

Running head: IDENTITY PRIMING

Identity Priming and Free Recall in Student-Athletes

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Abstract

Previous research has documented that identity priming influences academic performances. Other research has found that emotional priming enhances memory for emotional words. The experiment reported here examined the memory of members of a girls high school tennis team who were primed with student or athlete identities and positive or negative emotions within each identity. The effects of identity and emotional priming were measured in the number of words recalled from each of four categories (positive student, negative student, positive athlete, negative athlete). Consistent with the hypothesis, an interaction between the identity prime and corresponding identity words remembered was narrowly found. Though results were not statistically significant, they provided implications for additional research into the role of emotional and identity priming on memory.

### Identity Priming and Free Recall in Student Athletes

All people relate to many complex identities. The proper understanding of identities is especially important for adolescents as they struggle to resolve conflicting identities. High school girls are at a point in their lives in which their personal identities greatly influence their actions and perspectives. The identities of those who choose to be high school student-athletes are especially complex and potentially conflicting. This dual identity may benefit or hinder the cognitive performance of the student-athlete. For instance, as athletes, they are often expected to perform poorly on academic tasks; however, as students, they are often expected to have high academic abilities (Engstrom & Sedlacek, 1991). The current study extends the work on stereotypic identity and examines both the positive and negative components of priming academic and athletic identities on word recall tasks.

Numerous studies have demonstrated that identity has a direct effect on task performances. In general, priming positive identities enhances performance related to the identities and conversely, priming negative identities hinders performance. For instance, Shih, Pittinsky, and Ambady (1999) primed Asian American women to think of themselves as either women (an identity associated with poor math abilities) or as Asian Americans (an identity associated with more superior math abilities). The Asian-American women performed worse on the math test when their gender identity was primed, and performed better on the test when their ethnic identity was primed. These results were consistent with the stereotype threat, the risk of confirming a negative stereotype (e.g., Spencer, Steele, & Quinn, 1999; Steele & Aronson, 1995). Other research showed that African Americans performed less well on academic tests when they were made aware of their racial identity and that women performed less well on a challenging math test when they were made aware of their gender identity (Steele et al., 1999).

Each identity has both positive and negative aspects. Shih et al. (1999) focused on the effect of positive aspects of identities on cognitive behaviors. They indicated that the Asian identity was associated with a positive academic stereotype, while female gender identity was typically associated with a negative stereotype. This study found that the positive Asian stereotype resulted in a higher performance in academic math tests than those Asian- American women who were primed for gender. However, the positive components of gender and negative components of the ethnicity were ignored in this study.

Similarly, Yopyk and Prentice (2005) showed that task performance is influenced by the identity that is primed at the time of the task. After priming for an athlete, student, or neutral identity (e.g., negative for identity "athletes" and positive for identity "students" in the study of Yopyk and Prentice, 2005), student-athletes took a standardized math test to determine the effects of identity priming. They found that participants primed as athletes had lower scores on the math test and the most negative academic self-regard compared to participants primed as students, who attempted more math problems and arrived at more correct answers.

As in Shih et al. (1999) Yopyk and Prentice's (2005) study neglects both positive and negative components of identities. It is rare that each identity is associated with only one attribute. The emotion attribute of identities is one such example. A student identity can be both positive (enjoying certain aspects of being a student) and negative (being fearful or anxious, for example). Similarly, athletes' identities also have both positive and negative attributes such as an athlete may fail strength tasks but excel in tasks of agility. The current study, therefore, was designed to examine the effect of priming of both positive and negative attributes of the student and athlete identities on their cognitive performance.

### Background on Priming

Priming has been defined in many ways across different studies. Beer and Diehl (2001), for example, defined the priming effect as a phenomenon in which an item or event presented first, improves cognitive processes of future information. Previous research has established that priming increases memory recall and decreases response time (e.g., Beer & Diehl, 2001), suggesting that activating concepts stored in long-term memory will enhance storage of new information in working memory later.

