relationship was discovered. A positive relationship was suggested to occur between the negative exemplar prime condition and task performance; yet, no such relationship appeared there either.

These results are counter to research demonstrating the power of priming, whether with generic or named exemplars (Dijksterhuis & van Knippenberg, 1998; Dijksterhuis et al., 1998; LeBoeuf & Estes, 2004). Dijksterhuis and van Knippenberg (1998) noted performance increases for those assigned to a generic professor prime versus those in control and a “secretary” condition. Via exemplars, the present study did not find a similar performance change (or separation between conditions) based on the basketball free throw task given to the participants. Perhaps Dijksterhuis and van Knippenberg’s use of questions from a Trivial Pursuit game may have better lent itself to manipulation by a prime. Meanwhile in the current study, the specific free throw task in combination with the pressure manipulation may have been too complex to capture the desired impact of priming seen in previous research.

The current study’s results may have contrasted with the outcomes of Dijksterhuis et al. (1998) and LeBoeuf and Estes (2004) due to the dissimilar nature of the exemplar
descriptions included. Dijksterhuis and his colleagues employed the exemplars of Claudia Schiffer and Albert Einstein, in addition to a generic professor and a supermodel. The familiar characteristics of each exemplar were a powerful stimulus for participants, as their results indicated. However, in the study conducted here the exemplar conditions were only subtly dissimilar due to their individual free throw percentages. Each of the condition descriptions contained a professional athlete who was African-American, smiling, and represented by a head shot photograph. That similarity may have dulled the intended contrasting effect of the prime across the conditions.

Additionally, the length of the time frame given to participants to write about the exemplar and undergo the manipulation process was reviewed as a possible reason for the difference in outcome between this study and those from the past. In the Dijksterhuis and van Knippenberg (1998) and the Dijksterhuis et al. (1998) studies, participants were primed for different time trials of 2 minutes, 5 minutes, and 9 minutes for the writing task. The 5-minute length was chosen to, again, parallel the stronger results yielded by the previous research. During the live portion of the study, participants were instructed to type continuously until the required amount of time finished. It is possible that while the participants were typing about the exemplar they received, the priming strength diminished once they stopped typing. This may explain why the exemplar relationship did not have an effect on performance.

In the original study done by Dijksterhuis and van Knippenberg (1998), the researchers also investigated the length of prime decay in the study. For them, by the third examination, participants in all prime conditions gave similar percentages of correct answers. This was explored in follow-up experiments by increasing the pace of the task
and also the time span of the priming agent. In the current study, participants received their random assignment of the prime or control conditions. Each participant’s decay time was not the same, because the participants individually performed the basketball free throw task individually in random order, while the rest waited outside. Those who were last in their group to perform the task had the largest decay of prime. However, since participants were also randomly assigned to their placement in this order across conditions, prime decay does not appear to be a confound for the present study. Instead, this issue calls for better attention in future studies that have priming elements.

Use of a priming method more in line with that of LeBoeuf and Estes (2004) might have allowed the current thesis a greater chance to see contrasting effects in performance. The current study merely asked the participant to write freely about the exemplar assigned. If participants were given the opportunity to think/write about their similarities to the exemplar, this may have allowed participants to self-prime, thus strengthening the manipulation. Self-efficacy theory (Bandura, 1986) suggests that in athletes and non-athletes alike, self-efficacy may be derived from vicarious experiences of similar others. Future researchers of priming in sport would do well to consider this literature: if an exemplar is seen as similar, then self-efficacy may mediate the relationship between prime similarity and its impact on performance (as in LeBoeuf & Estes, 2004). The current thesis also operated on the assumption that experienced basketball players would see themselves as at least somewhat similar to the exemplar primes. A check on this part of the manipulation, perhaps in the form of a post-study survey on levels of perceived similarity felt by participants, might also have been helpful.

Across all conditions, participants’ mean level of state anxiety was unexpectedly
not different (and for positive anxiety, greater) at baseline than as measured directly after the video camera was introduced. Previous research done by Otten (2009) included a control condition that was not video recorded as a comparison group. While anxiety increased significantly when the experimental group was video recorded, the control group did not experience the same increase – thus, verifying the manipulation of pressure for Otten (2009). In the current study, there was no control group, and thus no systematic way of checking the pressure manipulation. For the current thesis, the initial CSAI-2R questionnaire was also completed by participants prior to arrival at the live portion of the study. In the research done by Otten (2009) and others, the baseline CSAI-2R was given immediately before the participant was to attempt their initial performance/set of free throws. Thus, the current manipulation check does little to allow conclusions about the impact of priming under conditions of pressure.