The effects of priming have been examined with a variety of different methodologies. Steele and his colleagues (Spencer, Steele, & Quinn, 1999; Steele & Aronson, 1995) as well as Yopyk and Prentice (2005) used math tests to study the effects of priming with lexical decision tasks used by Beer and Diehl (2001). Free recall of personal memories has been used to measure the effects of priming (Pittinsky, Shih, & Ambady, 1999). Free recall is also be used in the current study in which a list of words is presented to the participants to be memorized. After a brief delay, participants are asked to recall as many words they can in any order. The participants of the current study examine free recall of four categories of words associated with different identities. Because emotionally arousing events and experiences are typically remembered faster and more accurately than emotionally neutral ones (e.g., Cahill & McGaugh, 1995; Thomas & LaBar, 2005) the current experiment therefore used positive and negative emotional words.

In summary, previous research suggests that both identity and emotions affect memory and recall. Research has also specifically investigated the effect of priming student and athlete identity on mathematical performance. However, no research has been done to determine how emotionally priming of student and athletic identities influences memory and word recall in adolescents. Specifically, this study tested high school girls on a competitive tennis team and

their word recall. Although all previous research discussed above has studied adults, the effects of identity on adolescents should not be ignored. Adolescence is a time of development when the individual becomes more self-aware (e.g., Sigelman & Rider, 2006). The way in which adolescents identify themselves is a critical part of their development. This study went further by manipulating positive and negative emotions within both athletic and student identities.

### The Present Study

The purpose of this experiment was to determine how positive and negative identity primes affect memory for corresponding words. Word recall was measured to avoid the negative gender stereotype associated with mathematic abilities. This also provides the opportunity to determine whether priming specific identity components will result in an enhanced memory for words in corresponding categories. This resulted in four priming conditions (student identity: positive or negative, and athlete identity: positive or negative) and four categories of words associated with the four priming conditions.

I predict that the priming effect should depend on whether the prime is positive or negative. Specifically, positive primes would result in a greater number of correctly recalled words compared to negative primes. Also, student primes should result in a greater number of correctly recalled words than athlete primes; therefore, it is hypothesized that the positive student prime would result in the best recall of the four priming conditions. The prime condition with the fewest recalled words is hypothesized to be the negative athlete condition.

The second question to be answered in this study is whether the type of prime affects the type of words recalled. There is a higher level recall for words associated with the prime given. For example, the positive student prime should result in the most recall of positive student related words compared to the other priming conditions.

## Method

### *Participants*

Participants were volunteers from the Corvallis High School girls tennis team. A total of 14 students between the ages of 14 and 18 participated. The coach of the girls' team was contacted to gain permission to use part of a team practice to conduct this study and parental permission was granted by all of the volunteer participants.

### *Materials*

A questionnaire of four questions on a 1 to 4 Likert scale (see Appendix A) was given to all participants, which asked background information and how strong the individual identified as a student or an athlete.

Four passages of approximately 250 words were used as identity and emotional primes. One passage primed a positive student identity while another passage primed for a negative student identity (see Appendix B). Two similar passages primed for positive and negative athlete identity (see Appendix C).

A pool of 50 academic related words and 50 tennis/athletic related words were selected for use in the recall test (see Appendix D). An effort was made to control for word length and frequency of use. Each participant for each condition was given a list of randomly selected words from the original pools. Eight words from each group were selected (four within each group were positive and four were negative), giving a total of 16 words for possible recall. Four lists were made in total (see Appendix E).

### *Procedure*

Parents of participants under 18 were asked to sign a confirmed consent form, which explained the purpose of the study. Participants were given a packet, which included all four

passages, the corresponding word lists and a response sheet for each passage. The order of the conditions was counter balanced using a Latin Square such that each condition occurred in each order equally often to control for any order effects.

Participants were given approximately 90 seconds to read an individual passage. They were then asked to turn over the page and not turn back. The next page in the packet included the list of words in random order. They were given one minute to study the word list. Participants were told again to turn the page and not turn back. The next page included the response sheet with 16 blanks. Participants were asked to recall as many words as possible in any order in the given three minutes. At the signal, the participants began the next condition using the same procedure with a new passage priming for a different identity than the previous passage. A new word list was given after each priming passage. The word lists each had four words associated with a condition (positive student, negative student, positive athlete, or negative athlete). This process continued for a total of four priming conditions. The number of correctly recalled academic and athletic related words was counted for each condition.