Additionally, perceived control was investigated across conditions but no significant differences were found. Differences were expected to be linked to the positive prime condition; however, the data shows that neither the positive nor the negative condition was able to show a separation of the construct. The research done by Otten (2009), derived from Seger (1994), had suggested that performances which improved or increased under pressure were related to high levels of perceived control within the participant.

In support of this, perceived control did indeed correlate significantly with performance post-prime in the current study (see Table 2). This was expected, since this relationship has been seen as strong, particularly when control is assessed directly after the pressure performance (see Otten, 2009). Therefore, since the prime did not seem to
influence the participants’ performance, it seems logical that it did not seem to influence participants’ perceived control, either. Indeed, as also seen in Table 2, performance and perceived control then each correlated negatively with state anxiety, and positively with state anxiety - positive. Thus, the apparent lack of impact of the current study’s priming activity seemed to spread throughout these correlated constructs, thus disqualifying one by one the study’s hypotheses. Interestingly, however, preliminary evidence suggests that this correlation between perceived control and performance may have been stronger for those in the negative exemplar condition (positive exemplar $r = .58$; negative exemplar $r = .76$). Past literature suggests perceived control to be important for performance under pressure. Here, it appears it may be particularly important under the influence of the combination of pressure and a negative prime. Future researchers might further investigate this possibility.

Limitations, future directions

One aspect that might have limited the study was the use of undergraduate students from the university rather than elite athletes from either club, collegiate, or professional level basketball teams. Then again, it is unclear whether primes such as these will impact experts the same as they would novices. A comparison of novice and elite athletes in their susceptibility to priming might make an interesting future study.

Another limitation of the present study might have been demand characteristics: participants could have read the descriptions and surmised that the study was trying to force a comparison, or influence them toward a certain attitude. In this way, the experimental exemplar priming conditions might have served more as influence, or
suggested comparison, rather than as true primes. Future studies might frame or disguise the prime or exemplar in a more elaborate way.

A funnel debriefing conducted at the end of the live portion of the study might have helped this cause, allowing us to better determine whether the exemplar prime was activated or recognized. By asking participants if they were aware of the purpose of the study or if they recognized the content or manipulations used, it might have allowed us to systemically reveal the purpose of the study while gleaning whether the exemplar prime was understood by the participant. Additionally, using qualitative data analysis software to analyze and interpret the patterns participants formulated in their free responses might serve as an additional manipulation check, for our data and/or future studies that may employ similar paradigms. Such analysis might allow for further insight as to how the exemplars impacted the participants prior to performance.

As a variation of LeBoeuf and Estes (2004), another consideration for future research which would be to incorporate participants’ reflections on their own most- or least-successful past athletic performances. Having participants use their own past history as an exemplar might provide a more introspective and personally relevant aspect to the priming manipulation. This shift in perspective may lead to a stronger connection between the manipulation response and one’s subsequent performance. As in LeBoeuf and Estes (2004), such a paradigm would allow participants to self-prime, and may allow researchers to observe the contrasting performance effects that had been predicted here.

Another relevant follow-up study would involve researching more sustained periods of priming of participants, as was done by Dijksterhuis et al. (1998). The longer priming periods might allow for a more substantial impact on performance for
participants. Additionally, to greater mimic live stress and pressure conditions that collegiate and professional basketball teams encounter during a contest, we might introduce an audience component. Similar to Blascovich et al.’s (1999) conditions, which called for participants to perform a task in front of the researcher, this type of study could include more researchers in the facility during the athletic task portion of the study, thus increasing the pressure on the athlete. On average, one researcher was present with the participant during the collection of data for the current free throw task. Having additional researchers present may raise the perceived importance of the study to the participant and elevate the pressure as well.