### Results

Previous research has shown that priming student-athletes with a student identity results in better performance in academic tasks. This study extended these previous findings using a word test instead of a math test. A 2x2 within-subjects analysis of variance (ANOVA) was conducted on the total number of words recalled for each of four conditions: positive student, negative student, positive athlete, and negative athlete. This analysis revealed that there were no significant main effects or interactions between the means of the two independent variables, identity type (athlete or student) and the identity emotion (positive or negative),  $p > 0.15$ . This finding is inconsistent with the hypothesis that the priming effect depends on whether the prime



was positive or negative. Specifically, the positive prime did not result in greater recall of words. Similarly, the student prime did not result in greater recall of words (see Table 1).

An additional hypothesis stated the type of prime affects the type of words recalled. Two additional ANOVAs were conducted. One compared the relationship between the emotion prime type (positive or negative) and the emotion of the word type (positive or negative). Neither of the two main effects nor their interaction was significant,  $F_s < 1.0$ ,  $p_s > 0.5$ . This finding is inconsistent with the hypothesis that priming types affect the type of words recalled.

The other ANOVA compared the identity prime (student or athlete) and the identity word type (student or athlete). The main effects of these variables were not significant. However, there was a trend toward greater recall of the words when the prime type matched the word type than when it did not,  $F(1,13) = 2.34$ ,  $p = 0.15$  (see Figure 1). The mean tennis words recalled was 9.5 when given a tennis prime compared to 8.2 tennis words recalled when given a student prime.

### Discussion

The primary hypotheses involved the total recall of words. Specifically it was hypothesized that student primes and positive primes would have more accurate recall overall and the positive student prime would have the best recall of all four conditions. The results revealed no significant differences between the four types of primes (positive or negative; athlete or student) on the number of words correctly recalled. These results are inconsistent with previous research, which found that an athlete identity prime inhibits performance on academic tasks and, in contrast, a student prime enhanced performance (Yopyk & Prentice, 2005).

The second hypothesis stated that the type of prime affects the type of words recalled. That is that the positive student prime should result in the most recall of positive student-related words compared to other priming conditions (e.g., Houwer, Hermans, & Eelen, 1998). The

present study found that the type of word recalled was not affected by the type of prime used, which is inconsistent with the hypothesis. In addition, this hypothesis stated that student primes would result in a greater recall of student words and conversely, athlete primes would result in the recall of tennis words. These results showed some support for the hypothesis in that a greater number of athletic words were remembered when an athletic prime was given. This supports the theory that activating concepts in long-term memory results in greater storage of new information (Beer & Diehl, 2001). Specifically, presenting an athletic prime resulted in greater storage of athletic related words in working memory. Student primes also resulted in a greater activation of student related concepts and better storage and recall for student related words.

This study is unique in that it used adolescent student-athletes as participants. Previous research did not study the effects of both positive and negative emotional aspects within each identity (e.g., the student or athlete). Also, there is very little research done on adolescents, a period in development when personal identity has a large significance on human growth and self-perception.

While the present study revealed some evidence for identity prime affecting the type of the identity word recalled, there are several limitations that may have impacted the results of this study. Firstly, the participants were members of a high school girls' tennis team. They may have identified less as athletes than the college football and hockey players used in previous studies causing the primes to have less of an effect. It has not been established that tennis players, especially at the high school level, are not academically intelligent. On the contrary, there may be a stronger identity for high school tennis players to be of high intelligence. This can be resolved in future research by using an independent sample to establish normative identities of

adolescent tennis players. If it is established that tennis players do not have a strong athletic identity, another sport identity could be primed.

Significant results may not have been found in this study because in each priming passage, a stressful situation was described and then concluded in either a positive or negative result. This may have added to the negative primes but counterbalanced the positive primes, making the positive primes less effective. Some people may identify the stressful situations as exciting while others may consider the situations to be negative or frightening. Further investigations could be made to examine personality factors and how they interact with emotional priming.

Another effect may have been that the experiment was conducted prior a team practice at the tennis courts causing students to be in an athletic state of mind before the experiment began. This may have strengthened the athletic prime while weakening the student prime. Future studies may conduct this experiment in a neutral setting or manipulate the setting as an independent variable.