Finally, future research might focus on the physiological symptoms of the state anxiety investigated in the study – tangible readings of the participants’ state anxiety levels prior, during, and post, athletic task. Measuring adrenaline and cortisol rates might allow for a greater idea of how primes affect athlete performance. Heart rate data collection from the participants would allow us to determine more exactly when the task was interpreted as arousing. With the variety and ubiquitous presence of data collection devices, such as the Fitbit or the Apple Watch, aggregating participant results may become more efficient and potentially more exact. This may allow coaches, trainers, players, and team officials to better determine what allows an athlete to perform in pressure-filled situations.

What do current results imply for coaches and sport psychologists? Since results are inconclusive, the current thesis does not yet provide evidence to support the use of primes or exemplars for training or performance enhancement. Previous results (Dijksterhuis & van Knippenberg, 1998; Dijksterhuis et al., 1998; LeBoeuf & Estes,
2004) seemed to suggest that coaches should prime athletes with thoughts of a generic successful athlete; or for a contrasting effect, a specific less successful athlete exemplar. Based on current results, however, the jury is still out on such recommendations.

Understanding the psychological and physical connections between and among stress, pressure, priming, and athletic success are significant in our culture that celebrates the elite athlete as a role model and a lucrative asset. Results from the current study supported connections already seen in the literature linking state anxiety, perceived control, and performance. Results were not conclusive, however, regarding where exemplar priming fits into this picture. Further research is necessary here in the continuing effort to understand what distinguishes an ordinary athlete from one who thrives under pressure.
References

doi:10.1080/15534510.2012.662473


Sassenberg, K., & Moskowitz, G. B. (2005). Don't stereotype, think different!


doi:10.1037/0033-2909.115.2.163


This is the order that the eligible student filled out the initial questionnaire set prior to attending the live portion of the study.
The above diagram represents the order of operations each participant experienced during the live portion of the experiment.
The above picture represents what a participant viewed if randomly assigned into the negative exemplar prime condition during the live portion of the experiment.
Figure 4

Professional basketball player Damian Lillard shot a free throw percentage of 87.1% in the 2013/2014 season.

Please list any typical behaviors, lifestyle, basketball skill set, or whatever comes to your mind in respect to this type of player.

1. Please select the NBA player you are shown above.

☐ Damian Lillard

The above picture represents what a participant viewed if randomly assigned into the positive exemplar prime condition during the live portion of the experiment.
The above picture represents what a participant viewed if randomly assigned into the control exemplar prime condition during the live portion of the experiment.
Table 1

*Summary Statistics*

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Performance</strong></td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>2.81 (0.79)</td>
</tr>
<tr>
<td>Control</td>
<td>2.80 (0.79)</td>
</tr>
<tr>
<td>Negative</td>
<td>2.91 (0.84)</td>
</tr>
<tr>
<td><strong>Perceived Control</strong></td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>4.77 (1.12)</td>
</tr>
<tr>
<td>Control</td>
<td>4.56 (1.19)</td>
</tr>
<tr>
<td>Negative</td>
<td>4.54 (1.37)</td>
</tr>
<tr>
<td><strong>Post-Test State Anxiety (Negative)</strong></td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>1.85 (0.73)</td>
</tr>
<tr>
<td>Control</td>
<td>1.89 (0.65)</td>
</tr>
<tr>
<td>Negative</td>
<td>1.80 (0.59)</td>
</tr>
<tr>
<td><strong>Post-Test State Anxiety (Positive)</strong></td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>2.60 (0.62)</td>
</tr>
<tr>
<td>Control</td>
<td>2.53 (0.54)</td>
</tr>
<tr>
<td>Negative</td>
<td>2.45 (0.56)</td>
</tr>
</tbody>
</table>

*Note.* Sample sizes: positive (n = 87), negative (n = 88), control (n = 94)
Table 2

*Correlations for measured variables*

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Perceived control</td>
<td>_</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. State anxiety</td>
<td>-.29**</td>
<td>_</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. State anxiety – positive</td>
<td>.30**</td>
<td>.05</td>
<td>_</td>
<td></td>
</tr>
<tr>
<td>4. Performance</td>
<td>.69**</td>
<td>-.24**</td>
<td>.21**</td>
<td>_</td>
</tr>
</tbody>
</table>

*p < .05; **p < .01
APPENDIX B

Experimenter Script

Jobs for experimenters:
- Experimenter: Reads all instructions to participants, records the free throws.
- Rebounder (2): Rebound the ball for participants shooting free throws.
- Enforcer: Be in the hallway with participants. Enforce the NO TALKING OR CELL PHONE RULE with an iron fist. It is crucial that participants do not share how many free throws they made with each other. BE STERN IF YOU HAVE TO, I WILL SUPPORT YOU!

The demographics questionnaire should be filled out prior to arrival. If they have not done so, they are not allowed to participate and will receive no credit.

SONA explicitly states that if you sign up for this study without first completing the demographic survey, they will be dismissed without credit and may not participate in the study. Once they leave, the rebounder will take the place of the participant (DO NOT let the other participants know that they are part of the study, treat them like any other participant).

When the participants arrive at the gym, ask them for their Participant ID code, and check it against the ID codes printed from SONA and the complete survey list. This should be with the day’s materials. If they have not completed initial questionnaire, they cannot participate and will be marked down as a non-participant.

Hello and welcome to experiment 237. My name is _____, and I am the experimenter for the study. The first thing we would like you to do is fill out a quick informed consent form. Please raise your hand when you are done and we will come collect it from you.

{Please read the following to the participants as a group when you are ready to begin}

This experiment is conducted in two parts. First, we asked that you fill out a series of short questionnaires about your background, thoughts, and feelings prior to coming to this live portion of the study. Second, we will ask you to do some basketball free throw shooting, and fill out a few more questionnaires. The whole experiment will take about 60 minutes. Do you have any questions?

{Please read to participants as a group once you are ready to start shooting}

You will not know how many free throws any of the other participants has made for the first or the second set of free throws. You will not be allowed to talk to other participants for the remainder of today’s study. Let’s begin.

We would now like you to each shoot 15 free throws, one person at a time. That is, one person shoots 15 free throws, and then the next person shoots 15, and so on. While the person is shooting, the rest of you will be outside with one of the experimenters. After the first person is done, we will call you each in one at a time to shoot. Please do not use your cell phones or speak with other participants for the remainder of the study.

Please do the best that you can. After each shot, we will rebound the ball for you and I’m going to count out “one for one, two for two,” etc., depending on how many you make. Good luck.

We will now ask that you all move into the hallway.
Call participants in one at a time for first set of free throws. After they are done tell them to go outside. Call in the next participant.

[For experimenter]:

After completing the first 15 free throws

Bring all participants back into the gym. Once the person has taken a seat, please read the following:

Okay, in a minute we are going to do 15 more free throws. The process will be the same: that is, one person will come into the gym and shoot 15 free throws, and then the next person comes in and shoots 15, and so on. We will be video recording this set of free throws to document and accurately note the second attempts. First, however, we ask that you fill out a short questionnaire about your current thoughts and feelings. This is one of the same questionnaires we asked you to fill out before shooting your free throws. This time, however, we are interested in how you are feeling at this moment, right now. Please take your time, and be honest. It should only take 5 to 10 minutes. Please answer them fully and when you are completed, please raise your hand to let us know.

[Pass out the input devices]

After completing all questionnaires and retrieving the input devices, please ask participants to go back outside. Bring them back in one at a time to shoot the second set of free throws. Once all have taken their second attempt, bring all participants back into the gym, and repass the final questionnaire.

Okay, we have one final round question for you to answer. Please answer them fully and when you are completed, please raise your hand to let us know.

[Please debrief once all participants have completed the second 15 free throws and the last 2 questionnaires]

[Please read to all GROUPS when all participants have completed the last 15 free throws]:

We want to thank you for your participation in our study. Before you go, we’d like to give you a little more information on the questions we are investigating in this study. We are interested in how visual priming on an athletic task will allow the athlete to be positively or negatively influenced following that visual prime. Most importantly, we are predicting that participants who demonstrate specific types of anxiety and pressure will respond to a positive visual prime and will perform better than the participants whose anxiety and pressure affects them negatively. As you may recall, we asked you fill out a number of questionnaires. These questionnaires were designed to measure you on some of these characteristics so that we could try to explain why you performed the way you did on the court.

All of your information and performance scores will remain completely confidential, and you will be identified only by your assigned participant ID number. Finally, we ask that you not discuss the study to others in your psychology class, or people who may be potential participants in the study. Thanks again for participating in the study!