Limitations also existed in the word lists used to measure recall. The word lists should be tested to ensure that they represent the correct identity and emotion. Norms should be established for each of the four categories and words should be selected randomly from the resulting list.

Further investigations could measure the effects of priming on other, more complex cognitive tasks involving deeper processing of material than word list recall. More complex tasks would be more applicable to academic situations.

Additional research may also study the effects of priming on athletic tasks instead of academic ones with positive athletic primes positively influencing athletic performance. This would be very relevant to coaching and training situations to help prepare athletes in times of

competition. Although this study had its weaknesses, there were promising results justifying the investigation of priming effects in future research.

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**Appendix A**  
**Questionnaire**

Please circle the number that most accurately indicates the degree to which you disagree or agree with the following statements.

1. I identify with being a student.

1	2	3	4
Strongly disagree	Disagree	Agree	Strongly agree

2. I identify with being an athlete.

1	2	3	4
Strongly disagree	Disagree	Agree	Strongly agree

3. I generally enjoy playing tennis.

1	2	3	4
Strongly disagree	Disagree	Agree	Strongly agree

4. I generally enjoy being a student.

1	2	3	4
Strongly disagree	Disagree	Agree	Strongly agree

## Appendix B

**Positive Student Prime**

Imagine you are a junior at CHS. You are in a group project for your psychology class. At the end of the semester, you are required to give a speech on a topic of your choice. Your team decides to research and speak about the complex emotion of happiness. You dedicate every afternoon for the next three weeks to this project and spend long hours at the library doing research. You want to be fully prepared because you know how nervous you get during speeches and you know your teacher has very high expectations. The day of your presentation finally comes. You sit at your desk, nervously drumming your fingers and tapping your feet, waiting for your turn. Finally, your group is called. You are the first to speak. You notice your hands are shaking but you tell yourself you know the material, take a deep breath and begin. You avoid looking at your note cards and begin to speak comfortably. You are making your peers laugh as you try to engage them and present the feeling of happiness. Your feeling of success is confirmed when your teacher congratulates you for giving the best speech of the class, ensuring you an A in the class. You have never received a compliment from this teacher. You are very proud of your hard work and the quality of your presentation.

**Negative Student Prime**

Imagine it is the first semester of your senior year in high school and you are uninterested in doing homework or going to classes. Unfortunately, you are required to pass all of the six classes you are enrolled in to graduate. You hate all of your classes. To make matters worse, in order to be accepted by the college of your choice, you must increase your GPA and receive only one B this year. While all your friends are enjoying the relaxing lifestyle of a senior, all you have time for are classes, homework, and studying. You have tests weekly and each day is a struggle.



You are losing touch with your friends and missing out on fun. By trying to do everything, you feel you are disappointing everyone. You are stressed constantly. Your parents are pressuring you to keep up with your work and apply to more colleges, which creates a daily battle at home. At the end of the term, you cross your fingers that you were good enough and wait for grades to be sent home. When they finally arrive, you realize your GPA did not increase enough to be accepted. You know that you will not be able to attend the college you had dreamed of. You are starting at square one; you do not know what you are going to do. You are questioning your ability to even go to college.

## Appendix C

**Positive Tennis Prime**

Imagine this is your first year playing as a member of the CHS tennis team. For the past 5 years, all you have wanted and dreamed of is to play the number one position on your high school team. You are given a challenge match against last year's number one player, a senior! You know she's not taking you seriously as she laughs with her friends while you try to warm up and prepare for the match. She serves the first serve of the match. You're able to step into the ball and hit a forehand down the line that is right out her reach. Her smile and relaxed demeanor soon disappears as you pump your fist and walk to the other side. You end up breaking her service game at deuce giving you an early lead. Soon, everyone on the team is watching the match as it becomes more and more competitive and closer to the end. After barely winning the first set 6-4, you are taken into a tiebreaker in the second. It's a close match and your heart is pounding. At 6-5 in the tiebreaker, it's your serve. You bounce the ball and count, 1...2...3... to calm your nerves, throw it up and turn your body and hit the ball that hits the middle T at the service line... ACE! You win the game and the number one spot on the team! This is the greatest victory of your tennis career!

**Negative Tennis Prime**

Imagine it is your freshman year at CHS and you are a member of the tennis team. You have just won the match that determines you will be playing as the number one singles player for the rest of the season. This is the position you have hoped and trained for the past five years.

Unfortunately, since you beat the favored senior for the #1 position, the team has turned against you and there is constant tension at practices. Every shot you miss, you can feel people thinking, "She does not deserve to play #1, she'll crumble under the pressure." Your first league match is

next week and you realize you're playing the toughest team in the League. All you want to do is win this match so the team will find you worthy of playing #1. The day of the match, you meet your competition. She's not known for being the best in the league but you're still very nervous. She serves first and it flies right by you before you can register the ball had come across the net. You manage to get your racket on a few balls but can't pull through. After a demoralizing first set and losing without winning a single game, you start losing hope and give up trying before the game is over. You lose the match 0-6, 0-6. This was supposed to be the game to prove yourself; instead, you have never felt so defeated in your entire tennis career.

## Appendix D

**Athletic Words**

1. Ace	22. Serve	44. Flat footed
2. Baseline	23. Service box	45. Victory
3. Bounce	24. Set	46. Clumsy
4. Deuce	25. Sideline	47. Champion
5. Doubles	26. Singles	48. Trophy
6. Down-the-line	27. Smash	49. Cheers
7. Drive	28. Volley	50. Strong
8. Drop shot	29. Tiebreak	51. Skilled
9. Double Fault	30. Advantage	52. Winner
10. Foot fault	31. Backhand	53. Choke
11. Ground stroke	32. Break point	54. Nervous
12. Half-volley	33. Crosscourt	
13. Let	34. Forehand	
14. Lob	35. Game	
15. Love	36. Grand Slam	
16. Match	37. Racket	
17. Match point	38. Rally	
18. Net	39. Return	
19. Player	40. Set	
20. Rally	41. Slice	
21. Receiver	42. Stroke	
	43. Top spin	

<b>Academic Words</b>	14. Highlighter	28. Confused	42. Alarm
1. Teacher	15. Test	29. Cheating	43. Library
2. Pencil	16. Homework	30. Dishonesty	44. Textbooks
3. Eraser	17. Honors	31. Success	45. Exams
4. White board	18. Smart	32. Strength	46. Chapters
5. Desk	19. Attention	33. Approval	47. Students
6. Pen	20. College	34. Disapproval	48. Lockers
7. Glue	21. Understand	35. Fail	49. Science
8. Backpack	22. Knowledgeable	36. Proud	50. History
9. Ink	23. Detention	37. Graduation	
10. Scissors	24. Probation	38. Education	
11. Ruler	25. Poor	39. Award	
12. Notebook	26. Stupid	40. Finals	
13. Binder	27. Unemployed	41. Schedule	

## Appendix E

List 1	List 2	List 3	List 4
Penalty	Knowledgeable	Trophy	Poor Essay
Graduation	Test Panic	Exhaustion	Injured
Failed Exam	Clumsy	Honors	Reward
Boos	Acceptance	Team Leader	Victory
Scholarship	Weak	Dumb	Clueless
Fit	Student Leader	Skilled	Winner
Cheers	Defeat	Punishment	Test Ready
Sluggish	Strong	Good Essay	Coordinated
Remember	College	Agile	Quick Footed
Double Fault	Rejection	Poor Shot	Novice
Unemployment	Ace Serve	Promotion	Smart
Stupid	Probation	Student Outcast	Plagiarism
Demotion	Stamina	Choke	Loser
Triumph	Team Outcast	Honesty	Good Shot
Flat Footed	Forget	Dropout	Intelligent
Aced Exam	Smash	Default	Detention

Table 1

*Means of Identity Words Recalled in Regards to Identity Primes*

	Athlete Words			Student Words		
	Mean	SD	N	Mean	SD	N
Athlete Prime	9.5	1.8	14	8.64	1.53	14
Student Prime	8.71	1.94	14	8.21	1.45	14

Figures Captions

Figure 1: Effects of identity primes on recall of identity words



